JTIDS / MIDS MULTINATIONAL AD HOC SPECTRUM SUPPORT WORKING GROUP NOTEBOOK

MAY 2006

The information contained within has been provided by the membership of the Multinational Working Group for the purpose of facilitating better understanding of JTIDS/MIDS operations and to provide information necessary for conducting effective and compliant JTIDS/MIDS operations. The information provided by the respective nations and contained within is published on the understanding that this information is releasable to the public.

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Acknowledgements

This **JTIDS / MIDS Multinational Ad Hoc Spectrum Support Working Group Notebook** is the by-product of the Multinational countries and organizations that make up the JTIDS / MIDS community. The notebook includes the MNWG Charter, a list of the current MNWG participants, some recent accomplishments, Frequency Clearance Criteria Document (also known as the Common Frequency Clearance), and copies of current JTIDS / MIDS frequency clearances that have been provided by 22 of the participating nations, as well as other useful information.

Comments from the JTIDS / MIDS MNWG community on the content and structure of this guide are welcomed. Please submit any comments or suggestions to **navy_spectrum@nmsc.navy.mil**, or contact **Mr. Perry Lemmons at 703-325-2815 (perry.lemmons@nmsc.navy.mil)**, or **Mr. Kurt Nahser at 703-325-2793 (kurt.nahser.ctr@nmsc.navy.mil)**.

1.0
MNWG CHARTER

1 June 2004

CHARTER

Multinational Working Group (MNWG)

I. Background and Purpose.

As demands for the frequency spectrum are increasing, operations of Joint Tactical Information Distribution Systems (JTIDS)/Multifunctional Information Distribution Systems (MIDS) like equipment here to referred to as Link 16, other military systems and the use of civil systems in and around the 960-1215 MHz band will increase drastically over the upcoming years. Cooperative and coordinated operations between the U.S., Allied Nations, NATO, and other affected nations will become increasingly important in order to improve combat situational awareness, and assure interoperability in this multi-service, multinational operating environment. Of equal importance, is the need to ensure compatibility of existing and future Link 16 and military, civil systems that operate in and around this band, in order to enhance air traffic safety and to address authorized services in potentially affected adjacent frequency bands.

The MNWG, an ad hoc spectrum support working group, provides a forum for all nations that deploy or intend to deploy Link 16 or similar systems, for nations that are impacted by Link 16 operations, for civil and federal aviation authorities, operators, and network designers, to address and resolve issues related to spectrum access in the 960-1215 MHz band.

II. Scope

The scope is focused on achieving the following:

1. Addressing issues between the national spectrum management authorities, the civil aviation administrations (CAAs), and Department of Defense or Ministry of Defense delegations concerning conditions for Link 16 system procurement and operations, and the development of new systems. A working relationship between military and civil authorities will maintain a cooperative coexistence of Link 16 and commercial/civil systems.
2. Promoting and reviewing common frequency clearance criteria for operational conditions across international borders. Nations are encouraged to make efforts toward common frequency clearance criteria for their frequency clearances in order to simplify operational processing and procedures, as well as network designs.
3. Developing comprehensive solutions for addressing cross border operations to ensure compliance with national frequency clearances.
4. Standardizing terminal EMC Features and platform integration requirements, as well as their implementation. A baseline for terminal EMC Features provides an assurance that Link 16 terminals will not interfere with other systems.
5. Fostering communication of new requirements, new systems, and other information that will/may have an impact on Link 16 systems. Communication should focus on

understanding the need for new requirements and addressing their impact on interoperability between Link 16 systems. Issues associated with the deployment of future non Link 16 systems that could threaten the operation of Link 16 type systems should be addressed as early in the system development as possible so that the MNWG can, as a single voice, provide concerns to the applicable procurement program office.

6. Providing EMC test data and reports as a resource for nations planning to allow Link 16 operations within their territories in order to avoid or reduce the amount of additional testing thus reducing costs and time for obtaining a frequency clearance. Each participating nation is encouraged to exchange analysis and test documentation they have developed in order to foster the improvement and attainment of national frequency clearances
7. Defining procedures for guest force Link 16 operations. Clear definition of these procedures simplifies processing time to obtain assignments for all nations.

III. Membership

A. General Membership

Membership of the MNWG shall consist of four major groups:

1. Civil and military delegations from nations who have Link 16 systems deployed, plan to have them deployed or have Link 16 systems under development.
2. Civil and military delegations from nations that do not deploy Link 16 but allow or plan to allow its operation in their airspace.
3. Civil and Military delegations from nations that are developing new systems that operate in a frequency band within or adjacent to the 960-1215 MHz band.
4. International military organization representatives. (e.g., NATO's Strategic Commands)

The exact composition of each delegation in each of these groups shall be left to the discretion of the national Head of Delegation (HOD). The maximum number of participants at any specific meeting may be limited by host nation facilities, member nation travel budgets, or the nature of the meeting as determined by majority agreement of steering committee members.

B. Steering Committee

After the initial two-year transition period, a steering committee Chairperson shall be elected by a majority vote of the HODs in attendance at the steering committee meeting and shall serve a two year term. See Section III D below for the voting procedures of all elected positions associated with the MNWG. During the initial two-year transition period, the U.S. Office of Assistant Secretary of Defense (OASD) will serve as the steering committee chairperson. For all elected positions the term "year" refers to the annual meeting cycle. Membership shall consist of the MNWG Chairperson, Co-Chair, and HOD representatives. The primary purpose of the steering committee is to provide oversight of the MNWG and includes proposing the agenda for future main sessions of the MNWG based on the needs of the nations. Additional responsibilities include determining the location of future main MNWG meetings, addressing any cost issues and designating the main MNWG Chairperson / Co-Chair and potential attendees

for upcoming subworking group meetings. The HOD for the respective countries are responsible for determining the personnel make-up of the main session, which is driven by agenda topics. The agenda will be categorized to address issues related to impacts on the four membership groups. The Steering Committee shall meet once a year and for cost effectiveness this meeting will be held in conjunction with the main MNWG meeting.

C. MNWG Chairperson / Co-Chair

The Chairperson and Co-Chair are nominated and elected by members of the Steering Committee. HODs recommend potential candidates from their respective country for the Chair and Co-Chair position, which then is voted upon by the full Steering Committee membership. The Chair and Co-Chair are responsible for organization and support of the Main session and reporting results and recommendations of the main session to the Steering Committee. The Chair and Co-Chair position shall serve two-year term. The Chair and Co-Chair will not hold a HOD position during their term of office.

D. Voting Procedures

The process for electing individuals is based on a majority of votes cast by the Heads of Delegation in attendance for each country. The Head of Delegation is the only member that may cast a vote and must be present.

IV. Meetings

A. MNWG Main Session

The MNWG main session will occur once a year. It is expected that the location of the main session will be rotated between volunteering host countries and determined by the steering committee.

A nominal conference fee will be imposed on all participants to cover administrative costs such as materials and conference rooms. No conference fees collected will be used for social functions. Travel and lodging costs for each participant will be funded by the respective nation/organization.

B. Sub Working Group / Regional Working Group Meetings

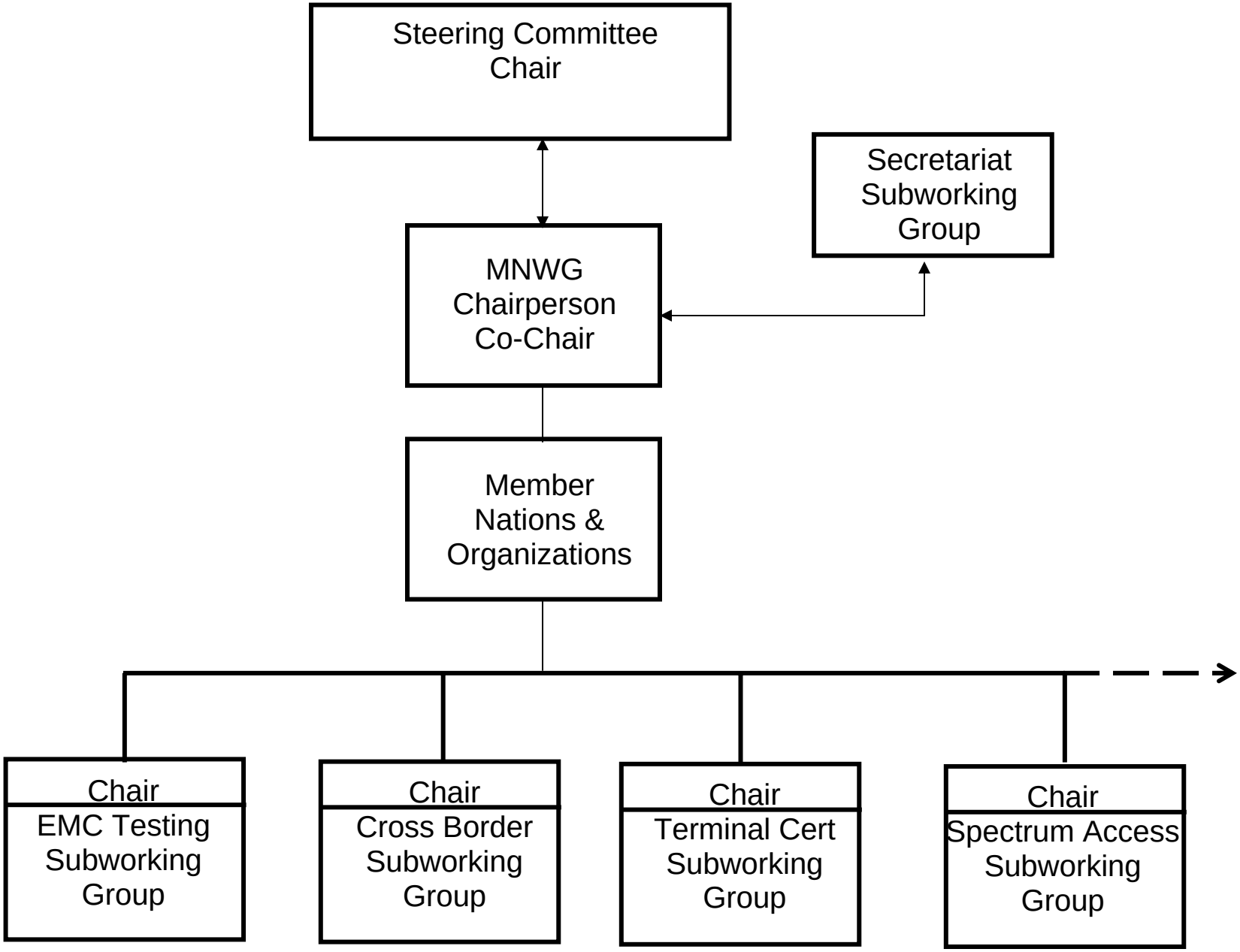
Sub working group meetings may be conducted if the steering committee determines that a specific issue requires resolution. These subworking group meetings would be scheduled as required and attendees would consist only of those with the required expertise and those nations interested in resolving the issue. The participants of the subworking group meeting will determine the chair of the subworking group meeting. These subworking groups would meet as often as deemed necessary by the subworking group chairperson to resolve pertinent issues. The results and action items of the subworking group meetings and of relevant regional working group meeting would be briefed at the MNWG main session.

A secretariat subworking group shall be formed to assist the steering committee in coordinating future meetings. The Chairperson shall be from the nation hosting the main MNWG meeting and will be supported by a permanent support staff established and funded by the MNWG Chair and Co-Chair nations. This sub working group will be responsible for coordinating the meeting facilities, coordinating the presentations based on the agenda proposed by the steering committee, generating meeting minutes, submitting the meeting invitation messages and will report back to the Co-Chairperson of the MNWG.

Regional meetings consisting primarily of a subset of the MNWG could also be held as deemed necessary by participating nations. Such regional meetings could concentrate on resolving issues that are particular to their region of operations. The purpose and scope of these meetings would be determined by those nations requesting the meeting. For example, Europe is striving to resolve issues related to cross border conditions that can affect national frequency clearances and could necessitate a regional working group meeting. The Chairperson(s) of these regional meetings would provide an update to the main session of the MNWG so that the group as a whole could benefit from the smaller and perhaps less formal discussions.

V. MNWG Structure

Figure 1 provides a graphical representation that illustrates the overall MNWG structure. It shows the relationship between the steering committee, the Chairperson/Co-Chair and the subworking groups.


Steering Committee Chair
Secretariat Subworking Group
MNWG Chairperson Co-Chair
Member Nations & Organizations
Chair
EMC Testing Subworking Group
Chair
Cross Border Subworking Group
Chair
Terminal Cert Subworking Group
Chair
Spectrum Access Subworking Group

2.0
MNWG PARTICIPATING NATIONS / ORGANIZATIONS

MNWG PARTICIPATING NATIONS

* Australia
* Austria
* Belgium
* Canada
* Czech Republic
* Denmark
* France
* Germany
* Greece
* Hungary
* Iceland
* Israel
* Italy
* Japan
* Korea
* Luxembourg
* The Netherlands
* New Zealand
* Norway
* Poland
* Portugal
* Singapore
* Spain
* Sweden
* Switzerland
* Turkey
* United Kingdom
* United States

3.0
MNWG
ACCOMPLISHMENTS

MNWG ACCOMPLISHMENTS

- Exchanged EMC test and analysis information

- As a result of information provided by the group participants

    - 21 nations granted JTIDS / MIDS frequency clearances
        - Most nations granted frequency clearance without extensive national test and analysis programs
    - 9 nations granted the Common Frequency Clearance

        * Canada
        * Czech Republic
        * Denmark
        * France
        * The Netherlands
        * Norway
        * Spain
        * Sweden
        * Switzerland

- More nations (Belgium, Greece, Iceland, Luxembourg, Portugal, Turkey) are expect to grant the Common Frequency Clearance in the near future

- Assisted in resolving NATO Force Command frequency clearance requirement for expanded operations

- Developed close Military / Civil technical working relationships
    - Promotes technical assistance among countries
    - Aids in resolving day - to - day EMC and spectrum support problems

- Gained insight into EMC concerns of MNWG member nations
    - Later generation terminal EMC Features design will be more acceptable for worldwide operations

- Exchanged ideas and information among experienced personnel

- Developed common set of definitions

4.0
MNWG GOALS

MNWG GOALS

- Common Frequency Clearance across international borders
    - Obtain improved 100/50 TSDF frequency clearance from each nation for JTIDS/MIDS platforms
        - Use standard Geographic Area for JTIDS/MIDS operations
        - Use standard separation distance to ATC systems
- Discuss Common Frequency Clearance efforts and EMC requirements
- Exchange EMC test data and test reports with participating nations
- Promote common EMC Features baseline
- Participate in network management coordination procedures development for regional operations
- Promote the use of standardized procedures for Guest Forces Operations
- Promote common definition for specific terms

5.0
FREQUENCY CLEARANCE CRITERIA DOCUMENT

FREQUENCY CLEARANCE CRITERIA DOCUMENTATION FOR JTIDS/MIDS OPERATIONS

DECEMBER 1996

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TABLE 1 CARRIER FREQUENCIES..... 5

FREQUENCY CLEARANCE CRITERIA DOCUMENTATION

FOR JTIDS/MIDS OPERATIONS

1.0 SCOPE

This document defines the Frequency Clearance criteria for the operational employment of the Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS).

1.1 A National Frequency Clearance details the conditions of operation and controls placed on JTIDS/MIDS operations. This Frequency Clearance criteria document is intended to form the basis for National Frequency Clearance Agreements between the appropriate Civil and Military Authorities. It provides a foundation for the harmonization of National Frequency Clearance Agreements and strives to achieve commonality between them. Furthermore, it aims to fulfill the minimum operational requirements of the North Atlantic Treaty Organization (NATO) Forces and provides the flexibility to handle differing National requirements.

1.2 The criteria contained in this document are based on the results of Electromagnetic Compatibility (EMC) testing and analyses. The conditions contained in this document ensure that the performance of Air Traffic Control (ATC) equipment does not experience harmful interference.

2.0 BACKGROUND

2.1 The International Telecommunications Union (ITU) Radio Regulations (RR) Article S5, Frequency Allocation Tables, allocates the 960 to 1215 Megahertz (MHz) frequency band to the Aeronautical Radionavigation Service. To comply with Article S4 Number S4.10 of the Radio Regulations, the Radionavigation Service must be protected by special measures to ensure that no harmful interference occurs.

2.2 Radio Regulations Article S5 Number S5.328, states that the 960 to 1215 MHz frequency band is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground based facilities. These protection requirements are applicable to both current and future Aeronautical Radionavigation Systems.

2.3 The use of this frequency band by JTIDS/MIDS equipment is made possible under the provisions of RR Number S4.4. That is, JTIDS/MIDS transmissions shall not cause harmful interference to either existing or future equipment and systems in the Aeronautical Radionavigation Service and for itself cannot claim protection from harmful interference.

2.4 Extensive compatibility studies, testing and analysis of the JTIDS/MIDS Time Division Multiple Access (TDMA) architecture have been performed by Civil Aviation Authorities and Military Organizations and the results and conclusions have been documented to produce the conditions of operation detailed in Section 6. Unless otherwise stated, all references to JTIDS/MIDS equipment shall be taken to mean the system technical parameters specified in Section 5.

2.5 The results of the EMC testing/analyses show that a Frequency Clearance for JTIDS/MIDS operations can be provided based on the criteria detailed in this document.

3.0 NATIONAL CLEARANCE CONSIDERATIONS

3.1 It is recognized that National Frequency Clearances are a sovereign right and that specific National Clearances may be more restrictive or less restrictive than the criteria contained in this document.

3.2 JTIDS/MIDS operations may or may not be coordinated with the Administrations of neighboring Non-NATO Countries. In case of interference reports from those countries, the conditions defined in specific National Frequency Clearances may be reviewed.

4.0 BASIS FOR JTIDS/MIDS OPERATION

4.1 The operation of JTIDS/MIDS equipment in accordance with the conditions stated in this document should preclude harmful interference. Should harmful interference be reported, immediate action will be taken to stop JTIDS/MIDS transmissions until it has been shown that the interference is not JTIDS/MIDS related.

4.2 To ensure compliance with National Frequency Clearance Agreements, an appropriate Military Authority will coordinate and
control all JTIDS/MIDS operations (see Section 7, Management and Control).

4.3 When JTIDS/MIDS platforms of one Nation operate in the Flight Information Region (FIR) of another Nation, they shall comply with the Frequency Clearance of the Host Nation and the operations shall be coordinated with and controlled by the appropriate Civil/Military Authorities.

5.0 JTIDS/MIDS TECHNICAL CHARACTERISTICS

JTIDS/MIDS is a tactical data link that employs a TDMA architecture and provides secure and integrated information distribution, position location, identification and navigation capabilities. This section details the technical characteristics of the system. The conditions of operation are contained in Section 6.

5.1 Frequency

While the system is capable of transmitting on a single frequency at 969 MHz, the normal mode of operation is where individual pulses are transmitted using a pseudorandom hopping sequence across 51 carrier frequencies (3 MHz spacing) in the 969 to 1008 MHz, 1053 to 1065 MHz and 1113 to 1206 MHz bands inclusive (TABLE 1).

5.2 Pulse Characteristics

5.2.1 The system employs a TDMA transmission architecture with a time slot duration of 7.8125 milliseconds (ms). Each terminal transmission within a time slot consists of a sequence of either 72 pulses, 258 pulses or 444 pulses spaced by 6.6 microseconds (µs). Individual pulses are 6.4 µs in duration and the carrier is modulated by Continuous Phase Shift Modulation (CPSM) at a

rate of 5 megabits per second to produce a 32 bit message symbol. Pulse rise and fall times are approximately 800 nanoseconds (ns).

5.2.2 The active transmission period for a standard (258 pulses) time slot is 1.6512 ms. The signal format accommodates up to 128 time slots per second giving a maximum pulse rate of 56,832 pulses per second (444 pulse time slots). There are 1536 time slots in a frame of 12 seconds duration. Time Slot Duty Factor (TSDF) is the percentage of time slots occupied in a 12 second frame (based on 258 pulses per time slot).

TABLE 1

CARRIER FREQUENCIES

Carrier Number	Frequency (MHz)	Carrier Number	Frequency (MHz)	Carrier Number	Frequency (MHz)
0	969	17	1062	34	1158
1	972	18	1065	35	1161
2	975	19	1113	36	1164
3	978	20	1116	37	1167
4	981	21	1119	38	1170
5	984	22	1122	39	1173
6	987	23	1125	40	1176
7	990	24	1128	41	1179
8	993	25	1131	42	1182
9	996	26	1134	43	1185
10	999	27	1137	44	1188
11	1002	28	1140	45	1191
12	1005	29	1143	46	1194

Carrier Number	Frequency (MHz)	Carrier Number	Frequency (MHz)	Carrier Number	Frequency (MHz)
13	1008	30	1146	47	1197
14	1053	31	1149	48	1200
15	1056	32	1152	49	1203
16	1059	33	1155	50	1206

5.3 Pulse Spectrum

The pulse spectrum is measured in a 300 kilohertz (kHz) bandwidth.

At ∀ 3 MHz from carrier - at least 10 dB weaker than peak.

At ∀ 5 MHz from carrier - at least 23 dB weaker than peak.

At ∀ 13 MHz from carrier - at least 55 dB weaker than peak.

At and beyond ∀ 15 MHz - at least 60 dB weaker than peak.

5.4 Transmitter Power

Maximum power is a nominal 200 watts measured at the terminal output.

5.5 Antenna (General Characteristics)

5.5.1 Nominal Gain	Surface Station	9.0 dBi[1]
	Large Aircraft	7.0 dBi
	Fighter Aircraft	5.0 dBi

[1] Decibels relative to an isotropic antenna.

5.5.2	Nominal Loss	Surface Station	5.0 dB[2]
		Large Aircraft	3.0 dB
		Fighter Aircraft	2.0 dB

6.0 CONDITIONS OF OPERATION

National and NATO Forces should be subject to the conditions of operations detailed in this section. The conditions apply to transmissions by fixed site, air mobile, marine mobile and ground mobile JTIDS/MIDS terminals.

6.1 Terminal Operation

6.1.1 Time Slot Duty Factor 100/50

6.1.1.1 A single JTIDS/MIDS user shall not transmit more than 50% TSDF (198,144 pulses in a 12 second period).

6.1.1.2 The Geographic Area of JTIDS Operations is defined as a cylinder of 100 Nautical Miles (NM) radius covering the total airspace between the highest airborne JTIDS/MIDS platform and the ground.

6.1.1.2.1 Within the Geographic Area of JTIDS Operations, the total TSDF shall not exceed 100% (396,288 pulses in a 12 second period).

6.1.1.2.2 Within the Geographic Area of JTIDS Operations, the pseudorandom frequency hopping pattern for each user

[2] Decibels

transmitting simultaneously in any 7.8125 millisecond time interval must be unique except for the purposes of Initial Net Entry and maintaining network synchronization (Round Trip Timing, RTT).

6.1.1.3 Multinet operations (time slot reuse on different nets) are allowed.

6.1.1.4 The minimum separation between JTIDS/MIDS terminals operating in contention shall be 100 NM.

6.1.1.5 Standard and Packed message structures (that is, 258 and/or 444 pulse time slots) are allowed.

6.1.1.6 Ground based JTIDS/MIDS radiations for the purpose of maintenance or repair need not be included in the TSDF limitations of the Geographic Area of JTIDS Operations.

6.1.2 Frequency Hopping

The JTIDS/MIDS frequency hopping transmissions shall comply with the JTIDS/MIDS System Segment Specification requirements.[1] The JTIDS/MIDS System Segment Specification shall not create a situation which compromises the compatibility with ATC systems when JTIDS/MIDS equipment is operated in accordance with the conditions of this document.

6.1.3 EMC Protection Features

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[1] SS10466A dated 22 February 1988 and DCB79S4000C dated 21 March 1983.

The EMC Protection Features (EPF) shall be operating at all times. The EMC Features shall inhibit transmissions automatically when the performance of a terminal diverges from one of the following restrictions.

6.1.3.1 Deviation from the specified pulse width tolerance (6.4 μs ∀ 0.32 μs).

6.1.3.2 Uniform distribution of the JTIDS/MIDS radiation across the whole frequency band as defined in the following subparagraphs.

6.1.3.2.1 The terminal should increment the count associated with the authorized carrier by one-fourth if the pulse is from the first 32 pulses of any TDMA message package structure and by one for all other pulses.

6.1.3.2.2 The Terminal is to determine the end of an authorized carrier frequency measurement block when the sum of the 51 counts of the authorized carrier frequency measurements is at least equal to 1020 but not more than 1440.

6.1.3.2.3 At the end of each block, the Terminal is to ascertain for each carrier if the count is less than 0.1 times the expected value of the count or greater than 1.9 times the expected value of the count. The expected value of the count for the block is equal to the sum of the 51 authorized carrier counts in the block divided by 51.

6.1.3.3 The transmissions exceed an equivalent TSDF of 50% in a 12 second period.

6.1.3.4 The radiated energy within ∀ 7 MHz of 1030 MHz and 1090 MHz exceeds the -60 dB level with reference to the maximum JTIDS/MIDS signal level measured in a 300 kHz bandwidth.

6.1.3.5 Deviations from the use of the EMC Features may be granted on a case by case basis by the appropriate National Authority.

6.1.4 Output Power

The output power shall not exceed a nominal 200 watts + 1 dB. JTIDS/MIDS terminals with a high output power capability will inhibit transmissions if the output power exceeds 200 watts + 1 dB.

6.2 Geographic Separation

6.2.1 Ground Based ATC Equipment

6.2.1.1 The minimum separation between any fixed site, marine mobile or ground mobile JTIDS/MIDS terminal and any ground based Tactical Air Navigation/Distance Measuring Equipment (TACAN/DME) operating in the 960 to 1215 MHz band shall be based on a received signal level of -33 dBm (decibels relative to a milliwatt) which is approximately 0.5 NM or 0.9 kilometers (km) for a 200 watt JTIDS/MIDS terminal.

6.2.1.2 The minimum separation between any fixed site, marine mobile or ground mobile JTIDS/MIDS terminal and any Air Traffic Control Radar Beacon System/Secondary Surveillance Radar

(ATCRBS/SSR) ground equipment operating in the 960 to 1215 MHz band shall be based on a received signal level of -20 dBm which is approximately 900 feet or 274 meters for a 200 watt JTIDS/MIDS terminal.

6.2.1.3 The minimum vertical separation between airborne JTIDS/MIDS users and ground based ATC systems operating in the 960 to 1215 MHz band shall be 1000 feet or 305 meters.

6.2.2 Airborne ATC Platforms

6.2.2.1 The minimum separation between any airborne JTIDS/MIDS terminal and a civil aircraft operating ATC equipment in the 960 to 1215 MHz band shall be 1000 feet or 305 meters slant range.

6.2.2.2 The separation between airborne ATC equipment operating in the 960 to 1215 MHz band and JTIDS/MIDS surface based platforms shall be at least 1000 feet or 305 meters.

6.3 Operating Records

6.3.1 All JTIDS/MIDS radiations shall be recorded to assist in the resolution of reported cases of interference in the 960 to 1215 MHz band. Records shall contain sufficient information for investigations of JTIDS/MIDS operations and have at least the following entries: network in use, date, time in UTC-Zulu Time (start and end of radiation), altitude, position or standard flight pattern, any automatic EMC Feature inhibits, and any EMC Feature overrides if they are authorized.

6.3.2 Records must be retained for one year and be provided on short notice when requested by the National Civil Authorities or the National Allied Radio Frequency Agency (NARFA).

6.3.3 The Military Authorities agree to have the appropriate Military Organizations participate in investigations set up by the Civilian Authorities to review complaints when JTIDS/MIDS equipment may have been operating in the area.

6.4 Control

All JTIDS/MIDS operations shall be managed and controlled in accordance with the procedures detailed in Section 7.

7.0 MANAGEMENT AND CONTROL

Absolute control of the Frequency Clearance agreements rests with the appropriate National Authorities. When capacity conflicts arise between National/NATO units, then National requirements (current and future) always take precedence. However, National/NATO JTIDS/MIDS users shall provide details of their operational requirements to the Two Major NATO Commanders[a] (BI-MNC) Data Link Management and Interoperability Cell located at the Supreme Headquarters Allied Powers Europe (SHAPE) facilities so that the necessary coordination is accomplished to ensure that the conditions of all National Frequency Clearance Agreements are adhered to. The Cognizant Office of the United States (US) Department of Defense (DoD) will coordinate JTIDS/MIDS Operations within the US and Canada.

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[a] Supreme Allied Commander Atlantic (SACLANT) and Supreme Allied Commander Europe (SACEUR).

7.1 Frequency Clearance Guidance

7.1.1 Frequency Clearance Requests for JTIDS/MIDS terminals shall be processed through both the Allied Radio Frequency Agency (ARFA) and the BI-MNC Data Link Management and Interoperability Cell, except for the US and Canada, in accordance with the special National instructions for the coordination of fixed radio sites and mobile radio terminals. In the US, the appropriate Military Frequency Management Agency will process the Frequency Clearance Requests through the normal National Telecommunications and Information Administration (NTIA) channels. In Canada, the Department of National Defense Director
Electronics, Communications and Spectrum Services Five (DECSS 5) will process the Frequency Clearance Requests.

7.1.2 Nations shall inform the BI-MNC Cell and ARFA of any changes to their existing National Frequency Clearance Agreements.

7.1.3 The European focal point for JTIDS/MIDS Coordination and Control is the BI-MNC Data Link Management and Interoperability Cell located at SHAPE/SHOPC IVSN 254-3974 or Commercial 32-6544-3974.

7.2 Frequency Clearance for Expanded Exercises

7.2.1 Modifications and deviations from the parameters specified in the National and NATO Forces Frequency Clearance Requests are to be submitted separately and are subject to special approval.

7.2.2 Requests to relax existing Frequency Clearance Agreements shall be coordinated with the BI-MNC Cell for approval by the appropriate National Authorities (advance notice of 8 to 16 weeks is required).

7.2.3 For infrequent large scale exercises, permission may be granted by the Civil Aviation Authorities for the override of the EMC Protection Features in Paragraph 6.1.3 and for the lifting of the common restrictions in Section 6. Such dispensations are expected to be for short periods of time and in all cases must be agreed to in advance by the Civil and Military Authorities.

7.2.4 To provide protection during the periods when restrictions are relaxed or removed, a control warning and coordination procedure embodying a "stop radiation" requirement is to be included in the Operations Order covering the effective period. The procedures to be used are to be submitted to the Civil Authorities together with the request for relaxation of restrictions. Such procedures are to be complied with by the NATO/Military Forces during all operations that are granted approval under this section of the document.

7.3 Frequency Clearance for Jamming Exercises

7.3.1 JTIDS/MIDS operations that include jamming exercises may take place in the airspace and territory of the NATO Nations only in accordance with the special provisions/procedures that are applicable and agreed to in advance by the Civil and Military Authorities of the affected Nations.

7.3.2 The Civil Authorities will retain the right to object to any proposed jamming exercise, when they are not satisfied that the means, the areas of deployment, or the particular exercise will fully safeguard the Civil Aviation Radio Services.

8.0 REVIEW

8.1 The National Authorities of the NATO Nations reserve the right to modify or expand the restrictions for the operation of JTIDS/MIDS equipment at any time and in particular for any of the following reasons.

8.1.1 The proposed introduction of a new Aeronautical Radio Navigation System, or a variant of an existing system with characteristics differing in important respects from those on which the proven compatibility has been established.

8.1.2 Proposed changes in the operational requirement for JTIDS/MIDS terminals, or new or significantly modified JTIDS/MIDS equipment designs.

8.1.3 Problems encountered with any aspect of this document.

8.2 The National Military Authorities of the NATO Nations may request modification or expansion of JTIDS/MIDS operations when additional operational capabilities are required.

COMMON FREQUENCY CLEARANCE CRITERIA

DOCUMENTATION

FOR

JTIDS / MIDS OPERATIONS

(DRAFT WORKING COPY)

APRIL 2003

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1 CARRIER FREQUENCIES 5

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COMMON FREQUENCY CLEARANCE CRITERIA DOCUMENTATION FOR JTIDS/MIDS OPERATIONS

1.0 SCOPE

This document defines the Frequency Clearance Criteria and conditions for the employment of the Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS).

1.1 National Frequency Clearance Agreements detail the conditions under which JTIDS/MIDS users in a National Flight Information Region (FIR) must operate. This Frequency Clearance Criteria Document is intended to form the basis for National Frequency Clearance Agreements between the appropriate Civil and Military Authorities. It provides a foundation for the harmonization of National Frequency Clearance Agreements and strives to achieve commonality between them. The purpose of this document is to provide a combination of protection to Air Traffic Control (ATC) equipment and flexibility to the operational community.

1.2 The criteria contained in this document are based on the results of Electromagnetic Compatibility (EMC) testing and analyses. The conditions contained in this document ensure that the performance of ATC equipment does not experience harmful interference.

2.0 BACKGROUND

2.1 The International Telecommunications Union (ITU) Radio Regulations (RR) Article 5, Frequency Allocation Tables, identifies the 960 to 1215 Megahertz (MHz) frequency band for the Aeronautical Radionavigation Service. To comply with Article 4 Number 4.10 of the Radio Regulations, the Radionavigation Service must be protected by special measures to ensure that no harmful interference occurs.

2.2 Radio Regulations Article 5 Number 5.328, states that the 960 to 1215 MHz frequency band is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground based facilities. These protection requirements are applicable to both current and future Aeronautical Radionavigation Systems.

2.3 The use of this frequency band by JTIDS/MIDS equipment is made possible under the provisions of RR Number 4.4. That is, JTIDS/MIDS transmissions shall not cause harmful interference to either existing or future equipment and systems in the Aeronautical Radionavigation Service and for itself cannot claim protection from harmful interference.

2.4 Extensive compatibility studies, testing and analysis of the JTIDS/MIDS Time Division Multiple Access (TDMA) architecture have been performed by Civil Aviation Authorities and Military Organizations and the results and conclusions have been documented to produce the conditions of operation detailed in Section 6. Unless otherwise stated, all

references to JTIDS/MIDS equipment shall be taken to mean the system technical parameters specified in Section 5.

2.5 The results of the EMC testing / analyses show that a Frequency Clearance for JTIDS/MIDS operations can be provided based on the criteria detailed in this document.

3.0 NATIONAL CLEARANCE CONSIDERATIONS

3.1 It is recognized that National Frequency Clearance Agreements are a sovereign right and that specific National Clearances may be more restrictive or less restrictive than the criteria contained in this document.

¶ 3.2 Deleted.

4.0 BASIS FOR JTIDS/MIDS OPERATION

4.1 The operation of JTIDS/MIDS equipment in accordance with the conditions stated in this document should preclude harmful interference. Should harmful interference be reported, immediate action will be taken to stop JTIDS/MIDS transmissions until it has been shown that the interference is not JTIDS/MIDS related.

4.2 To ensure compliance with National Frequency Clearance Agreements, an appropriate Military Authority will coordinate and control all JTIDS/MIDS operations (see Section 7, Management and Control).

4.3 When JTIDS/MIDS platforms of one Nation operate in the FIR of another Nation, they shall comply with the Frequency Clearance requirements of the Host Nation which regulate Guest Forces, and the operations shall be coordinated with and controlled by the appropriate Civil/Military Authorities.

5.0 JTIDS/MIDS TECHNICAL CHARACTERISTICS

JTIDS/MIDS is a tactical data link that employs a TDMA architecture and provides secure and integrated identification, navigation, position location and information distribution capabilities. This section details the technical characteristics of the system. The conditions of operation are contained in Section 6.

5.1 Carrier Frequencies

The system normally operates by transmitting individual pulses whose frequency is determined by using a pseudorandom hopping sequence across 51 carrier frequencies, with 3 MHz spacing, in the 969 to 1008 MHz, 1053 to 1065 MHz and 1113 to 1206 MHz bands inclusive (see TABLE 1).

TABLE 1

CARRIER FREQUENCIES

Carrier Number	Frequency (MHz)	Carrier Number	Frequency (MHz)	Carrier Number	Frequency (MHz)
0	969	17	1062	34	1158
1	972	18	1065	35	1161
2	975	19	1113	36	1164
3	978	20	1116	37	1167
4	981	21	1119	38	1170
5	984	22	1122	39	1173
6	987	23	1125	40	1176
7	990	24	1128	41	1179
8	993	25	1131	42	1182
9	996	26	1134	43	1185
10	999	27	1137	44	1188
11	1002	28	1140	45	1191
12	1005	29	1143	46	1194
13	1008	30	1146	47	1197
14	1053	31	1149	48	1200
15	1056	32	1152	49	1203
16	1059	33	1155	50	1206

5.2 Pulse Characteristics

5.2.1 The system employs a TDMA transmission architecture with a time slot duration of 7.8125 milliseconds (ms). Each terminal transmission within a time slot consists of a sequence of either 72 pulses, 258 pulses or 444 pulses spaced by 6.6 microseconds (µs). Individual pulses are 6.4 µs in

duration and the carrier is modulated by Continuous Phase Shift Modulation (CPSM) at a rate of 5 megabits per second to produce a 32 bit message symbol. Pulse rise and fall times are approximately 800 nanoseconds (ns).

5.2.2 The active transmission period for a standard (258 pulses) time slot is 1.6512 ms. The signal format accommodates up to 128 time slots per second giving a maximum pulse rate of 56,832 pulses per second (444 pulses per time slot). There are 1536 time slots in a frame of 12 seconds duration. Time Slot Duty Factor (TSDF) is the percentage of pulses transmitted in a 12 second frame (based on 258 pulses per time slot, maximum of 396,288 pulses in a 12 second frame for a TSDF of 100%).

5.3 Pulse Spectrum

The pulse spectrum is measured in a 300 kilohertz (kHz) bandwidth.

At ± 3 MHz from carrier - at least 10 dB weaker than peak.
At ± 5 MHz from carrier - at least 23 dB weaker than peak.
At ± 13 MHz from carrier - at least 55 dB weaker than peak.
At and beyond ± 15 MHz - at least 60 dB weaker than peak.

5.4 Transmitted Power

Maximum power is a nominal 200 watts measured at the terminal output.

5.5 General Antenna Characteristics

5.5.1 Nominal Gain	Surface Station	9.0 dBi[1]
	Large Aircraft	7.0 dBi
	Fighter Aircraft	5.0 dBi
5.5.2 Nominal Loss	Surface Station	5.0 dB[2]
	Large Aircraft	3.0 dB
	Fighter Aircraft	2.0 dB

6.0 CONDITIONS OF OPERATION

National and Guest Forces will be subject to the conditions of operations detailed in this section. The conditions apply to transmissions by fixed site, air mobile, marine mobile and ground mobile JTIDS/MIDS Terminals. Users must refer to the official agreement of the Nation where operations are to be held.

6.1 Terminal Operation

6.1.1 Time Slot Duty Factor 100/50

6.1.1.1 A single JTIDS/MIDS user shall not transmit more than 50% TSDF (198,144 pulses in a 12 second period).

[1] Decibels relative to an isotropic antenna.
[2] Decibels

6.1.1.2 The Geographic Area of JTIDS/MIDS Operations is defined as a cylinder with no altitude limit and a 100 Nautical Mile (NM) radius covering the area and airspace around a JTIDS/MIDS Terminal on the surface of the earth or airborne.

6.1.1.2.1 Within the Geographic Area of JTIDS/MIDS Operations, the total TSDF shall not exceed 100% (396,288 pulses in a 12 second interval).

6.1.1.2.2 Within the Geographic Area of JTIDS/MIDS Operations, two or more platforms transmitting simultaneously in any 7.8125 millisecond time interval (time slot) must have unique frequency hopping patterns except for the purpose of Initial Net Entry and maintaining network synchronization (Round Trip Timing, RTT). This means transmissions must be separated either by time (unsynchronized), synchronized on a different net (multinetting), or using different crypto. This is to avoid creating contention access conditions within the Geographic Area.

6.1.1.3 Multinet operations (time slot reuse on different nets) are allowed.

6.1.1.4 The minimum separation between JTIDS/MIDS Terminals operating in contention shall be 100 NM.

6.1.1.5 Standard and Packed message structures (that is, 258 and / or 444 pulse time slots) are allowed.

6.1.1.6 Ground based JTIDS/MIDS radiations for the purpose of maintenance or repair need not be included in the TSDF limitations of the Geographic Area of JTIDS/MIDS Operations.

6.1.2 Frequency Hopping

The JTIDS/MIDS frequency hopping transmissions shall comply with the JTIDS/MIDS System Segment Specification requirements.[1] JTIDS/MIDS System Specifications shall not be used to compromise the compatibility with ATC systems when JTIDS/MIDS equipment is operated in accordance with the conditions of this document.

6.1.3 EMC Protection Features

The EMC Protection Features (EPF) shall be operating at all times. The EMC Features shall inhibit transmissions automatically when the performance of a terminal diverges from one of the following restrictions.

6.1.3.1 Deviation from the specified pulse width tolerance (6.4 µs ± 0.32 µs).

6.1.3.2 Uniform distribution of the JTIDS/MIDS radiation across the whole frequency band as defined in the following subparagraphs.

[1] SS10466A dated 22 February 1988 and DCB79S4000C dated 21 March 1983.

6.1.3.2.1 The Terminal should increment the count associated with the authorized carrier by one-fourth if the pulse is from the first 32 pulses of any TDMA message package structure and by one for all other pulses.

6.1.3.2.2 The Terminal is to determine the end of an authorized carrier frequency measurement block when the sum of the 51 counts of the authorized carrier frequency measurements is at least equal to 1020 but not more than 1440.

6.1.3.2.3 At the end of each block, the Terminal is to ascertain for each carrier if the count is less than 0.1 times the expected value of the count or greater than 1.9 times the expected value of the count. The expected value of the count for the block is equal to the sum of the 51 authorized carrier counts in the block divided by 51.

6.1.3.3 The transmissions exceed an equivalent TSDF of 50% in a 12 second interval.

6.1.3.4 The radiated energy within ± 7 MHz of 1030 MHz and 1090 MHz exceeds the -60 dB level with reference to the maximum JTIDS/MIDS signal level measured in a 300 kHz bandwidth.

6.1.3.5 Deviations from the use of the EMC Features may be granted on a case-by-case basis by the appropriate National Authority.

6.1.4 Output Power

The output power shall not exceed a nominal 200 watts + 1 dB. JTIDS/MIDS Terminals with a high output power capability will inhibit transmissions if the output power exceeds 200 watts + 1 dB.

6.2 Geographic Separation

6.2.1 Ground Based ATC Equipment

6.2.1.1 The minimum separation between any fixed site, marine mobile or ground mobile JTIDS/MIDS Terminal and any ground based Tactical Air Navigation/Distance Measuring Equipment (TACAN/DME) operating in the 960 to 1215 MHz band shall be based on a received signal level of -33 dBm (decibels relative to a milliwatt) which is approximately 0.5 NM or 0.9 kilometers (km) for a 200 watt JTIDS/MIDS Terminal.

6.2.1.2 The minimum separation between any fixed site, marine mobile or ground mobile JTIDS/MIDS Terminal and any Air Traffic Control Radar Beacon System/Secondary Surveillance Radar/Mode Select (ATCRBS/SSR/Mode S) ground equipment operating in the 960 to 1215 MHz band shall be based on a received signal level of -20 dBm which is approximately 900 feet or 274 meters for a 200 watt JTIDS/MIDS Terminal.

6.2.1.3 The minimum vertical separation between airborne JTIDS/MIDS Users and ground based ATC systems operating in the 960 to 1215 MHz band shall be 1000 feet or 305 meters.

6.2.2 Airborne ATC Platforms

6.2.2.1 The minimum separation between any airborne JTIDS/MIDS Terminal and a civil aircraft operating ATC equipment in the 960 to 1215 MHz band shall be 1000 feet or 305 meters slant range.

6.2.2.2 The separation between airborne ATC equipment operating in the 960 to 1215 MHz band and JTIDS/MIDS surface based platforms shall be at least 1000 feet or 305 meters.

6.3 Operating Records

6.3.1 All JTIDS/MIDS radiations shall be recorded to assist in the resolution of any reported cases of interference in the 960 to 1215 MHz band. Records shall contain sufficient information for investigations of JTIDS/MIDS Operations and have at least the following entries: network in use, date, time in UTC - Zulu time (start and end of radiation), altitude, position or standard flight pattern, any automatic EMC Feature inhibits, and any EMC Feature overrides if they are authorized.

6.3.2 Records should be retained for one year and be provided when requested by the National Civil Authorities or the National Radio Frequency Authority.

6.3.3 The Military Authorities agree to have the appropriate Military Organizations participate in investigations set up by the Civilian Authorities to review incidents when JTIDS/MIDS equipment may have been operating in the area.

6.4 Controls

All JTIDS/MIDS Operations shall be managed and controlled in accordance with the procedures detailed in Section 7.

7.0 MANAGEMENT AND CONTROL

Absolute control of the Frequency Clearance Agreements rests with the appropriate National Authorities. When capacity conflicts arise between National/Guest Forces units, then National requirements (current and future) always take precedence. The National Frequency Clearance Agreements shall include the requirement for the National/Guest Forces JTIDS/MIDS Users to provide the necessary details of their operations to the appropriate central authority for that region [sometimes known as the Combined Air Operations Center (CAOC)]. (See the appropriate annex for the specific region.) This is required so that the necessary coordination is accomplished to ensure that the conditions of all National Frequency Clearance Agreements are adhered to.

7.1 Frequency Clearance Guidance

7.1.1 Frequency Clearance Requests for JTIDS/MIDS Terminal Operations shall be processed in accordance with the special National instructions for the coordination of fixed radio sites and mobile radio terminals.

7.1.2 Nations shall inform the central regional authority responsible for managing JTIDS/MIDS Operations of any changes to their existing National Frequency Clearance Agreements.

7.1.3 The European focal point for JTIDS/MIDS Coordination and Control is the BI-SC Data Link Management and Interoperability Cell located at SHAPE/SHOPC IVSN 254-5512 or Commercial 32-6544-5512.

7.1.4 The North American focal point for JTIDS/MIDS Coordination and Control is the JTIDS Network Design Library (JNDL) at Headquarters Forces Command/AFOP - JT DSN 367- 4636 or Commercial 404 - 464 - 4636.

7.1.5 The Japan focal point for JTIDS/MIDS/Tactical Data System (TDS) Coordination and Control is the 624 ACF/CC DSN 315-224-3442 or Commercial 81-311-754-3442.

7.2 Frequency Clearance for Expanded Exercise

7.2.1 Modifications and deviations from the parameters specified in the National and Guest Forces Frequency Clearance Agreements are to be submitted separately and are subject to special approval.

7.2.2 Requests to relax existing Frequency Clearance Agreements shall be coordinated with the designated agency to obtain approval by the appropriate National Authorities (advance notice of 8 to 16 weeks is required).

7.2.3 For infrequent large scale exercises, permission may be granted by the Civil Aviation Authorities for the override of the EMC Protection Features in Paragraph 6.1.3 and for the lifting of the common restrictions in Section 6. Such dispensations are expected to be for short periods of time and in all cases must be agreed to in advance by the Civil and Military Authorities.

7.2.4 To provide protection during the periods when restrictions are relaxed or removed, a control warning and coordination procedure embodying a "stop radiation" requirement is to be included in the Operations Order covering the effective period. The procedure to be used is to be submitted to the Civil Authorities together with the request for relaxation of restrictions. This procedure is to be complied with by the Military Forces during all operations that are granted approval under this section of the document.

7.3 Frequency Clearance for Jamming Exercises

7.3.1 JTIDS/MIDS Operations that include jamming exercises may take place in the airspace and territory of the Nations only in accordance with the special provisions/procedures that are applicable and agreed to in advance by the Civil and Military Authorities of the affected Nations.

7.3.2 The Civil Authorities will retain the right to object to any proposed jamming exercise, when they are not satisfied that the controls, the areas of deployment, or the particular exercise operating conditions will fully safeguard the Civil Aviation Radio Services.

8.0 FREQUENCY CLEARANCE REVIEW

8.1 The National Civil Authorities of the Nations reserve the right to modify or expand the restrictions for the operation of JTIDS/MIDS equipment at any time and in particular for any of the following reasons.

8.1.1 The proposed introduction of a new Aeronautical Radio Navigation System, or a variant of an existing system with characteristics differing in important aspects from those on which the proven compatibility has been established.

8.1.2 Proposed changes in the operational requirement for JTIDS/MIDS Terminals, or new or significantly modified JTIDS/MIDS equipment designs.

8.1.3 Problems encountered with any aspect of this document.

8.2 The National Military Authorities of the Nations may request modification or expansion of JTIDS/MIDS Operations when additional operational capabilities are required.

6.0

NATIONAL FREQUENCY CLEARANCE MATRIX

JTIDS / MIDS FREQUENCY CLEARANCES

	‘79	‘80	‘81	‘82	‘83	‘84	‘85	‘86	‘87	‘88	‘89	‘90	‘91	‘92	‘93	‘94	‘95	‘96	‘97	‘98	‘99	‘00	‘01	‘02	‘03	‘04	‘05
AUSTRALIA																						100/50		CFC			
BELGIUM							100/50												CFC-								
CANADA				40/20 TSDF													100/50		CFC			CFC					
CZECH REPUBLIC																							CFC				
DENMARK							100/50												CFC								
FRANCE **BENCH TESTS**								100/50											CFC+								
GERMANY **BENCH TESTS**						100/50											IMP	IMP			IMP						
GREECE								100/50										IMP									
HUNGARY																					100/50	iMP					
ISRAEL																								100/50			
ICELAND									100/50																		
ITALY							100/50											iMP									
JAPAN **FLIGHT & BENCH TESTS**																				100/50	IMP						
LUXEMBOURG							100/50												CFC-								
THE NETHERLANDS							100/50											CFC									
NEW ZEALAND																					40/20				100/50		
NORWAY							100/50											CFC									
POLAND																							100/50				
PORTUGAL							100/50																				
SOUTH KOREA **FLIGHT & BENCH TESTS**										100/50																	
SPAIN								100/50											CFC								

LEGEND

TSDF = TIME SLOT DUTY FACTOR

CFC = COMMON FREQUENCY CLEARANCE

IMP = IMPROVED

	‘79	‘80	‘81	‘82	‘83	‘84	‘85	‘86	‘87	‘88	‘89	‘90	‘91	‘92	‘93	‘94	‘95	‘96	‘97	‘98	‘99	‘00	‘01	‘02	‘03	‘04	‘05
SWEDEN																			CFC+			IMP					
SWITZERLAND																					CFC						
TURKEY							100/50												IMP		IMP						
UK FLIGHT & BENCH TESTS							100/50										IMP		IMP		IMP					IMP	
USA FLIGHT & BENCH TESTS	40/20												100/50			IMP											

LEGEND

TSDF = TIME SLOT DUTY FACTOR

CFC = COMMON FREQUENCY CLEARANCE

IMP = IMPROVED

02287LS1 Flag Chart

10 April 2006

Country / Platform → / Function ↓	AS	BE	CA	CZ	DE	FR	GE	GR	HU	IT	IS	JA
	All	All	All	All	All	All	All	All	All	All	All	AEW & Ships
Low Power (200 Watts)	★	★	★	★	★	★ 1KW Gnd & Ship	★	★	★	★	★	★
Max TSDF (100/50)	★	Helos 10% TSDF	★	★	★	★	★	★	≤ 20% FTR TSDF Helos 10% TSDF	★	★	★
Standard Messages (258 Pulses)	★	★	★	★	★	★	★	★	★	★	★	★
Packed Messages (444 Pulses)	★	★	★	★	★	★	★	TBD	★	★		★
Individual Nets (Different Nets Without Time Slot Reuse)	★	★	★	★	★	★	★	★	★	★	★	★
Multinet (Time Slot Reuse On Different Nets)	★	★	★	★	★	★	★	TBD	≥ 100 nm	TBD	TBD	★
Contention (Time Slot Reuse On Same Net)	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	TBD	≥ 100 nm	≥ 200 nm	TBD	≥ 166 nm
Initial Net Entry /RTT (Modes A & B)	★	★	★	★	★	★	★	★	★	★	★	★
Geo Area Of JTIDS/MIDS Operations	100 nm radius ★	100 nm radius ★	100 nm radius ★	100 nm radius ★	100 nm radius ★	100 nm radius ★	50 nm radius ★	100 nm radius ★	50 nm radius ★	100 nm radius ★	TBD	166 nm radius
EMC Features Operational	★	★	★	★	★	★	★	★	★	★	★	★
Records Maintained (One Year)	★ 90 days	★	★	★	★	★ 30 Days	★	★	★	★	★	★
Separation (Std ATC V=1000 ft CoAlt H= 3 To 5 nm)	0.5 nm from Beacon	★	★	★	★	★	★	★	★	★	★	**See Note 2**
	900 ft from ATCRBS	2 nm from ATC Ground Equip For Surface Units & Helos	0.5 nm from Beacon	0.5 nm from Beacon	0.5 nm from Beacon	0.5 nm from Beacon	2 nm from ATC Ground Equip For Surface Units & Helos		2 nm from ATC Ground Equip	3 nm H & V from ATC Ground Equip		
Other Separation Requirements	2 nm from Some Sites		900 ft from ATCRBS	900 ft from ATCRBS	900 ft from ATCRBS	900 ft from ATCRBS						

Function Authorized	Awaiting Data	Awaiting Signature	Shaded Area means Common Clearance Parameters	To Be Determine
★				TBD

Dated: 28 March 2006

Country / Platform → / Function ↓	LU	NL	NO	NZ	PO	PL	TU	SP	SE	SW	US	UK
	All	All	All	All but Gnd Mobile	AEW	All	All but Helos	All	All	All	All	All
Low Power (200 Watts)	★	★	★	★	★	★ 1KW Ground	★	★	★	★	★	★
Max TSDF (100/50)	★	★	★	★	★	≤ 20% FTR TSDF below 18 Kft Helos 10%	FTR ≤20% TSDF	★	★	★	★	See Note 1
Standard Messages (258 Pulses)	★	★	★	★	★	★	★	★	★	★	★	★
Packed Messages (444 Pulses)	★	★	★	★		★		★	★	★	★	
Individual Nets (Different Nets Without Time Slot Reuse)	★	★	★	★	★	★	★	★	★	★	★	★
Multinet (Time Slot Reuse On Different Nets)	TBD	★	★	≥ 100 nm	TBD	≥ 100 nm	≥ 100 nm	★	★	★	★	≥ 300 nm
Contention (Time Slot Reuse On Same Net)	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	TBD	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	≥ 100 nm	Note 4 ★	≥ 300 nm
Initial Net Entry /RTT (Modes A & B)	★	★	★		★	★	★	★	★	★	★	NO Mode B
Geo Area Of JTIDS/MIDS Operations	100 nm radius ★	100 nm radius ★	100 nm radius ★	100 nm radius ★	TBD	100 nm radius ★	50 nm radius ★	100 nm radius ★	100, 35, 13 nm radii ★	100 nm radius ★	100 nm radius Note 4 ★	300 nm radius Note 4 ★
EMC Features Operational	★	★	★	★	★	★	★	★	★ Temp Exempt Possible	★	★	★
Records Maintained (One Year)	★	★	★	★	★	★	★	★	★	★	★	★ 30 Days
Separation (Std ATC V = 1000 ft CoAlt H = 3 To 5 nm)	★	★	★	**See Note 3**	★	★	★	★	★	★	★	**See Note 1**
						2 nm from ATC Ground Equip For Surface Units & Helos	2 nm from ATC Ground Equip					Ships 5 nm from Aircraft
Other Separation Requirements	2 nm H & V from ATC Ground Equip	0.5 nm from Beacon	0.5 nm from Beacon					0.5 nm from Beacon	0.5 nm from Beacon	0.5 nm from Beacon	**See Note 4**	21 nm from Beacon
		900 ft from ATCRBS	900 ft from ATCRBS					900 ft from ATCRBS	900 ft from ATCRBS	900 ft from ATCRBS		6 nm from SSR

Function Authorized	Awaiting Data	Awaiting Signature	Shaded Area means Common Clearance Parameters	To Be Determine
★				TBD

Dated 28 March 2006

EXISTING JTIDS FREQUENCY CLEARANCES – NOTE 1

Note 1: An aircraft JTIDS/MIDS terminal shall not radiate when:

1. Within a slant range of 3.0 nm (nautical miles) of a civil aircraft or a military aircraft flying under civil conditions except when the following conditions exist.

    a) Provided that the total time slots used within that distance do not exceed 20 % and the vertical separation between civil aircraft and the JTIDS/MIDS aircraft is not less than 4000 ft.

    b0 The total time slots used within that distance do not exceed 10 % and an ATC vertical separation of 2000 ft is maintained between civil aircraft and JTIDS/MIDS aircraft.

    c) These TSDF relaxations are not permitted simultaneously.

2. Within a slant range of 12.5 of any DME or TACAN installation promulgated in the United Kingdom Air Pilot Document except when operating under the special conditions of Item 3.
3. The total number of time slots which may be used within slant ranges between 12.5 nm and 3.0 nm of a DME or TACAN beacon shall not exceed 20 %.
4. Within 3.5 nm of a Secondary Surveillance Radar (SSR) installation.

Note 1: A fixed or maritime mobile JTIDS/MIDS terminal shall not radiate when:

1. Within 5.0 nm of a civil aircraft except when the following conditions exist:

    a) Provided that the TSDF does not exceed 20%, the separation distance from civil aircraft can be reduced to 8500 ft.

    b) Provided that the TSDF does not exceed 10%, the separation distance from civil aircraft can be reduced to 3500 ft.

EXISTING JTIDS FREQUENCY CLEARANCES – NOTES 2 & 3

Note 2: A Tactical Data System (TDS) airborne terminal shall not radiate when:

1. Within a 1800 ft Disk with a radius of 0.7 nm centered on a civil aviation aircraft
2. Within 600 ft altitude and 1.9 nm range of a TACAN / DME ground station
3. Within 2900 ft altitude and 3.0 nm range of an SSR ground station
4. Within an approach control area

Note 2: A TDS surface – based terminal shall not radiate when:

1. Within 1300/2600 ft (Ground/Ship) vertically and 1.5/1.6 nm (Ground/Ship) horizontally of civil aircraft
2. Within 2.0 nm range of a TACAN / DME ground station
3. Within 3.6 nm range of an SSR ground station
4. Within an approach control area

Note 3:

1. The minimum separation between any fixed site, marine mobile or ground mobile JTIDS/MIDS terminal and any ground based DME or TACAN beacon used in the civil ATC system would be based on a signal level not exceeding –33dBm at the DME beacon receiver. In instances where testing has not been carried out a distance of 2NM shall apply.
2. The minimum separation between any fixed site, maritime mobile or ground mobile JTIDS/MIDS terminal and any air traffic control radar beacon system/secondary surveillance radar (ATCRBS/SSR) ground equipment shall be based on a received signal level of –20 dBm (approx 900ft for 200watt JTIDS/MIDS terminal). In instances where testing has not been carried out a distance of 2 NM shall apply.
3. The separation distance from a civilian or military aircraft flying under civilian conditions shall be at lease standard ATC separation (vertical separation 1000 feet and horizontal separation 3-5 NM).
4. The separation distance between airborne civilian or military aircraft and surface based JTIDS/MIDS platforms shall be at least 1000 feet.

EXISTING JTIDS FREQUENCY CLEARANCES – NOTE 4

Note 4:

1. The TSDF limit for contention (Repromulgation Relay, Time Slot Reallocation (TSR) and machine controlled contention (MCC)) is 25 percent of 396,288 pulses in a 12 second frame. MCC includes Round Trip Timing- Broadcast (RTT-B), Precise Participant Location Indicator (PPLI), Initial Net Entry (INE), Fighter to Fighter (Ftr To Ftr) and Conditional Paired Slot Relay (CPSR). If only fast moving platforms use MCC then the contention limit is 33 percent

2. Surface-based JTIDS/MIDS terminals must be located at distances that protect Tactical Air Navigation (TACAN) and Distance Measuring Equipment (DME) beacons from JTIDS/MIDS signals that exceed a peak power level of - 33 dBm and a combined maximum 50% TSDF at the beacon receiver input. In the event that this received signal condition cannot be met then up to a peak power level of - 24 dBm and a combined maximum 20% TSDF at the beacon input may be permitted, however this latter condition must be identified to the NTIA by the Navy Marine Corps Spectrum Center (NMSC) prior to authorization and use. For any and all power levels between -24 dBm and – 33 dBm coordination and authorization from NMSC is required.

3. Surfaced-based JTIDS/MIDS terminals will be located at distances that protect ATCRBS Interrogators and Mode S Sensors from signals that exceed a peak power level of –20 dBm at their respective receiver input.

JTIDS/MIDS USAGE & PLANS

FUNCTION / PLATFORM						
	AEW	FIGHTER A/C	GND/AIR C²	SHIPS	HELOs	NATO/PFP GUEST FORCES
COUNTRY						
AUSTRALIA	2H	M1	2H, M2	2H, M1		✓
BELGIUM		M1	1, M1			✓
CANADA	M1	M1	M2	2H		✓
CZECH REPUBLIC						✓
DENMARK		M1	M1	M1	M1	✓
NATO	2H		1			✓
FRANCE	2H	M1	2H, M1	2H, M1	M1	✓
GERMANY		M1	2M, M1	M1	M1	✓
GREECE			2M, 1			✓
HUNGARY						✓
ICELAND		FDL LVT 3	M1			✓
ISRAEL			2H			✓ *
ITALY		2, M1	M1	2, M1	M1	✓
JAPAN	2H	M3	M2, 2H, ML, 2M	2H		✓
LUXEMBOURG						✓
NETHERLANDS		M1	M1, 2M	M1		✓
NEW ZEALAND						✓
NORWAY		M1	1, M1	M1		✓
POLAND						✓
PORTUGAL		M1				
SPAIN		M1	M1	M1	M1	✓
SWEDEN	M1	M1	M1	M1		
SWITZERLAND		M1	M1			✓
TURKEY						✓
UK	2H, RN	M1, 2	1, RN, 2H	2H, RN		✓
US	2H, M1	2, M1, M3	2, 2M, 2H, M1, M2	2H, M1		✓

LEGEND

1 = Class 1 (IJMS)

2 = Class 2

M1 = MIDS LVT 1

M2 = MIDS LVT 2

M3 = MIDS LVT 3 or FDL

RN UK URC 138

* Coordinated through EUCOM **Current** **Planned**

7.0

NATIONAL

FREQUENCY CLEARANCES

7.1

AUSTRALIA

FREQUENCY CLEARANCE

AUSTRALIAN FREQUENCY CLEARANCE

The Australian Frequency Clearance is described in this attachment (Attachment 1). If there are any inconsistencies between this attachment and any other part of this document, Attachment 1 shall take precedence.

This clearance has been granted to the Department of Defence by Airservices Australia under Contract 98/99-120.

Frequency Clearance Agreement between The Commonwealth of Australia (Department of Defence) & Airservices Australia relating to the use of the frequency band 960 – 1215 MHz by the JTIDS system.

1. Introduction

This frequency clearance relates to the operation, by the Department of Defence and visiting allied forces, of fixed and mobile stations of the communications equipment conforming to the Joint Tactical Information Distribution System[1] (JTIDS) defined in STANAG 4175 and operating in the frequency band 960 – 1215 MHz.

Extensive compatibility studies, testing and analysis of the JTIDS/MIDS TDMA architecture have been performed by Civil Aviation Authorities and Military organisations. The results and conclusions of these studies are well documented. Airservices Australia has assessed and analysed the available data and documentation to produce the conditions of use.

The agreement by Airservices Australia is conditional on the strict observance and adherence to the restrictions and the specified conditions of operation.

The frequency band 960 – 1215 MHz has been allocated worldwide for the use of aeronautical radionavigation under Section 5.328 of the Radio Regulations (Ref. 14). The use of JTIDS is allowed for in the Radio Regulations under Section 4.4.

2. Agreed Basis for JTIDS/MIDS Operation

Operation of JTIDS/MIDS is agreed, on a non-interference basis to existing aeronautical facilities and services, in accordance with the conditions stated in this agreement.

All reference to JTIDS/MIDS in this document, unless otherwise stated, shall be taken to mean the system technical parameters specified in ***Annex A*.**

The equipment types considered in this agreement operate in the 960 – 1215 MHz band and are listed below.

1. Distance Measuring Equipment (DME / N),
2. Secondary Surveillance Radar (SSR),
3. Airborne Collision Avoidance System (ACAS).

[1] JTIDS may also be referred to as the Multifunctional Information Distribution System (MIDS). MIDS is the NATO term for JTIDS and refers to the later generation of JTIDS terminals.

Airservices Australia reserves the right to review this clearance with respect to the above equipment types and any variants of the above equipment types (refer ***Section 10).*** The conditions applying to future systems that may operate in the 960 – 1215 MHz band are described in ***Section 4***.

Note that, notwithstanding this agreement, the use of the band 960 – 1215 MHz by JTIDS/MIDS is subject to any necessary authorisation by the Australian Communications Authority (ACA).

3. Territorial Scope

This agreement applies to all airspace within the Australian Flight Information Region (FIR), including the airspace under Australian control outside the Australian Economic Zone (200 NM limit).

4. Future Civil and Military Systems

In accordance with ITU Radiocommunication Regulations, JTIDS/MIDS transmissions shall not cause harmful interference to either existing or future equipment and systems in the aeronautical radionavigation service and for itself cannot claim harmful interference.

Future civil aeronautical radionavigation systems, including variants of existing systems and new equipment types, intended for operation in the 960 – 1215 MHz band, and which are not covered by the existing compatibility studies, shall be subject to study, practical testing, and assessment by Airservices Australia, in agreement with the Department of Defence to determine the extent JTIDS/MIDS is compatible with the new system. The Department of Defence agrees to fund the cost of such a study with respect to the JTIDS/MIDS system.

Airservices Australia undertake to provide advice to Department of Defence, at the earliest possible stage, of any new aeronautical navigation system using or under consideration for use in the frequency band 960 to 1215 MHz.

Department of Defence undertake to keep Airservices Australia appraised of any JTIDS/MIDS variants or changes to the parameters specified in ***Annex A*** when they are being considered for operational use.

5. Conditions of Use

Refer to ***ANNEX A*** for a description of the JTIDS/MIDS technical characteristics.

5.1. Geographic Area of JTIDS/MIDS Operations

The Geographic Area of JTIDS/MIDS operation is defined as a cylinder of 100 NM radius covering the total airspace between the highest airborne JTIDS/MIDS platform and the ground. In the absence of an airborne JTIDS/MIDS platform, the Geographic Area of JTIDS/MIDS operation is defined as a cylinder of radius 100 NM surrounding any JTIDS/MIDS terminal.

The pulse limit restrictions within this area defined in ***Section 5.2.***

5.2. Time Slot Duty Factor

The total JTIDS/MIDS community within a geographic area shall be limited to 100% effective TSDF, ie 396,288 pulses per 12 seconds (1536 time slots with 258 pulses per time slot). The time slot (pulse) utilisation limit is based on assigned transmit time slots whether or not actual JTIDS/MIDS transmissions take place during an assigned time slot.

The geographic area limitation is defined in ***Section 5.1.***

Except for network entry purposes and maintaining network synchronisation (RTT-A and RTT-B), no time slot is to be used by more than one user in the same network unless the users are separated by a minimum distance of 100 NM.

When less than 100% of time slots are being used, those in use shall be approximately evenly distributed within any frame period.

No one user is to be allocated more than 50% of all time slots.

5.3. Use of Networks

Users separated by less than the minimum distance of 100 NM are permitted to operate on different networks provided the networks are synchronised in time and subject to the pulse limits specified in ***Section 5.2***.

When users are separated by at least 100 NM synchronisation of networks is unnecessary.

5.4. Contention Operations

The minimum separation between JTIDS/MIDS terminals operating in contention shall be 100 NM.

5.5. Power Output

The maximum power output of a JTIDS/MIDS terminal shall be 200 W + 1 dB.

5.6. Packed Messages

Packed messages (P2DP and P4SP) are permitted, noting the pulse restrictions described in ***Section 5.2***.

5.7. EMC Protection Features (EPF)

The EMC Protection Features must be operational at all times, except when given dispensation by Airservices Australia for Defence exercises ***(Section 8*** refers). The EMC Protection Features are described in ***Annex A.10***.

5.8 Separation Requirements

Department of Defence may operate JTIDS/MIDS, within the Australian FIR subject to the separation requirements described below:

- The separation distance from a DME / TACAN ground beacon shall be such that the JTIDS/MIDS signal level does not exceed -33 dBm at the DME beacon receiver. With consideration to antenna radiation patterns this corresponds to a distance of approximately 0.5 NM (926 m). This separation distance shall be greater for those instances listed below (i, ii, iii, iv):

  i. The Canberra DME (MCAN). This DME uses Y mode, which has not been tested for this type of beacon. The separation distance shall be 2 NM (3704 m).

  ii. The Armidale DME (ARM). This is a Pelorus 8900 DME, and has not been tested for JTIDS electromagnetic compatibility. The separation distance shall be 2 NM (3704 m).

  iii. The Brisbane DME (Ident: IBS). This DME uses a high gain antenna. Aircraft on approach or departure to the associated ILS (Ident: IBS) shall stop transmissions of JTIDS/MIDS within 2 NM (3704 m) of the DME.

  iv. DME ground beacons that employ Long Distance Echo Suppression[2] (LDES). This technique naturally reduces the Beacon Reply Efficiency. Temporary interference from overflying aircraft will not cause degradation to the DME service. However, if locating a JTIDS/MIDS ground terminal near such a site, a survey of the transponder loading must be undertaken to ensure that the ICAO ANNEX 10 (July 1996) requirement for BRE is maintained at all times during the operation of the DME.

- The separation distance from a Thomson RSM97O SSR interrogator shall be such that the JTIDS/MIDS signal level does not exceed -20 dBm at the SSR interrogator receiver. With consideration to antenna radiation patterns this corresponds to a distance of approximately 900 feet (274 m). The following exceptions apply (v, vi):

  v. The separation distance from the Sydney PRM shall be at least 2 NM (3704 m).

  vi. Radars operated by the Department of Defence have not been tested with relation to JTIDS/MIDS. Airservices Australia have no objections to the Department of Defence abiding by the parameters of this agreement with relation to the siting of JTIDS/MIDS ground terminals near Defence radars. However, authorisation will have to be obtained from the relevant service provider.

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[2] Long Distance Echo Suppression (LDES) is rarely used.

- The separation distance from a civilian, or military, aircraft flying under civilian conditions shall be at least standard ATC separation[3].

- JTIDS/MIDS radiation is not permitted from a ground mobile station unless the transmitting location has been frequency coordinated with Airservices Australia. ***Section 8*** refers.

6. Location of Fixed JTIDS/MIDS Stations

Airservices Australia requires that the Department of Defence advise Airservices Australia of the geographic coordinates of any proposed fixed JTIDS/MIDS station. This advice is to be provided at the earliest possible time to enable frequency coordination.

7. Visiting Allied Forces

JTIDS/MIDS equipped units from visiting allied forces are subject to the conditions of this agreement when operating in Australian airspace. Airservices Australia requires that the Department of Defence accept responsibility for ensuring that these conditions are made known and complied with for all such visits.

8. Peace Time Exercises

For large-scale exercises, Airservices Australia may grant permission for the removal of the EMC Protection Features described in ***Annex A.10***, and for the lifting of certain restrictions in this agreement. Airservices Australia requires that the Department of Defence seek permission from Airservices Australia at the earliest possible time to permit Airservices to give reasonable consideration to the request.

Airservices Australia reserves the right to object to any proposed removal of restrictions for exercise purposes where it is not satisfied that aeronautical radionavigation services are not fully protected.

To provide a safeguard during exercises when restrictions are removed, a control and warning coordination procedure embodying a "STOP RADIATION" requirement is to be included in the operational procedures. The procedure to be used is to be submitted to Airservices Australia together with the request for relaxation of restrictions. Such procedures are to be complied with by the Department of Defence and allied forces during the period of the exercise.

Airservices Australia understands that the focal point for all operational JTIDS/MIDS coordination and control is the Defence RF Spectrum Manager[4], HQADF M-SB-10, Department of Defence, Russell Offices, Canberra ACT 2600. Tel: (02) 6265 0526, fax: (02) 6265 0517.

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[3] For the purposes of this report, standard ATC separation corresponds to a vertical separation of 1000 feet and a horizontal separation of approximately 3-5 NM.

[4] All frequency coordination requests are to be initiated through the Spectrum Manager. A new address will be advised once the Datalink Management Cell is established.

9. Reporting and Clearing of Interference

Airservices Australia requires that the Department of Defence prohibit JTIDS/MIDS operations when requested by Airservices Australia.

Airservices Australia requires that the Department of Defence establishes and maintains sufficient records of JTIDS/MIDS transmissions (eg. dates, times, locations, TSDF) to permit a retrospective investigation to assess the involvement of JTIDS/MIDS in particular interference cases. The records are to be maintained for a minimum period of three months. In the event of an incident all records pertaining to the incident shall be maintained indefinitely.

Airservices Australia requires that the Department of Defence participate in any investigations set up by Airservices Australia, into reports of interference where JTIDS/MIDS may have been either a contributor or the sole cause. Defence must consult with Airservices to determine a suitable operational, or engineering, solution in order to resume operation of JTIDS/MIDS. Any cost associated with this solution must be borne by the Department of Defence.

10. Review

This agreement may be reviewed at any time for any of the following reasons:

i. Introduction of new or variants of aeronautical radionavigation equipment that do not have proven compatibility with JTIDS/MIDS.

ii. Changes to the operational requirement for JTIDS/MIDS or introduction of new equipment types or designs.

iii. Any difficulties with the existing agreement.

REPORT ON JTIDS COMPATIBILITY WITH SSR INTERROGATORS

Written by,

Paul Burford,
Spectrum Engineer,
Engineering Services,
Airservices Australia,
7th December, 1999.

1. EXECUTIVE SUMMARY

The Department of Defence intend to operate the Joint Tactical Information Distribution System (JTIDS), a tactical and communications system, in the Aeronautical Navigation band. This band is utilised by DME, TACAN, SSR, and TCAS systems. JTIDS is operated in eighteen countries without degradation to the above services.

A clearance for JTIDS operation was granted to Defence, conditional upon the successful testing of the Thomson RSM97O Secondary Surveillance Radar (SSR) Interrogators. This is the ground component of the SSR system. This testing was undertaken at The Round Mountain (near Coffs Harbour) and involved a JTIDS equipped aircraft flying several low passes over the top of the SSR interrogators.

The tests showed that the presence of JTIDS did not affect the performance of the Thomson RSM97O SSR interrogator. In arriving at a frequency clearance for the operation of JTIDS, test results obtained overseas, particularly the US, were also considered.

It should be noted that the clearance for JTIDS use in the Aeronautical Navigation Band is evolving. As more test results become available both in Australia and overseas, restrictions on the use of JTIDS in terms of signal levels, and modes of operation, will be lifted when proven not to degrade Aeronautical Navigation Services. This will require further cooperation between Airservices Australia and The Department of Defence.

2. BACKGROUND

The Department of Defence was granted a frequency clearance for the operation of JTIDS under Contract C98/2 between Airservices Australia and the Department of Defence. This clearance was conditional upon the successful testing of Aeronautical Navigation ground equipment, specifically the DM9, and DM10, Distance Measuring Equipment, and the Thomson SSR interrogators (RSM97O).

The testing of the DM9 and DM10 DME beacons was undertaken by Airservices Australia at the Central Module Repair Depot, Melbourne, where it was shown that JTIDS does not degrade the DME system.

JTIDS operates in the frequency band adjacent to the SSR frequencies. There was some concern that out of band emissions from JTIDS signals may fall on SSR frequencies, and produce interference to the SSR system. It should be noted that under the worst case scenario this power level would be at the lower end of that detectable by the SSR interrogator.

The main aim of the tests was to detect any susceptibility of the Thomson RSM97O SSR interrogator receivers to JTIDS. Tests have also been performed overseas and these results (particularly the US test results) were considered when arriving at a frequency clearance for the operation of JTIDS.

2.1. Airservices Australia Contact

The Airservices Australia contact person for issues concerning the operation of JTIDS is:

Paul Burford,
Spectrum Engineer,
GPO Box 367,
CANBERRA, ACT, 2601

ph: (02)6268 4218
fax: (02)6268 5191

Alternatively, contact Adrian Goodfellow, Senior Engineer, on (02) 6268 4713.

3. BASIS OF AGREEMENT

Airservices Australia approves the use of JTIDS in the frequency band set aside for aeronautical navigation, subject to the operational restrictions given in ***Attachment 1***, dated 7th December, 1999.

The main aim of this report was to test the susceptibility of the Thomson RSM97O Secondary Surveillance Radar (SSR) interrogator receivers to the JTIDS signal. This is examined in ***ANNEXES E & F***. The specifications for the Thomson RSM97O SSR interrogator are given in ***ANNEX D***. The test results were compared to those obtained overseas for other SSR interrogators *(refer **ANNEX G**).*

This report also examines the effect of JTIDS on airborne equipment, including Distance Measuring Equipment (DME) interrogators, SSR transponders, and Airborne Collision Avoidance Systems (ACAS). These effects are discussed in ***ANNEX G***.

The JTIDS technical characteristics are described in ***ANNEX A***, and the SSR system is described *in **ANNEX B***.

A comparison of the Australian Frequency Clearance, dated 7th December, 1999 ***(Attachment 1)***, to clearances granted in other countries is given in ***ANNEX H***. The Recommendations of this report are provided in ***ANNEX I***, and describe improvements to the previous Australian Frequency Clearance, dated 30th March 1999.

4. CONCLUSION

From an analysis of the test results obtained at The Round Mountain SSR site, and a review of test results obtained overseas, it was determined that JTIDS would not affect the performance of the Thomson RSM97O SSR interrogators (ground equipment). The conditions of use are given in ***Attachment 1, The Australian*** *Frequency Clearance.* Radars operated by the Department of Defence have not been tested by Airservices Australia for susceptibility to JTIDS/MIDS. However, from an analysis of the available test results it is concluded that JTIDS should not affect these radars, provided that the operational restrictions given in ***Attachment I*** are adhered to. Authorisation for the use of JTIDS with respect to this equipment must be obtained from the relevant service provider.

By reviewing test results obtained overseas it was also determined that JTIDS would not affect DME and SSR equipment on-board aircraft.

As a result of this testing, and by reviewing test results obtained overseas, the operation of JTIDS by the Department of Defence is permitted, subject to the operational restrictions provided in ***Attachment 1***. The frequency clearance granted to the Department of Defence is consistent with clearances provided in other countries, where JTIDS has been operating for several years.

Future coordination between the Department of Defence and Airservices Australia will be required to determine the operational restrictions of the JTIDS system. As more information about the effects of JTIDS on aeronautical navigational equipment is obtained, The Department of Defence may wish to improve the clearance as given in ***Attachment 1***. The Department of Defence may also wish to remove some of the restrictions in ***Attachment I*** when undertaking Defence exercises. The Department of Defence will be required to negotiate with Airservices Australia for the removal of these restrictions. Airservices Australia reserves the right to object to the removal of any restrictions when not completely satisfied that the removal does not affect aeronautical radionavigation systems. It should be noted that the Department of Defence are secondary users of this spectrum, and are required to obtain this permission when seeking to remove restrictions in the Australian Frequency Clearance.

5. APPROVALS

This document was written by Paul Burford, Spectrum Engineer, with the assistance of Greg Vaile, Senior Radar Engineer.

Paul Burford,
(Document Author),
Spectrum Engineer,
Engineering Services,
Airservices Australia.

Greg Vaile,
Senior Radar Technical Officer,
Engineering Services, Airservices Australia.

This agreement, specifically The Australian Frequency Clearance (***Attachment 1***), dated 7/12/99, is approved by the following people.

Jeffery Bollard,
Chief Engineer,
Safety & Standards,
Airservices Australia

13/12/99

Adrian Dumsa,
Representative of Asset Owners,
Head Air Traffic Controller,
Airservices Australia.

7.2

BELGIUM

FREQUENCY CLEARANCE

JOINT BOARD OF TELECOMMUNICATIONS

(COMIXTELEC)

Queen ELISABETH Quarters
1, Everestreet
Brussels, 1140
BELGIUM

Tel: +32 2 7013624
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JTIDS/MIDS Frequency Clearance for the Kingdom of Belgium

Reference: Frequency Clearance Criteria Documentation for JTIDS/MIDS Operations, October 1998

1. Belgian frequency clearance is in accordance with the document in reference except for the following points:

1.1. Within the Belgian confines of the Brussels FIR/UIR, Air Traffic Control (ATC) equipment operating in the band 960-1215 MHz shall be protected by the following measures:

1.1.1. Separation for JTIDS/MIDS surface stations and JTIDS/MIDS helicopter airborne equipment:
The minimum separation between any JTIDS/MIDS ground terminal, JTIDS/MIDS naval platform, JTIDS/MIDS helicopter airborne equipment operating in the band 960-1215 MHz and any ground based ATC system operating in the band 960-1215 MHz shall be 2 NM.
Separation for airborne JTIDS/MIDS terminals:
The minimum separation between any airborne JTIDS/MIDS terminal operating in the band 960-1215 MHz and any airplane under civil Air Traffic Control or any ground based ATC system operating in the band 960-1215 MHz shall be 1000 ft.

1.1.2. A fighter aircraft shall not transmit more than 20% TSDF.
A fighter aircraft is allowed to use the max 50% TSDF as a radio relay above flight level 180. However, TSDFs above 20% will be limited to the fighter platform TSDF as authorized by the country of origin.
Helicopters are permitted to transmit with max 10% TSDF.

1.2. Introduction of civil satellite frequencies in the DME frequency band may result in a more narrow DME and JTIDS/MIDS frequency band in Belgium. In that case, frequency compatibility needs to be studied again and it may be required to change the frequency clearance.

2. Management and control

2.1. The management and control in the Belgian confines of the Brussels FIR/UIR will be executed by the Belgian Data Link Management Cell (BE-DLMC) situated at the Control and Reporting Center of Glons (CRC Glons/for the POC, see annex). The BE-DLMC is the centralized network management service which controls the JTIDS/MIDS operations in the Brussels FIR/UIR and acts as a point of contact.

The services responsible for the provision of ATC in the Brussels FIR/UIR should be informed in a continuous way and at least 24 hours in advance of all JTIDS/MIDS activities that could cause interference. This is done in order to intervene in case of suspected or reported interference and to stop the JTIDS/MIDS activities within a radius of at least 100 NM around the location of the suspected or reported interference through the appropriate channels.

2.2. The list of points of contact for the Kingdom of Belgium with regard to JTIDS/MIDS activities can be found in annex. Changes to this annex will not need to be considered as a change of the frequency clearance.

3. JTIDS/MIDS operations outside the limits in this document are not authorized.

4. This frequency clearance for JTIDS/MIDS operations will become effective on the 31st of January 2005 and replaces all previous JTIDS/MIDS frequency clearances.

5. The Belgian civil and military Federal Authorities responsible for Air Traffic Control and frequency management reserve the right to modify or expand the restrictions.

For Belgocontrol:

J.C. TINTIN
Gedelegeerd Bestuurder
Belgocontrol

For the "Directoraat-Generaal Luchtvaart/FOD Mobiliteit en Vervoer":

E. Van Nuffel
Directeur - Generaal
Dir-Gen Luchtvaart/FOD Mob & Verv

For the military:

T CORNELIS
Gen Maj Ir
Chairman COMIXTELEC (CMTel)

For the BIPT:

E. VAN HEESVELDE
Chairman of the Council
B.I.P.T.

Brussels, 28 February 2005

7.3

CANADA

FREQUENCY CLEARANCE

National Defence | Défense nationale

National Defence Headquarters
Ottawa, Ontario
K1A 0K2

Quartier général de la Défense nationale
Ottawa (Ontario)
K1A 0K2

2772-3 1 (DTSES 5-4)

4 April 2000

Distribution List

AMENDED NATIONAL COMMENTS CONCERNING
CANADIAN JTIDS/MIDS FREQUENCY CLEARANCE

References : A. NDHQ Ottawa 2772-6-8 (DECSS 5-4), 24 June 1998
B. Frequency Clearance Criteria Documentation for JTIDS/MIDS Operations, December 1996, known as "[The] Common Frequency Clearance Criteria."

1. This document updates and supersedes the Canadian national comments at Reference A. Canada has adopted Reference B with the following national comments:

a. Guest Forces shall request clearance at least 45 days in advance of a JTIDS/MIDS deployment. The contact person is Mr. Ed Kemmis, kemmis.ed@ic.gc.ca, voice 1-613-992-8744, facsimile 1-613-991-3961, or message NDHQ OTTAWA//DTSES 5-3/I. The exercise message shall include the following information:

(1) User. Enter the name of the host or user unit.

(2) Command. Enter the name of the Command or responsible agency.

(3) Area of Operation and Coordinates. Name the geographical area in which the activity will take place, the operating base(s) being used, the coordinates of the approximate centre of the activity, and the approximate radius of the activity in nautical miles.

(4) Platforms. List all platforms participating in the activity and their respective TSDF. For aircraft, identify the type of aircraft and quantity of each type; for ships, identify the type of ship and the quantity of each type, and give the name of each ship if possible; for ground based platforms, identify the location(s) and installation type(s).

(5) Network Design. Enter the name of the network, the Network Design Facility (NDF), the total network TSDF, a point of contact at the NDF if applicable, and a network management point of contact.

(6) Deconfliction. Detail the means by which deconfliction has been effected and the date.

(7) Dates. Enter the start and end dates for the activity.

(8) Compliance Statement. Canada has adopted the Common Frequency Clearance Criteria (Reference B). Indicate here that clearance is being sought in compliance with the Common Frequency Clearance Criteria, Section 6, "Conditions of Operation," or indicate any deviations being requested from the Criteria. Please contact NDHQ/DTSES 5-3 if a copy of the Criteria needs to be made available.

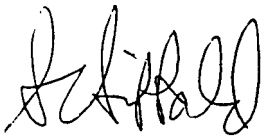
(9) Authority. Enter the name, position, telephone number and e-mail address of the operation/exercise authority.

(10) Contact. Enter the name, position, telephone number and e-mail address of an individual familiar with the requirement and able to discuss technical details.

(11) Stop Buzzer. Enter the telephone number(s) for the operational duty centre where a cease transmission message can be received on a 24/7 basis during the period of the JTIDS/MIDS activity.

b. Guest Forces that have JTIDS/MIDS equipped units permanently stationed in Canada will be radio licensed by Canada and subject to full regulatory control.

2. For further information please contact the undersigned at commercial voice, 1-613-992-0473, DSN 842-0473, or e-mail: sibbald.stephen@ic.gc.ca.



S. C. Sibbald
Lieutenant-Colonel
Directorate Telecommunications and Spectrum
Engineering and Support

Distribution List

Chairman FMSC
NHQC3 S/FMB
NATO HQ
B-1110 Brussels, Belgium

Mr. Les Skews
EMC Test Director
JSC/SSI
3500 Burleigh Dr
Mitchellville, MD, USA
20721-2412

7.4

CZECH REPUBLIC

FREQUENCY CLEARANCE

COMMUNICATIONS AND INFORMATION SYSTEMS AGENCY

NARFA CZ
Vítězné náměstí 5
161 05 PRAGUE 614
CZECH REPUBLIC

22nd January 2001 103/7/399/2001- 4164

For info: Lt Col KUSCHE
Plans and Policy Section NHQC3S / FMB
BRUSSELS

From: NARFA CZ

SUBJECT: NATIONAL FREQUENCY CLEARANCE FOR JTIDS / MIDS

Reference: AC / 322 (SC/3) WP / 28
AC / 322 (SC/3) WP / 28 REV - 1

In accordance with reference AC/322 (SC/3) WP/28, AC/322(SC/3) WP/28 REV - 1 and after consultation with Czech Telecommunication Office, Ministry of Transport and Telecommunications / Civil Aviation Department and Department for civil & military aviation relations of MoD, the statement of MoD / NARFA CZ is following:

1) National frequency clearance:

	Platforms	Power (W)	TSDF	Messages	Multinet	Contention (6)	RTT & INE[a]	Radius of operations	EMC Features On	Records	Separation from ATC
CZ	All	200	100/50	258 + 444	Yes	Sep ≥ 100 NM	Yes	100 NM	yes	1 year	std (3)

(3) Standard separation distance between JTIDS/MIDS and ATC equipment:
- altitude separation from ATC aircraft >= 1000 ft or co-altitude horizontal distance >= 3 to 5 NM

(6) Up to now, contention (transmit in the same time slot on the same net using the same frequency hopping pattern) is not authorised in the Common Frequency Clearance Criteria document. A large quantity of contention testing has been accomplished, but the documentation and review processes are not complete. Therefore, contention operations are only authorised on a coordinated basis at this point in time. It was indicated that contention operations are expected to be authorised in the US at the completion of the EMC T&E Program. Contention will be proposed for the Common Frequency Clearance Criteria, after it is approved in at least one member Country.

[a] RTT = Round Trip Timing
INE = Initial Net Entry

REQUIREMENT PROCEDURE

a) Guest Forces shall request clearance at least 45 days in advance of a JTIDS/MIDS Deployment in the Czech Republic. The contact point is

1. For frequency issue:

AKIS
NARFA CZ
Vítězné náměstí 5
161 05 PRAHA 614

Phone: ++ 420 2 20214 831
FAX: ++ 420 2 20214 808

2.
For operational issue:
Sekce J6/GŠ AČR
Pplk. Jaroslav Sušeň
Vítězné náměstí 5
161 05 PRAHA 614

Phone: ++ 420 2 20 217 353
FAX: ++ 420 2 20 217 377
++ 420 2 3119330

The request shall include the following information:

1. User (The name of Unit)
2. Command (The name of Command or Agency responsible for)
3. Area of Operation and Coordinates (Identification of geographical area, coordinates of the approximately centre of activity and the approximate radius of the activity in NM)
4. Platforms (List of platforms and their TSDF). For Aircraft identity the type and quantity, for ground platforms identify the locations)
5. Network design (The name of network, the total network TSDF, a point contact)
6. Deconfliction (Detail the means by which deconfliction has been effective and date
7. Time period (The start and end dates of activity)
8. Compliance statement
9. Contact point of the Authority responsible for exercise
10. Contact point for technical details
11. Stop Buzzer (Telephone number for the operational duty center where a cease transmission message can be permanently received.)

b) In the case of permanent installation the JTIDS/MIDS equipped units shall be authorized by the Czech Telecommunications Authority in accordance to the new Czech Telecommunication Act.

Machytka Jan
Deputy Director CAD

MINISTERSTVO DOPRAVY A SPOJŮ ČR

7.5

DENMARK

FREQUENCY CLEARANCE

Civil Aviation Administration - Denmark
Luftfartshuset

To:	Fax:	Pages:
Mr Les Skews Mitchelville, Maryland, USA	301 464 3131	3
	Date: 5 May 1998	
Contact person: Kjeld S. laursen/568	**Our ref.:**	
Subject: JTIDS/MIDS Frequency Clearance	**Your ref.:**	

If pages are missing or are illegible, please contact us on the phone number listed below.

Dear Les,

Thank you for your telephone-call concerning the danish frequency clearance for JTIDS/MIDS.

As you will see by the enclosed, the danish National Telecom Agency did sign the new clearance February 25th 1997. Unfortunately the clearance only exist in danish, but It Is stated in the text, that the clearance for JTIDS/MIDS is based on criteria documentation for JTIDS/MIDS operations, December 1996.

By a message Ole Johansen has Informed ARFA (FMSC) Bruxelles accordingly.

I hope that this simple danish procedure is acceptable to your administration. If not please give me a call and I will translate the text from the Telecom Agency into English.

Best regards

Kjeld

Luftfartshuset
Box 744
Ellebjergvej 50
DK-2450 Copenhagen SV

Phone +45 3644 4848
Fax +45 3644 0303
Office hours 09.00-15.00

X400: C=DK; A=DK400; P=SLV; S=DCAA;
Internet: dcaa@slv.dk
Telex 27096

KOPI: Statens Luftfartsvæsen
sagen

Telestyrelsen
National Telecom Agency

Forsvarskommandoen
Det Militære Frekvenskontor
Postboks 202
2950 Vedbæk

Deres reference:
Vorts reference: *323-62*
Sagsbehandler: *H.B. Andersen*
Dato: *25. februar 1997*

JTIDS/MIDS Common Frequency Clearance

./. Fra Statens Luftfartsvæsen har Telestyrelsen modtaget det i kopi vedlagte brev, hvori SLV erklærer sig indforstæet med, at den seneste udgave af fælles kriterier for frekvenstilladelse til JTIDS/MIDS udsendelser, kan danne grundlag for fremtidig frekvenstilladelse til anvendelse af JTIDS/MIDS i Danmark.

./. Telestyrelsen skal derfor meddele, at den tidligere tilladelse RTT.T.466 af 29. april 1985, erstattes af vedlagte "Frequency clearance criteria documentation for JTIDS/MIDS operation", december 1996.

Statens Luftfartstjeneste modtager kopi af dette brev.

Med venlig hilsen

Per Christensen

Henning B. Andersen

Holsteinsgade 63
2100 Kabenhaun Ø
Telefon 35 43 03 33
Telefax 35 43 14 34
E-post: tst@tst.dk
x.400:
s=tst;p=tst;a=dk400;c=dk
Homepage:
http://www.tst.dk

Sagsbehandlers direkte telefon: 35 43 03 22) 515

7.6

FRANCE

FREQUENCY CLEARANCE

AGREEMENT BETWEEN THE MINISTRY OF DEFENSE AND MINISTRY OF TRANSPORTATION (CIVIL AVIATION AUTHORITY)

1. SCOPE OF THE AGREEMENT

The purpose of the agreement is:

- To complete and specify the procedures agreed to by the Directorate of Air Navigation for the utilization in France by French and allied Forces, for the Multifunction Information Distribution System (MIDS) operating in the frequency band 960 to 1215 MHz, and based on MIDS/JTIDS Class 2 or Class 1 operating on the Airborne or Naval platforms as well as associated ground stations.

- To extend the temporary authorization to MIDS/LVT equipment which will be fitted in different types of French and Allied military platforms a few years from now.

- Applicable during peacetime within the FIR/UIR of French responsibility.

2. USAGE CONDITIONS FOR MIDS/JTIDS

2.1. GENERAL CONDITIONS

In accordance with Radio Regulations (RR), the International Telecommunication Union (ITU) and the National table of frequencies bands (Document II of the Telecommunication and Coordination Committee).

- The frequencies band 960 to 1215 MHz is allocated to Aeronautical Radionavigation and is reserved on a worldwide basis for the use and development of airborne electronic aids to aeronautical navigation as well as any directly associated ground-based facilities.

- In France, the users of this band for this service are Civil Aviation which has a primary user status, and the Armed Forces are authorized to use the bands 960 to 1070 MHz and 1110 to 1215 MHz and have a secondary user status for radio communications that utilize spread spectrum techniques.

The Directorate of Air Navigation (DNA) gives its agreement to this use on the general principal of non-interference with the civil aeronautical radionavigation equipment under the following conditions identified herein for both national and allied equipment and the associated ground stations.

2.1.1 With the following limitations, Airborne MIDS/JTIDS terminals are authorized to transmit on the frequencies identified while maintaining the characteristics contained in the annex.

- Power output limited to 200 watts.
- Equivalent Time Slot Duty Factor (TSDF) limited to 100/50 within any geographic area of 100 NM radius and centered on each MIDS/JTIDS platform.
- Transmission in contention access of RTT-B messages is authorized
- Separation between terminals that transmit in the same time slot on the same net must be 100 NM or greater.
- Multinet operations are authorized.
- Interference Protection Features must be operating.
- Lateral and vertical separation distances of transmitting airborne platforms from civil aircraft will be in accordance with the normal flight separation distances required depending on the type of control (military air traffic or general air traffic).

2.1.2 The list of Ground and Shipboard stations is established and maintained on a mutual agreement basis. These stations are authorized to transmit under the same conditions, but are subject to the following limitations.

- The Effective Isotropic Radiated Power (EIRP) of 1 kilowatt is authorized under the condition that the received signal level at the DME/N beacon does not exceed – 33 dBm and that the MIDS/JTIDS signal level at the input of all Secondary Surveillance Radar ground stations does not exceed – 20 dBm.
- Equivalent TSDF and contention are subject to the same limitations as for aircraft.
- Interference Protection Features must be operating.

2.1.3 The Armed Forces will take the necessary measures to ensure the coordination of MIDS/JTIDS usage by French, NATO and Allied Countries within national territory and along the border regions.

2.1.4 Maintenance tests or verification of the correct functioning of modes of operation not normally authorized, such as the fixed frequency mode of operation will be conducted.

- For airborne platforms, on the ground at their main operating base.
- For ground and naval stations at least monthly.

2.1.5 During a one year trial period, all MIDS emissions will have to be recorded to include all the dates and hours of the beginning and the end of transmission, geographic positions and corresponding altitudes. Those records will be maintained for at least 30 days in the absence of any incidents and will be provided to DNA when an incident occurs.

2.2. SPECIAL CONDITIONS

The conditions of use indicated in paragraph 2.1 above are the normal conditions in peacetime.

Relaxation of the imposed limitations could be given for the following situations.

- For testing
- For exercises
- For operational needs

2.3. ADDITIONAL CONDITIONS

The Armed Forces will continue to perform studies and tests in order to ensure that the civil aeronautical radionavigation equipment, specifically French manufactured equipment that was not subject to testing by the allies, will not suffer harmful interference from MIDS. Based on the results of this further work, certain limitations imposed on the utilization of the MIDS equipment could eventually be relaxed or cancelled.

If existing MIDS/JTIDS equipment is modified, the Armed Forces will proceed in collaboration with the Directorate of Air Navigation to conduct studies and testing as necessary to ensure that those modifications will not increase the risk of harmful interference to existing civil aeronautical radionavigation systems.

If existing radionavigation equipment is modified, or if new radionavigation equipment is introduced in French Airspace, the Directorate of Air Navigation, in collaboration with the Armed Forces and the manufacturers concerned, will take the appropriate measures to ensure the electromagnetic compatibility of the new or modified equipment with the existing MIDS/JTIDS terminals.

3. CONDITIONS OF USE FOR MIDS/LVT EQUIPMENT

The conditions of use established for MIDS/JTIDS equipment will be temporarily applicable to MIDS/LVT equipment. Depending on the results of the studies and tests

that will be carried out, the conditions of use for the MIDS/LVT will be the object of either a new agreement, or modifications or additions to the present agreement.

Agreed in Paris

For the Ministry of Defense	For the Ministry of Transport
Original signed	Original signed

ANNEX

GENERAL TECHNICAL CHARACTERISTICS OF MIDS

1. PRESENTATION

The NATO acronym MIDS[1] designates the technical operational concept (the function of communication, localization, cooperative identification and TACAN) and also the family of reporting equipment. JTIDS[2] designates the original version of equipment that came from America. MIDS/LVT[3] designates a version of the NATO class of equipment under multinational development.

2. FREQUENCIES USED BY MIDS

The MIDS equipment utilizes spread spectrum and frequency hopping techniques. It uses a pseudo-random pattern of 51 frequencies separated by a space of 3 MHz in the bands 969 to 1008 MHz, 1053 to 1065 MHz and 1113 to 1206 MHz. The MIDS terminals can also operate in a fixed frequency mode.

Frequency Number	Frequency MHz	Frequency Number	Frequency MHz	Frequency Number	Frequency MHz
0	969	17	1062	34	1158
1	972	18	1065	35	1161
2	975	19	1113	36	1164
3	978	20	1116	37	1167
4	981	21	1119	38	1170
5	984	22	1122	39	1173
6	987	23	1125	40	1176
7	990	24	1128	41	1179
8	993	25	1131	42	1182
9	996	26	1134	43	1185
10	999	27	1137	44	1188
11	1002	28	1140	45	1191
12	1005	29	1143	46	1194
13	1008	30	1146	47	1197
14	1053	31	1149	48	1200
15	1056	32	1152	49	1203
16	1059	33	1155	50	1206

[1] Multifunction Information Distribution System
[2] Joint Tactical Information Distribution System
[3] MIDS / Low Volume Terminal

3. TIME STRUCTURE OF MIDS COMMUNICATIONS

The MIDS system of transmission is Time Division Multiple Access (TDMA) with each time slot being 7.8125 milliseconds. In each time slot, the transmitted messages use 72, 258 or 444 pulses lasting 6.4 microseconds and spaced by 6.6 microseconds.

The modulation carrier wave of each pulse is by Continuous Phase Shift Modulation at a rate of *5* MHz per second and using 32 chip sequences as modulating signals.

4. TIME SLOT DUTY FACTOR

The pulse density is characterized by the Time Slot Duty Factor (TSDF). This TSDF is written in the form of two figures X / Y. The X represents the maximum percentage of time slots allocated to the group of terminals within a given MIDS/JTIDS geographic area and the Y represents the maximum percentage of time slots attributed to a single MIDS terminal in the same area.

For example, the notation 100/50 specifies that the group of MIDS terminals shall not exceed a pulse density of 396,288 (100% x 258 pulses per time slot x 1536) per 12 second cycle and that each individual terminal shall be limited to not more than 198,144 pulses per cycle (50% x 396,288).

The calculation of TSDF is accomplished based on a standard time slot containing 258 pulses. To calculate equivalent TSDF when different pulse densities are used requires a correction to take into account time slots that contain 444 (Pack four - single pulse).

Accordingly a TSDF of 100% for a community of MIDS/JTIDS that exclusively use the time slots that contain 444 pulses allows for the use of 396,288 pulses per a 12 second cycle which corresponds to:

$$\frac{396{,}288}{444 \times 1536} = 58\% \text{ time slots}$$

5. PULSE SPECTRUM

The spectrum power of emissions must stay within the envelope listed below when in the band 969 to 1206 MHz.

- At ± 3 MHz from carrier - at least 10 dB weaker than peak.
- At ± 5 MHz from carrier - at least 23 dB weaker than peak
- At ± 13 MHz from carrier - at least 55 dB weaker than peak
- At ± 15 MHz and beyond - at least 60 dB weaker than peak.

6. OUTPUT POWER OF THE MIDS TERMINALS

The nominal output power of the MIDS terminal shall be 200 Watts. A 1 kW version is also available.

7. INTERFERENCE PROTECTION FEATURES

The MIDS terminal contains devices designed to protect against interference by controlling and monitoring radiation emissions in order to meet the allowed conditions of use.

These devices permit:

The control of different parameters and technical characteristics.

- Uniform distribution of frequencies hopping
- Pulse width
- Peak output power
- Spectrum range and radiated energy in the sub-bands 1030 ± 7 MHz and 1090 ± 7 MHz

The control of different parameters and characteristics of use.

- Time slot duty factor
- Message types
- Relay and access modes

Automatic shutdown of the terminal when it is outside of specifications.

8. CONTEXT OF MIDS USE

The JTIDS/MIDS terminals can function in three modes.

- Combat mode: None of the protection features to limit emissions will be activated.
- Exercise mode: Emissions will be automatically inhibited if:
  - The carrier frequencies are not evenly distributed in the authorized bands
  - The pulse width is not in accordance with the specifications
  - The radiated energy in the bands 1030 ± 7 MHz and 1090 ± 7 MHz is outside of specifications

- Normal mode in peacetime: All interference protection features are activated.

JTIDS GROUND STATIONS

NAVAL STATIONS	LOCATION	EQUIPMENT	LAT	LONG
	CIN SAINT MANDRIER	JTIDS CLASS 2H	43°05’N	005°56’E
	SERTEL PIPADY	JTIDS CLASS 2H	43°06’10”N	055°55’36”E
	BAN LANDIVISIAU		48°31‘30”N	004°08’50”W
	BAN HYERES		43°05’40”N	006°08’50”E
	BAN NIMES		43°45‘30”N	004°24’ 50”E

AIR STATIONS	LOCATION	EQUIPMENT	LAT	LONG
	NICE MONT AGEL	JTIDS CLASS 2H	43°46”28’N	007°25”18’E
	BREST-LOPERHET	JTIDS CLASS 2H	48°23’50”N	004°19’17”W
	CONTREXEVILLE	JTIDS CLASS 2H	48°13’46”N	005°47’22”E
	MONT DE MARSAN AVORD	JTIDS CLASS 2H	43°55’21”N	000°29’29”E

7.7

GERMANY

FREQUENCY CLEARANCE

Bundesamt für Informationsmanagement und Informationstechnik der Bundeswehr
A9 NARFA GE

Bundeswehr

Außenstelle Rheinbach
Münstereifeler Straße 75
53359 Rheinbach
Tel.: (0 22 26) 88 - 21 50
Fax: (0 22 26) 88 - 25 11
Bw-Netz: 34 05 - 21 50

Rheinbach, 20 May 2005

Subject: **JTIDS/MIDS Frequency Clearance in the Federal Republic of Germany**

Reference: JTIDS/MIDS Frequency Clearance in the Federal Republic of Germany, 12 February 2003

1 Introduction

- The Multifunctional Information Distribution System (MIDS) as specified in NATO Standard Agreement (STANAG) 4175 and the MIDS predecessor, the Joint Tactical Information Distribution System (JTIDS), are utilising the Data Language Link 16 as laid down in STANAG 5516. Both of the systems operate in the frequency band 960-1215 MHz on a Time Division Multiple Access (TDMA) principle.
- According to both Article 5 of the International Telecommunication Union (ITU) Radio Regulations (RR) and the Frequency Allocation Table of the Federal Republic of Germany, the frequency band 960-1215 MHz has been allocated to the aeronautical radionavigation service on a primary basis. Additionally the frequency band 1164-1215 MHz has been allocated to the radionavigation satellite service on a primary basis.
- JTIDS/MIDS shall not cause harmful interference to the aeronautical radionavigation service and the radionavigation satellite service in the frequency bands mentioned above and for itself cannot claim protection from harmful interference. If harmful interference occurs, the operation of JTIDS/MIDS shall be reduced or even stopped at the request of the German Federal Authorities until protective measures have been taken to eliminate the source of interference.
- Air Traffic Control (ATC) equipment operating in the band 960-1215 MHz shall be protected by the following measures:

2 JTIDS/MIDS Platform Restrictions

Platform certification is required as described in the annex.

2.1 Fixed and mobile ground stations and naval platforms

- Beyond 2007, for the highest terminal output power the maximum radiated signal power shall not exceed an equivalent isotropically radiated power (EIRP) of 200 Watts within the main lobe of the antenna pattern.
- Until the end of 2007, platforms with a higher radiated signal power than 200 Watts EIRP may be operated with a maximum gain of the transmit antenna of up to 9 dBi.

2.2 Aircraft (fixed wing airplane and helicopter)

For the highest terminal output power the maximum radiated signal power shall not exceed an equivalent isotropically radiated power (EIRP) of 400 Watts within the main lobe of the antenna pattern.

3 Communication Modes, Electromagnetic Compatibility Features and Transmit Modes

- Terminals have to be operated in the Communication Mode 1 (frequency hopping mode on 51 frequencies), in the Full IPF Mode 100/50 %[1] Time Slot Duty Factor (TSDF) only.
- Terminals shall not be operated at a nominal terminal output power higher than 200 W.
- When deviating from one of the following EMC criteria any affected terminal must inhibit transmission automatically:
  - Terminal output power ≤ 200 Watts + 1dB;
  - Specified pulse width;
  - Uniform distribution of the JTIDS/MIDS radiation across the whole frequency band;
  - Equivalent TSDF ≤ 50%;
  - The radiated energy within ± 7 MHz of the 1030 and 1090 MHz frequencies must be at least 60 dB below the transmitted JTIDS/MIDS level measured in a 300 kHz bandwidth.
- Terminals in line with the specifications and restrictions of this Frequency Clearance can be operated in the Normal, Polling and Conditional Radio Silent Modes. All other terminals can be authorized to operate in the Conditional Silence Mode on a case-by-case decision by NARFA GE.

4 Separation Criteria

4.1 Airborne Platforms

The minimum vertical separation between any transmitting JTIDS/MIDS airborne terminal and any aircraft under Civil Air Traffic Control shall be 1000 ft. It is always the obligation of the pilot of the transmitting aircraft to maintain that distance. In case the minimum distance cannot be maintained, the pilot has to take appropriate measures (e.g. switch off equipment, request different altitude / Flight level, etc.).

4.2 Separations from DME-N/TACAN ground equipment

DME-N/TACAN ground equipment operating in the band 960-1215 MHz shall be protected through the following minimum separations to be kept by any transmitting JTIDS/MIDS terminal. These separations are based on a standard DME-N beacon antenna gain of 9 dBi. If the antenna gain of the DME-N/TACAN ground equipment exceeds 9 dBi, the minimum separations have to be defined on case-by-case calculations.

- The following minimum separations from DME-N/ TACAN ground equipment are mandatory:
  - 0,7 NM horizontal for all JTIDS/MIDS **ground stations and naval platforms** with a maximum radiated signal power of 200 Watts EIRP or less.
  - 2,0 NM horizontal for all JTIDS/MIDS **ground stations and naval platforms** with a radiated signal power higher than 200 Watts EIRP.

[1] 100/50 %: Maximum total equivalent TSDF within a Geographic Area of 100% and maximum TSDF for single MIDS/JTIDS users of 50 %.

- 0,7 NM horizontal or 500 ft vertical for all JTIDS/MIDS **aircraft** transmitting at the highest terminal output power of 200 Watts or less.
- 0,3 NM horizontal or 500 ft vertical for all JTIDS/MIDS **aircraft** with a terminal capable for maximum terminal output power of 200 Watts when transmitting with not more than 40 Watts terminal output power (e.g. MIDS-LVT 1 or 2: Medium Power) or less .
- 0,1 NM horizontal or 500 ft vertical for all JTIDS/MIDS **aircraft** with a terminal capable for maximum terminal output power of 200 Watts when transmitting with not more than 40 Watts terminal output power (e.g. MIDS-LVT 1 or 2: Medium Power) or less and a cumulative maximum TSDF of not more than 10% TSDF.

The usage of any free text digital voice messages is prohibited within a minimum separation of 0,3 NM horizontal or 500 ft vertical from DME-N/TACAN ground equipment.

- Within the following minimum separations from DME-N/TACAN ground equipment the total of all transmitted JTIDS/MIDS platform TSDF shall not exceed 50%:
  - 5,0 NM horizontal or 3000 ft vertical for all JTIDS/MIDS platforms with a terminal output power of 200 Watts and less.

4.3 Separations From DME-P Ground Equipment

- DME-P ground equipment used as in a DME-N mode shall be protected as described under § 4.2 above.
- DME-P ground equipment used as a stand-alone DME-P beacon or in combination with MLS require much larger separations from MIDS/JTIDS platforms than DME-N equipment. These separation criteria will be determined by case-by-case decisions.

4.4 Separations from SSR/IFF/Mode-S ground equipment

SSR/IFF/Mode-S ground equipment with antenna gains of up to 20 dBi operating in the band 960-1215 MHz shall be protected through the following minimum separations to be kept by any transmitting JTIDS/MIDS terminal.

The following minimum separations from SSR/IFF/Mode-S ground equipment are mandatory:

- 0,7 NM horizontal for all JTIDS/MIDS ground stations and naval platforms transmitting at the highest terminal output power of 200 Watts EIRP or less.
- 2,0 NM horizontal for all JTIDS/MIDS ground stations and naval platforms with a radiated signal power higher than 200 Watts EIRP.

- 0,7 NM horizontal or 500 ft vertical for all JTIDS/MIDS aircraft transmitting at the highest terminal output power of 200 Watts or less.
- 0,3 NM horizontal or 500 ft vertical for all JTIDS/MIDS aircraft with a terminal capable for maximum terminal output power of 200 Watts when transmitting with not more than 40 Watts terminal output power (e.g. MIDS-LVT 1 or 2: Medium Power) or less.
- 0,1 NM horizontal or 500 ft vertical for all JTIDS/MIDS aircraft with a maximum terminal capable for output power of 200 Watts when transmitting with not more than 40 Watts terminal output power (e.g. MIDS-LVT 1 or 2: Medium Power) or less and a cumulative maximum TSDF of not more than 10% TSDF. These aircraft require sufficient 1030/1090 MHz notch filter.

The usage of any free text digital voice messages is prohibited within a minimum separation of 0,3 NM horizontal or 500ft vertical from SSR/IFF/Mode S ground equipment.

SSR/IFF/Mode-S ground equipment with antenna gains between 20 dBi and 27 dBi operating in the band 960-1215 MHz shall be protected through the following minimum separations.

The following minimum separations from SSR/IFF/Mode-S ground equipment are mandatory:

- 1,5 NM horizontal for all JTIDS/MIDS ground stations and naval platforms with a maximum radiated signal power of 200 Watts EIRP or less.
- 3,0 NM horizontal for all JTIDS/MIDS ground stations and naval platforms with a radiated signal power higher than 200 Watts EIRP.

- 2,0 NM horizontal or 2000 ft vertical for all JTIDS/MIDS aircraft transmitting at the highest terminal output power of 200 Watts or less.
- 0,7 NM horizontal or 1000 ft vertical for all JTIDS/MIDS aircraft with a terminal capable for maximum terminal output power of 200 Watts when transmitting with no more than 40 Watts terminal output power (e.g. MIDS-LVT 1 or 2: Medium Power) or less.

If the antenna gain of the SSR/IFF/Mode-S ground equipment exceeds 27 dBi, the minimum separations have to be defined on case-by-case calculations.

5 Time Slot Reuse

- The time slot reuse on different nets is authorized for synchronised multi-net and unsynchronised multiple network operations.
- The time slot reuse on the same net referred to asContention Access is authorized under the following restrictions:

5.1 Random Timeslot Access (Machine-controlled Contention Access)

- The Random Timeslot Access is authorized without restrictions for Initial Net-Entry (IE) and Round-Trip-Timing (RTT-B) only.
- For all other Network Participation Groups (NPGs) the Random Timeslot Access is authorized under the following conditions:
    - Timeslot Access Rate not greater than the size of the Contention Access Pool in timeslots multiplied by 0.25 and
    - No more than 20 terminals share the same Contention Access Pool.

After a suitable operation management system has been established, the latter restriction will be relaxed to 20 terminals sharing the same Contention Access Pool within any Geographic Area[2].

5.2 Timeslot Reallocation

- The use of the centralised Timeslot Allocation Mode is authorized.
- The use of the decentralised Timeslot Allocation Mode is authorized for up to 10 terminals sharing the same Timeslot Reallocation Pool. After a suitable operation management system has been established, up to 10 terminals sharing the same Timeslot Reallocation Pool can be operated within any Geographic Area.

The use of the Repromulgation Relay Mode and any further modes which results in a timeslot reuse on the same net are prohibited.

[2] Definition of Geographic Area:
A cylinder of 50 NM radius centered on any point.

6 Calculation of the JTIDS/MIDS Platform TSDF

The equivalent TSDF[3] of a single JTIDS/MIDS platform is calculated on a 12 second time frame basis and is equal to the sum of all transmitted equivalent TSDF in the Dedicated Access Mode and the Contention Access Modes. TSDF related to Digital Voice Messages shall not count to the individual platform TSDF but will be added separately for the Geographic Area TSDF as described below.

6.1 Dedicated Access Mode

The contribution to the platform TSDF from Dedicated Access transmissions is equal to the sum of all assigned transmit-timeslot pulses (72/258/444).

6.2 Random Timeslot Access Mode

The contribution to the platform TSDF from Random Timeslot Access (Machine-controlled Contention Access) transmissions is equal to the Terminal Access Rate within a 12-second timeframe multiplied with the number of pulses per timeslot (72/258/444) summed up for each Contention Access Pool.

6.3 Timeslot Reallocation Mode

The contribution to the platform TSDF from Timeslot Reallocation transmissions is equal to the TSDF of the TSR time slots in which the platform could transmit (i.e., 22% or 60% of the TSR pool size depending on the specific platform initialisation) multiplied with the number of pulses per timeslot (72/258/444) summed up for each TSR pool.

7 Restriction of the JTIDS/MIDS TSDF within the Geographic Area

The total of all equivalent JTIDS/MIDS platform TSDF transmitted within the Geographic Area plus the equivalent TSDF contribution of all digital voice shall not exceed 100/50%.
Although the corresponding TSDF of the voice pools is only subject to the overall Geographic Area TSDF calculation, no platform shall transmit at a higher TSDF including voice transmissions than either approved for that platform or in general not more than 50% TSDF.
The use of TDMA digital voice has to be in accordance with the instructions laid down in the ACP-125-E “Communication Instructions Radiotelephone Procedures”. Consequently, it is not permitted that more than one terminal per voice pool transmits at the same time.

8 Co-ordination of Operations

- The German Datalink Management Cell (DLMC-GE) is authorized to coordinate JTIDS/MIDS operations in Germany and to grant the respective network clearances. Accordingly, requirements for JTIDS/MIDS operations in Germany are to be submitted to the DLMC-GE.
- When given network clearance, forces intending to use JTIDS/MIDS must apply for clearance to operate with the responsible Combined Air Operations Center (CAOC).
- In addition, requirements for operations that are not covered by this document shall also be submitted to NARFA GE.
- Any JTIDS/MIDS radiation must be recorded in a logbook to help identify possible causes of interference. The logbook must contain the following entries:

[3] Definition of equivalent TSDF:
The equivalent TSDF of 100% equals 396288 pulses in a 12 second frame.

Date, time in UTC[4] - Zulu Time – (start and end of radiation), altitude, position or standard flight pattern or possible deviations there from.

- The logbook entries necessary for the investigation of causes of interference must be provided on short notice when requested by the National Radio Frequency Agency Germany (NARFA GE) or DFS Deutsche Flugsicherung GmbH[5]. In any case, the logbooks must be stored for one year.
- In case of suspected interference DFS is authorized to instruct the responsible POC to cease JTIDS/MIDS radiation immediately.

9 Miscellaneous

- Independent from this Frequency Clearance proposals for Frequency Supportability according to the "ACP 190 NATO Supp-1 A" are mandatory for every configuration of JTIDS/MIDS-terminals installed in any platform before bringing them into use in Germany for the first time and in case of software changes relevant for the Frequency Clearance.
  Additionally, for each ground station, which shall be located for more than one year, frequency assignment has to be applied for with NARFA GE.
- This frequency clearance for JTIDS/MIDS operations in the Federal Republic of Germany will replace all previous JTIDS/MIDS frequency clearances.
- The German Federal Authorities reserve the right to modify or expand the restrictions.

By order

Edelmann
Lieutenant Colonel

[4] Universal Time Coordinated
[5] German Air Navigation Services

Annex to "JTIDS/MIDS Frequency Clearance Agreement (FCA) in the Federal Republic of Germany":

Collocation of Time Division Multiple Access (TDMA) - Terminals and ATC Equipment

Within the scope of platform certification TDMA terminals have to demonstrate collocation compatibility with on board ATC equipment.
Certification testing shall be accomplished with all relevant systems operating normally and the TDMA Terminal transmitting up to a maximum of 50% TSDF depending on the maximum TSDF that demonstrates compatibility. Test data will be made available to the relevant Air Traffic Authorities upon request.

Blanking of the Low Level Detector (LLD) EMC Feature is permitted, if required, to ensure the TDMA transmissions are not inhibited due to interference from collocated ATC transmitters. The blanking signal sources are limited to only ATC transmitters operating in the 1030/1090 MHz bands and the blanking shall not exceed 6% in a 12 second timeframe. TDMA Terminal platforms that require additional blanking will be addressed on a case-by-case basis. TDMA Terminals shall not blank ATC systems in the 1030/1090 MHz bands.

Reset of TDMA Waveform Transmission Inhibits

Automatic reset of TDMA waveform transmission inhibits is strictly prohibited. Platform dependent exceptions will be handled on case-by-case decisions.

Manual transmit inhibit resets shall be allowed subject to the following conditions:

- For single-seat fighter aircraft, at least one action is required for reset.
- For all other terminal platforms, at least two actions are required for reset.

7.8

GREECE

FREQUENCY CLEARANCE

TO: JTIDS/MIDS MNWG

INFO: HNDGS/CISD/D

HELLENIC NATIONAL GENERAL DEFENCE STAFF
COMMUNICATION & INFORMATION SYSTEMS DIVISION
Tel. (01) 655 -2107
FN. 936/171381
DN. 281
Athens, 20 March 1996

SUBJ ; JTIDS/MIDS MULTINATIONAL AD HOC SPECTRUM SUPPORT WG MEETING (26-28 March 1996)

REF : JSC ANNAPOLIS MD//AF// , 151145 Z FEB 96

1. Please be advised that no Greek Representative will participate in subject meeting.

2. Regarding the Agenda items 24, 31, and 32 our comments are as follows:

a. Common Frequency Clearance: According to the initial estimation by Hellenic CAA the proposed Draft could be acceptable. Our final approval will be given through the appropriate NATO fora (CEAC, ARFA).

b. DME/P Equipment: Its introduction is not anticipated in the near future.

c. Mode S: By 1997 the installation and operation of SSR equipped with Mode S sensors is provided for several Hellenic Airports.

True Copy

Dr. Boukis

Brig. Gen. J. Tzifis
CIS Dir.

Print Date: 05/08/98 Time: 05:37:14 User Name: IN1

To: IN1
Subject: NU P 071121Z MAY 98 FM HNDGS ATHENS GR. TARE

RECEIVED
NATO
Frequency
Management
Sub Committee
235

VZCZCCHQ0299 UU
PP RXFSNHQ
DE RKQCCMA 5274 1280450
ZNR UUUUU ZXG ZEV
P 071121Z MAY 98
FM HNDGS ATHENS GR
TO RXFSNHQ/NATO HQ//NHQC3S/FMB//
INFO RXFPSH /SHAPE
RKQRCAA/HAFGS ATHENS GR//A4-G3//
RKQPSOC/SOC LARISSA GR
RKQRDEL/CIVIL AVIATION AUTHORITY//D5//
BT
NATO UNCLAS
SIC SPA
SECRET SYSTEM HIGH GENERATED/MEDIATED MESSAGE
RELAU D1D
SUBJ.JTIDS/MIDS FREQUENCY CLEARANCE CRITERIA DOCUMENTATION//
REF.: AC/322(SC/3)L/3, 06 MAY 97//
RMKS/
REGARDING SUBJECT ISSUE PLEASE BE ADVISED OF THE FOLLOWING:
A. THE FREQUENCY CLEARANCE CRITERIA, DESCRIBED IN THE ANNEX I OF THE REFERENCE, ARE AGREED, IN PRINCIPLE.
B. AS IT IS INDICATED ION THE //SCOPE//, (PARA 1.1), SUBJECT DOCUMENT WILL SERVE AS A BASIS FOR OUR NATIONAL JTIDS/MIDS

PAGE 02 RKQCCMA5274 NATO UNCLAS
FREQUENCY CLEARANCE AGREEMENT COVERING ALL PLATFORMS.
C. HOWEVER, THERE ARE SOME POINTS UNDER FURTHER INVESTIGATION (I.E. USE OF TERMINALS IN HELOS, MULTINET OPERATION/TIME SLOT REUSE, GEOGRAPHIC SEPARATION BETWEEN JTIDS TERMINALS AND ATC EQUIPMENT) AND DIFFERENTIATIONS IS POSIBLE TO BE ENSUED. IN THIS CASE, THE RESPECTIVE PROVISIONS OF THE NATIONAL AGREEMENT WILL BE FORMULATED ACCORDINGLY.

#5274

NNNN

	Action	Info
CHM		2
	858	1
P&F	3	ETP/1

7.9

HUNGARY

FREQUENCY CLEARANCE

GOVERNMENTAL FREQUENCY MANAGEMENT AGENCY	CIVIL AVIATION AUTHORITY OF HUNGARY	MINISTRY OF DEFENCE MILITARY AVIATION AUTHORITY

Re. No: 61/1/2005 GFMA

COOPERATION AGREEMENT

between the
Governmental Frequency Management Agency,
Civil Aviation Authority of Hungary
and MoD Military Aviation Authority
of Hungary

– 2005 –

ORIGINAL IN HUNGARIAN

Cooperation Agreement
concluded between the

Governmental Frequency Management Agency, 20. Salgótarjáni rd., distr. X., Budapest, Hungary (hereafter referred as: GFMA),

Civil Aviation Authority of Hungary, building 13., portal „A", Terminal I., Budapest-Ferihegy Airport, (hereafter referred as: CAA), and

MoD Military Aviation Authority, 21-23. Hűvösvölgyi rd., distr. II., Budapest, Hungary (hereafter referred as: MoD MAA), as cooperating parties

relating to the use of the frequency band 960-1215 MHz by the military information distribution systems in Hungarian airspace.

I.

Aim of the cooperation

1./ The aim of the cooperating parties is the definition of the peacetime frequency usage regulations within the borders and airspace of the Republic of Hungary for the JTIDS/MIDS[1] type military information distribution system (hereafter referred as: system) as well as determination of the tasks and obligations of the concerned organisations, in order to ensure that the application of the system does not endanger the air traffic safety.

II.

Scope of the Cooperation Agreement

2./ The scope of this Agreement extends to the activities of the a Hungarian Defence Forces (hereafter referred as: HDF), of the armed forces of the NATO and NATO member countries as well as of the countries adjoined the NATO Partnership for Peace Program (PfP), during which the employment of the system is carried out (hereafter referred as: operation). The operation in which participate only one or more fixed land terminal operated by the HDF and an AWACS aircraft is considered as simplified operation (hereafter referred as: AWACS operation).

III.

General provisions

3./ According to Article 5 of the Radio Regulations (RR) and the Government Decree on the Establishment of the National Frequency Allocations (hereafter referred as: Gov. Decree) the frequency band 960-1215 MHz has been allocated on a primary basis to the Aeronautical Radionavigation Service and Aeronautical Radionavigation Satellite Service (space-to-Earth), therefore the system can be used only under condition that it shall not cause

[1] MIDS – Multifunctional Information Distribution System (NATO term); JTIDS – Joint Tactical Information Distribution System (US term). For the purpose of this document the term „JTIDS/MIDS type radio system" refers also to the Swedish Radio90 (Ra90) tactical information distribution system.

harmful interference to the primary services and cannot claim protection from harmful interference generated by the primary services.

4./ According to the Gov. Decree – in accordance also with the NATO Joint Civil/Military Frequency Agreement (NJFA) – frequencies in the band 960-1 375 MHz may also be assigned for NATO purposes.

5./ This Agreement is applicable as frequency assigning decision (needs to be followed by radio licence to transmit).

6./ The system can only be operated in possession of valid radio licence.

7./ During operation shall be maintained direct communications by the organisation(s), responsible for the safety of Hungarian civil air traffic [hereafter referred as: civil point(s) of contact] for the case when malfunctioning of the aeronautical radionavigation service or aeronautical radio navigation satellite service equipment is observed. The interruption of the operation could be initiated immediately at the organisation, carrying out the network management functions of the system.

IV.

Conditions of the operation

8./ The system can be operated utilizing technical characteristics as specified in, or compatible with, the „Technical Characteristics of the Multifunctional Information Distribution System (MIDS)" NATO standardisation Agreement (STANAG 4175).

9./ The terminal nominal output power shall not exceed 200 W.

10./ Geographic Area of the operations defined as a circle of 50 NM radius

11./ The summarized equivalent Time Slot Duty Factor (hereafter referred as: TSDF) in any Geographical Area of the operations cannot exceed 100 %.

12./ The TSDF for different platforms listed below shall not exceed the following values:

Helicopters	10 %,
Fighter aircraft	20 %,
Other platforms	50 %.

13./ Standard message structure (258 pulses) and packed message structure (444 pulses) are allowed.

14./ Time slot reuse in different networks (multinet operations) or in the same network (contention) within 100 NM is not allowed.

15./ Frequency hopping pattern in any time slot shall be unique except for initial net entry and maintaining network synchronisation (RTT A and B modes).

16./ The Electromagnetic Compatibility Protection Features of the terminals in use during operation shall be operated permanently in full EMC Protection Mode. When diverging from any of the following restrictions any affected terminal must inhibit transmission automatically:

- maximal terminal output power is 200 W + 1 dB;
- specified pulse width is 6.4 μs ± 0.32 μs;
- uniform distribution of the transmitted power between specified carrier frequencies across the whole frequency range;
- the value of the maximal equivalent TSDF during the 12 second time cycle does not exceed the platform specific values, listed above;
- the radiated energy within ± 7 MHz of the 1030 and 1090 MHz frequencies is at least 60 dB below the permitted maximum level measured in any 300 kHz bandwidth.

17./ The minimum separation between land terminals of the system and aeronautical navigation ground equipment operating in 960-1215 MHz frequency band is 2 NM, between any civil aircraft and air platforms, operating airborne terminals of the system shall be 1000 ft.

18./ The aircraft of the system participating in the operation, which is operating its terminal – with exception of the justified cases (e.g. the special character of the operation, airspace, etc.) – in all cases shall operate their C or S mode transponders.

19./ Data of the operation (place and date of the operation, start and stop time of the radiation in UTC, time of any automatic cessation of the operation, altitude, position or standard flight pattern, etc.) are to be recorded in a logbook and are to be stored by the organisation, carrying out the network management functions of the system, and to be placed at GFMA's disposal by its written request.

V.

Licensing procedures

20./ For the operations within the territory or airspace (FIR) of the Republic of Hungary, GFMA fulfils the administrative tasks of the non-civil purpose frequency management and by request of the applicant issues radio licence. For licensing of AWACS operations, by request of the applicant preliminary radio licence can be issued as well. (Radio licence and preliminary radio licence hereafter referred as: licence). Requests can be submitted only with exact designation of the organisation, carrying out the network management functions of the system (hereafter referred as: licensee).

21./ The request can be submitted in writing (by fax) by the authorized professional organ of the HDF (hereafter referred as: applicant). The content of the request for radio licence is specified in Annex 1, the content of the request for preliminary radio licence is specified in Annex 2. The GFMA shall notify CAA of the authorization of the applicant.

22./ The request shall be submitted before the requested date of the operation, taking into consideration the administrative procedure connected with the legislation of the frequency use (42 days). If the request is not in full conformity with the contents of this Agreement, the GFMA, giving description of the deficiencies and determining appropriate deadline, calls the applicant for supplementation of missing data. The time period of the

supplementation of missing data does not count to be part of the administrative procedure time.

23./ The GFMA notifies the CAA by a writ on the request in order to get the authority consent of it. The CAA shall accomplish the writ within 15 days.

The CAA – in case of its consent – provides the name and accessibility of the civil point(s) of contact (persons or services), concerned with the operation and authorized to initiate the cessation of the operation as well as

a) in case of an individual radio licence the deadline for confirmation of the direct communications,

b) in case of a preliminary radio licence the deadline of the notification on the operation,

which could be not more than 10 days before the start of the operation.

24./ On the basis of the issued consent of the CAA, the GFMA issues the radio licence, of which simultaneously notifies the MoD MAA. If the CAA refuses to issue its consent, the GFMA will reject the request, and thus abates the procedure. On the partial or full cancellation of the request, made in written form by the applicant, the GFMA shall notify the CAA immediately by telephone, and afterwards in written form.

25./ The GFMA shall send the radio licence to the applicant and to the licensee or it shall send the decision on the rejection of the request for radio licence to the applicant.

26./ Concerning the questions of the licensing procedure, not regulated by this Agreement, are governing the arrangements of the relevant executive decree of the Hungarian minister of defence.

VI.

Further areas of the cooperation

27./ In case of an operation carried out on the basis of an individual radio licence the applicant – complying with the deadline, defined in the radio licence – confirms the data of direct communications at the CAA. In case of missing timely confirmation by the applicant the GFMA will – by initiative of the CAA – withdraw the radio licence immediately.

28./ In case of an operation carried out on the basis of a preliminary radio licence the applicant – complying with the deadline, defined in the preliminary radio licence – notifies the CAA about the operation data, with simultaneous notification of the MoD MAA.

29./ The CAA after receiving notification on the time of transmission or following the confirmation of the direct communications informs the civil point(s) of contact.

30./ In case of the interference notification from civil point(s) of contact authorized to initiate the cessation of the operation the licensee is bound to inhibit the operation (transmission) immediately.

31./ The operation can only be continued by request of the licensee and with the consent of the civil point(s) of contact notifying on interference, if it can be established unambiguously that the interference has not been caused by the terminals of the system, or

that the source of the interference, after taking necessary measures, has been excluded from the system.

32./ Within 1 year after the end of the operation the CAA - via the GFMA - can initiate the examination of the recorded operation data in the logbook at the licensee.

VII.

Closing provisions

33./ The cooperating parties will consider the contents of this Agreement for themselves as binding. The carrying out of the operations can be licensed exclusively according to the provisions of this Agreement. The cooperating parties reserve their rights to case-by-case aggravation of the Conditions of the operation.

34./ During operation in Hungarian airspace the civil point(s) of contact in case of a foreign interference notification, possibly associated with the operation will proceed similarly as in case of domestic interference notification.

35./ The judicial disagreements of the cooperating parties would be solved first of all by negotiation.

36./ The GFMA shall notify on the content of this Agreement the concerned international, NATO and Hungarian national military organisations.

37./ This Agreement can be denunciated in writing by any of the cooperating parties. The term of denunciation is 90 days from the according notification.

38./ Amendment of the present Agreement can be initiated in writing by any of the cooperating parties.

This cooperation Agreement will come into force from the date of signing, therewithal abating the documents No 104/27/1998 GFMA: „JTIDS/MIDS Frequency Clearance in the Republic of Hungary (Revision 3) and No 104 /28 /1998 GFMA: „Operational Procedure for application of JTIDS/MIDS radio systems within the Hungarian Airspace".

Annexes: 1.: Request for radio licence (1 page)
2.: Request for preliminary radio licence (1 page)

Budapest, on 22nd March 2005

/signed/
(József BAJÓ)
Director
Governmental Frequency Management Agency

/signed/
(László FEJÉREGYHÁZI)
Director
Civil Aviation Authority of Hungary

/signed/
(Col. Barnabás JÁROMI)
General Director
MoD Military Aviation Authority

VII.

Záró rendelkezések

33./ Együttműködő felek a jelen megállapodásban foglaltakat magukra nézve kötelezőnek tartják, a műveletek végrehajtása kizárólag az ezen megállapodás előírásai szerint engedélyezhető. Együttműködő felek emellett fenntartják a jogot a Működési feltételek eseti szigorításához.

34./ A polgári kapcsolattartó(k) a magyar légtérben folyó művelet során, a művelettel kapcsolatba hozható külföldi zavarbejelentés esetén is a hazai zavar esetére vonatkozó módon jár(nak) el.

35./ Együttműködő felek jelen megállapodás végrehajtásával kapcsolatos jogvitáikat elsősorban tárgyalás útján rendezik.

36./ A KFGH a megállapodás tartalmáról tájékoztatja az érintett nemzetközi, NATO és hazai katonai szerveket.

37./ Jelen megállapodást bármelyik fél írásban felmondhatja, a felmondási idő a közléstől számított 90 nap.

38./ Jelen együttműködési megállapodás módosítását bármelyik fél írásban kezdeményezheti.

Ezen együttműködési megállapodás az aláírás napján lép hatályba, ezzel egyidejűleg a 104/27/1998. KFGH nyt. számú „JTIDS/MIDS Frekvenciahasználati Megállapodás a Magyar Köztársaságban", valamint a 104/28/1998. KFGH nyt. számú „Eljárásrend a JTIDS/MIDS rádiórendszer magyar légtérben történő alkalmazásához" hatályát veszti.

Mellékletek: 1. számú: rádióengedély kérelem (1 lap)
2. számú: keret rádióengedély kérelem (1 lap)

Budapest, 2005. március 22-én

.....
(Bajó József)
Kormányzati Frekvenciagazdálkodási Hivatal
igazgató

.....
(Fejéregyházi László)
Polgári Légiközlekedési Hatóság
igazgató

.....
(Járomi Barnabás ezredes)
HM Katonai Légügyi Hivatal
főigazgató

REQUEST OF RADIO LICENCE FOR THE JTIDS/MIDS OPERATIONS

The request is to be submitted to the non-civil frequency management authority, at the following address:

Governmental Frequency Management Agency
Budapest 1885. (Hungary)
Fax: (361) 275-0964

The request shall contain the following data:

Name of the applicant	Name and accessibility (telephone, fax, e-mail) of the requesting organisation.
Name of the licensee	Name and accessibility (telephone, fax, e-mail) of the entity, ensuring network management during the operation.
Platforms participating in the operation	Data of all platforms participating in the operation in the following order: type, quantity, location (in case of land terminals, in WGS84 coordinates), planned TSDF values.
Employment time period	Full employment time period of the operation (start and end day), as well as the more exact description of daily operation time in UTC (e.g.: 24H, or: between 0700 and 1800).
Geographic Area of the operation	By possibility with the description of the airspace to be used, operational area in WGS84 coordinates, giving country or administrative boundaries and the highest flight altitude.
Point of contact	Contact data of such organization(s) of the competent military air operation centre which are authorized to order the immediate cessation of the operation in case of interference notification from organizations responsible for safety of the civil air traffic: Name and access data of the organization [telephone (commercial, military, mobile), fax, e-mail]
Statement	Statement of the applicant on acceptance of and adherence to the Hungarian regulations of the JTIDS/MIDS frequency use.
Other	All other important data related to the operation (e.g. requested deadline for issuing the licence, code name of the exercise, data of the person coordinating the preparation)

REQUEST OF PRELIMINARY RADIO LICENCE FOR THE JTIDS/MIDS AWACS OPERATIONS

The request is to be submitted to the non-civil frequency management authority, at the following address: **Governmental Frequency Management Agency** **Budapest 1885. (Hungary)** **Fax: (+361) 275-0964** **The request shall contain the following data:**	
Name of the applicant	Name and accessibility (telephone, fax, e-mail) of the requesting organisation.
Organs of the HDF, responsible for carrying out of the operation	Name of the concerned by the AWACS operation organisations of the HDF and access data of their 24 hrs duty services (telephone, fax, e-mail)
Platforms participating in the operation	Data of all fixed land terminals in the following order: type, location (in WGS84 coordinates), the expected (planned) individual TSDF values.
Expected geographical area of operation	The expected area of operation in WGS84 coordinates, giving country or administrative boundaries and the highest flight altitude.
Statement	Statement of the applicant on acceptance of and adherence to the Hungarian regulations of the JTIDS/MIDS frequency use.
Other	All other important data related to the AWACS operations.

7.10

ITALY

FREQUENCY CLEARANCE

STATO MAGGIORE DELLA DIFESA

Reparto T.E.I. – Ufficio Agenzie NATO
Agenzia Mi. R.F.A.

28 Aug 1996

Prot N. 156 / 1 / **1497 – B** / 29.02

00100 Roma
T.C. Renato SALATINO – 24056

Allegati N.

OGGETTO: MIDS Frequency Clearance (Link 16)

ALLO STATO MAGGIORE AERONAUTICA
All'attenzione del T.C. ABRIANI 00100 ROMA

Riferimento: Fax SMA – TEIAV del 20 Agosto 1996.
Seguito: Foglio 156 / 1 / 491 – B / 29.02 del 11 Marzo 1996.

Al fine di consentire la diffusione nelle competenti sedi internazionali della clearance in oggetto, gia inviata con la lettera a seguito, se ne trasmette il testo in lingua inglese.

SUBJECT: MIDS Frequency Clearance (Link 16)

1. MOD ITALY – T.E.I. Mi.R.F.A. grants Frequency Clearance, on a noninterference basis, to allow Link 16 operation within Italian territory / Airspace.

   The subject clearance is subordinate to the observance of the following parameters.

Platforms	All
Low Power	200 Watts
Maximum TSDF	100 / 50
Message Structure	258 and 444 Pulse Time Slots
Single Net	Allowed
Multinet	TBD
Contention	> 200 nmi radius
Initial Net Entry / RTT	Allowed
Area of Operations	100 nmi radius
Records Maintained	One year
Aircraft Separations	Standard ATC
Ground Separations	3 nmi horizontal and vertical

The following additional conditions will be compiled with.

- Any request to operate, in accordance with the above parameters, will be addressed in advance and specifically approved by a MOD ITALY – T.E.I. Mi.R.F.A. .

- All operations should be conducted on noninterference basis with military / civil TACAN / DME and ATCRBS / SSR / IFF equipment.

2. The above clearance can be expanded, restricted or revoked without notice after its release. The clearance will be reexamined as soon as the results of the ongoing electromagnetic compatibility study become available.

IL CAPO REPARTO T.E.I.
(Giuseppe CICCHETTI)

7.11

JAPAN

FREQUENCY CLEARANCE

TACTICAL DATA SYSTEM OPERATION AGREEMENTS

April, 1999

Radio Communication Division
Control Safety Department
Civil Aviation Bureau
Ministry of Transport

Command and Communication Division
Operations Bureau
Japan Defense Agency

The Radio Communication Division, Control Safety Department, Civil Aviation Bureau, Ministry of Transport (hereinafter referred to as "the MOT") and the Command and Communication Division, Operations Department, Japan Defense Agency (hereinafter referred to as "the JDA") agree about the operation of the Tactical Data System, and any other similar system, functioning in the frequency band from 960 to 1215 MHz (hereinafter referred to as "the TDS") as follows:

Article 1 Purpose

1 This document defines the operation of TDS radio stations of the JDA within a specified area. The JDA takes the responsibility to make its TDS operators understand and comply to the agreements in this document.

2 960-1215 MHz band is assigned by the Radio Regulations of the International Telecommunication Union (ITU) for the use and development of the Air Traffic Control System both onboard and on the ground, and protected for the present and the future. The MOT agrees on the operation of the TDS defined in this document provided that it does not interfere with any existing or future Air Traffic Control Ground System or related onboard systems.

3 The JDA shall co-ordinate about the operation of the TDS of the USA within the area specified in this document.

Article 2 Area

The agreements in this document are applied to Tokyo and Naha FIR.

Article 3 Operational Requirements

The JDA operates the TDS that satisfies the technical specifications listed in Attachment 1, under the following requirements:

(1) The Time Slot Duty Factor (TSDF) shall be 100/50 or less.

(2) When more than one terminal are operating on the same network, the area of the network shall be defined as the union of the vertical cylinders with a radius of 300 NM from the participating terminals.

(3) Only single network operation is allowed.

(4) The interference protection function must be activated in order to automatically prevent the following situations:

1) The pulse width does not fit in 6.08-6.72(μs) range.
2) The transmission frequencies in the frequency hopping pattern are not used with an equivalent probability.
3) The transmission power exceeds the ERP specified in Article 3, Attachment 1 (5).
4) The number of time slots for a terminal exceeds 50% in one or more frames.

5) The power radiated at some frequencies in the bands from 1012 to 1050 MHz and from 1068 to 1110 MHz exceeds the level that is 60 dB below the peak level of the TDS spectrum.

(5) Protected airspace

The TDS shall not be operated in the following airspace (Separate sheet 2 indicates "TDS Operation Protected Airspace Outline".):

1) The air traffic control areas for public use, the approach control areas, and the airspace identical to the information zones indicated in the air route magazine (Aeronautical Information Publication (AIP)) published by the Civil Aviation Bureau, MOT. For airports for which no information zone is defined, the airspace up to the altitude of 900m over the 9 km radius circle with its center at the aerodrome reference point shall substitute. No such airspace is designated for airports without DME, TACAN, and SSR facilities.
2) Regarding antennas installed on the ground or at sea, stationary or moving: The airspace within the horizontal distance of 2.4 NM from any DME or TACAN facility on the ground for public purposes released in AIP. Regarding aviating antennas: The airspace within the altitude of 1600 ft and the horizontal distance of 3.8 NM from any of the above mentioned facilities.
3) Regarding antennas installed on the ground, at sea or moving: The airspace within the horizontal distance of 2.0 NM from any of the SSR facilities in attachment 3. Regarding aviating antennas: The airspace within the altitude of 1700 ft and the horizontal distance of 2.2 NM from any of the SSR facilities in attachment 3.
4) Regarding antennas installed on the ground, at sea, or moving and aviating antennas: The airspace within the horizontal distance of 3.6 NM and the vertical distance of 5,500 ft from any TACAN/DME Interrogator installed on civil aircraft. The airspace within the horizontal distance of 1.4 NM and the vertical distance of 1,600 ft from any TACAN/DME Interrogator installed on civil aircraft.

Article 4 Interference handling

1 Upon inquiry from the MOT on interference onto the air traffic control facility, the JDA shall promptly reply with the TDS operational status.

2 Upon a halt request from the MOT, the JDA shall promptly halt the operation of the TDS. The halt term shall continue until it is proved that the TDS has not been involved in the interference.

3 The MOT and the JDA shall establish contact channels as shown in separate sheet 4.

4 The MOT and the JDA shall cooperate in the investigation of the cause of the interference, and make efforts to prevent repetition.

5 The JDA shall retain for 1 year the operation records of the TDS that provide enough information for interference investigation, and promptly submit them upon request from the MOT. These records shall cover dates, the start and end times of radio wave radiation (UTC), altitudes, positions, flight's wakes, operational status of the interference protection function, etc.

Article 5 Information Security

Secrets obtained by enforcing these agreements shall not be revealed to others by MOT or JDA.

Article 6 Uncertainty

When uncertainty about the understanding of these agreements arises, it shall be resolved upon mutual discussion between the MOT and the JDA.

Article 7 Alteration and Abolition

When any of the following conditions is met, alteration or abolition of this document may be discussed between the MOT and the JDA. These agreements shall be altered or abolished after sufficient investigation and discussion of conformability; The MOT and the JDA shall jointly discuss the investigation requirements and the JDA shall bear the cost.

(1) A new Air Traffic Control System, a different version of existing system, or an existing system with different parameters is to be implemented.

(2) The conditions for TDS Operation are to be changed; the operational abilities are to be augmented; or the specification is to be changed.

(3) Uncertainty arises on these agreements.

Rider

1 These agreements shall be effective as of 21st April, 1999.

2 2 copies of this document shall be prepared with the stamps of the chief of the Radio Communication Division, the MOT, and the chief of the Command and Communication Division, the JDA, and each shall retain a copy.

Date: 21st April, 1999

Kazuo INOUE,
Division Manager,
Radio Communication Division,
Control Safety Department,
Civil Aviation Bureau,
Ministry of Transport,
Kasumigaseki 2-1-3,
Chiyoda-ku, Tokyo.

Yoshiaki KAMATA,
Division Manager,
Command and Communication Division,
Operation Department,
Japan Defense Agency,
Akasaka 9-7-45,
Minato-ku, Tokyo.

Attachment 1 (Related to Article 3)
The technical specification for the Tactical Data System

The TDS on which agreements made in this document should meet the following technical specification.

(1) Terminals
JTIDS class 2 terminals

(2) Frequencies of operation
Operation is in Mode 1 using a pseudorandom sequence amongst the 51 carrier frequencies designated from 960 to 1215 MHz with exceptions of unless from 1012 to 1050 MHz and from 1068 to 1110 MHz.

(3) Pulses description

Type of transmission	Time Division Multiple Access (TDMA)
Time slot duration	7.81250 ms
Pulses per time slot	258 pulses / time slot
Pulse duration	6.4 micro-sec
Pulse Modulation	Continuous Phase Shift Modulation (CPSM)
Bit rate	5 Mbits/sec, 32 bit /pulse
Rising time	800 ns
Time slot rate	128 slots /sec
Pulse rate	32024 pulses / sec
Timeslots per flame	1536 time slots / flame

(4) Pulse Spectrum (measured with a frequency resolution of 300 kHz)
At ± 3 MHz from the carrier frequency: At least 10 dB below the carrier peak.
At ± 5 MHz from the carrier frequency: At least 23 dB below the carrier peak.
At ± 13 MHz from the carrier frequency: At least 55 dB below the carrier peak.
More than ± 15 MHz away from the carrier frequency: At least 60 dB below the carrier peak.

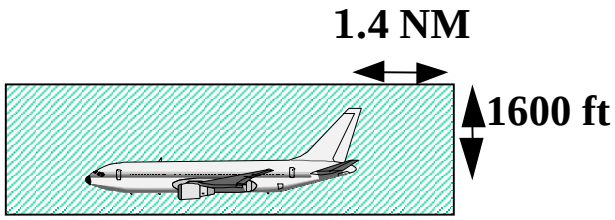
(5) Power Output

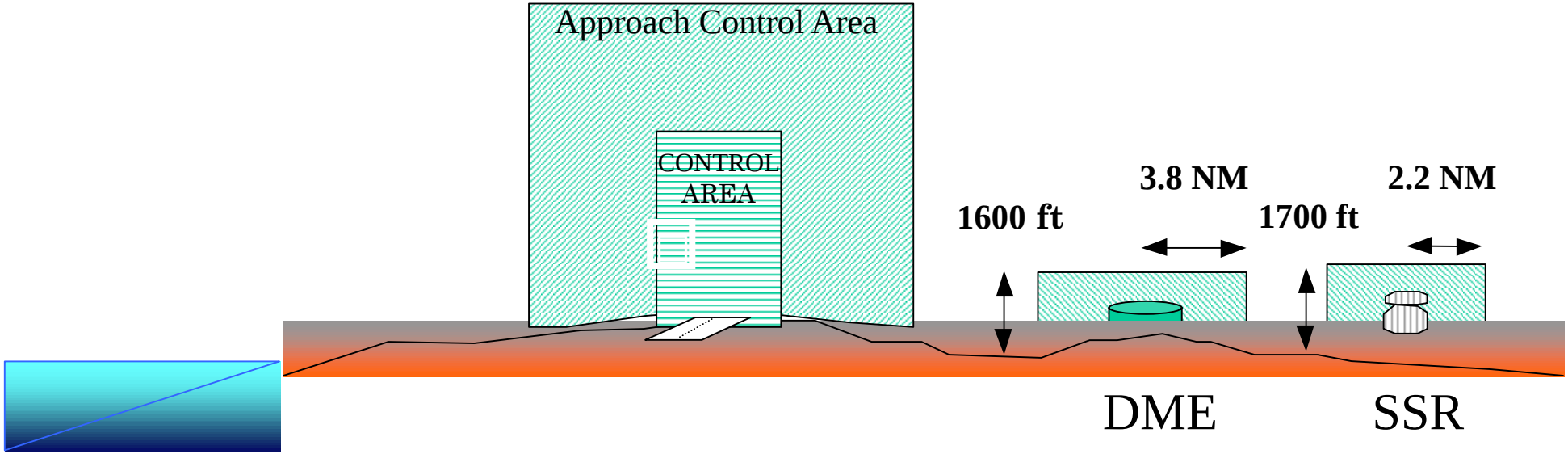
The nominal value of the output power should be defined to be the effective radiated power (ERP), with the antenna gain and the feeder loss took into calculation. The actual ERP should not exceed the nominal value by more than 3 dB.

Regarding the ground and ship-board terminal:	54 dBm(assuming 250 W) or less
Transmitter Output:	53.0 dBm
Antenna Gain:	3.5 dBi
Feeder Loss:	2.5 dB

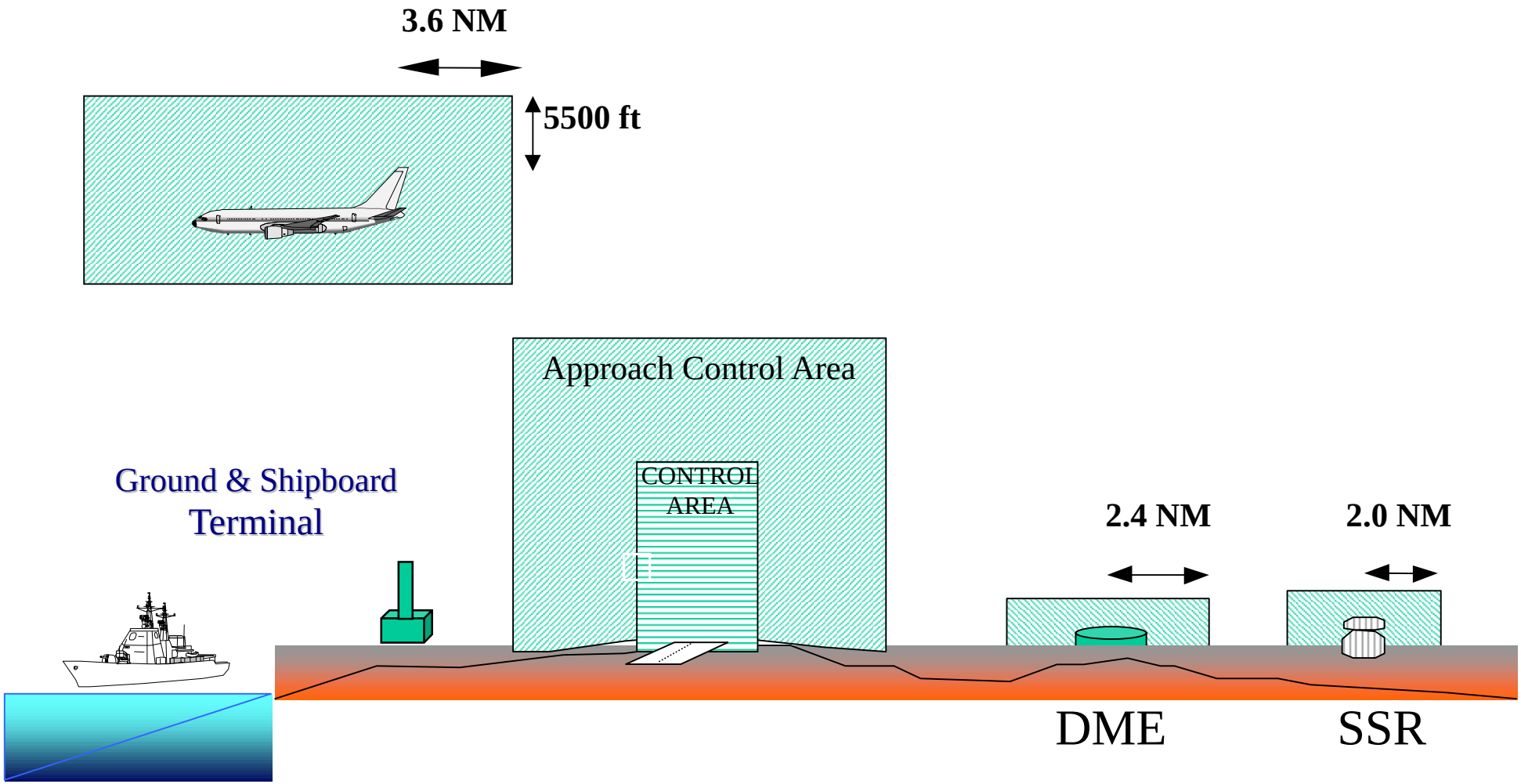
Regarding the Air-born terminal:	53.4 dBm(assuming 220 W) or less
Transmitter Output:	51.1 dBm
Antenna Gain:	7.0 dBi
Feeder Loss:	4.7 dB

Attachment 2 [TDS Operation Protected Airspace Outline]
For Airborne terminal





Attachment 2 [TDS Operation Protected Airspace Outline]
For Ground and Shipboard terminal



Attachment 3 [SSR facility]

Classify	Site name	Position (Tokyo Datum Position)	Classify	Site name	Position (Tokyo Datum Position)
ASR /SSR	Hakodate	N 41° 46’ 23” E140°49’ 20”	ASR /SSR	Fukuoka No.1	N 33° 35’ 18” E130°26’35”
	Sendai	N 38° 08’ 27” E140°55’ 22”		Fukuoka No.2	N 33° 34’ 41” E130°26’58”
	Niigata	N 37° 56’ 50” E139°06’ 47”		Nagasaki	N 32° 54’ 46” E129°54’36”
	Narita No.1	N 35° 45’ 19” E140°22’ 44”		Oita	N 33° 28’ 33” E131°44’08”
	Narita No.2	N 35° 46’ 14” E140°22’ 47”		Kumamoto	N 32° 49’ 36” E130°50’51”
	Haneda No.1	N 35° 32’ 23” E139°46’ 10”		Miyazaki	N 31° 52’ 08” E131°27’08”
	Haneda No.2	N 35° 32’ 18” E139°47’ 38”		Kagoshima No.1	N 31° 47’ 54” E130°43’37”
	Nagoya No.1	N 35° 15’ 00” E139°47’ 38”		Kagoshima No.2	N 31° 47’ 31” E130°43’57”
	Nagoya No.2	N 35° 15’ 30” E136°55’ 11”		Naha	N 26° 11’ 04” E127°39’38”
	Osaka No.1	N 34° 47’ 04” E135°25’ 47”	ARSR /SSR	Shimojishima	N 24° 49’ 24” E125°08’30”
	Osaka No.2	N 34° 46’ 47” E135°26’ 10”		Kushiro	N 43° 01’ 33” E144°33’28”
	Kansai No.1	N 34° 26’ 23” E135°15’ 22”		Yokotsutake	N 41° 56’ 07” E140°46’30”
	Kansai No.2	N 34° 25’ 28” E135°13’ 53”		Hachinohe	N 40° 29’ 54” E141°35’41”
	Hiroshima	N 34° 25’ 50” E132°55’ 07”		Kamishinayama	N 38° 29’ 52” E141°21’44”
	Takamatsu	N 34° 13’ 03” E134°01’ 25”		Oginojo	N 37° 29’ 18” E138°43’52”
	Kouchi	N 33° 32’ 34” E133°40’ 49”		Yamada	N 35° 46’ 34” E140°31’50”

Attachment 3 [SSR facility]

Classify	Site name	Position (Tokyo Datum Position)	Classify	Site name	Position (Tokyo Datum Position)
ARSR /SSR	Hakone	N 35° 10’ 35” E139°04’ 07”	ORSR	Hukue	N 32° 36’ 42” E128°42’ 55”
	Mikawa	N 34° 51’ 55” E137°13’ 06”			N 32° 39’ 52” E128°50’ 21”
	Mikuniyama	N 34° 21’ 35” E135°29’ 17”			N 32° 36’ 35” E128°36’ 37”
	Hirata	N 35° 28’ 06” E132°47’ 26”	APID	Akita	N 39° 36’ 37” E140°12’ 55”
	Imanosan	N 32° 51’ 14” E132°50’ 57”			N 39° 36’ 32” E140°13’ 28”
	Kaseta	N 31° 22’ 37” E130°16’ 10”		Toyama	N 36° 38’ 22” E137°11’ 15”
	Amami	N 28° 24’ 43” E129°34’ 22”			N 36° 38’ 19” E137°11’ 34”
	Miyakojima	N 24° 51’ 31” E125°17’ 52”		Okayama	N 34° 45’ 21” E133°51’ 13”
	Sangunsan	N 33° 33’ 08” E130°35’ 08”			N 34° 44’ 48” E133°50’ 17”
	Yaedake	N 26° 37’ 57” E127°55’ 52”		Matsuyama	N 33° 49’ 38” E132°42’ 08”
ORSR	Iwaki	N 37° 06’ 32” E140°47’ 56”			N 33° 49’ 34” E132°42’ 19”
		N 37° 05’ 01” E140°51’ 47”		Amami	N 28° 25’ 47” E129°42’ 39”
		N 37° 08’ 44” E140°58’ 45”			N 28° 25’ 53” E129°42’ 48”
	Hachijojima	N 33° 04’ 32” E139°49’ 05”			
		N 33° 03’ 54” E139°49’ 22”			
		N 33° 03’ 55” E139°48’ 32”			

Attachment 4 (Related to Article 4) [Liaison System]

The MOT and the JDA shall establish the liaison system enabling communication on the telephone or fax.

The points of contact

The Ministry of Transport

The person in charge	Administration section chief
Address	2-1-3, kasumigaseki, chiyoda-ku, Tokyo
Phone	03-3580-4066
Phone (FAX)	03-3580-7971

The Japan Defense Agency

The person in charge (daytime)	Radio management specialist
Address	9-7-45, akasaka, minato-ku, Tokyo
Phone	03-3408-5211 (ext. 4124)
Phone (FAX)	03-3746-1413
The person in charge (nighttime)	Duty Officer, Air Staff Office
Address	9-7-45, akasaka, minato-ku, Tokyo
Phone	03-3408-5211 (ext. 2985,3854)
Phone (FAX)	03-3408-5211 (ext. 2984)

7.12

THE NETHERLANDS FREQUENCY CLEARANCE

****

TELECOPIER / FACSIMILEMESSAGE

****

NL MINISTRY OF DEFENCE
Defence Staff/PL/CIS-FREQ
Postbox 20701
2500 ES The Hague

Tel/Fax:
PTT **31.70.318.7246 or .6933
IVSN 245.7246 or .6933
FAX **31.70.318.8453 (unclas)

RECEIVED
12 FEB 1996
NATO
ALLIED RADIO
FREQUENCY
AGENCY

From : MOD NL - CIS-FREQ - LTCDR N. De Waal

To : NATO HQ - IMS - CIS - ARFA Plans and Policy

Faxnumber: 0.00.32.2.707.5383

Date : 12th February 1996

Total number of pages (including frontpage): 12

Subject: JTIDS/MIDS Frequency Clearance for the Netherlands
Reference: Letter “TZ/LS 95/0567" of “LVB" dated 26th September 1995

1. Attached, you will find the Netherlands Frequency Clearance for JTIDS/MIDS with a short translation of it. I hope we can use it within NATO in order to try to get all NATO administrations in line with one JTIDS/MIDS clearance in future. All is based however on the centralized timeslot network management by SHAPE.

2. A copy of this clearance was asked for by SHAPE and I think it could be useful for ARFA as well to get insight in the actual situation concerning a NATO Frequency Clearance for JTIDS/MIDS.

Best regards,

Nico de Waal
LTCDR RNLNA
NL ARFA REP

luchtverkeersbeveiliging
air traffic control

Ministerie van Defensie
Defenslestaf - CIS
t.a.v. Itz. N. de Waal
Postbus 20701
2500 ES DEN HAAG

uw brief van:	schiphol-c: 26 September 1995	contact pers: H.L van Noort
uw kenmerk:	ons kenmerk: TZ/LS 95/0567	toestelnummer: (020) - 602.3544
onderwerp: JTIDS klaring	bijlage(n); 1	faxnummer (020) - 602.3607

Geachte.heer de WaaI,

Het verzoek van Defensie om tot een duIdelijker en rulmere klaring voor het gebruik van JTIDS in/boven Nederland te komen is voor do LVB aanleiding geweest do compatibiliteit tussen JTIDS en het civiel gebruik van do SSR-frequenties nogmaals te bestuderen. Hierbij kon dankbaar gebrulk worden gemaakt van de binnen de Multi National Working Group(MNWG) gepubliceerde gegevens van compatibiliteits-studies alsmede van do door Defensie verzorgde briefing over dit onderwerp.

Na verdere inwinning van gegevens bij de betrokken Duitse instantie kunnen wij u meedelen accoord to gaan met het gebruik van JTIDS in/boven Nederland onder do voorwaarden zoals omschreven in de bijgevoegdo “DRAFT Frequency Clearance for JTIDS/MIDS Operations within the Flight Information Regions of the NATO Nations”.

Hoogachtend,

LVB systemen,
buro LS/NV,

(H.L. van Noort.)

Postbus 7601, 1118 ZJ Schiphol-Centrum, Nederland, telefoon +31 20 60 29 111, telefax +31 20 64 84 999

12 February 1996

This document contains a close (as literal as possible) translation of the attached letter of The Netherlands Civil Aviation Authorities, referring to the (also attached) Draft Frequency Clearance for JTIDS/MIDS use (version 10 May 1995).

This letter has been addressed to MOD NL - CIS Dept - Frequency Policy Officer - (LTCDR N. De Waal) and was sent by the head of the Civil Aviation Bureau (Mr. H.L. van Noordt) who deals with civil aeronautical frequency matters on behalf of the Dutch Government. The text is as follows:

The request of (the Ministry of) Defense for a clearer and wider clearance for the use of JTIDS in/above The Netherlands (FIR) has been the reason for the LVB (Civil Aviation Authorities) to study again the compatibility between JTIDS and the civil use of SSR frequencies. For this study we were glad to be able to use the published data on compatibility studies issued by the MultiNational Working Group (MNWG) and especially the briefing we attended at the MOD.

After further gathering of data, the German Authorities involved, we can tell you that we agree to the use of JTIDS/MIDS in/above The Netherlands (FIR) under the conditions as stated in the attached “Draft Frequency Clearance for JTIDS/MIDS Operations within the Flight Information Regions of the NATO Nations.”

Best Regards,
Nico de Waal - LTCDR RNLNA
MOD NL - CIS - Frequency Policy

(Personal Note: This briefing was held for Civil and Military Authorities at MOD NL and arranged by MSgt Kurt Nahser of SHAPE. It gave more insight in the civil/military frequency sharing possibilities than the MNWG was able to do in many years time, producing large piles of technical studies.)

Ministry of Defence

RNLAF Tactical Air Force

Afdeling Communicatie en Informatie Systemen

Visit address:
Hoofdkwartier Koninklijke Luchtmacht
Binckhorstlaan 135
Postal address:
MPC 58 L
Postbus 20703
2500 ES Den Haag
The Netherlands
www.luchtmacht.nl

Author:
Major ing. G.J. Wolkers
Telephone +31 70 3396214
Fax +31 70 3396574
Internal (450) 62 14
E-mail:
acis@stl.af.dnet.mindef.nl

Royal Netherlands Air Force

To See list of addressees

Date 08 DEC 2004

Our reference STL 2004037543

Subject Use of Link 16 by visiting forces in the Amsterdam FIR

In recent years several European and non-European nations have started up Link 16 operations. JTIDS/MIDS Link 16 operates in the frequency band 960 – 1215 Mhz which is under control of the Civilian Aviation Authorities (CAA). In order to get permission to operate JTIDS/MIDS, negotiations between the military and the CAA were started. As a result authorisation to operate on a Non Interference Basis (NIB) was granted, subject to certain restrictions as laid down in the Frequency Clearance Agreement (FCA).

To operate JTIDS/MIDS, two requirements have to be fulfilled. JTIDS/MIDS users need to operate in adherence to the Frequency Clearance Agreement (FCA) document. These FCA documents differ per country and stipulate the restrictions for the operational use of JTIDS/MIDS in that country. Most NATO nations have developed adequate FCA documents and procedures to ensure adherence to these Agreements. Next to the FCA, a second issue has to be addressed. In order to use equipment like radio systems, datalinks or radars, special permission is required to radiate within the frequency spectrum. For these systems, so-called Frequency Supportability Requests (FSR) are needed to have the equipment cleared for use within the FIR. The FSR is a mandatory (inter)national procedure which has to be completed before a system can be used for the first time.

Until now temporary waivers have been granted to visiting forces for operational use of Link 16 equipped platforms in the Amsterdam FIR. This was all done on the basis that within a reasonable period FSR forms would be forwarded to the Frequency Management Office of the Royal Netherlands Air Force, which acts as Link 16 FCA point of contact for the Dutch forces. With the growth of Link 16 equipped platforms, more attention for the completion of the FSR procedure for each platform configuration is needed.

The amount of short notice requests and subsequent temporary waivers which are being processed by the RNLAF could potentially violate the restrictions and regulations of the FCA en FSR. Such a situation is not desirable since it could jeopardise the Netherlands FCA.

Please quote date, our reference and subject when replying.

Ministry of Defence

RNLAF Tactical Air Force

Afdeling Communicatie en
Informatie Systemen

Date 08 DEC 2004
Our reference STL 2004037543

Therefore, I have made the following decisions to safeguard current and future JTIDS/MIDS/Link 16 operations within the Amsterdam FIR:

1. Visiting forces will be granted a temporary waiver regarding the Frequency Supportability Request until March 1st 2005.

2. In order for visiting forces to continue operating JTIDS/MIDS/Link 16 within the Amsterdam FIR after March 1st 2005 a formal FSR (ACP-190 or DoD 1494 forms) has to be received by the Radio Systems and Frequency Management Office for Frequency Supportability (TL/ACIS/BRF) before March 1st 2005.

3. In order to operate JTIDS/MIDS/Link 16 prior to March 1st 2005, a JTIDS/MIDS/Link 16 Authorisation Request has to be forwarded to the NDMC for each time Link 16 is to be used within the Amsterdam FIR. This request, in accordance with the procedures document attached to this letter, must be received by the NDMC at least 24 hours prior to Link 16 usage.

4. The maximum allowed power setting for the Link 16 terminal (ie. JTIDS, MIDS, URC-138, etc) shall **not exceed** 50 Watt. Only visiting forces with a by TL/ACIS/BRF approved FSR can operate on a 200 Watt terminal setting.

5. For all operational Link 16 issues, the National Datalink Management Cell will act as the first point of contact.

In case you need clarification or assistance on how to process a FSR you are advised to contact your national military frequency management office or TL/ACIS/BRF (PSTN +31 70 339 6214). Frequency management organisations are requested to pursue the international licensing of their national platforms equipped with Link 16.

Commander Tactical Air Force

J.H. de Jong
Major General

Attached: Procedures for operating JTIDS/MIDS in peacetime in the Amsterdam FIR.

Ministry of Defence

RNLAF Tactical Air Force

Afdeling Communicatie en
Informatie Systemen

Date 08 DEC 2004
Our reference STL 2004037543

List of addressees:

CC AIR Ramstein
Ramstein Air Base
D – 66877 Ramstein Miesenbach
Germany

HQ USAFE
Ramstein Air Base
D – 66877 Ramstein Miesenbach
Germany

CAOC 2
Kalkar
Germany

CAOC 4

CAOC 9
RAF High Wycombe
Maphill
Buckinghamshire
HP 14 4UE United Kingdom

Stab Fernmeldeführung
Starhemberg Kaserne
Gussriegelstrasse 45
1100 Wien
Austria

Belgium Forces – NARFA Belgium
General Staff
KKE Evertstraat 1
1140 Brussels
Belgium

Director Electronics,Communications
and Spectrum Services (DTSES 5 – 3)
NDHQ Ottawa
Canada

Czech Armed Forces
Command and Control Division
PO Box 69
Vitezue namesti 5
16000 Prague
Czeck Republic

HQ Chief of Defense
RDFKA NARFA Denmark
PO Box 202
DK 2950
Vebaek
Denmark

CDAOA / CGRLD
BA 921
95155 Taverny Cedex
France

FAFCISO15 / NARFA Germany
Tomburg Kaserne
Munstereifeler Strasse 75
D – 53359 Rheinbach

Hellenic Air Force General Staff
Communications Brach (C3/2)
TGA 1010
Athens
Greece

Government Frequency Management Office
X. Salgotarjani 20
1885 Budapest
Hungary

Ministry of Defence

RNLAF Tactical Air Force

Afdeling Communicatie en
Informatie Systemen

Date 08 DEC 2004
Our reference STL 2004037543

Stato Maggiore Difesa
Reparto T.E.I.
Agenzia Mi.R.F.A.
00100 Roma

Stato Maggiore Aeronautica
3rd Reparto
Viale dell Universita 4
00185 Roma

Headquartes Defense Command
CIS DIV (K 6)
Oslo MIL
Huseby
(N – 0016 Oslo 1)
Norway

Military Frequency Management Office
A1. Niepodleglosci 218
Warszawa 00 - 911
Poland

Estado Maior General das Forces Armadas
Avenida ILHA DA
Madeira 1499
Lisbon
Portugal

Portuguese Air Force
Comando Operacional da Forca Aerea
Monsanto 1500
Lisbon
Portugal

CEAR
Carretera N –320
KM 274
19145 Bellavista
Guadalajara
Spain

Swedish Armed Forces HQ
SE – 10785 Stockholm
Sweden

Air Force Brigade 31
Military Base
CH 8600 Dubendorf
Switzerland

Turkish General Staff
CEIS DIV
National Radio Frequency Agency
06100 Ankara
Turkey

HQ Joint Force Air Component
Data Link Operations Cell
RAF High Wycombe
Maphill
Buckinghamshire
HP 14 4UE United Kingdom

Naval Electromagnetic Spectrum Center
2461 Eisenhower Ave
Alexandria, VA 22331 - 1408
United States

In copy to:

TL/AJO
TL/AOO

Ministry of Defence

RNLAF Tactical Air Force

Afdeling Communicatie en
Informatie Systemen

Date 08 DEC 2004
Our reference STL 2004037543

TL/ACIS
TL AGW/STO
Commandant AOCS NM
Commandant VLB LW
Commandant VLB VKL
Commandant VLB TW
Commandant VLB EHV
Commandant GGW
NDMC

PROCEDURES FOR MILITARY FORCES OPERATING JTIDS/MIDS IN PEACETIME IN THE AMSTERDAM FLIGHT INFORMATION REGION

1. INTRODUCTION

1.1 The use of JTIDS/MIDS in the Amsterdam Flight Information Region (FIR) is subject to restrictions imposed by the Netherlands Civil Aviation Authorities ("Luchtverkeersleiding Nederland"- LVNL). The LVNL and the Radio Systems and Spectrum Management Office (STL/ACIS/BRF) of the Royal Netherlands Air Force (RNLAF) have agreed that use of JTIDS/MIDS within the Amsterdam FIR is allowed in peacetime on a non-interference basis. The LVNL has imposed restrictions and regulations for the use of JTIDS/MIDS, laid down in the Netherlands Frequency Clearance Agreement (FCA). The National Datalink Management Cell, for supporting JTIDS/MIDS/Link 16 operations, is responsible for ensuring that all JTIDS/MIDS users operating within the Amsterdam FIR coordinate their operations to ensure compliance with the conditions of the Netherlands FCA. The Netherlands FCA is based on the Common Frequency Clearance Criteria as summarised in appendix 1.

2. OBJECTIVE

2.1 To state the procedures for the use of JTIDS/MIDS in the Amsterdam FIR in peacetime.

3. EXECUTION

3.1 **General.** The procedures, as described in this document, only apply to the use of JTIDS/MIDS in the Amsterdam FIR in peacetime. An overview of the Amsterdam FIR is depicted in appendix 2. The Netherlands FCA is constantly evaluated by the NDMC and the LVNL for their validity and may be modified. It is the responsibility of each JTIDS/MIDS user to be aware of and to adhere to the restrictions in force during periods of intended operations in the Amsterdam FIR.

3.2. **Requesting authorisation for using JTIDS/MIDS.** JTIDS/MIDS operations must be coordinated, authorised and managed to prevent interference and unintended degradation of the network. The NDMC is tasked with these responsibilities. Every platform that wishes to operate JTIDS/MIDS within the Amsterdam FIR is required to request authorisation for using JTIDS/MIDS. The NDMC will coordinate and manage the requests with adjecent Data Link Management Centres to prevent any form of interference. The procedure for obtaining authorisation for using JTIDS in the Amsterdam FIR is described in appendix 3 to this document.

3.3 **Requests for Frequency Supportability.** The number of JTIDS/MIDS users in the world is steadily growing. Each platform is required to ensure that their JTIDS/MIDS or equivalent Link 16 terminal installation is granted permission to radiate within the Amsterdam FIR. The Radio Systems and Spectrum Management Office (STL/ACIS/BRF) has the principal responsibility regarding the frequency supportability of platforms. The procedures for requesting permission are described in appendix 4.

3.4 **Reporting.** Each individual platform operating JTIDS/MIDS within the Amsterdam FIR must generate a JTIDS Activity Report (JAR), after each sortie/mission or at least once every 24 hours when the mission lasts for more than 24 hours. The JAR must be retained by the originating unit for a minimum of six months. The NDMC will also keep a record of received JARs for future reference. The information to be recorded in the JAR is depicted in appendix 5.

3.5 **Timelines.** Requests for participating and using existing networks need to be received by the NDMC at least 3 weeks prior to the actual use of the networks. Requesting a new, to be designed, network needs to be received by the NDMC at least 9 weeks in advance. The NDMC reserves the right to deviate from these periods.

3.6 **Point Of Contact – NDMC**. The NDMC is the joint organisation within the Netherlands for coordinating, managing and authorising JTIDS/MIDS/Link 16 operations within the Amsterdam FIR and for all units of the Netherlands Armed Forces using JTIDS/MIDS/Link 16. The NDMC can be contacted by:

National Datalink Management Cell for supporting JTIDS/MIDS/Link 16 operations
Royal Netherlands Air Force
Material Command
P.O. Box 20703
2500 ES The Hague, The Netherlands
Tel.: +31 - (0)70 – 339 78 69 / 78 71 / 78 66
Fax: +31 - (0)70 – 339 66 82
E-mail: ndmc@af.dnet.mindef.nl

Radio Systems and Spectrum Management Office for Frequency Supportability (STL/ACIS/BRF)
Royal Netherlands Air Force
Staff Tactical Air Force, CIS Division
P.O. Box 20703
2500 ES The Hague, The Netherlands
Tel.: +31 – (0)70 – 339 62 14
Fax: +31 – (0)70 – 339 65 74
E-mail: acis@stl.af.dnet.mindef.nl

APPENDICES:

1. Common Frequency Clearance Criteria.
2. Amsterdam Flight Information Region.
3. JTIDS/MIDS Authorisation Request Form
4. Frequency Supportibility Request Form.
5. JTIDS Activity Report (JAR)

APPENDIX 1
COMMON FREQUENCY CLEARANCE CRITERIA

1. **Coordination and control.** JTIDS/MIDS operational or test transmission are to be coordinated with the SHAPE Data Link Management and Interoperability Cell (DLMIC) via STL/ACIS.

2. **Separation.** Standard ATC separation[1] for airborne terminals. Minimum separation between surface terminal and TACAN/DME equipment is 0.5 NM (-33 dBm receive signal) and between surface terminal and ATCRBS/SSR is 900 feet (-20 dBm receive signal).

3. **Output power.** The output power shall not exceed the nominal 200 Watts.

4. **EMC features.** The EMC protection features shall be operating at all times unless special authorisation to override them has been granted by STL/ACIS.

5. **Messages.** Standard (258 pulses) and packed (444 pulses) messages are allowed.

6. **Time Slot Duty Factor (TSDF).** In an operations area[2] of 100 NM radius the total equivalent TSDF shall not exceed 100%. A single JTIDS/MIDS user shall not transmit more than 50% TSDF.

7. **Time Slot reuse.** Single net and multi-net operations (time slot reuse on different nets) are allowed. Contention access (time slot reuse on the same net) is prohibited except for Round Trip Timing (RTT) and Initial Entry functions. The minimum separation between JTIDS/MIDS terminals transmitting in the same time slot on the same net (contention) shall be 100 NM.

8. **Recording.** All JTIDS/MIDS activities must be recorded in a logbook. The logbook must contain at least the following entries: date, time in UTC-Zulu (start and end of radiation), altitude, position or standard flight pattern and EMC features automatic or override. The logbooks must be maintained for at least one year.

9. **Review.** The national authorities of the NATO nations reserve the right to modify or expand the restrictions for the operation of JTIDS/MIDS equipment at any time.

10. **Use of frequencies.** All networks, cleared for operations within the Amsterdam FIR, are based on the use of 51 channels. Platforms with frequency remapping capabilities must indicate this capability and intended use in their Requests.

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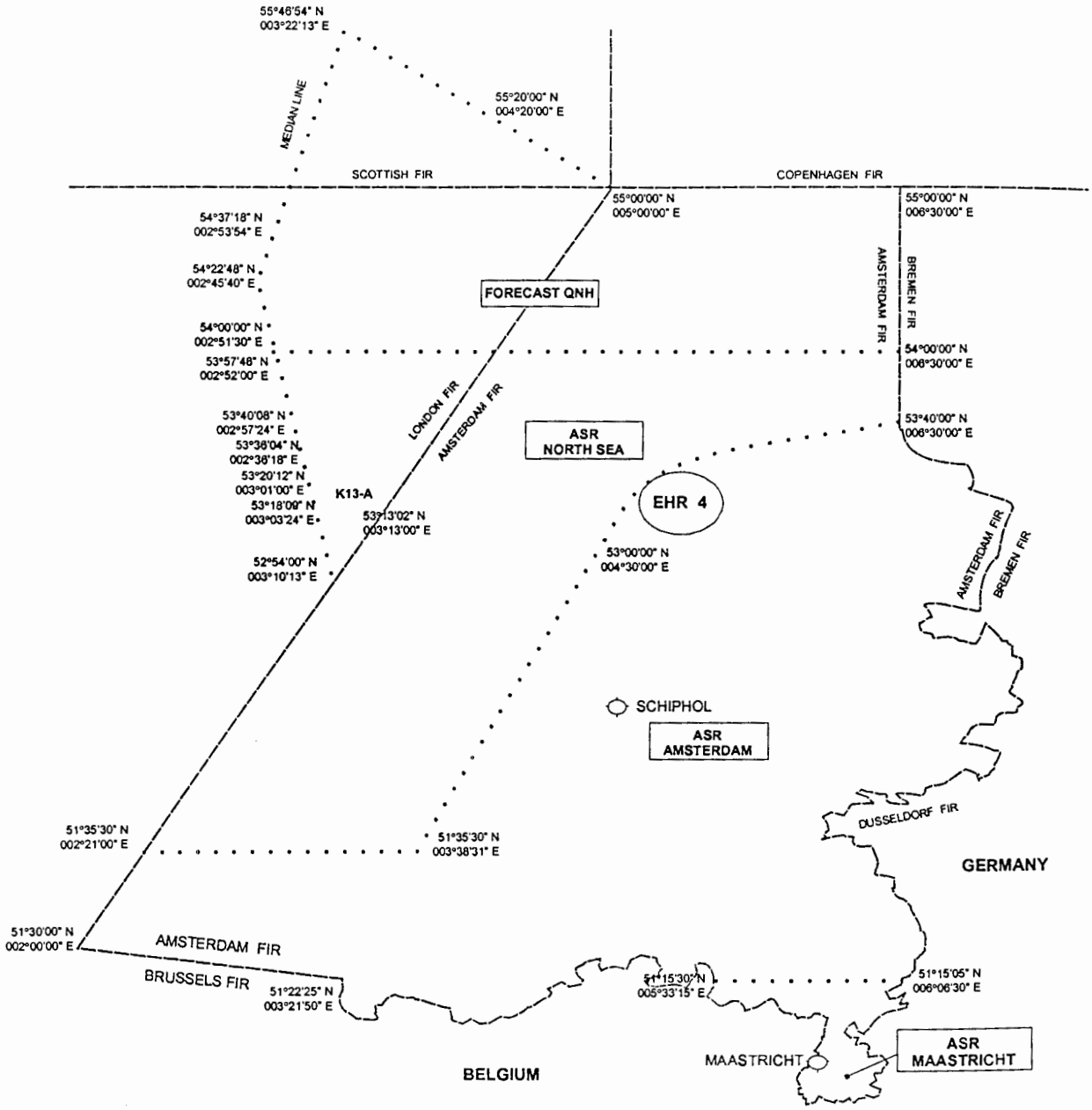
[1] Procedures for Air Navigation Services – Rules of the air and air traffic services (PANS-RAC) (Doc 4444) part III and IV.

[2] A cylinder covering the total airspace between the highest airborne JTIDS/MIDS terminal and the ground.

APPENDIX 2
AMSTERDAM FLIGHT INFORMATION REGION



APPENDIX 3
JTIDS/MIDS Authorisation Request Form

For requesting authorisation for using JTIDS/MIDS operationally within the Amsterdam FIR, the following request needs to be filled out for each platform participating in a JTIDS/MIDS/Link 16 network structure within the Amsterdam FIR. The form must be received by the NDMC within the timeliness described above.

The form is to be addressed in softcopy to:

a. Action Addressee : Netherlands National Datalink Management Cell

b. Info Addressee : Radio Systems and Spectrum Management Office (STL/ACIS/BRF)

a. Reason of the request.

b. Frequencies in use. (the use of JTIDS/MIDS within the Amsterdam FIR is bases on the 51 channels for JTIDS/MIDS. If another number of channels is used, specify here)

c. Period of Use and Operating Schedule. (specify the dates/times when the operation is planned and indicate the perceived use during the operation. I.e. 6 hours per 24 hours or intermittent per 24 hours etc.)

d. Geographic area of operations and horizontal and vertical dimensions of the operating area (i.e. height bands/radius of operating area)

e. Type of terminals participating and maximum power output (i.e. MIDS LVT-1, FDL, JTIDS Class 2M, URC-138 etc.)

f. Date by which the authorisation (or rejection) needs to be received.

g. Point(s) of Contact per participating unit and overall co-ordinating Point Of Contact.

h. Objective of the operation (i.e. type of exercise, in transit, work-up phase for deployment, etc).

i. Network to be used (e.g. HFBT0001C)

j. Type of force (i.e. naval, air, ground, mixed, etc)

k. Number and type of Participating Units (I.e. F-15 Fighter, E-3 C2 platform etc.)

l. Force locations (I.e. location (Lat/Long) ground forces etc.)

m. Priorities.

n. Special requirements (i.e. network duties, relative grid, crypto, etc).

o. Documents to be used and/or required. (SOPs i.e. ADatP-16, ADatP-33, NDMC procedures etc.)

p. Point Of Contact details. (these must include name of the organisation, name and rank of personnel acting as POC, (mobile) phone- and fax numbers (both at the homebase and on the deployment location and mailadressess)

APPENDIX 4
Frequency Supportability Request Form

For requesting clearance for using a particular JTIDS, MIDS or equivalent terminal for Link 16, the following form needs to be filled out for each platform, if prior permission and/or a waiver has not yet been received. The form must be within the timeliness described above.

The form is to be addressed in softcopy to:

a. Action Addressee : Radio Systems and Spectrum Management Office (STL/ACIS/BRF)

b. Info Addressee : Netherlands National Datalink Management Cell

CLASSIFICATION

REQUEST FOR FREQUENCY SUPPORTABILITY
DEMANDE DE DISPONIBILITE DE FREQUENCES

DATE	PAGE

TO - *A*: :	FROM (Office making request) *DE (Bureau qui présente la demande):*
1-EQUIPMENT NOMENCLATURE AND/OR MODEL NUMBER *DESIGNATION DU MATERIEL ET NUMERO DE MODELE*	
2-STATUS OF SUPPORTABILITY REQUEST (Check one) *CENTRE DE DEMANDE (Cochez une seule case)*	

☐ EXPERIMENTAL RESEARCH OR EXPLORATORY DEVELOPMENT *RECHERCHE EXPERIMENTALE OU DEVELOPPEMENT PRELIMINAIRE*	☐ ADVANCED OR ENGINEERING DEVELOPMENT *DEVELOPPEMENT AVANCE OU INGENIERIE*	☐ OPERATIONAL *UTILISATION OPERATIONNELLE*

1 - EQUIPMENT USAGE - *UTILISATION DU MATERIEL*

3-FUNCTION AND PURPOSE - *FONCTION ET BUT*
4-METHOD OF OPERATION - *MODE DE FONCTIONNEMENT*
5-EXTENT OF USE - *EXTENSION DE L'UTILISATION*
6-OPERATIONAL ENVIRONMENT - *MILIEU D'UTIILISATION*
7-GEOGRAPHICAL AREA OF EXPERIMENTAL RESEARCH OR DEVELOPMENTAL EVALUATION - *REGION GEOGRAPHIQUE DE LA RECHERCHE EXPERIMENTALE OU DE L'EVALUATION DU DEVELOPPEMENT*
8-GEOGRAPHICAL AREA OF OPERATIONAL USE – *REGION GEOGRAPHIQUE DE L'UTILISATION OPERATIONNELLE*
9-NUMBER OF EQUIPMENTS IN INITIAL PHASE – *NOMBRE D'APPAREILS PENDANT LA PHASE INITIALE*
10-NUMBER OF THESE EQUIPMENTS PLANNED FOR OPERATIONAL USE - *NOMBRE D'APPAREILS PREVU POUR L'UTILISATION OPERATIONNELLE*
11- NUMBER OF THESE EQUIPMENTS OPERATING SIMULTANEOUSLY IN THE SAME ELECTROMAGNETIC ENVIRONMENT - *NOMBRE D'APPAREILS FONCTIONNANT SIMULTANEMENT DANS LE MEME MILIEU ELECTROMAGNETIQUE*

12-TARGET DATE FOR THE START AND END OF EXPERIMENTAL OR DEVELOPMENTAL EVALUATION - *DATE PREVUE POUR LE COMMENCEMENT ET LA FIN DE L'EVALUATION EXPERIMENTALE OU DE L'EVALUATION OU DEVELOPPEMENT*
13-TARGET DATE FOR OPERATIONAL USE - *DATE PREVUE D'UTILISATION OPERATIONNELLE*
14-PREVIOUS APPLICATION NUMBER - *NUMERO DE L'ANCIEN FORMULAIRE*
☐ CONTINUED UNCHANGED *RESTE EN VIGUEUR* ☐ SUPERSEDED *EST REMPLACE* ☐ RELATED *DEMEURE CONNEXE* ☐ NONE *AUCUN*

CLASSIFICATION

FS Forms 1

INSTRUCTIONS FOR COMPLETING FREQUENCY SUPPORTABILITY FORM

1. Type in classification and downgrading stamp and insert nomenclature and equipment type, e.g., AN/FPS-16 Instrumentation Radar. Indicate by check mark whether for Experimental Research or Exploratory Development. Advanced or Engineering Development, or Operational. The classification of the title will be appropriately indicated. Classified information contained in the completed form will be indicated either as a general statement in the Remarks paragraph such as "The purpose, functions ... are classified ..... ." or by an enumeration of the applicable paragraphs and subparagraphs with their classification, or the classification may be marked alongside each entry on the form.

EXPERIMENTAL RESEARCH OR EXPLORATORY DEVELOPMENT

2.a. To test the feasibility of new techniques or concepts of natural phenomena and environment and efforts towards solution of problems in the physical behavioural and social sciences that have no direct military application.

b. To test the feasibility of adapting conventional techniques to new purposes prior to projection into development planning includes all effort!directed toward solution of specific military problems, short or major development projects.

ADVANCED OR ENGINEERING DEVELOPMENT

a. To develop equipment which have moved into the development of hardware for experimental or operational test.

b. To modify existing operational equipment for improved performance.

c. To develop programs being engineered for service use but which have not yet been approved for production and service deployment.

d. To continue development of equipment/systems that have been approved for production and service use.

OPERATIONAL

To operate and test equipment which have passed the development phase and are planned for operational use for:

(1) Tactical and training purposes.

(2) Non-tactical purposes such as for test range instrumentation purposes.

3. Describe the function and purpose to be performed as specifically as possible. For example, Guided Missile Control Radar; Troposcatter Communications equipment; provides acquisition and tracking information; short range communications; telemetry for quality control.
4. Describe the method of operation. For example: Radar activates beacon transponder in missile with coded pulses; Beacon provides missile track; Radar also transmits coded pulse command signals to missile beacon receiver for guidance.
5. Describe operational extent of usage. For example: Continuous or intermittent-expected duty cycle during mission; expected number of hours of operation per day or other appropriate time period; Indicate any conditions governing intermittent use; When appropriate, describe mission phase during which system operates.
6. Give brief description of ultimate operational environment. For example: Amphibious landing operations; Defence of strategic target area; sea areas; field army. Provide any additional environment factors pertinent to a meaningful assessment of electromagnetic compatibility such as: specific vehicle/platform types; expected mobility; or other factors affecting the environment variability.
7. State geographical area used for experimental research or development.
8. State geographical area for potential use. Provide latitude and longitude of centre of operational area and radius of operation in kilometres.
9. List number of equipment's planned for experimental or developmental phase.
10. List number of equipment's planned for operational use.
11. Indicate maximum number of these equipment's which will be operating simultaneously in the same environment. For example: 3 missiles will be flown simultaneously in an operating area.
12. Indicate the dates on which it is expected that experimental or developmental phase will start and finish.
13. Indicate target date for operational use as defined in item 6.

CLASSIFICATION

TRANSMITTER EQUIPMENT CHARACTERISTICS
CARACTERISTIQUES DU MATERIEL EMETTEUR

PAGE

1. Nomenclature, Manufacturer's Model No. - *Désignation, no de modèle du fabricant:*

2. Manufacturer's Name - *Nom du fabricant:*

3. Transmitter installation - *Installation émettrice:*

4. Transmitter Type - *Type d'émetteur:*

5. Tuning Range - *Gamme d'accord:*

6. Method of Tuning - *Méthode d'accord:*

7. RF Channeling Capability - *Répartition des voies RF:*

8. Emission Designator(s) - *Identificateur(s) d'émission:*

9. Frequency Tolerance - *Tolérance de fréquence:*

10. Filter employed - *Filtre utilisé:* Yes - *Oui* ☐ No - *Non* ☐

11. Spread Spectrum - *Spectre étalé:* Yes - *Oui* ☐ No - *Non* ☐

12. Emission Bandwidth - *Largeur de bande de l'émission:* Calculated ☐ *Calculée* Measured ☐ *Mesurée*
(a) -3 dB
(b) -20 dB
(c) -40 dB
(d) -60 dB
(e) OCCBW *Larg. de bande occupée*

13. Maximum Bit Rate - *Débit binaire maximal:*

14. Modulation Techniques and Coding - *Techniques de modulation et de codage:*

15. Maximum modulation Frequency - *Fréquence de modulation et de codage:*

16. Pre-emphasis - *Préaccentuation:* Yes - *Oui* ☐ No - *Non* ☐

17. Deviation Ratio - *Rapport de déviation:*

18. Pulse Characteristics - *Caractéristiques des impulsions:*
(a) Rate - *Fréq. de récurrence* _____
(b) Width - *Durée* _____
(c) Rise Time - *Temps de montée* _____
(d) Fall Time - *Temps de descente* _____
(e) Comp Ratio - *Rapport de comp.* _____
Larg. de bande occupée

19. Power - *Puissance:*
(a) Mean - *Moyenne* _____
(b) PEP - *En crête* _____

20. Output Device - *Dispositif de sortie:*

21. Harmonic Level - *Niveau des harmoniques:*
(a) 2nd - *2e* _____
(b) 3rd - *3e* _____
(c) Other - *Autres* _____

22. Spurious Level - *Niveau du rayonnement non essentiel:*

24. Remarks - *Remarques:*

CLASSIFICATION

TRANSMITTER EQUIPMENT CHARACTERISTICS

1. Enter the government assigned equipment designation. If above is not available, enter the manufacturer's model number, e.g. MIT502, and complete item 2. If above is not available enter a short descriptive title, e.g. ATS-6 telemetry transmitter.
2. Enter if available. If a manufacturer's model number is listed in item 1, this item must be completed.
3. List specific type(s) of vehicle(s), ship(s), plane(s) or building(s) etc. where the transmitter(s) will be installed.
4. Enter the generic class of the transmitter, e.g. Frequency scan, Scan While Track Radar, Monopulse Tracker, AM or PM communications. In addition, for radar enter the radar type e.g. Non-FM Pulse, FM-Pulse, Frequency Hopping, CW or FM-CW.
5. Enter the frequency range through which the transmitter is capable of being tuned, e.g. 225-400 MHz. For equipment designed to operate only at a single frequency, enter the frequency indicate units e.g. kHz, MHz or GHz.
6. Enter the method of tuning, e.g. crystal, synthesiser or cavity. If the equipment is not readily tuneable in the field. Indicate in Remarks (item 23) the complexity factors such as skill levels involved, major assemblies involved, time required and location (factory or depot) where equipment is to be tuned.
7. Describe the RF channelling capability. For uniformly spaced channels, enter the centre frequency of the first channel and channel spacing e.g. first channel 406MHz, 100kHz increments; for continuous tuning, enter the lowest frequency and the word "continuous"; for others, such as SSB or cases where channel selection is under software control, enter a detailed description in Remarks (23), e.g. degraded channels, internal hardwiring limitations or lockout capability for frequency hopping systems.
8. Enter the emission designator(s) including the necessary bandwidth for each designator e.g. 16K0F3E. For systems with a frequency hopping mode as well as a non-hopping mode, enter the emission designators for each mode. Identify each mode such as hopping or non-hopping.
9. Enter the frequency tolerance, i.e. the maximum departure of a transmitter from its assigned frequency after normal warm-up time has been allowed. Indicate the units in part per million (ppm) for all emission types except single side band, which shall be indicated in Hertz (Hz).
10. Check the appropriate box.
11. Check the appropriate box. If YES see instructions for item 14.
12. Enter the emission bandwidths for which the transmitter is designed at the -3, -20 and -60dB levels and the occupied bandwidth. The bandwidth at -40dB shall also be entered for pulse radar transmitters. The emission bandwidth is defined as that appearing at the antenna terminals and includes any significant attenuation contributed by filtering in the output circuit or transmission lines. Values of emission bandwidth specified should be indicated as calculated or measured by checking the appropriate block. Note that the occupied bandwidth (item 12(e)) is defined as the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated.
13. Enter the maximum information bit rate for digital equipment, in bits per second. If spread spectrum is used, enter the bit rate after encoding.
14. Describe in detail the modulation and/or coding techniques employed. For complex modulation schemes such as direct sequence spread spectrum, frequency hopping, frequency agile, provide information relating to hop rate, processing gain, clock rate, No of hop sets, No of frequencies per hop set, etc. If too lengthy, use item 23.
15. For frequency or phase-modulated transmitter, enter the maximum modulation or base band frequency. The frequency is assumed to be the frequency at -3dB point on the high frequency side of the modulator response curve. Indicate the units, e.g. Hz, kHz or MHz.
16. For frequency or phase modulated transmitter check the appropriate block to indicate whether pre-emphasis is available.
17. For frequency or phase modulated transmitter enter the deviation ratio computed with the formula:

    $$\text{Deviation ratio} = \frac{\text{maximum frequency deviation}}{\text{maximum modulation frequency}}$$

18. For pulse modulated transmitters
    a. enter the pulse repetition rate in pulses per second (pps)
    b. enter the pulse width at the half voltage levels in usec
    c. enter the pulse rise time in microseconds (usec). This is the time duration for the loading edge of the voltage pulse to rise from 10% to 90% of its peak amplitude
    d. enter the pulse fall time in microseconds (usec). This is the time duration for the training edge of the voltage pulse to fall from 90% to 10% of its peak amplitude
    e. enter the maximum pulse compression ratio if applicable.

    For coded pulse waveform see instructions for item 14.
19. Enter the mean power delivered to the antenna terminals for all AM and FM emissions or the peak envelope power (PEP) for all other classes of emissions. If there are any unique situations such as interrupted CW, provide details in Remarks (23). Indicate the units e.g. W or kW.
20. Enter a description of the device used in the transmitter output stage e.g. ceramic diode, reflex klystron, transistor or TWT.
21. Enter the harmonic level of the 2nd and 3rd harmonics in dB relative to the fundamental. Enter in item (c) the relative level in dB of the highest-powered harmonic above the 3rd.
22. Enter the maximum value of spurious emission in dB relative to the fundamental which occurs outside the -60dB point on the transmitter fundamental emission spectrum (item 12) and does not occur on a harmonic of the fundamental emission spectrum (item 12) and does not occur on a harmonic of the fundamental frequency. Indicate in kHz or MHz the location of the spurious from the fundamental frequency.
23. Remarks.

CLASSIFICATION

RECEIVER EQUIPMENT CHARACTERISTICS
CARACTERISTIQUES DU MATERIEL RECEPTEUR

PAGE

1. Nomenclature, Manufacturer's Model No. - *Désignation, no de modèle du fabricant:*

2. Manufacturer's Name - *Nom du fabricant:*

3. Receiver installation - *Installation réceptrice:*

4. Receiver Type - *Type récepteur:*

5. Tuning Range - *Gamme d'accord::*

6. Method of Tuning - *Méthode d'accord:*

7. RF Channeling Capability - *Répartition des voies RF:*

8. Emission Designator(s) - *Identificateur(s) d'émission:*

9. Frequency Tolerance - *Tolérance de fréquence:*

10. IF Selectivity - *Sélectivité FI:*

	1st *1ère*	2nd *2e*	3rd *3e*
(a) -3 dB			
(b) -20 dB			
(c) -60 dB			

11. RF Selectivity - *Sélectivité RF:* Calculated ☐ *Calculée* Measured ☐ *Mesurée*

(a) -3 dB
(b) -20 dB
(c) -60 dB

12. IF Frequency - *Fréquence intermédiaire:*

(a) 1st - *1ère* _____
(b) 2nd - *2e* _____
(c) 3rd - *3e* _____

13. See instructions / *Voir instructions*

14. See instructions / *Voir instructions*

15. Oscillator Tuned - *Oscillateur accordé:*

	1st *1ère*	2nd *2e*	3rd *3e*
(a) Above Tuned Frequency *au-dessus de la fréq. d'accord*	☐	☐	☐
(b) Below Tuned Frequency *au-dessous de la fréq. d'accord*	☐	☐	☐
(c) Either Above or Below the Freq. *soit au-dessus, soit au-dessous de la fréq. d'accord*	☐	☐	☐

16. Maximum Bit Rate - *Débit binaire maximal:*

17. Sensibility - *Sensibilité:*

(a) Sensibility - *Sensibilité* _____ dBm
(b) Criteria - *Critère* _____
(c) Noise Fig - *Facteur de bruit* _____ dB
(d) Noise Temp - *Temp. de bruit* _____ kelvins

18. De-emphasis - *Désaccentuation:* Yes - *Oui* ☐ No - *Non* ☐

19. Image Rejection - *Rejet de fréquence image:*

20. Spurious Rejection - *Rejet des fréquences parasites:*

21. Remarks - *Remarques:*

CLASSIFICATION

RECEIVER EQUIPMENT CHARACTERISTICS

1. Enter the alphanumeric equipment designation. If above is not available, enter the manufacturer's model number e.g. MIT502 and complete item 2. If above is not available, enter a short descriptive title e.g. GPS receiver. A separate receiver submission is required for each receiver in a complex system e.g. radar ECCM receivers.
2. Enter the manufacturer's name if available. If a manufacturer's model number is listed in item 1, this item must be completed.
3. List specific type(s) of vehicle(s), ship(s), plane(s) or building(s) etc. where the receiver(s) will be installed.
4. Enter the generic class e.g. Dual conversion super-heterodyne or homodyne.
5. Enter the frequency range through which the receiver is capable of being tuned e.g. 225-400 MHz. For equipment designed to operate only at a single frequency, enter this frequency. Indicate units: kHz, MHz or GHz.
6. Enter the method of tuning e.g. crystal, synthesiser or cavity. If the equipment is not readily tuneable in the field, indicate in Remarks (21), the complexity of tuning include complexity factors, such as skill levels involved, major assemblies involved, time required and location (factory or depot) where equipment is to be tuned.
7. Describe the RF channelling capability. For uniformly spaced channels, enter the centre frequency of the first channel and channel spacing e.g. first channel 408 MHz, 100 kHz increments, for continuous tuning, enter the lowest frequency and the words "continuous", for others, including cases where channel selection is under software control, enter a detailed description in Remarks (21).
8. Enter the emission designator(s) including the necessary bandwidth for each designator e.g. 16K0F3E. For systems with a frequency hopping mode as well as non-hopping modes, enter the emission designators for each mode.
9. Enter the frequency tolerance, i.e., the maximum departure of a receiver from its assigned frequency after normal warm-up time has been allowed. Indicate the units in parts per million (PPM) for all emission types except single side band, which shall be indicated in Hertz (Hz).
10. Enter the bandwidth for each IF stage at -3, -20 and -60dB levels. Indicate units, e.g. kHz or MHz.
11. Enter the bandwidth at -3, -20 and -60dB levels. The RF bandwidth includes any significant attenuation contributed by filtering in the input circuit or transmission line. Values of RF bandwidths specified should be indicated as calculated or measured by checking the appropriate block. Indicate units, e.g. kHz or MHz. Enter the pre-selection type, e.g. tuneable cavity.
12. Enter the tuned frequency of the 1st, 2nd and 3rd IF stages. Indicate units, e.g. kHz or MHz.
13. and 14. Intentionally left blank to match US form.
15. Check the appropriate block to indicate the location of the 1st, 2nd and 3rd oscillator frequencies with respect to the associated mixer input signal.
16. Where applicable, enter the maximum bit rate (BPS) that can be used. If spread spectrum is used, enter the bit rate after decoding. Describe any error detecting/correcting codes in Remarks (21).
17. a. enter the sensitivity in dBm.
    b. specify criteria used, e.g. 12dB SINAD (signal + noise + distortion over noise + distortion)
    c. if the receiver is used with terrestrial systems, enter the receiver noise figure in dB.
    d. if the receiver is used with space or satellite earth stations, enter the receiver noise temperature in Kelvin.
18. For frequency modulated or phase modulated receivers indicate whether de-emphasis is available.
19. Enter the image rejection is the ratio of the image frequency signal level required to produce a specified output, to the desired signal level required to produce the same output.
20. Enter the spurious rejection in dB. Enter the single level of spurious rejection that the receiver meets of exceeds at all frequencies outside the -60dB IF bandwidth. Spurious rejection is the ratio of a particular out-of-band frequency signal level required to produce a specified output, to the desired signal level required to produce the same output.
21. Remarks.

CLASSIFICATION

ANTENNA EQUIPMENT CHARACTERISTICS
CARACTERISTIQUES DU MATERIEL D'ANTENNE

PAGE

1. Transmitting *Emission* ☐ Receiving *Réception* ☐ Transmitting and Receiving *Emission et réception* ☐

2. Nomenclature, Manufacturer's Model No. - *Désignation, no de modèle du fabricant:*

3. Manufacturer's Name - *Nom du fabricant:*

4. Frequency Range - *Gamme de fréquences:*

5. Type:

6. Polarization - *Polarisation:*

7. Scan Characteristics – *Caractéristiques de balayage:*

(a) Type _____

(b) Vertical Scan: *Balayage vertical:* _____

(1) Max Elev *Angle de site max.* _____

(2) Min Elev *Angle de site min.* _____

(3) Scan Rate *Vitesse de balayage* _____

(c) Horizontal Scan: *Balayage horizontal:* _____

(1) Sector Scanned *Secteur balayé* _____

(2) Scan Rate *Vitesse de balayage* _____

(d) Sector Blanking *Effacement de secteur* Yes *Oui* ☐ No *Non* ☐

8. Gain:

(a) Main Beam *Faisceau principal* _____

(b) 1st Major Side Lobe *1er lobe latéral important* _____

9. Beamwidth - *Largeur du faisceau:*

(a) Horizontal _____

(b) Vertical _____

21. Remarks - *Remarques:*

(a)

(b)

CLASSIFICATION

FS Forms 4

ANTENNA EQUIPMENT CHARACTERISTICS

1. Check the appropriate block to indicate the type of antenna. For multi-antenna system, use one page for each antenna.
2. Enter the assigned alphanumeric equipment designation. If above is not available, enter the manufacturer's model number e.g. DS6558 and complete item 3. If above is not available, enter a short descriptive title e.g. ATS-6 Telemetry antenna.
3. Enter the manufacturer's name if available. If a manufacturer's model number is listed in item 2, this item must be completed.
4. Enter the range of frequencies for which the antenna is designed. Indicate units e.g. kHz or MHz.
5. Enter the generic name or describe general technical features e.g. Horizontal, Log periodic, Cassegrain with polarisation twisting, Whip, Phased Array or Conformal Array.
6. Enter the polarisation: if circular, indicate whether it is left or right hand.
7. a. If this antenna scans, enter the type of scanning, e.g. vertical, horizontal, vertical and horizontal.
   b. Vertical scan:
      (1) enter the maximum elevation angle in degrees (positive or negative referenced to the horizontal) that the antenna can scan.
      (2) enter the minimum elevation angle in degrees (positive or negative referenced to the horizontal) that the antenna can scan.
      (3) enter the vertical scanning rate in scans per minute.
   c. Horizontal scan:
      (1) enter the angular scanning range in degrees of the horizontal sector scanned.
      (2) enter the horizontal scan rate in scans per minute.
   d. Indicate if antenna is capable of being sector blanked. If yes, enter details in Remarks (10).
8. a. Enter the maximum gain in dB relative to an isotropic radiator (dBi).
   b. Enter the nominal gain of the 1st major side lobe in dBi and the angular displacement from the main beam in degrees.
9. Enter the -3dB beam width in degrees.
10. Use this item to describe any unusual characteristics of the antenna, particularly as they relate to the assessment of electromagnetic compatibility. Use this item to amplify or clarify any of the information provided above. In addition, enter the following information if applicable:
    a. the front to back ratio in dB for directional antennas used in Radio Relay circuits.
    b. for phased array antennas, enter:
       (1) mode of operation, single or multiple beam;
       (2) single beam parameters;
       (3) multiple beam parameters:
          (a) polarisation of each beam;
          (b) gain of each beam;
          (c) beam width of each beam;
          (d) scan characteristics of each beam (refer to item 7).

APPENDIX 5
JTIDS/MIDS Activity Report Form

Each participant within a JTIDS/MIDS/Link 16 network structure is required to fill out a JTIDS/MIDS After Action Report (JAAR).

The form is to be addressed in softcopy to:

1. Action Addressee : Netherlands National Datalink Management Cell
2. Info Addressee : Radio Systems and Spectrum Management Office (STL/ACIS/BRF)

1. Period, DTG.
2. Platform Type, Callsign, STN and terminal type.
3. Operating location, area, height/altitude
4. Network design/Initialisation Data set.
5. Date, time and position at start net entry
6. Date, time and position on exit from network.
7. Quality of network structure and information exchange
8. Quality of real time co-ordination, network management and support
9. Problems encountered, possible cause, work arounds and solutions employed. Suggested (long-term) solutions.

7.13
THE NEW ZEALAND FREQUENCY CLEARANCE

From: Wayne Wedderspoon [Wayne.Wedderspoon@med.govt.nz]
Sent: Monday, 13 October 2003 13:08
To: EMIRALI BRUCE , MR
Cc: Andrew Mulcahy; Richard Sawers; Brian Miller
Subject: JTIDS/MIDS Operations 960 - 1215 MHz

Bruce Emirali
Frequency Manager
New Zealand Defence Force

Dear Bruce,

Joint Tactical Information Distribution System - Frequency Clearance (JTIDS)
Multifunctional Information Distribution System (MIDS)

I refer to your letter NZDF 02840/2/4 JCIS dated 17 March 2003 requesting frequency clearance for the operation of JTIDS/MIDS within the NZ Flight Information Region (FIR) in the frequency band 960-1215MHz.

The Ministry has examined the conditions of use contained in Annex A of your letter, and has also consulted with the Civil Aviation Authority (CAA) on the matter. We have also considered international practice and current use of this band and, as a consequence, we agree in principle to NZDF operation in the band on the terms and conditions described in your letter, and Annex A in particular.

Specific operation will need to be coordinated on a case-by-case non-interference basis with the CAA and RSM Licensing. The conditions of use prescribed in Annex A (attached) must be adhered to at all times.

<<Annex to RSM letter 17 Mar 03.doc>>

An application for a temporary radio licence should be made to RSM Licensing prior to the to any operation by visiting defence forces.

This agreement replaces the interim approval for JTIDS operation granted in 1995.

Yours sincerely

Wayne Wedderspoon
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Annex A to
MED BTP5/STK/3
Dated 13 October 2003

NZ Frequency Clearance JTIDS/MIDS

Introduction

1. This frequency clearance relates to the operation by the NZ Defence Force and visiting allied forces of fixed and mobile stations of the communications equipment confirming to the Joint Tactical Information Distribution System (JTIDS) defined in STANAG 4175 and operating in the frequency band 960-1215 MHz.

2. The frequency band 960-1215 MHz has been allocated worldwide for the use of aeronautical radionavigation under Section 5.328 of the Radio Regulations. The use of JTIDS/MIDS is strictly on a non-interference basis as provided for under Section 4.4 of the Radio Regulations.

3. This agreement applies to all airspace within the NZ Flight Information Region (FIR) including the airspace under New Zealand control outside the New Zealand Economic Zone (200NM).

4. Condition of Use for JTIDS/MIDS Operation

4.1 Operations of JTIDS/MIDS is on a non-interference basis only. In accordance with ITU Radiocommunications Regulations, JTIDS/MIDS transmissions shall not cause harmful interference to either existing or future equipment and systems in the aeronautical radionavigation service and for itself cannot claim harmful interference.

5. Geographic Area of JTIDS/MIDS Operations

5.1 The geographic area of JTIDS/MIDS operations is defined as a cylinder of 100NM radius covering the total airspace between the highest airborne JTIDS/MIDS platform and the ground. In the absence of an airborne JTIDS/MIDS platform, the Geographic Area of JTIDS/MIDS operations is defined as a cylinder of radius 1000 NM surrounding any JTIDS/MIDS terminal.

5.2 The pulse restrictions within this area are defined in section 6.

6. Time Slot Duty Factor (TSDF)

6.1. The total JTIDS/MIDS community within a geographic area shall be limited to 100% effective TSDF, ie 396,288 pulses per 12 seconds (1536 time slots with 258 pulses per time slot). The time slot (pulse) utilisation limit is based on assigned transmit time slots whether or not actual JTIDS/MIDS transmissions take place during an assigned time slot.

6.2 The geographic area limitation is defined in section 5

6.3 Except for network entry purposes and maintaining network synchronisation, no time slot is to be used by more than one user in the same network unless a minimum distance of 100NM separates the users.

6.4 When less than 100% of time slots are being used, those in use shall be approximately evenly distributed within any frame period.

6.5 No one user is to transmit more than 50% TSDF (198,144 pulses in a 12 second period)

7. Use of Networks

7.1 Users separated by less than the minimum distance of 100 NM are permitted to operate on different networks provided the networks are synchronised in time and subject to the pulse limits specified in para 6

8. Packed Messages

8.1 Both standard messages (258 pulses) and Packed messages (444 pulses) are permitted noting the pulse restrictions in section 6.

9. Separation Requirements

9.1 The minimum separation between any fixed site, marine mobile or ground mobile JTIDS/MIDS terminal and any ground based DME or TACAN beacon used in the civil ATC system would be based on a signal level not exceeding –33dBm at the DME beacon receiver. In instances where testing has not been carried out a distance of 2NM shall apply

9.2 The minimum separation between any fixed site, maritime mobile or ground mobile JTIDS/MIDS terminal and any air traffic control radar beacon system/secondary surveillance radar (ATCRBS/SSR) ground equipment shall be based on a received signal level of –20 dBm (approx 900ft for 200watt JTIDS terminal). In instances where testing has not been carried out a distance of 2 NM shall apply.

(Note paras 5.2 and 5.3 are in keeping with the restriction imposed on various untested sites in the ASA agreement.)

9.3 The separation distance from a civilian or military aircraft flying under civilian conditions shall be at lease standard ATC separation (vertical separation 1000 feet and horizontal separation 3-5 NM)

9.4 The separation distance between airborne civilian or military aircraft and surface based JTIDS/MIDS platforms shall be at least 1000 feet.

10. Contention Operations

10.1 The minimum separation between JTIDS/MIDS terminals operating in contention shall be 100NM.

11. Power Output

11.1 The maximum power output of a JTIDS/MIDS terminal shall be 200 watts

12. EMC Protection Features (EPF)

12.1. EMC Features shall be operating at all times.

12.2 The EMC features will inhibit transmissions when the performance of a terminal diverges from normal operations. Specifically when;

a. Four or more frequencies are used less than twice or more than 38 times in a group of 1020 transmitted pulses

b. the terminal deviates from the specified pulse width tolerance (6.4 μs ± .0.32 μs)

d. The terminal attempts to transmit in more than 50% of the timeslots in any single frame.

c. The JTIDS/MIDS transmitter exceeds the peak power which gives rise to the EIRP as follows: Surface station: 24 dBW transmitter +9dbi antenna gain –2db feeder loss=31.5db; Aircraft station: 24 dBW transmitter power + 5.5dBi antenna gain –2dB feeder loss = 27.5dB.

e. Transmissions are not in dedicated timeslots

f. When the radiated energy in either of the frequency bands 1023-1037 MHz or 1083-1097 MHz exceeds the -60dB level with reference to the maximum JTIDS/MIDS signal level measured in a 300 kHz bandwidth.

13. **Operating Records**

13.1 All JTIDS/MIDS radiations shall be recorded to assist in the resolution of any reported cases of interference in the 960-1215 MHz band. Records shall contain sufficient information for investigations of JTIDS/MIDS operations.

13.2 Records should be retained for one year and be provided when requested by National Civil Authorities or the National Radio Frequency Authority

7.14
THE NORWEGIAN FREQUENCY CLEARANCE

Headquarters Defence Command Norway
Communication and Information Systems Staff

Our date
1996-11-01

Our reference
#45629 /96/FO/I/A-JT/361

Previous date

Previous reference

Action officer
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Staff - info only

Draft frequency clearance criteria documentation for JTIDS/MIDS operations

Subject document has been reviewed and evaluated by both the civil and military authorities.

Norway hereby agree to the text as proposed in the draft document, edition of june 1996.

Common Frequency Clearance for JTIDS/MIDS operations over Norwegian territories is granted.

L Roschberg (ba)
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Chief Implementation Branch

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From:	**Headquarters Defence Command Norway Communication and Information Systems Staff**
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Note: ☐ Urgent ☒ Information only ☐ Please reply ASAP ☐ Please comment

JTIDS/MIDS frequency clearance.

Ref discussions during last weeks ARFA Plenary concerning frequency clearance for JTIDS/MIDS. Norway was not able to answer during the session about the restrictions and regulations concerning frequency clearance in Norway. After consulting with Norwegian authorities, the answer is:

SHAPE coordinate as necessary and just inform Norway. about the actual use. (Same as NL)

Elisabeth Natvig

Elisabeth Natvig

Arrival
000071 09.DEC.96
NATO CONFIDENTIAL

7.15
THE POLISH
FREQUENCY CLEARANCE

REPUBLIC OF POLAND

FREQUENCY CLEARANCE AGREEMENT

BETWEEN THE MINISTRY OF DEFENCE

AND MINISTRY OF INFRASRUCTURE

RELATING TO THE USE OF

THE FREQUENCY BAND 960 - 1215 MHz BY

THE JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM /

MULTIFUNCTIONAL INFORMATION DISTRIBUTION SYSTEM

IN POLISH AIRSPACE

(version updated on 20 AUG 2003)

ORIGINAL IN POLISH

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Chapter 1
Introduction

§ 1

1. The purpose of the agreement is to complete and specify the procedures agreed to by the Ministry of Defence and Ministry of Infrastructure for the utilisation in Poland by Polish and Allied Forces, for the Joint Tactical Information Distribution System / Multifunctional Information Distribution System (JTIDS/MIDS) operating in the frequency band 960 – 1215 MHz and operating on airborne and ship platforms as well as associated ground stations.
2. The Agreement is applicable during peacetime within the Polish Airspace responsibility and relates to the operations, by the MOD and visiting forces of the North Atlantic Treaty Organisation (NATO) and Partnership For Peace (PFP) nations, of the fixed and mobile stations of communication equipment conforming to the JTIDS/MIDS Time Division Multiple Access (TDMA) architecture as laid down in NATO Standardisation Agreement (STANAG) 4175.
3. Operation of the JTIDS/MIDS equipment is agreed on a non-harmful interference basis to existing and future aeronautical facilities and services, in accordance with the conditions stated in this agreement.
4. The acceptance by the Ministry of Infrastructure is conditional on the observance of the specified conditions of operation and other limitations stated in this frequency clearance document.

Chapter 2
General conditions

§ 2

1. According to both Article 5 of the Radio Regulations (RR) and the Frequency Allocation Table of the Republic of Poland the frequency band 960 - 1215 MHz has been allocated exclusively to the Aeronautical Radionavigation Service on a primary basis. In compliance with Article 4, Number 4.10 of the RR the Radionavigation Service, due to its safety aspects must be protected by special measures in order to ensure that no harmful interference occurs.
2. Footnote 5.328 in Article 5 of RR states that the frequency band 960 - 1215 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. According to paragraph 2.1 above, these protection requirements are therefore totally applicable to both current and future Aeronautical Radionavigation Services.
3. The use of this frequency band by JTIDS/MIDS equipment is only possible under the provisions of RR Number 4.4. That is JTIDS/MIDS transmissions shall not cause harmful interference to either existing or future equipment and systems in the Aeronautical Radionavigation Service and for itself cannot claim protection from harmful interference. Should harmful interference be reported JTIDS/MIDS transmissions shall be stopped at the request of the Civil Aviation Authorities (CAA) until protective measures are taken to eliminate the source of interference.

4. JTIDS/MIDS operations may or may not be coordinated with the administrations of neighbouring non-NATO countries. In case of interference reports from those countries, the conditions defined in this document may be reviewed.
5. To ensure compliance with this agreement the Frequency Management Military Office (FMMO - NARFA PL) will coordinate and control all JTIDS/MIDS operations.
6. JTIDS/MIDS equipped units from other NATO and PFP countries are subject to the conditions in this agreement when operating in Polish Airspace. The Ministry Of Defence accepts responsibility for ensuring that these conditions are made known and complied with for all such cases.

Chapter 3
System technical parameters

§ 3

JTIDS/MIDS is a tactical data link that employs a TDMA architecture and provides secure and integrated information distribution, position location, identification and navigation capabilities.

1) Frequencies

JTIDS/MIDS uses a pseudorandom hopping sequence across 51 carrier frequencies (3 MHz spacing) in the 969 - 1008 MHz, 1053 - 1065 MHz and 1113 - 1206 MHz bands inclusive as shown in the table below.

Frequency number	Frequency [MHz]	Frequency number	Frequency [MHz]	Frequency number	Frequency [MHz]
0	969	17	1062	34	1158
1	972	18	1065	35	1161
2	975	19	1113	36	1164
3	978	20	1116	37	1167
4	981	21	1119	38	1170
5	984	22	1122	39	1173
6	987	23	1125	40	1176
7	990	24	1128	41	1179
8	993	25	1131	42	1182
9	996	26	1134	43	1185
10	999	27	1137	44	1188
11	1002	28	1140	45	1191
12	1005	29	1143	46	1194
13	1008	30	1146	47	1197
14	1053	31	1149	48	1200
15	1056	32	1152	49	1203
16	1059	33	1155	50	1206

2) Type of modulation and signal architecture

a) The system employs a TDMA transmission with a fundamental time slot duration of 7.8125 milliseconds (ms). Each terminal transmission within a time slot consists

of a sequence of either 72 pulses, 258 pulses or 444 pulses spaced by 6.6 microseconds (μs).

b) Each pulse is of 6.4 μs duration and the carrier is modulated by Continuous Phase Shift Modulation (CPSM) at a rate of 5 Mbits/s to produce a 32 bit message symbol. The active transmission time per time slot is 1.6512 ms.

c) The signal format accommodates up to 128 time slots per second giving a maximum pulse rate of 56,832 pulses per second (444 pulse time slot). There are 1536 time slots in a frame of 12 seconds duration. Time Slot Duty Factor (TSDF) is the percentage of time slots occupied in a 12 second frame (based on 258 pulses per time slot).

3) Pulse Spectrum

The pulse spectrum is measured in a 300 kHz bandwidth.

a) At ± 3 MHz from carrier - at least 10 dB weaker than peak.
b) At ± 5 MHz from carrier - at least 23 dB weaker than peak.
c) At ± 13 MHz from carrier - at least 55 dB weaker than peak.
d) At and beyond ± 15 MHz - at least 60 dB weaker than peak.

Chapter 4
Conditions of use in Polish Airspace

§ 4

Air Traffic Control (ATC) ground equipment and civil airborne equipment (within ICAO rules area of responsibility) operating in the band 960 - 1215 MHz shall be protected by the following measures.

1) The minimum separation between any JTIDS/MIDS ground terminal and any ATC equipment operating within the 960 - 1215 MHz navigational band shall not be less than 2 Nautical Miles (NM);
2) The minimum separation between any airborne JTIDS/MIDS terminal and any aircraft under civil ATC or any ATC equipment on the ground shall not be less than 1000 ft.

§ 5

Time Slot Duty Factor (TSDF) 100/50 criteria.

1) The Geographic Area of JTIDS/MIDS Operations[1] is 100 NM radius.

2) A single MIDS user shall not transmit more than 50% TSDF (198,144 pulses in a 12 second period).

3) In a Geographic Area of JTIDS/MIDS Operations the total equivalent TSDF shall not exceed 100% (396,288 pulses in a 12 second period).

4) A fighter aircraft normally shall not transmit more than 20% TSDF.

5) A fighter aircraft is allowed to use a maximum of 50% TSDF as a radio relay station above flight level 180.

[1] The Geographic Area of JTIDS/MIDS Operations is defined as a cylinder covering the total airspace between the highest airborne JTIDS/MIDS platform and the ground.

6) Helicopters are allowed to transmit with a maximum of 10% TSDF.

7) Within the Geographic Area the pseudorandom frequency hopping pattern for each user transmitting simultaneously in any time slot must be unique except for the purposes of Initial Net Entry and maintaining network synchronisation (Round Trip Timing).

8) Multinet operations are allowed.

9) The minimum separation between JTIDS/MIDS terminals operating in contention shall be 100 NM.

10) Standard and Packed message structures 258 and/or 444 pulse time slot are allowed.

§ 6

Output power

1) Output power of JTIDS/MIDS terminals shall be limited to 200 Watts.

2) If any ground station is established the Effective Isotropic Radiated Power (EIRP) of 1 kW is authorised under the condition that the received signal level at the DME/N beacon does not exceed -33 dBm and that the JTIDS/MIDS signal level at the input of all SSR ground stations does not exceed -20 dBm. Equivalent TSDF and contention of ground stations are subject to the same limitations as for aircraft.

§ 7

Electromagnetic Compatibility (EMC) protection.

1) EMC Protection Features shall be operated at all times. When diverging from one of the following limitations the affected terminal must inhibit transmission automatically and immediately.

   a) specified pulse width (6.4 μs ± 0.32 μs);

   b) uniform distribution of the JTIDS/MIDS radiation across the whole frequency band;

   c) the transmission exceeds maximum equivalent TSDF of 50% in a 12 second period;

   d) the radiated energy within ± 7 MHz of the 1030 MHz and 1090 MHz frequencies shall be at least 60 dB below the maximum JTIDS/MIDS level measured in a 300 kHz bandwidth.

Chapter 5
Operating Records

§ 8

1. Any JTIDS/MIDS radiation must be recorded in a logbook to help identify possible cases of interference. The logbook must contain the following entries.

   a) network in use;

   b) date, time in UTC (start and end of radiation);

   c) altitude, position or standard flight pattern;

   d) any automatic EMC inhibits;

e) any EMC Features overrides if they are authorised.

2. The logbook entries necessary for the investigation of cases of interference must be retained for one year and must be provided on short notice when requested by the CAA.

Chapter 6
Exercises

§ 9

1. For large scale exercises, expected to occur infrequently, special permission may be granted by the CAA for the temporary removal or relaxation of some JTIDS/MIDS usage restriction(s). Such dispensations are expected to be for short periods of a few hours and in all cases must be agreed to in advance between the MOD and the CAA.
2. The CAA will retain full rights to object to any proposed removal or relaxation of restriction(s) for exercise purposes, either in general or particular, where it is not satisfied that in its opinion the parameters concerned, or the area of deployment or the times at which it is planned to occur do not fully safeguard the civil aviation radio services.
3. To provide protection during the periods when restrictions are relaxed or removed, a control, warning and coordination procedure embodying a “stop radiation” requirement is to be included in the Operations Order covering the effective period. The procedures to be used are to be submitted to the CAA together with a request for removal or relaxation of restrictions. Such procedures are to be complied with by the MOD during all times when an approval is granted under this section of the agreement.

Chapter 7
Reporting and clearing of interference

§ 10

1. The MOD undertakes to prohibit JTIDS/MIDS operation when requested by the CAA.
2. The MOD agrees to establish and maintain records to permit a retrospective investigation to assess the involvement of JTIDS/MIDS in particular interference cases, as described in Section 5.
3. The MOD agrees to participate in investigations, set up by the CAA, into reports of interference where JTIDS/MIDS may have been either a contributor or the sole source.

Chapter 8
Review

§ 11

1. The MOD and the CAA reserve the right to modify or expand the restrictions for the operations of JTIDS/MIDS equipment at any time.
2. This agreement may be reviewed for the following reasons.

a) Proposed introduction of a new aeronautical radionavigation system or variant of an existing system with characteristics differing in important respects from those on which proven compatibility has been established,

b) Proposed changes in the operational requirement for JTIDS/MIDS,

c) New or significant changes in JTIDS/MIDS designs,

d) Problems encountered with the existing agreement in any respect.

The agreement was signed by the Minister of Defence and the Minister of Infrastructure. The original is in the Polish language.

The agreement comes into force on the day of signing.

Warsaw, 16 JAN 2001.

ANNEXES

(updated on 2 OCT 2003)

Annex 1

Civil Secondary Surveillance Radar (SSR) locations in Poland

No	Location	Coordinates	Nomenclature
1	Gdańsk	5422N 1827E	MARCONI S-511h / MESSENGER MSSR
2	Kraków	5006N 1946E	MARCONI S-511h / MESSENGER MSSR
3	Poznań	5224N 1647E	RADWAR AVIA-C / MSSR Northrop Grumman
4	Pułtusk	5242N 2100E	RADWAR AVIA-C / MSSR Northrop Grumman
5	Rzeszów	5006N 2201E	IRS-20MPL
6	Szczecin	5335N 1454E	IRS-20MPL
7	Warszawa	5209N 2057E	ASR-9 Northrop Grumman / MSSR Northrop Grumman
8	Warszawa	5209N 2056E	ASR-10 / IRS-20MPL (Rayheon / Indra)
9	Wrocław	5106N 1652E	MSSR – IRS MPL 20 (Indra)
10	Katowice	5027N 1905E	planned

Annex 2

Distance Measuring Equipment DME/N frequencies and locations in Poland

No	Location	Channel	ID	Type	Coordinates	Nomenclature
1.	Czempin	92X	CZE	VOR/DME	5208N 1644E	Wilcox 585b / ASI 1119
2.	Darłowo	89X	DAR	VOR/DME	5425N 1623E	Wilcox 585b / Wilcox 5960
3.	Drezdenko	100X	DRE	VOR/DME	5249N 1550E	Wilcox 585b / ASI 1119
4.	Gdańsk	40X	GDA	ILS/DME	5422N 1828E	Wilcox MARK-10 / Wilcox 5960
5.	Grudziądz	93X	GRU	VOR/DME	5331N 1847E	AIRSYS ATM, DVOR 432/DME 435
6.	Jabłonka	111X	JAB	VOR/DME	4929N 1941E	Wilcox 585b / Wilcox 5960
7.	Karnice	125X	KRN	VOR/DME	5157N 2028E	Wilcox 585b / ASI 1119
8.	Kartuzy	79X	KRT	VOR/DME	5422N 1812E	Wilcox 585b / Wilcox 5960
9.	Kmiecin	115X	KMI	VOR	5412N 1909E	Wilcox 585b
10.	Kraków	40X	KRW	ILS/DME	5004N 1946E	Wilcox, MARK 20A/DME 5960
11.	Łódź	71X	LDZ	VOR/DME	5148N 1939E	Wilcox 585b / ASI 1119
12.	Poznań	40X	POZ	ILS/DME	5226N 1650E	Wilcox, MARK 20A/DME 5960
13.	Rzeszów	40X	RZE	ILS/DME	5007N 2203E	Wilcox MARK-20a / Wilcox 5960c
14.	Rzeszów	109X	RZE	VOR/DME	5007N 2203E	Wilcox 585b / Wilcox 5960
15.	Siedlce	94X	SIE	VOR/DME	5210N 2212E	Wilcox 585b / Wilcox 5960
16.	Słubice	114X	SUI	VOR/DME	5223N 1435E	Wilcox 585b / Wilcox 5960
17.	Suwałki	124X	SUW	VOR/DME	5404N 2254E	AIRSYS ATM, DVOR 432/DME 435
18.	Trzebnica	83X	TRZ	VOR/DME	5119N 1707E	Wilcox 585b / ASI 1119
19.	Warszawa	36X	WAS	ILS/DME	5209N 2058E	Wilcox MARK-10 / Wilcox 5960
20.	Warszawa	40X	WA	ILS/DME	5209N 2058E	Wilcox MARK-10 / Wilcox 5960
21.	Warszawa	81X	OKE	VOR/DME	5210N 2058E	Wilcox 585b / ASI 1119
22.	Wrocław	40X	WRO	ILS/DME	5110N 1657E	Wilcox MARK-10 / Wilcox 5960
23.	Zaborówek	96X	WAR	VOR/DME	5216N 2040E	ASI 1150 / ASI 1119
24.	Szczecin	42X	SZC	ILS/DME	5333N 1458E	Wilcox MARK-2 / Wilcox 5960b
25.	Linin	78X	LIN	VOR/DME	5155N 2109E	ASI 1150 / ASI 1119
26.	Jędrzejów	103X	JED	VOR/DME	5039N 2015E	Wilcox 585b / ASI 1119
27.	Mrągowo	120X	MRA	VOR/DME	5386N 2131E	AIRSYS ATM, DVOR 432/DME 435
28.	Łódź	42X	LOD	ILS/DME	5143N 1924E	Wilcox, MARK 20A/DME 415

Annex 3

List of Abbreviations

ATC	Air Traffic Control
CAA	Civil Aviation Authority
CPSM	Continuous Phase Shift Modulation
DME/N	Distance Measuring Equipment / Narrow band
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
FMMO	Frequency Management Military Office
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
JTIDS	Joint Tactical Information Distribution System
MIDS	Multifunctional Information Distribution System
MNWG	Multinational Working Group
MOD	Ministry of Defence
NARFA PL	National Radio Frequency Agency Poland
NATO	North Atlantic Treaty Organization
NM	Nautical Mile
PFP	Partnership For Peace
RR	Radio Regulations
RTT	Round Trip Timing
SSR	Secondary Surveillance Radar
STANAG	NATO Standardization Agreement
TDMA	Time Division Multiple Access
TSDF	Time Slot Duty Factor
UTC	Coordinated Universal Time
VOR	Very High Frequency Omnidirectional Radio Range (System)

Annex 4

References

1. STANAG 4175 – Technical Characteristics of Multifunctional Information Distribution System

2. Frequency clearance criteria documentation for JTIDS/MIDS operations – October 1998

3. Reports of activity of Multinational Working Group (MNWG)

4. Existing JTIDS/MIDS Frequency Clearance Agreements

5. JTIDS/MIDS Spectrum User Guide

FREQUENCY MANAGEMENT MILITARY OFFICE

P R O C E D U R E

FOR THE USE OF JTIDS/MIDS ON POLISH TERRITORY

SUMMARY

ORIGINAL IN POLISH

WARSAW - October 2003

Introduction

"Frequency clearance agreement between the Ministry of Defence and Ministry of Infrastructure relating to the use of the frequency band 960 - 1215 MHz by The Joint Tactical Information Distribution System / Multifunctional Information Distribution System in Polish airspace" (hereinafter: agreement) was signed on the 16th of January 2001. The agreement describes the way of JTIDS/MIDS use on Polish territory.

Coordination of JTIDS/MIDS operations amounts to the receiving requests and taking action in case of harmful interference to radionavigation equipment in the frequency band 960-1215 MHz.

The aim of this description is to define necessary activities before and during JTIDS/MIDS operations in Poland.

1. JTIDS/MIDS requests

Requests should be sent directly to the Frequency Management Military Office - NARFA PL not later than 30 days prior to a planned start of operation (7 days for AWACS flights only).

Required information:

a/ Name of user;

b/ Area of operation (e.g. coordinates of a centre and a radius)*;

c/ List of platforms and their TSDF (type and number of flying, naval, also location of ground platforms)*;

d/ Total TSDF*;

e/ Time of operation (period, schedule);

f/ POC responsible for preparation of operation (phone, fax number, e-mail address);

g/ Confirmation of adherence to conditions of JTIDS/MIDS usage, contained in the Polish Frequency Clearance;

h/ Stop buzzer - POC and 24 hour phone number (can be sent later but at least one day before start of operation). Without this information the use of JTIDS/MIDS terminals is forbidden.

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* for each net

2. Notification Civil Aviation Agency and Air Forces

NARFA PL notifies CAA and PL AF of a planned JTIDS/MIDS operation.

POC:

a/ **CAA –** Mr Miroslaw Bartkiewicz, phone +4822 5745720, fax +4822 5745729;

b/ **PL AF –** Senior Aviation Operation Officer, phone +4822 6888370, fax +4822 6888467.

3. Permission to use JTIDS/MIDS in Poland

Following the successful coordination with CAA, NARFA PL gives permission to use JTIDS/MIDS not later than 14 days prior to the beginning of operation (4 days for AWACS flights).

Every user is informed of POC in CAA and PL AF responsible for coordination of JTIDS/MIDS operation in Poland. In case of harmful interference they take necessary action.

NARFA PL also informs SHAPE Data Link Management and Interoperability Cell (SHAPE DLMIC) of planned JTIDS/MIDS use on Polish territory.

4. Action in case of harmful interference

In case of harmful interference CAA notifies the Senior Aviation Operation Officer of PL AF, who notifies CAOC 2 Data Link Management Cell (DLMC) and a contact person of a training unit (24 hour POC) to stop JTIDS/MIDS operation.

POC:

a/ **CAA –** Shift Manager of the Air Traffic Management Centre;

phone: +48 22 5745542
5745543
8460733

fax +4822 5745539

b/ **PL AF –** Senior Aviation Operation Officer, phone +4822 6888370, fax +4822 6888467.

CAA has also right to send a representative to a training area to keep close contact with a person of a JTIDS/MIDS user.

JTIDS/MIDS operation can be continued after permission from the Senior Aviation Operation Officer of PL AF.

Director of NARFA PL is also notified by PL AF of harmful interference caused by JTIDS/MIDS.

5. POC in Poland for JTIDS/MIDS operations

FMMO/NARFA PL (official contact)	WBZC ul. Pulawska 4/6 00-909 Warszawa	fax: +48 22 6870246 IVSN: 925 480 7870246 e-mail: wbzc@wp.mil.pl CRONOS: PL MOD NARFA
FMMO/NARFA PL (working contact)		phone: +48 22 6871488 IVSN: 925 480 7871488 e-mail: m.otreba@wp.mil.pl
CAA (notification of planed J/M use)	PPL – ARL Dzial Planowania Strategicznego ul. Zwirki i Wigury 1 00-906 Warszawa	phone: +48 22 5745720 fax: +48 22 5745709
CAA (notification of harmful interfer-ence)	Shift Manager of the Air Traffic Management Centre	phone: +48 22 5745542 5745543 8464175 fax: +48 22 5745539
PL AF	Senior Aviation Operation Officer	phone: +48 22 6888370 fax: +48 22 6888467

DIRECTOR OF FMMO NARFA PL
(-) Col Jerzy REMIASZ

7.16
THE PORTUGUESE FREQUENCY CLEARANCE

p/fax:00.1.301.464.3131 / 301 50 92

aeroportos e navegação aërea

TRANSMISSÃO DE FACSIMILE
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DATA / Date

03-04-97

PARA / To

Mr. LES SKEWS

Á ATENÇÃO DE / Care of

CÓPIAS PARA / Copies to

Cmd António Cabral

REMETENTE / From

ANA-EP
Edgar Cardoso

FAX N° / Fax Nr.

351-1-847 37 66

TELEFONE N° / Telefone Nr.

351-1-840 80 44

TELEX N° / Telex Nr.

ASSUNTO / Subject

MNWG Meeting from 12-14 November 1996

OBSERVAÇÕES / Remarks

I just receive by mail the report of the above referred meeting. Concerning the status of Portuguese Frequency Clearance I would like to clarify that I am not particulary working towards having fighter aircraft included in this clearance as stated in the minutes. Please take into account that I am working towards the approval of a Common Frequency Clearance, covering all JTIDS platforms according with last version of Common Frequency Clearance document

Best Regards

(Edgar Cardoso)

7.17
THE SPANISH
FREQUENCY CLEARANCE

MINISTERIO
DE
DEFENSA

QUARTEL GENERAL
DEL ESTADO MAYOR
DE LA DEFENSA

ESTADO MAYOR CONJUNTO

DICISION CIS/NARFA SP

FAX

DE/FROM. **JEMACON / DIV. CIS/ NARFA SP**	
A/TO **MR. SKEWS**	
ASUNTO/SUBJECT FREQUENCY CLEARANCE	
S/REF	N/REF 215-TF/ 135
FECHA/DATE **20 de marzo de 2001**	
N° DE PAGS. INCLUYENDO PORTADA **2**	

AT ENCLOSURE YOU CAN FIND THE EXTENSION OF CURRENT COMMON FREQUENCY CLEARANCE IN SPAIN.

IN SUMMARY, THE ANSWER OF MY CIVIL ADMINISTRATION IS THAT WE CAN CONTINUE USING JTIDS/MIDS UNTIL JULY 2002. AFTER THAT WE WILL RENEW AGAIN THE FREQUENCY CLEARANCE

THANK YOU VERY MUCH, MR. SKEWS, FOR YOUR ATTENTION.

EL CA. JEFE DE LA DIVISION DIS
De Orden de SE.
El CTC. JEFE DE NARFA SP

JUAN PADILLA MARTINEZ

CORREO
ipav@ext.mde.es

C/ Vitruvio, 1
28071 – Madrid
Tel.: 917455064

Ministerio de Clencia y Tecnolgia

Escretaria de Estado de Telecomunicaciones y
para la Sociedad de la Informacion

CC99/ml/AFM
S/REF.: n° 003223 de 12.06.00

ENTRADA
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En relación con su escrito de is refercnci con el que se solicita la renovación de la afectación para la utilización de determinadas frecuencias por el sistema JTIDS/MIDS, me complace comunicarle que no existe inconveniente al respecto, ampliando el plazo de la citada autorización hasta el 11/06/2002 con idénticos condicionantes y caracteristicas tecnicas a la autorizacion anterior de fecha 28 de mayo de 1998.

Madrid, 21 de junio de 2000
EL SUBDIRECTOR GENERAL DE GESTIÓN DE
RECURSOS ESCASOS DE TELECOMUNICACIONES

Ricardo Alvariño Alvare

MINISTERIO DE CIENCIA Y TECNOLOGIA
Secretaría de Estado de Telecomunicaciones y para la Sociedad de la Información
DIRECCION GENERAL DE TELECOMUNICACIONES Y TECNOLOGIAS DE LA INFORMACION

22 JUN 2000
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SECRETARIA GRAL. DE COMUNICACIONES
SUB.GRAL. DE GESTION DE RECURSOS ESCASOS DE TELECOMUNICACIONES
22.06.00 001713
SALIDA

SR. ALMIRANTE PRESIDENTE DEL COMITÉ DE TLC
ESTADO MAYOR CONJUNTO DE LA DEFENSA
DIVISIÓN CIS
GRUPO PERMANENTE DE FRECUENCIAS
C/ VITRUVIO, 1
28006 MADRID

AGENCIA NACIONAL DE RADIOFRECUENCIAS
NARFA SP

STATUS OF THE SPANISH JTIDS/MIDS FREQUENCY CLEARANCE

Dated May 28, 1998, the National Telecommunications Authority has issued the following resolution:

In view of National Laws regarding the public radio spectrum domain and the valuable services that use it.

In view of Radio Regulations Annex of the Information Telecommunications Union (ITU).

In view of Frequency Allocation National Framework published in 1996 and other pertinent dispositions to be considered.

In view of the resulting consultations carried out to AENA (the National Agency responsible of Civil Navigation and Airports) who does not see any inconvenience in using JTIDS/MIDS but making sure its compatibility with existing civil navigation systems that work in the same frequency band.

Considering that JTIDS/MIDS has been working for a year with no interference on other telecommunications services.

Considering, however, that JTIDS/MIDS uses state-of-the-art technology which spectral compatibility with current systems must be subject of a special control.

RESOLVES:

1) The agreement to the request and the assignment of a temporary use of the public radio spectrum for JTIDS/MIDS with the technical characteristics specified in the annex of this document.

2) The valid period of this assignment will extend since 01/06/98 until 01/06/2000 without prejudice to further renewals.

3) The assignment of frequencies is made on a secondary basis, under the terms established for this status in the ITU Radio Regulations.

4) The detection of harmful interference on other legally authorized telecommunications services will cause the immediate cease of JTIDS/MIDS emissions which cannot be resumed until the origin of that interference be resolved.

To ease the control and research of possible interference coming from JTIDS/MIDS all transmissions will be registered in a logbook that will contain its technical characteristics and its location in time and space.

5) Without prejudice to that management and control of networks, in which JTIDS/MIDS will be implemented on a temporary basis in Spain, be undertaken in a joint way among National Authorities, when issues concern to the National Defence, and North Atlantic Treaty Organization Authorities, the former will act as the head and final responsible to accomplish the terms of this assignment.

6) The General Secretary of Telecommunications held the right to modify any of the terms of this assignment, including the cancellation when well founded reasons exist to take such action

ANNEX

TECHNICAL AND OPERATIONAL CHARACTERISTICS OF JTIDS/MIDS

1) Definition

Tactical data transmission system containing position, identification and navigation.

2) Location

Ground, airborne and naval platform belonging to the Armed Forces located in the whole national territory with the geographical limitations later specified.

3) Frequency Band

960 to 1215 MHz. There are 51 carriers frequencies spaced every 3 MHz. Between 969 to 1008, 1053 to 1065 and 1113 to 1206 MHz.

4) Transmission System

The Transmission system is a time division multiple access with frequency hopping. The technical characteristics are those ones specified for the system.

5) Maximum Transmission Power

The power of transmitter shall not surpass 200 + 1 dB watts.

6) Maximum Antenna Gain

9,5 dBi.

7) Geographic Limitations of Use

The JTIDS/MIDS transmitter stations are not allowed to be used beyond the limits of national Jurisdiction and, in the case of an interference claim, along a border strip of 50 km. wide with those countries that have not issued authorization for the use of the system.

In the same way, the use is not allowed in areas close to air traffic control facilities if the induced signal levels could generate harmful interference on these services. If this case is guessed to happen, National Military Authorities shall coordinate the use through the General Secretary of Telecommunications. In no case JTIDS/MIDS signal levels shall exceed -33 dBm (decibels relative to a milliwatt) in places where TACAN/DME is running. Likewise, it shall not exceed -20 dBm in places where Beacon / Air traffic Control Radar / Secondary Surveillance Radar equipment is located.

8) Frequency Occupation (Time Slot Duty Factor)

The maximum occupation limit of each carrier of JTIDS/MIDS will be established at 50 % of Time Slot Duty Factor (TSDF) for each JTIDS/MIDS terminal.

The maximum occupation limit of each carrier for the network of JTIDS/MIDS terminals operating in a determined zone is limited to 100 % TSDF to prevent the possibility of interference with the aeronautical services.

The Contention Function Mode is not permitted.

Emissions will automatically stop if some of the following cases occur:

- Deviation of the permitted pulse width tolerance.
- No uniform distribution of JTIDS/MIDS radiation through the whole band.
- The radiated energy within plus or minus 7 MHz of 1030 and 1090 MHz exceeds a – 60 dB level with reference to the maximum JTIDS/MIDS signal level measured in a 300 kHz bandwidth.

AGENCIA NACIONAL DE RADIOFRECUENCIAS
NARFA SP

9) Electromagnetic Compatibility

The JTIDS/MIDS terminal must comply with the content of this document as well as the guidelines specified within the Common Frequency Clearance Criteria Document for use of the JTIDS/MIDS protection features to ensure electromagnetic compatibility.

This communication is provided for your information and further considerations.

ADMIRAL P. OLIVERI

ACOS CIS DIVISION

JOINT STAFF OF DEFENCE

7.18
THE SWEDISH FREQUENCY CLEARANCE

SWEDISH ARMED FORCES
HEADQUARTERS

Date
May 11,2001

HQ designation
12 700:65979

Mailing list
Page 2

Your reference | Your date | Your designation

Our reference | Our previous date | Our previous designation

Command and Control Dept., Anders Eklund,
+46 8 788 7889

Translation of Agreement texts
(2 enclosures)

The Agreement from 1997 (with its addition 2000) between the Swedish Armed Forces (SwAF) and the Swedish Civil Aviation Administration (SwCAA) concerning the use of Radio 90 in Sweden has been translated into English and may be included in the "MNWG Notebook" as a reference.

Enclosed are translations of

- the original agreement from 1997, SwAF reference HKV 1997-04-01 12 700:64474 (SwCAA ref. LFV 1997-03-21 1997-1575-0831), original title "Överenskommelse avseende användning av radio 90 (Ra 90) i Sverige" (Enclosure 1)

./ 1

- addition to the above agreement, from 2000, SwAF reference HKV 2000-07-20 12 700:33031 (SwCAA ref. LFV 2000-07-19 2000-3318-0831), original title "Tillägg till: Överenskommelse avseende användning av radio 90 (Ra 90) i Svige" (Enclosure 2)

./ 2

Jan Petersson
Head of Command and Control Department

(Eki)

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United States of America

For information
F 16 TU Sb/Marktele
FMV:KC Sensor och Tele

Headquarters
KRI LUFT
KRI LED

SwAF reference HKV 1997-04-01 12 700:64474
(SwCAA ref. LFV 1997-03-21 1997-1575-0831)

Swedish original title “Överenskommelse avseende användning av radio 90 (Ra 90) i Sverige”.

Agreement regarding the use of Radio 90 (Ra90) in Sweden

1. The parties

1.1 This agreement has been established, in two identical originals, between the two parties, the Swedish Civil Aviation Administration and the Swedish Armed Forces.

A corresponding agreement has been established between the Swedish Civil Aviation Administration and the Swedish Defence Materiel Administration (FMV)

2. Considering

2.1 That the Government decisions of 11 December 1986 (Dnr H 177/86) and of 21 March 1991 (Dnr H 153/93 and Dnr 173/93) laid down that a study and the development of a new radiocommunication system shall commence. The instruction to place an order, with reference to ground radio communication system, was decided in the Government decision of 16 December 1993 (Fö 93/2750/MIL) and regarding the system Ra90 in the Government decision of 14 December 1995 (Fö 95/21 93/MIL).

2.2 According to the International Telecommunications Union (ITU) Radio Regulations (RR) the Frequency Allocation Table allocates the frequency band 960 Megahertz (MHz) to 1215 MHz to the Aeronautical RadioNavigation Service on a primary basis. Further, the Radio Regulations Number S5.328, states that the frequency band is reserved for the use and development of airborne electronics aids.

2.3 The use by Ra90 in the frequency band 960 MHz to 1215 MHz is made possible under the provisions of RR Number S4.4, that is transmissions utilizing Ra90, shall not cause harmful interference to primary services and for itself cannot claim protection from harmful interference. If harmful interference occurs, transmissions from Ra90 shall cease, or be reduced, until the necessary measures have been taken.

2.4 In accordance with RR provision S4.10 the Aeronautical Radio Navigation Service, when regarded to be an essential consequence to safety of life, shall be protected by special measures. Accordingly, other coexisting services shall be regulated by means of special conditions, with the intention of ensuring that no harmful interference occurs.

2.5 The CEPT (European Conference of Postal and Telecommunications Administration) ERC (European Radiocommunications Committee) report number 25 – "CEPT REPORT CONSIDERING THE FREQUENCY BAND 960 MHz TO 105 GHz AND ASSOCIATED EUROPEAN TABLE OF FREQUENCY ALLOCATIONS AND UTILIZATION" and the annexed "EUROPEAN TABLE OF FREQUENCY ALLOCATIONS AND UTILIZATION" refers to the utilization of Radiocommunications services in the frequency band 960 MHz to 1215 MHz. The Ra90 is up to the standard of the mentioned major utilization by the Joint Tactical Information Distribution System (JTIDS).

3. Scope

3.1 This agreement covers the criteria for the operational employment of the radio within the Swedish Armed Forces, with regard to Radiocommunications services, in the band 960 MHz to 1215 MHz.

3.2 This agreement is based on the results of Electromagnetic Compatibility (EMC) testing and analyses. The conditions contained in this document ensure that the performance of civil *Air Traffic Control (ATC)* equipment does not experience harmful interference from military radiocommunications systems.

4. Geographical area

4.1 This agreement concerns the utilization of Ra90 within Swedish territory or within the Swedish *Flight Information Regions (FIR).*

5. Technical characteristics

5.1 Ra90 is a tactical radiocommunication system for transmission of voice and data providing secure and integrated information distribution, position location, identification and navigation capabilities. This agreement concerns the technical characteristics of the system in the frequency band 960 MHz to 1215 MHz.

5.2 By means of individually transmitted pulses using a pseudorandom hopping sequence across 51 carrier frequencies, with 3 MHz spacing, in the band 969 MHz to 1008 MHz, 1053 MHz to 1065 MHz and 1113 MHz to 1206 MHz inclusive (TABLE 1), the system employs a *Time Division Multiple Access (TDMA)* transmission architecture with a time slot duration of 7,8 125 milliseconds (ms)

allowing for a versatile communication architecture and obtaining the desired spectrum efficiency. Each terminal transmission within a time slot consists of a sequence of either 2 x 72 pulses, that is 144 pulses, 258 pulses or 444 pulses spaced by 13 microseconds (µs). Individual pulses are 6,4 µs in duration and the carrier is modulated by Continuous Phase Shift Modulation (CPSM) at a rate of 5 megabits per second (Mbits/s) to produce a 32 bit message symbol. The original design, with respect to the Ra90, is not making use of the possibility of transmitting a sequence of 444 pulses.

Table 1
Carrier frequencies

Carrier number	Frequency (MHz)	Carrier number	Frequency (MHz)	Carrier number	Frequency (MHz)
0	969	17	1062	34	1158
1	972	18	1065	35	1161
2	975	19	1113	36	1164
3	978	20	1116	37	1167
4	981	21	1119	38	1170
5	984	22	1122	39	1173
6	987	23	1125	40	1176
7	990	24	1128	41	1179
8	993	25	1131	42	1182
9	996	26	1134	43	1185
10	999	27	1137	44	1188
11	1002	28	1140	45	1191
12	1005	29	1143	46	1194
13	1008	30	1146	47	1197
14	1053	31	1149	48	1200
15	1056	32	1152	49	1203
16	1059	33	1155	50	1206

5.3

The active transmission period for a standard time slot is 3,3474 ms. A terminal transmission within a time slot consists of a sequence of 258 pulses. The signal format may contain up to 128 time slots per second giving a maximum pulse rate of 33024 pulses per second based on 258 pulses or a maximum pulse rate of 56832 pulses per second based on 444 pulses. There are 1536 time slots in a period of 12 seconds duration. A time period of 12 seconds may contain a maximum of 396288 pulses, regardless of 258 or 444 pulses being used. Time Slot Duty Factor (TSDF) is the percentage of time slots occupied in a 12 second period based on 258 pulses per time slot. In its original design the Ra90 is not making use of the possibility of transmitting a maximum pulse rate of 56832 pulses.

5.4 The pulse spectrum is measured in a 300 kilohertz (kHz) bandwidth with reference to the maximum signal level measured in a 300 kHz bandwidth.

At ± 3 MHz from carrier - at least 10 decibel (dB) weaker than peak.
At ± 5 MHz from carrier - at least 23 dB weaker than peak.
At ± 13 MHz from carrier - at least 55 dB weaker than peak.
At and beyond ± 15 MHz - at least 60 dB weaker than peak.

5.5 Maximum power is a nominal 200 watts (W) + 1 dB measured at the terminal output. That is, the average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

5.6 The general antenna gain characteristics with reference to airborne platforms shall not exceed 5,5 decibel relative to an isotropic antenna (dBi) and with reference to landstations the antenna gain shall not exceed 9,5 dBi. The likely feeder losses are normally equal to or more than 1,0 dB.

6. Conditions of operations

6.1 With respect to the concluded technical examinations, and the submitted results, the system Ra90 can be used under the conditions stated below.

6.2 Ground based Air Traffic Control (ATC) equipment

6.2.1 The minimum separation between any platform in the fixed service, the maritime mobile service or the land mobile service using a Ra90 terminal and any civil ground based *Aeronautical Radio Navigation (ARN)* system operating in the band 960 MHz to 1215 MHz shall be based on a received signal level of –33 dBm (decibel relative to a milliwatt) which is approximately 0,5 Nautical Miles (NM) or 900 meters (m) for a Ra90 terminal transmitting with an output power of 200 W.

6.2.2 The minimum separation between any fixed service, maritime mobile service or land mobile service using a Ra90 terminal and any *Air Traffic Control Radar Beacon System/Secondary Surveillance Radar (ATCRBS/SSR)* ground equipment operating in the band 960 MHz to 1215 MHz shall be based on a received signal level of –20 dBm which is approximately 900 feet or 274 meters for a Ra90 terminal transmitting with an output power of 200 W.

6.2.3 The minimum vertical separation between airborne Ra90 users and ground based ATC systems operating in the band 960 MHz to 1215 MHz shall be 1000 feet or 305 meters.

6.3 Airborne ATC platforms

6.3.2 The minimum separation between any airborne Ra90 terminal and a civil aircraft operating ATC equipment in the band 960 MHz to 1215 MHz shall be 1000 feet or

305 meters slant range.

6.3.3 The separation between airborne ATC equipment operation in the band 960 MHz to 1215 MHz and Ra90 surface based platforms shall be at least 1000 feet or 305 meters.

6.4 Time Slot Duty Factor

6.4.1 An *Operations Area*, the Geographic Area of Ra90 Operations, defined as a cylinder of 100 NM or 190 kilometers (km) radius covering the total airspace between the highest airborne Ra90 platform and the ground. Within the Geographic Area of Ra90 Operations, the total TSDF shall not exceed 100 %, that is 396288 pulses in 12 second period. The Swedish Armed Forces shall consequently be responsible for establishing conditional rules, with regard to its own utilization of system Ra90, as well as for the necessary international coordination of similar systems, to ensure that the conditions in this agreement are complied with, also considering the total number of occupying pulses in the overlapping Operations Areas. When necessary, with respect to increase demand for traffic capacity, the radius of an Operations Area may require to be reduced. In such a case, supporting documentation shall in due time be submitted to the Swedish Civil Aviation Administration.

6.4.2 A single Ra90 user shall not transmit more than 50 % TSDF, that is 198144 pulses in a 12 second period.

6.4.3 Multinet operations are allowed, that is time slot reuse on different nets.

6.4.4 Contention is allowed, that is Ra90 terminals transmitting in the same time slot in the same net, if minimum separation between Ra90 terminals operating in contention is 100 NM or 190 km.

6.5 Frequency hopping

6.5.1 The Ra90 frequency hopping transmission sequence shall comply with the conditions of the *Technical Specification for Development and Production* document.

6.6 EMC protection features

6.5.1 The EMC protection features (EPF) shall be operating at all times, if no other special arrangement has been agreed on between the parties. The Ra90 EMC Protection Features shall inhibit transmission automatically when the performance of a terminal diverges from one of the following restrictions,

- the output power exceeds a nominal 200 watts + 1 dB, at more than two occasions between the switching on and the switching off of the terminal,
- the specified pulse width tolerance (6,4 µs ± 0,32 µs),
- a uniform distribution with respect to the use of the 51 carrier frequencies,
- the radiated energy within ± 7 MHz of 1030 MHz and 1090 MHz exceeds the – 60 dB level with reference to 200 W nominal output power level measured in a 300 kHz bandwidth,

If no other special arrangement has been agreed on between the parties, a single Ra90 terminal shall automatically inhibit all transmission during the remainder of a 12 second period, following an automatic reset, if the performance of the terminal diverges from the following restriction,

- the transmissions exceed an equivalent TSDF of 50%.

6.7 Exceptions from the EPF

6.7.1 The Swedish Armed Forces shall ensure that a single Ra90 terminal during normal operational conditions does not exceed the equivalent TSDF of 50 % within an area of operation. However, this restriction does NOT apply on temporary transmissions when the Ra90 terminal is situated on ground, during flight preparations, testing, maintenance or repair. This exceptions does not apply to other parameters referred to under the heading “EMC protection features”.

6.7.2 Modification and deviation from the parameters specified in this agreement are to be submitted separately and are subject to special approval.

6.8 International coordination

6.8.1 In the event of an international coordination, the conditions in this agreement may be subjected to review.

The parties are in agreement that the Swedish Armed Forces can use the frequency band 960 MHz to 1215 MHz in accordance with the above conditions.

Stockholm 13-03-1997

J B R Wennerholm
J B R Wennerholm
Colonel, acting Head of Communications
and Informations Systems Department
HQ, Swedish Armed Forces

Norrköping 24-03-1997

Bo Redeborn
Bo Redeborn
Head of Staff Air Traffic Services
Swedish Civil Aviation Administration

SwAF reference HKV 2000-07-20 12 700:33031
(SwCAA ref. LFV 2000-07-19 2000-3318-0831)

Swedish original title “Tillägg till: Överenskommelse avseende användning av radio 90 (Ra 90) i Sverige”.

Addition to

Agreement regarding the use of Radio 90 (Ra90) in Sweden
(LFV 1997-03-21 1997-1575-0831, HKV 1997-04-01 12 700:644 74)

1. Background

The Swedish Armed Forces and the Defence Materiel Administration have agreed in the above contract with the Civil Aviation Administration on principles for the utilisation of Radio 90 (Ra90) in Sweden.

It is stated under paragraph 6.4 of the aforementioned contract that: *in the event of a need for increased traffic capacity, the radius relating to operations area may need to be reduced, documentation to cover such activity shall then be presented to the Civil Aviation Administration* and under paragraph 6.7.2 it is stated that: *modifications and other deviations from characteristics included in this agreement shall be dealt with separately and be the subject of special approval.*

During the autumn of 1999, documentation of this type was drawn up and presented to the Civil Aviation Administration. As a result of this documentation, the parties to the contract have agreed that this addition shall be made to the aforementioned contract.

The addition applies until further notice or until either party gives notice in writing to terminate it.

2. Geographical area

2.1 Geographical area

The term geographical area is used to mean the circular area around each radio node within which only 100% equivalent TSDF (Time Slot Duty Factor) may be transmitted.
The designations geographic area application and operational area occur in other documents.
The term equivalent TSDF means 396,288 pulses within a 12-second interval [see ref. 1].

2.2 Radius of geographical area

The radius of the geographical area is based on the set node power according to the table below (1 nautical mile (nmi) = 1852 m).

Node power	Radius of geographical area	
200W	100 nmi	(approx. 185 km)
20 W	35 nmi	(approx. 65 km)
2 W	13 nmi	(approx. 24 km)

Table 1. Radius of geographical area as a function of set node power.

2.3 Calculation of equivalent TSDF if precise positions of nodes are not known

In calculating equivalent TSDF within a geographical area, the calculations are to be based on a worst case regarding the location of nodes, if the precise positions of the nodes are not known.

For example, nodes which operate within the same exercise area and the precise positions of which are not known are regarded as being located within the same geographical area in the calculation of equivalent TSDF.

3. Summation within geographical area

Summation of equivalent TSDF within a geographical area shall be carried out as follows:
Three circles with a radius of 100 nmi, 35 nmi and 13 nmi (radii for the set node powers which may occur) are applied around each node.
The nodes of which the power corresponds to the radius concerned are summed for each of these circles.
I.e. for the circle with the radius 100 nmi nodes which use 200 W are summed, for the circle with the radius 35 nmi nodes with 20 W are summed and for the circle with the radius 13 nmi nodes with 2 W power are summed.
Finally the results from the different circles are added together, and this sum constitutes the equivalent TSDF for the node concerned.

Example of summation of equivalent TSDF with three 20 W nodes and one 200 W node. Within the circle with a radius of 100 nmi, the 200 W node 4 is summed. Within the circle with a radius of 35 nmi, the 20 W nodes 1 and 2 are summed. No node with 2 W occurs, and summation within a circle with a radius of 13 nmi therefore does not need to be done.

Node 1 equivalent TSDF therefore becomes the sum of nodes 1, 2 and 4 (node 3 is therefore not included). Summation is carried out in the same way for all the nodes.

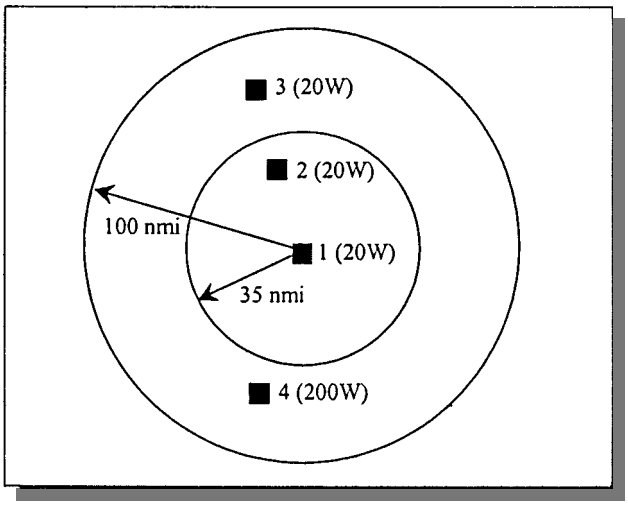

Figure 1. Calculation of equivalent TSDF

4. Method of calculation for TD channels

4.1 General

The duty factor for a TD channel is generally well below 100%, and two more realistic methods of calculating the TSDF load of TD channels have therefore been devised. Both method A and method B may be used, but not simultaneously.

4.2 Method of calculation A

Nodes which have the same TD channel allocated are designated a TD group. Of the nodes forming part of a TD group, only one of the nodes is regarded as using the TD channel at a time, regardless of whether the channel is configured as VAB (Voice Access Blocking) or not.

In summation within a geographical area, the TSDF load for a TD group shall be regarded as starting from the least advantageous node. I.e. even if only one of the nodes in a TD group falls within a geographical area, this node shall be regarded as holding the TSDF load of the TD channel.

Example
Nodes 2 to 5 have the same TD channel allocated. In summation within a geographical area, the TSDF load of the TD channel shall be applied to the least advantageous node, in this case for example node 4 in summation around node 1. The TSDF load of node 5 for the TD channel is then set to 0%.

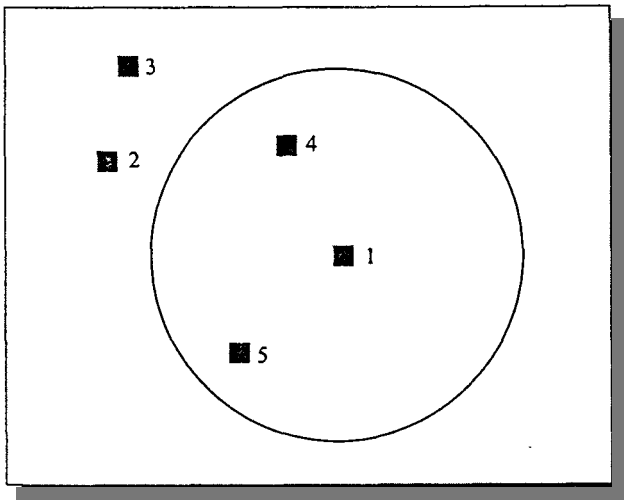

Figure 2. Method of calculation for TD channels.

4.3 Method of calculation B

Method of calculation B involves statically applying 35% duty factor for all TD channels.

5. Logging of activity

The Ra90 information below shall be kept for at least three months for the purpose of being able to clarify problems of interaction with civil navigational aids afterwards.

1. Information on where the equipment has been operational
For airborne equipment, this means particulars of the relevant area (e.g. exercise area) and approximate flight paths to/from this area. For ground-based systems, geographical position is also meant.

2. When the equipment has been switched on/off
For airborne equipment, this means when the aircraft and therefore the radio system have been energised. For ground equipment, this means logical transmission capability, i.e. that a ground station is connected to STRIC and that channels are allocated.

3. EMC restrictions or resets which have occurred.

4. Which EMC protection mode has been used

5. Which power level has been used

6. References

	Document	
1	Use of Ra90 in Sweden	HKV 12 700: 64474; 01-04-1997
2	Investigation: Ra90 reduction in operational area	Celsius Aerotech M3:6933, ELEKTRO 33200:38862, 08-11-1999
3	Ra90 EMC recording	Celsius Aerotech GN/99:463, 23-09-1999
4	20 W and 200 W Ra90 EMC simulations	Lars Håkansson, FlygvapenC Tu Sb/MT, 23-09-1999
5	Minutes of meeting 23-06-99	ELEKTRO 33200:26847/99
6	Minutes of meeting 21-07-99	ELEKTRO 33200:29630/99
7	JSC requirements for EMC logging Ground and Airborne	TARAS 117/99, 28-10-1999

The parties are in agreement on the above.

Stockholm, 13-06-00

Håkan Bergstrom
Håkan Bergstrom
Head of Command and Control Department
HQ, Swedish Armed Forces

Norrköping, 18-07-00

Michael Standar
Michael Standar
Head of Operational Standards and Procedures
Air Traffic Service, Civil Aviation Administration

Parterna är överens om ovanstående.

Stockholm 00-06 13

Håkan Bergström
Chef for Krigsförbandsledningens
ledningssystemavdelning
Försvarsmakten

Norrköping 00-07-18

Michael Standar
Chef for Operativa standards och procedurer
Flygtrafiktjänsten, Luftfartsverket

Parterna är överens om ovanstående.

Stockholm 00-06-20

Jan Otterström
Chef Produktionssamordning
Ledning, Drift och Underhål1
Försvarets materielverk

Norrköping 00-07-18

Michael Standar
Chef for Operativa standards och procedurer
Flygtrafiktjänsten, Luftfartsverket

7.19
THE SWITZERLAND FREQUENCY CLEARANCE

BAKOM Bundesamt für Kommunikation
OFCOM Office fédéral de la communication
UFCOM Ufficio federale delle comunicazioni
UFCOM Uffizi federal da communicaziuns

Generalstab
UG Führungsunterstützung
Sst KUem GV
Frequenzplanung und Internationales
3003 Bern

Biel, 15. Februar 1999

Sachbearbeiter/in:	Tel. Nr.:	Unser Zeichen:	Ihr Zeichen:
W. Spycher	032/327.5701	1999.00725/43/spw	Ang 594.08

Implementation of JTIDS/MIDS in Switzerland
Frequency Clearance

Dear Madam
Dear Sir

With your letter from 24 August 1998 you informed us about the intentions of air force concerning the inauguration of the JTIDS/MIDS ("Joint Tactical Information Distribution System"), and that you applied for a "Frequency Clearance" on request of the headquarter of NATO.

In agreement with the responsible authority for "Aeronautical Radionavigation Service" herewith we give on the "Frequency Clearance" for Switzerland. This frequency is in accordance with the so called "Common Frequency Clearance". The criteria for JTIDS/MIDS operations in Switzerland are laid down in "Frequency Clearance Criteria Documentation for JTIDS/MIDS Operations", dated 16 February 1998. These criteria are identified as "common clearance parameters" in the table "Existing JTIDS Frequency Clearances", dated 30 April 1998 (Enclosures). These both Papers are fully integrated in the "Frequency Clearance" of Switzerland.

It should be noted that these criteria include e.g. the following provisions:

- "JTIDS/MIDS transmissions shall not cause harmful interference to either existing or future equipment and systems in the Aeronautical Radionavigation Service and for it self cannot claim protection from harmful interference" (paragraph 2.3); and

- "Should harmful interference be reported, immediate action will be taken to stop JTIDS/MIDS transmissions until it has been shown that the interference is not JTIDS/MIDS related" (paragraph 4.1).

Zukunftstrasse 44/Rue de l'Avenir 44
Postfach /Case postale
CH-2501 BIEL-BIENNE
Tel./Tél. 032 /327 55 11
Fax 032 /327 55 55

It should also be noted that the following geographical separation minima between JTIDS/MIDS ground based mobile or fixed terminals (200 W) and aeronautical radionavigation ground equipment have to be applied:

- 900 m from Distance Measuring Equipment (DME) transponder (paragraph 6.2.1.1); and

- 274 m from Secondary Surveillance Radar (SSR) station (paragraph 6.2.1.2)

In any case of interference where a fast communication must be ensured, please let us know the direct contact name of the operator of JTIDS/MIDS in Switzerland.

Best regards

Federal Office for Communications
Section Frequency Planning

P. Horisberger

Enclosures.

7.20
THE TURKISH
FREQUENCY CLEARANCE

TURKISH GENERAL STAFF
ANKARA / TURKEY

CEIS : 3108.10- 50 -97/NARFA (1362)

SUBJECT : Turkish JTIDS/MIDS Frequency Clearance

16 MARCH 1997

SHAPE DATA LINK MANAGEMENT
AND INTEROPERABILITY CELL
BRUSSELS/BELGIUM

REFERENCE :**(a)** COMNAEWF Message dated 111409Z OCT 96, SIC SPA/ XIS, Same Subject

(b) Frequency Clearance Criteria Documentation for JTIDS/MIDS Operations dated 4 December 1996

1. By ref (a), please find herewith the Turkish Frequency Clearance prepared in compliance with ref (b) for JTIDS/MIDS operation in the Turkish Area of Responsibility.

2. Turkey keeps her reservation right to supersede, to renew and to modify the subject clearance and to extend the restrictions as specified in it.

Bülent ALPKAYA
Vice Admiral
ACOS CEIS

1 Enclosure : Turkish JTIDS/MIDS Frequency Clearance

DISTRIBUTION : DPC

Action :

SHAPE Data Link Management
and Interoperability Cell

Info :

ARFA/Brusssels
TMR/Brussels
COMEDNOREAST
Turkish Air Force Command

OPS/LOG

TGS Letter, CEIS:3108.10-50-97/NARFA (1362) DATED 14 MARCH 1997

TURKISH JTIDS/MIDS FREQUENCY CLEARANCE

REF.: (a) ITU Radio Regulation

(b) FRQ. Clearance Criteria Documentation for JTIDS/MIDS Operations dated 4 Dec 1996.

1. The frequency band 960 – 1215 MHz is reserved for Aeronautical Radio Navigation Service on a primary basis worldwide. This service must not suffer from harmful interference from these systems operating in the band in compliance with ref (a) Regulation. This position is essential.

2. As an ITU member country, Turkey accepts the statement above and takes care of the band to be used for the same purpose.

3. JTIDS/MIDS EMC TESTING AND EVALUATION PROCESS states as ”JTIDS operations will not have harmful affect on the operation of Terminal and Tactical Air Navigation (TACAN)/Distance Measuring Equipment (DME) interrogators, should harmful interference occur, the operation of JTIDS/MIDS will be reduced or stopped”. Together with the statement above, if harmful interference stems from JTIDS/MIDS operations even in or out of the 960 – 1215 MHz band due to the harmonics or collocated operation and the like, the system shall be shut off automatically and/or on the request of Turkish authorities relating to that subject until the protective measures are taken and be sure that the interference source is not the JTIDS/MIDS operation.

4. The system shall be operated in the frequency bands and the channels specified on the item 10.c.(5) of this clearance.

5. Pulse characteristics shall not exceed the limits described in ref (b) para 5.2.

6. Maximum power of transmitters shall be nominal 200 watts + 1 dB at the terminal output.

7. Antenna characteristics will be as follows:

Type	: Dipol Array, Monopole
Polarization	: Vertical
Nominal Gain and Loss	: Ref(b) 5.5 refers

8. JTIDS/MIDS operations are restricted to nine NAEW and C operations' area, fixed wing and combat aircraft in Turkey. In helicopters JTIDS/MIDS shall not be used.

9. NATO and any guest forces shall be subjected to transmissions by fixed site, air mobile, marine mobile and ground mobile JTIDS/MIDS terminals. For these operations necessary precoordinations shall be made with Turkish Authorities through normal diplomatic channels.

10. Air Traffic Control (ATC) equipment which are functioning in 960 – 1215 MHz band shall be protected as outlined below:

a. Ground Station Coordination:

(1) Minimum separation between any ground based JTIDS/MIDS TACAN / DME; and Air Traffic Control Radar Beacon System (ATCRBS) / Secondary Surveillance Radar (SSR) which are functioning in 960 – 1215 MHz band shall be 2 NM (ref (b) refers).

(2) Any ground based JTIDS/MIDS terminal operation shall be coordinated with Turkish Authorities through normal diplomatic channels.

b. Airborne Platforms Coordination:

The minimum separation between any airborne and ground JTIDS/MIDS terminal; and any airborne and ground ATC equipment shall be 1000 feet. (ref (b) refers)

c. Terminal Operation:

(1) Time Slot Duty Factor 100/50

(2) A Single JTIDS/MIDS user except fighter aircraft shall not transmit more than 50% TSDF (198,144 pulses in a 12 second period).

(3) A fighter aircraft shall not transmit 20% TSDF.

(4) In any area of 50 NM radius (a cylinder covering the total airspace between the highest airborne JTIDS/MIDS terminal and the ground) the TSDF shall not exceed 100%. In that area a single JTIDS/MIDS user shall not exceed 50% TSDF.

(5) The pseudorandom frequency hopping shall be in 969 – 1008 MHz, 1053 – 1065 MHz and 1113 – 1206 MHz frequency bands by using 51 carrier frequencies. But when deviation from specified pulse width, distribution of JTIDS/MIDS radiation uniformly across the whole frequency band, transmitting exceeding the 50**%** TSDF, the JTIDS/MIDS operation must be inhibited automatically.

(6) The minimum separation between JTIDS/MIDS terminals operating in the same time slot shall be 100 NM.

(7) Standard messages containing 258 pulses per time slot are authorized to be transmitted.

d. Electromagnetic Compatibility (EMC) Features:

EMC Protection Features shall always be under observation. When the performance of a terminal diverges from one of the restrictions specified as follows, the affecting terminal shall inhibit transmissions automatically:

(1) Deviation from the specified pulse width (6.4 µs ± 0.32 µs)

(2) When the distribution of the JTIDS/MIDS radiation across the whole frequency band (subparagraphs of ref (b) 6.1.3.2.1, 6.1.3.2.2, 6.1.3.2.3 refers).

(3) Transmitting more than 50% TSDF in a 12 second period.

(4) The radiated energy within ± 7 MHz of 1030 MHz and 1090 MHz exceeds the – 60 dB level with reference to the maximum JTIDS/MIDS signal level measured in a 300 kHz bandwidth.

e. Output Power:

The output power shall not exceed a nominal 200 w ± 1 dB. The JTIDS/MIDS terminals with a high output capability shall inhibit transmission if output power exceeds 200 watts + 1 dB.

11. Operating Records:

a. For JTIDS/MIDS operations the log records shall contain the networks in use, date, time in UTC - Zulu Time -, start-stop radiation time, altitude, position or standard flight pattern any automatic inhibited JTIDS/MIDS radiation etc.

b. The records shall be retained for one year and be provided in detail whenever requested by Turkish General Directorate of Radio Communications (TGM) and Turkish General Staff (TGS) .

12. If any test procedure will be applied on Turkish Territory, total power on the antenna may be tested.

13. In any case, the operational and test JTIDS/MIDS radiation shall not be applied simultaneously. This is to be coordinated by NAEW and C Operations Centre and Turkish Authorities (TGM and TGS).

14. For JTIDS/MIDS operation request into the Turkish Airspace, the nations shall submit their requests to the SHAPE Data Link Management and Interoperability Cell with a copy to TGS (NARFA TU). If the parameters are different from specified in the ref (b), the requests shall be made separately and be subjected to special approval.

15. Frequency Clearance Guide:

a. This Frequency Clearance which is specified in ref (b) shall be in validation for only available NATO JTIDS/MIDS operation. If any equivalent JTIDS/MIDS operation is requested beyond this clearance, this request is subjected to new EMC testing and a new Frequency Clearance.

b. In any case of interference, reports from neighbouring countries stemming from JTIDS/MIDS operation, this shall be subjected to change of this clearance.

c. For Expanded Exercises and Jamming Exercises 7.2 and 7.3 paragraphs of ref (b) refers), Frequency Clearance shall be taken.

16. Turkey keeps her reservation right to modify and to expand restrictions specified in this clearance**.**

ILKER TOSUN
COL.NARFA TU

TGS E-MAIL & FAX DATED 1 AUGUST 1999

TURKISH JTIDS/MIDS FREQUENCY CLEARANCE

REF.: (a) ITU Radio Regulation

(b) FRQ. Clearance Criteria Documentation for JTIDS/MIDS Operations dated 4 Dec 1996.

1. The frequency band 960 – 1215 MHz is reserved for Aeronautical Radio Navigation Service on a primary basis worldwide. This service must not suffer from harmful interference from these systems operating in the band in compliance with ref (a) Regulation. This position is essential.

2. As an ITU member country, Turkey accepts the statement above and takes care of the band to be used for the same purpose.

3. JTIDS/MIDS EMC TESTING AND EVALUATION PROCESS states as ”JTIDS operations will not have harmful affect on the operation of Terminal and Tactical Air Navigation (TACAN)/Distance Measuring Equipment (DME) interrogators, should harmful interference occur, the operation of JTIDS/MIDS will be reduced or stopped”. Together with the statement above, if harmful interference stems from JTIDS/MIDS operations even in or out of the 960 – 1215 MHz band due to the harmonics or collocated operation and the like, the system shall be shut off automatically and/or on the request of Turkish authorities relating to that subject until the protective measures are taken and be sure that the interference source is not the JTIDS/MIDS operation.

4. The system shall be operated in the frequency bands and the channels specified on the item 10.c.(5) of this clearance.

5. Pulse characteristics shall not exceed the limits described in ref (b) para 5.2.

6. Maximum power of transmitters shall be nominal 200 watts + 1 dB at the terminal output.

7. Antenna characteristics will be as follows:

Type	: Dipol Array, Monopole
Polarization	: Vertical
Nominal Gain and Loss	: Ref(b) 5.5 refers

8. JTIDS/MIDS operations are restricted to nine NAEW and C operations' area, fixed wing and combat aircraft in Turkey. In helicopters JTIDS/MIDS shall not be used.

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a. Ground Station Coordination:

(1) Minimum separation between any ground based JTIDS/MIDS TACAN / DME; and Air Traffic Control Radar Beacon System (ATCRBS) / Secondary Surveillance Radar (SSR) which are functioning in 960 – 1215 MHz band shall be 2 NM (ref (b) refers).

(2) Any ground based JTIDS/MIDS terminal operation shall be coordinated with Turkish Authorities through normal diplomatic channels.

b. Airborne Platforms Coordination:

The minimum separation between any airborne and ground JTIDS/MIDS terminal; and any airborne and ground ATC equipment shall be 1000 feet. (ref (b) refers)

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(2) A Single JTIDS/MIDS user except fighter aircraft shall not transmit more than 50% TSDF (198,144 pulses in a 12 second period).

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(5) The pseudorandom frequency hopping shall be in 969 – 1008 MHz, 1053 – 1065 MHz and 1113 – 1206 MHz frequency bands by using 51 carrier frequencies. But when deviation from specified pulse width, distribution of JTIDS/MIDS radiation uniformly across the whole frequency band, transmitting exceeding the 50**%** TSDF, the JTIDS/MIDS operation must be inhibited automatically.

(6) The minimum separation between JTIDS/MIDS terminals operating in the same time slot shall be 100 NM except for RTT Modes A & B & Initial Net Entry Transmissions.

(7) Standard messages containing 258 pulses per time slot and packed messages containing 444 pulse time slots are authorized to be transmitted.

d. Electromagnetic Compatibility (EMC) Features:

EMC Protection Features shall always be under observation. When the performance of a terminal diverges from one of the restrictions specified as follows, the affecting terminal shall inhibit transmissions automatically:

(1) Deviation from the specified pulse width (6.4 µs ± 0.32 µs)

(2) When the distribution of the JTIDS/MIDS radiation across the whole frequency band (subparagraphs of ref (b) 6.1.3.2.1, 6.1.3.2.2, 6.1.3.2.3 refers).

(3) Transmitting more than 50% TSDF in a 12 second period.

(4) The radiated energy within ± 7 MHz of 1030 MHz and 1090 MHz exceeds the – 60 dB level with reference to the maximum JTIDS/MIDS signal level measured in a 300 kHz bandwidth.

e. Output Power:

The output power shall not exceed a nominal 200 w ± 1 dB. The JTIDS/MIDS terminals with a high output capability shall inhibit transmission if output power exceeds 200 watts + 1 dB.

11. Operating Records:

a. For JTIDS/MIDS operations the log records shall contain the networks in use, date, time in UTC – Zulu Time, start-stop radiation time, altitude, position or standard flight pattern any automatic inhibited JTIDS/MIDS radiation etc.

b. The records shall be retained for one year and be provided in detail whenever requested by Turkish General Directorate of Radio Communications (TGM) and Turkish General Staff (TGS) .

12. If any test procedure will be applied on Turkish Territory, total power on the antenna may be tested.

13. In any case, the operational and test JTIDS/MIDS radiation shall not be applied simultaneously. This is to be coordinated by NAEW and C Operations Centre and Turkish Authorities (TGM and TGS).

14. For JTIDS/MIDS operation request into the Turkish Airspace, the nations shall submit their requests to the SHAPE Data Link Management and Interoperability Cell with a copy to TGS (NARFA TU). If the parameters are different from specified in the ref (b), the requests shall be made separately and be subjected to special approval.

15. Frequency Clearance Guide:

a. This Frequency Clearance which is specified in ref (b) shall be in validation for only available NATO JTIDS/MIDS operation. If any equivalent JTIDS/MIDS operation is requested beyond this clearance, this request is subjected to new EMC testing and a new Frequency Clearance.

b. In any case of interference, reports from neighbouring countries stemming from JTIDS/MIDS operation, this shall be subjected to change of this clearance.

c. For Expanded Exercises and Jamming Exercises 7.2 and 7.3 paragraphs of ref (b) refers), Frequency Clearance shall be taken.

16. Turkey keeps her reservation right to modify and to expand restrictions specified in this clearance**.**

Kemal KIZILTAN
Hv.Mu.Kd.Alb.
Frk.YntS.Md.

7.21
THE UNITED KINGDOM FREQUENCY CLEARANCE

FREQUENCY CLEARANCE AGREEMENT BETWEEN THE MINISTRY OF DEFENCE AND THE CIVIL AVIATION AUTHORITY FOR THE USE OF THE FREQUENCY BAND 960 TO 1215 MHZ BY THE MULTIFUNCTIONAL INFORMATION DISTRIBUTION SYSTEM / JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM

EDITION 6.3

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RECORD OF AMENDMENTS

AMENDMENT NUMBER	DATE	SIGNATURE
AL 1		
AL 2		
AL 3		

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FOREWORD

This Document defines the agreed authorities, regulations, functions and procedures for units involved in operations using the Multifunctional Information Distribution System (MIDS)/Joint Tactical Information Distribution System (JTIDS) within UK Airspace in peacetime and is effective upon receipt. Amendment to this agreement, which is to be recorded in the Record of Amendments, may be necessary from time to time to reflect the introduction of new equipment or changes to operational procedures.

The Document is jointly sponsored by the MoD and the CAA and is managed by the JTIDS Frequency Clearance Agreement Management Committee on behalf of DG INFO and DAP respectively. Any queries concerning this Agreement should be addressed to IA6b, DPA, on +44 (0) 117 913 4187 or SS4, CAA, on +44 (0) 207 453 6534.

J R D ARSCOTT
DAP
Civil Aviation Authority

29 July 2004

J C T TAYLOR
DG INFO
Ministry of Defence

29 July 2004

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SECTION 1: GENERAL

1 Introduction

1.1 The Multifunctional Information Distribution System/Joint Tactical Information Distribution System (MIDS/JTIDS) operates within the 960-1215 MHz frequency band which has been allocated internationally for aeronautical radio-navigation systems, including Distance Measuring Equipment (DME) and Secondary Surveillance Radar (SSR). Consequently, there is the potential for MIDS/JTIDS transmissions to cause interference to those navigation systems. Therefore, extensive compatibility studies have been carried out, the results and conclusions of which have been analysed and assessed to produce the specific conditions of use and to identify the specific equipment to be covered by this Agreement.

2 Aim

2.1 The use of MIDS/JTIDS in the UK Flight Information Regions (FIR)/Upper Airspace Information Regions (UIR) is governed by this Frequency Clearance Agreement (FCA) between the Ministry of Defence (MoD) and the Civil Aviation Authority (CAA). It defines the agreed authorities, regulations, functions and procedures for units involved in MIDS/JTIDS operations within the UK Airspace in peacetime.

3 Authority

3.1 Use of MIDS/JTIDS in peacetime is only authorised by agreement with the appropriate national aviation authorities. In the UK FIR/UIR, authority for national aviation is vested in the CAA, specifically, the Directorate of Airspace Policy (DAP), in accordance with Ministerial Directions to the CAA[1]. Furthermore, the use of MIDS/JTIDS is subject to its continued inclusion in the UK Frequency Allocation Table (FAT), which is approved by the National Frequency Planning Group (NFPG).

4 Applicability

4.1 This Agreement applies to all use of MIDS/JTIDS by the MoD and its agencies, civilian organisations and visiting forces, including those of the North Atlantic Treaty Organisation (NATO), operating within the UK FIR/UIR. In addition, UK and Visiting forces will respect the terms of this Agreement when operating within the Shanwick Oceanic Control Area east of Longitude 15ºW.

5 Precedence

5.1 This Agreement is the principal document governing the use of MIDS/JTIDS in UK airspace and has precedence over all other documents and instructions.

6 MIDS/JTIDS Definition

6.1 “MIDS/JTIDS” refers to and describes all military uses of the Time-Division Multiple Access (TDMA) tactical data link that is characterised by the pseudo-random use of 51 spot frequencies within the band 960 to 1215 MHz. This specifically includes MIDS, Link 16 and the Interim JTIDS Message Specification (IJMS).

[1] Civil Aviation Authority (Air Navigation) Directions 2001, issued jointly under section 66(1) of the Transport Act 2000 by the Secretary of State for the Environment and the Regions and the Secretary of State for Defence.

7 Compliance

7.1 The acceptance by the CAA of any use of MIDS/JTIDS within the frequency band 960 to 1215 MHz is conditional on the strict observance of the specified conditions of operation and restrictions mandated in this frequency clearance document. No condition contained in this Agreement implies any status for the MIDS/JTIDS other than that stated, nor does any condition imply an obligation for the acceptance of the use of MIDS/JTIDS beyond that specified in this Agreement.

7.2 Only those MIDS/JTIDS terminals and associated platforms listed at Annex A are cleared for operations within the geographic scope of this Agreement.

7.3 Failure to adhere to the conditions and restrictions set out in this Agreement could result in the withdrawal of approval for continued use of MIDS/JTIDS in the UK FIR/UIR.

8. Review and Amendment

8.1 This document is jointly sponsored by the MoD and the CAA, and is managed by the JTIDS Frequency Clearance Agreement Management Committee (JFMC) on behalf of DG INFO and DAP respectively. Through the FCA Management Structure described at Section 3, this Agreement is continually reviewed and will be subject to change. Amendments will be considered at any time in response to:

a. Results from testing and analysis of MIDS/JTIDS effects on navigation and surveillance systems.

b. Proposed changes in the operational requirement for MIDS/JTIDS, or the introduction of new or significantly modified JTIDS equipment.

c. The proposed introduction of a new aeronautical radio-navigation system, or a variant of an existing system with characteristics that differ in important respects from those on which proven compatibility has been established.

d. Problems encountered with the existing agreement in any respect.

8.2 Proposed amendments will be discussed and assessed by either the JTIDS FCA Safety Committee (JFSC) or the JTIDS FCA Technical Working Group (JFTWG). Amendments endorsed by these groups will be presented to the JFMC for formal acceptance, before incorporation and issue. Relaxation of operating restrictions will only be considered once evidence has been obtained, through testing/measurement and analysis, confirming that interference to aeronautical services will remain within tolerable limits. User communities wishing to make proposals for change should forward requests to the DPA IA6, JDLMO or TDL IPT for assessment by the appropriate group. Contact details are available at Annex K.

8.3 The approval of specific conditions of use in this Agreement and the adoption of any future relaxation does not imply a perpetual approval for their use, particularly with regard to separation minima from aeronautical navigation aids. The introduction of such equipment may require the imposition of more restrictive operating conditions on a temporary or permanent basis. Alternatively, as a result of issues raised under sub-paragraph 8.1d above, other general conditions may be imposed, if required.

9 Withdrawal

9.1 Whilst this Agreement seeks to define a procedure for the orderly management of changes to MIDS/JTIDS frequency clearance within the band, exceptional circumstances cannot be foreseen. It is agreed that this Agreement may be withdrawn, completely or in part, at any time after consultation between the CAA and MoD.

10 Times Of Crisis And Conflict (TCC)

10.1 This Agreement will be rescinded and all constraints to MIDS/JTIDS operations will be lifted during TCC when all air traffic services are brought under military direction. However, during the early stages of TCC the surveillance of civil and military air traffic can be expected to increase. This will require a commensurate increase in MIDS/JTIDS communications capacity that, if satisfied, could pose an increased risk to civil air navigation services, particularly when using DME in the final approach and landing phases. Therefore, certain conditions of use restrictions could be lifted at the preparatory stage of the transfer of ATC services and, depending on prevailing operational circumstances, MIDS/JTIDS equipped forces will avoid TMAs, wherever possible. When these TCC measures are rescinded on restoration of normal conditions, the conditions of this Agreement will be re-imposed.

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SECTION 2: MIDS/JTIDS CLEARANCE TO OPERATE IN THE UK FIR

1 Introduction

1.1. The purpose of this Section is to describe the fundamental strategy that underpins MIDS/JTIDS operations in the UK and to provide guidance on the processes that are required by platforms to gain long-term frequency clearance for MIDS/JTIDS operations within the UK. The process is shown graphically at Figure 1 on page 2-4.

2 MOD FCA Safety Strategy

2.1 As agreed with the CAA, the MoD will maintain a Safety Plan to underpin the ongoing operation of MIDS/JTIDS in the UK. The aim of the Safety Plan is to define the UK MIDS/JTIDS frequency clearance management organisation and the safety management activities necessary to ensure that NavAid user safety is not compromised by the use of MIDS/JTIDS. As well as operational requirements, the Plan identifies the safety activities to be undertaken during equipment procurement, design, development, integration and/or modification phases.

2.2 Based on the Safety Plan, the MoD has produced a Baseline Safety Case (BSC) to support the general operation of MIDS/JTIDS as a system concurrent with the safe operation of DME and SSR. The BSC defines specific Safety Requirements that are directly related to the conditions of MIDS/JTIDS use specified in this Agreement. Safety targets are provided for MIDS/JTIDS terminal functional and performance requirements and for operational requirements.

2.3 Safety Case Reports will be produced for each MIDS/JTIDS terminal and platform detailing how each will address the BSC Safety Requirements and meet the specified safety targets.

3 Ownership of Safety Documentation

3.1 All the safety documentation related to MIDS/JTIDS operations is developed for and owned by the MoD. All such documentation will be made available to the CAA for examination and review.

4 Terminal and Platform Clearance

4.1 All terminals and platforms must have an approved safety case to operate MIDS/JTIDS within the UK in the long-term. If a safety case for a terminal/platform does not exist, it is the responsibility of the platform support authority to start the safety case production process. When a platform is utilising a terminal that has already been cleared for use in the UK (i.e. a terminal safety case already exists and is, therefore, listed at Annex A to this document), a platform safety case should be produced as an annex to the terminal safety case. When a new platform is also introducing to service a new terminal, the supporting authority must produce both terminal and platform safety cases. When preparing safety cases, advice should be sought from the JTIDS FCA Programme Manager (JFPM) within the DPA TDL IPT (TDL13).

4.2 Once a draft terminal or platform safety case has been produced, it must be submitted to the JTIDS FCA Safety Committee (JFSC) for approval. After staffing a safety case and incorporating any required amendments, the JFSC will endorse the safety case and refer it to the JTIDS FCA Management Committee (JFMC) with a recommendation for its formal acceptance. Once a safety case has been accepted by the JFMC, the terminal or platform is

deemed to be 'cleared' for use within the UK airspace. The supporting authority and operating community will be informed of this status by IA6b and the terminal/platform will be formally listed within Annex A of this Agreement.

4.3 Once the Safety Case has been formally accepted by the JFMC, the platform will be granted permanent clearance to operate in the UK FIR; however a set of Standard Operating Procedures (SOPs) covering its operation in the UK will also have to be provided. The DLMC at High Wycombe will review these in accordance with the information presented in the platform safety case, and only then will the platform be provided with a network load. Failure to provide a comprehensive set of SOPs in support of the safety case will prevent the platform from operating in the UK until this information is provided.

4.4 The formal safety case clearance process may take 4-8 months to complete. It is imperative that platform support authorities initiate safety case production as soon as a MIDS/JTIDS requirement is identified. Whilst the relevant safety case is being prepared, development activities or initial operation of the platform may be permitted under the auspices of a temporary operating waiver (See Section 5). However, such a waiver will normally only be granted if safety case preparations have been initiated.

5 MIDS/JTIDS Site Clearance

5.1 Within the UK, MIDS/JTIDS transmissions may only occur from ground locations that have been cleared by the CAA. Aircraft-operating communities wishing to transmit whilst on the ground at airfields and maritime communities wishing to transmit in port must also obtain the appropriate site clearance. Listed at Annex B are sites that are already cleared for MIDS/JTIDS operations, together with ones that have restricted clearance and sites from which MIDS/JTIDS operations are prohibited. Units wishing to operate from sites not listed at Annex B should liaise with JDLMO, who will then initiate the site clearance processes.

5.2 MIDS/JTIDS operations at sites not listed at Annex B, for the purposes of exercises or trials, may be permitted subject to the CAA approving the site location. JDLMO will submit a clearance request to the CAA. The new site location will be assessed for proximity to aeronautical navigation aids and Protected Airspace (See Annex E) and for the likelihood that resultant transmissions would cause intolerable interference. On completion of its assessment, the CAA may clear the site for normal MIDS/JTIDS operations. Alternatively, the CAA may request that an in-depth site survey be completed to assist in their site evaluation. Thereafter, the CAA may deem the site suitable for unrestricted MIDS/JTIDS operations, restricted MIDS/JTIDS operations or the CAA may prohibit any transmissions from the site. Once categorised the sites will be listed, with location details, within Annex B.

5.3 Given that MIDS/JTIDS operations are permitted on a secondary basis only, the status of Cleared and Restricted Sites may be changed at any time to take account of changes to ground based Navaid infrastructure or airspace design.

6 Resident Forces

6.1 Platforms of all units resident in the UK, whether UK national or non-UK, are subject to this Agreement and will be required to follow the Safety Case process detailed in this Section.

7 Visiting Forces

7.1 Platforms of visiting forces are subject to this Agreement when operating in UK airspace and must contact JDLMO before commencing operations. Visiting platforms that JDLMO consider can comply with the operating requirements of this Agreement (See Section 4) are

not required to seek MIDS/JTIDS clearance and need only conduct operational co-ordination for their activity with the JDLMO. However, those visiting platforms that JDLMO consider cannot comply must seek a waiver in advance of operations (See Section 5). When visiting platform operations are likely to be frequent (whether compliant or non-compliant), the MoD will, in co-ordination with the JDLMO, assess whether a permanent MIDS/JTIDS clearance would be more appropriate. When a permanent clearance for visiting platform is deemed desirable, the MoD will request the production of a Safety Case for the specified platform.

8 Operational Co-ordination

8.1 In order to comply with the requirements of this Agreement, all UK airspace MIDS/JTIDS operations, whether by operational units, civil contractors or visiting forces, must be co-ordinated through the JDLMO. All MIDS/JTIDS users are to notify JDLMO of intended operations in accordance with the procedures detailed within the UK JTIDS/MIDS Management Standard Operating Procedures.[2]

[2] CAOC9.1253.60.1 dated 1 Nov 02.

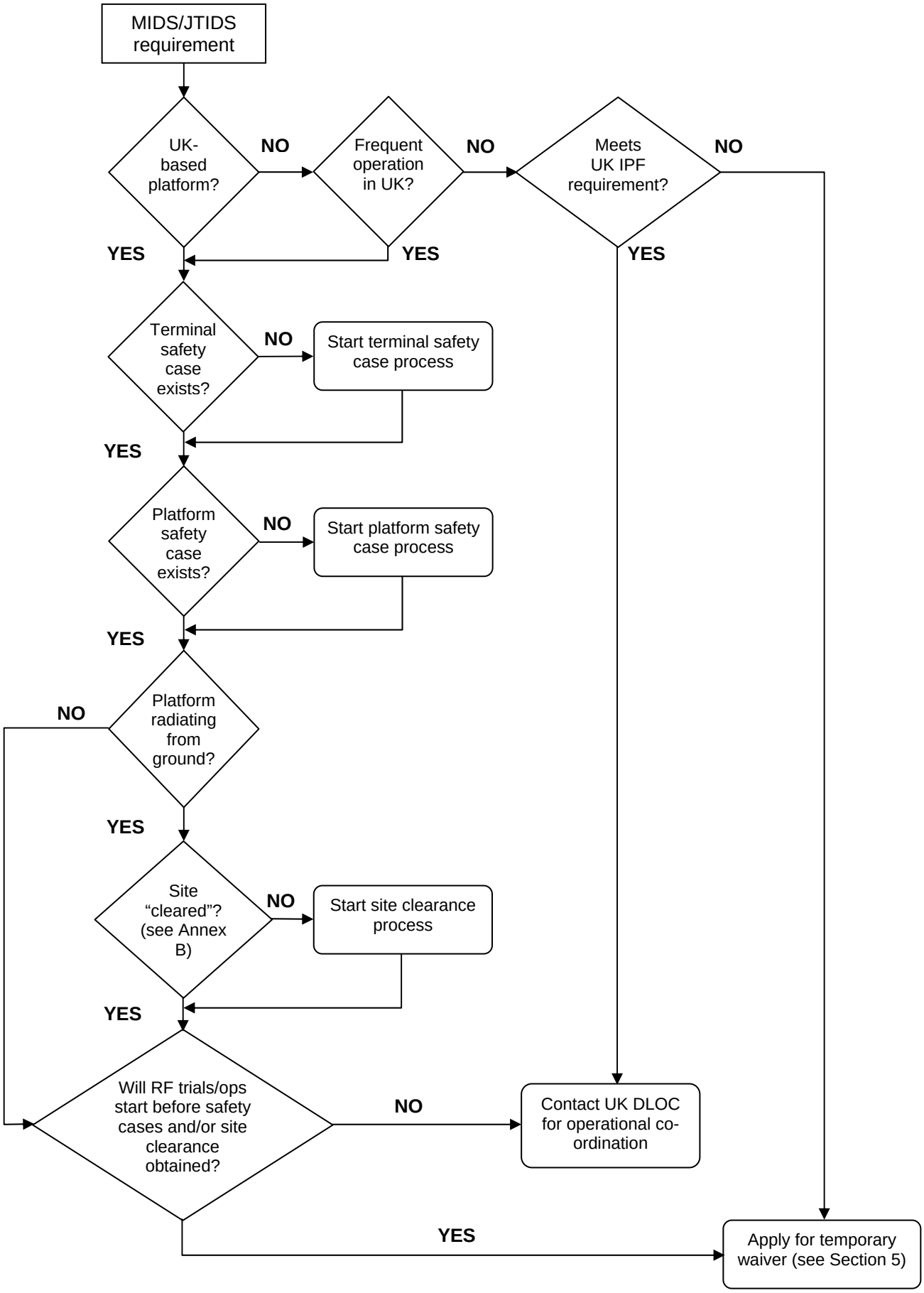

Figure 1 - MIDS/JTIDS Clearance Process

SECTION 3: FCA MANAGEMENT STRUCTURE

1 Introduction

1.1 The purpose of this Section is to describe the frequency clearance management and safety structure that is used to manage MIDS/JTIDS operations within the UK. This Section will detail the individuals or agencies and their responsibilities within this structure, which is illustrated at Figure 2 on page 3-5.

2 JTIDS FCA Management Committee (JFMC)

2.1 The JFMC is the overarching authority with respect to MIDS/JTIDS frequency clearance within the UK FIR. The JFMC has overall responsibility for ensuring safe operation of MIDS/JTIDS.

2.2 The JFMC is co-chaired by Mgr S&SM (CAA) and TDL1 (DPA representing MoD), with SS6 (CAA) as secretary; other members are EC(CCII)GII JDN3 (MoD), IA6b (DPA). The Committee is supported by TDL13 (DPA), SO2 TDL, JDLMO (MoD), SS2 (CAA), and SS4 (CAA). Other members may be co-opted at the discretion of the co-chairmen. The JFMC meets at least twice yearly.

2.3 The JFMC is responsible for:

a. Agreeing and setting out the MoD and CAA strategy for safe MIDS/JTIDS operations in UK airspace.

b. Reviewing and accepting safety cases endorsed by the JFSC.

c. Overseeing the joint programme of work to provide amendment and maintenance to the FCA as required.

d. Monitoring the areas of potential risk/threat to the safe operation of JTIDS within the protected 960-1215 MHz band.

e. Monitoring the completion of FCA related tasks and the achievement of milestones as laid down in the agreed MoD frequency clearance enhancement strategy.

f. Reviewing and accepting proposed amendments to the current MIDS/JTIDS FCA.

g. Monitoring the implementation of the MIDS/JTIDS FCA compliance monitoring and operating clearance processes.

h. Providing resolution of frequency clearance issues that have been presented to the JFMC for arbitration.

i. Directing the work programmes undertaken by the JFTWG.

j. Raising issues that cannot be resolved to respective higher authorities at Assistant Director level.

3 JTIDS FCA Safety Committee (JFSC)

3.1 The JFSC oversees the production of MIDS/JTIDS documentation required to underpin the safety argument of the FCA. The JFSC functions as a subordinate Committee to the JFMC.

It comprises representatives from the DPA (TDL IPT), IA6, CAA, JDLMO and Operational MIDS/JTIDS Users.

3.2 The CAA must be represented during discussions that recommend endorsement of a safety case. Additionally, support or operating authorities for those platform safety cases that are being endorsed, must attend the JFSC meeting at which the case is being presented. Support or operational authority representatives may bring individuals with them to the meetings to provide technical support.

3.3 The Committee shall meet twice yearly as a minimum, or when required, under the Chairmanship of TDL13. The JFSC is responsible for:

a. Ensuring MoD/CAA MIDS/JTIDS FCA policy and rules are adhered to, as prescribed by the JFMC.

b. Overseeing the maintenance of the MIDS/JTIDS Safety Plan.

c. Overseeing the maintenance of all Terminal and Platform Safety Cases.

d. Reviewing, endorsing and recommending acceptance by the JFMC of all MIDS/JTIDS FCA Safety Plans and Safety Cases.

e. Liaising with DPA platform project offices to ensure timely and complete delivery of required MIDS/JTIDS Safety documentation to the JFSC.

f. Liaising with the CAA regarding additional safety cases required to support MIDS/JTIDS operations in the UK FIR.

4 JTIDS FCA Technical Working Group (JFTWG)

4.1 The JFTWG is chaired by TDL13 (DPA); other members are IA6b (DPA), SS2 (CAA), SS3 (CAA) and OC DLMC. The JFTWG is assisted by technical support representatives and safety case consultant representatives. The JFTWG meets at least quarterly.

4.2 The JFTWG will act as the technical focus for FCA issues and is responsible for:

a. Resolving technical issues relating to the FCA under the guidance of the JFMC.

b. Providing technical support to the development of future FCA relaxations.

c. Identifying and reviewing potential areas of risk/threat to the safe operation of MIDS/JTIDS within the 960–1215 MHz Frequency Band.

d. Reviewing the technical arguments underpinning the Baseline Safety Case.

e. Overseeing the development of the JTIDS Assurance Facility (JAF) and providing guidance on its use and deployment.

f. Reviewing the frequency clearance work undertaken by other MIDS/JTIDS user states to assess the relevance and implications to the UK.

5 JTIDS FCA Programme Manager (JFPM)

5.1. The JFPM, TDL13, at the Tactical Data Links (TDL) Integrated Project Team (IPT) within DPA at Abbey Wood, is responsible for the day-to-day management of work being conducted for enhancement of the FCA under the direction of the JFMC. The JFPM is responsible to TDL1.

6 UK Joint Data Link Management Organisation (JDLMO)

6.1. The JDLMO is a UK National organisation located at RAF High Wycombe. The JDLMO manages TDL on behalf of CAOC 9 within Co-ordination Area (CA) 9, whilst supporting UK MIDS/JTIDS activities. The JDLMO's peacetime tasks include the following:

a. The design, promulgation and configuration control of MIDS/JTIDS Networks.

b. The planning, co-ordinating and tasking of TDL activities, whilst de-conflicting frequency clearance issues.

c. The Operational Network (OPNET) management of UK Link 16.

6.2 To achieve its responsibility, the JDLMO is sub-divided into the Network Design Cell (NDC) and Data Link Management Cell (DLMC) as follows:

a. The NDC is responsible for the design of MIDS/JTIDS Link 16 Networks for all UK, NATO and foreign forces operating within CA 9 and for converting non-UK network designs for use by UK platforms on OOA ops. It also produces supporting documentation for networks and acts as a validating authority for non-national networks required by UK forces.

b. The DLMC is responsible, in conjunction with CAOC 9 Planning staffs, for the planning, co-ordination and delegation of TDL functions. Additionally, the DLMC co-ordinates all TDL issues for UK MIDS/JTIDS platforms on OOA deployments. Data Link Managers (DLM) within the Cell monitor all MIDS/JTIDS activities, on behalf of the UK MoD/CAA, employing the JTIDS Air Platform Network Management System (JAPNMS) located within the CAOC 9 ops room. The DLMC is established to support a MIDS/JTIDS OPNET for 78 hrs a week. However, this period can be extended with prior notice or when deemed operationally essential. The DLMs are responsible to the CAOC 9 Duty Controller, through the Duty Air Surveillance Officer, for the immediate TDL management within CA 9.

7 Integration Authority 6 (IA6)

7.1 The DPA's Integration Authority (IA) is the MoD agency responsible for overseeing the operational policy aspects of the FCA. IA6 is responsible for directing and developing MoD policy and procedures on frequency clearance and network management issues. IA6b acts as the MoD desk officer for UK FCA issues, on behalf of IA6.

8 CAA Directorate of Airspace Policy (DAP)

8.1 DAP is a group within the UK CAA with responsibilities for the planning and regulation of all UK airspace including the communications, navigation and surveillance infrastructure to support safe and efficient operations. DAP is staffed by civilian and military experts with experience of commercial, business, recreational and military aviation. Within DAP, the Surveillance and Spectrum Management (S&SM) section is responsible for developing and

enforcing national policy for the use and assignment of civilian aeronautical radio frequencies. S&SM is therefore the interface between the MoD and the CAA on all MIDS/JTIDS frequency clearance issues.

8.2 Manager S&SM is responsible for directing and developing CAA policy and procedures on MIDS/JTIDS frequency clearance within the aeronautical navigation spectrum. SS2 and SS3 act as the technical advisors and SS4 (RAF SO2 – Squadron Leader) acts as the DAP desk officer for the UK MIDS/JTIDS FCA and provides the administrative support for all routine MIDS/JTIDS FCA issues. SS6 is the editorial coordinator of the MIDS/JTIDS FCA and provides the administrative support for all routine MIDS/JTIDS FCA issues.

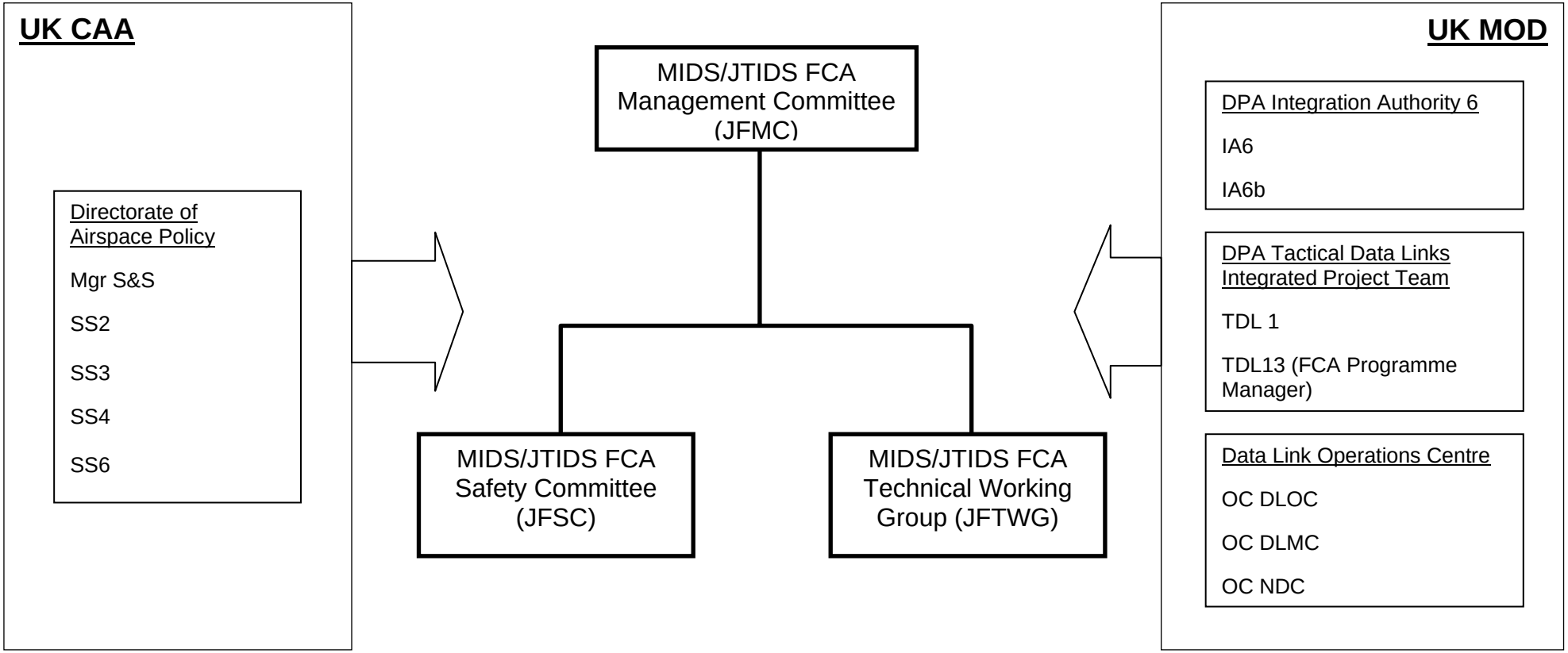

Figure 2 – FCA Management Structure

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SECTION 4: RESTRICTIONS AND CONDITIONS OF USE

1 Introduction

1.1 This section seeks to define the conditions under which the operation of MIDS/JTIDS is considered tolerable. The measures detailed are designed to safeguard the integrity of the navigational services within the UK FIR and to ensure that the level of performance achievable by any approved equipment, operating in the frequency band 960 to 1215 MHz, is not reduced below the minimum specified by the CAA.

2 Secondary Surveillance Radar (SSR)

2.1 SSR ground stations are used to identify and track transponder equipped aircraft. The ground station generates an interrogation signal on 1030 MHz and transponders reply on 1090 MHz. As MIDS/JTIDS signals contain some residual power at SSR frequencies, there is a risk of interference to SSR ground station receivers and airborne transponder receivers. Consequently, MIDS/JTIDS interference could result in the transponder failing to detect the interrogation, or the SSR ground station failing to detect a transponder reply. Either outcome could lead to a loss of separation and measures are necessary to ensure that sufficient distance is maintained between MIDS/JTIDS, SSR ground stations and transponder equipped aircraft. These measures are solely based on separation from SSR ground stations, and are not influenced by platform TSDF.

2.2 The SSR stations listed at Annex C are all used to provide an ATS to civil aircraft, either by civil en-route radar services (ENR), airport approach (APP) or the Lower Airspace Radar Service (LARS). This list of SSR stations is for guidance only, and although correct at the time of publication, current SSR site data must be used when considering MIDS/JTIDS siting proposals.

3 Distance Measuring Equipment (DME)

3.1 In its basic form, DME provides information in the form of an instantaneous slant range between an aircraft and a reference point on the ground (usually the DME Beacon). By comparing distance measurements over time and interrogating multiple DME Beacons simultaneously, the system has evolved to also provide velocity, height, heading and position information with high levels of accuracy and integrity. Consequently, much reliance is placed on the performance of DME systems to ensure accurate and safe air navigation.

3.2 DME interrogator equipment on the aircraft generates pairs of pulses, separated by either 12 or 36 microseconds. The ground-based DME beacon receives these pulses and transmits a pair of reply pulses on a different frequency after a fixed delay. MIDS/JTIDS systems operate over the same frequency range as DME and their waveform characteristics are similar in that they generate a series of short single pulses. Consequently, a MIDS/JTIDS pulse has the potential to degrade the DME system performance by ‘fooling’ the receiver that it is part of a DME pulse pair. This can result in a reduction in Beacon Reply Efficiency (BRE) and an increased Time to Acquire (TTA) for airborne DME interrogators.

3.3 Due to the ability for MIDS/JTIDS to affect DME system performance, measures are necessary to ensure that ground-based DME beacons and airborne DME interrogators are protected. These measures are based on physical separation (slant range) from DME beacons, civil aircraft and the maximum allocated TSDF of the MIDS/JTIDS platform. A list of DME sites can be found at Annex D. However, it should be noted that this list is for guidance only and, although correct at the time of publication, current DME site data must be used when considering MIDS/JTIDS siting proposals.

4 Protected Airspace

4.1 **Definition**. Protected Airspace for the purpose of this Agreement is airspace of defined dimensions within which no MIDS/JTIDS transmissions shall be originated. In addition, MIDS/JTIDS transmissions shall not be made when in close proximity to Protected Airspace, as defined in paras 13.1(d) and 14.1(e) below. The purpose of Protected Airspace is to ensure the safety of aircraft in areas where reliance on DME is crucial during take-off and landing. The airspace within the UK FIR that is designated Protected Airspace is detailed at Annex E.

4.2 **Limits of Protected Airspace**. For the purposes of this Agreement, the limits of Protected Airspace are defined as follows:

a. **Associated with a CTR, CTA or TMA**. Where the Protected Airspace is associated with the designated CTR, CTA or TMA, (Classes A-E)[3] the limits are as follows:

(1) **Lateral Limits**. The lateral limits are bound by the outer limits of the specific portion of airspace. For example, the lateral limits of the Newcastle CTR/CTA Protected Airspace are bound by the dimensions of the limits of both the Newcastle CTR and the Newcastle CTA.

(2) **Upper Vertical Limits**. The upper vertical limits are the same as those promulgated for the specific portion of airspace. For example, the upper vertical limit of the Newcastle CTR/CTA is FL75 and so the upper vertical limit of the Newcastle CTR/CTA Protected Airspace is also FL75.

(3) **Lower Vertical Limits**. The lower vertical limits always extend to the surface. This prevents MIDS/JTIDS transmissions from occurring underneath aircraft operating in CTAs and TMAs during the critical stages of flight. For example, the lower limit of the Newcastle CTA is 1,500ft but for the purposes of this agreement the lower limit of the Newcastle CTR/CTA Protected Airspace extends to the surface.

b. **Associated with an Airfield in Class F or G Airspace**. Where the Protected Airspace is associated with an airfield in Class F or G airspace that has published Instrument Approach Procedures (IAPs), the limits are as follows:

(1) **Lateral Limits**. The lateral limits are bound by a circle with a radius of 10nm from the published location of the airfield stated in the UK Aeronautical Information Publication.

(2) **Vertical Limits**. The vertical limits are from the surface to a height of 3,000ft.

c. **Overlapping Protected Airspace**. The lateral limits of some adjacent areas of Protected Airspace overlap. In those cases, particular care is to be taken to ensure that the avoidance of one area of Protected Airspace does not result in an infringement of the adjacent area.

5 Time Slot Duty Factor (TSDF)

5.1 Time Slot Duty Factor (TSDF) is an indication of terminal load expressed as a percentage of 1536 timeslots/frame (e.g. 50% TSDF denotes 768 timeslots/frame). TSDF may be used to

[3] As described in JSP 550.

denote the amount of network capacity that is assigned to an individual platform (Potential Platform TSDF) or that is being utilised by an individual platform (Actual Platform TSDF). A platform's Potential TSDF is the sum of network capacity allocated to it for use by its assigned Initialisation Data (ID) load. During operations, an authorised Network Manager may amend a platform's Potential TSDF by the addition or deletion of timeslots, using manual or semi-automatic methods. A platform's Actual TSDF indicates the amount of network capacity being used (live transmissions) by a platform at any given time – this amount will always be less than its Potential TSDF and will vary through time during operations. Additionally, TSDF may be used to denote the amount of capacity assigned or utilised within a network (Potential Network TSDF and Actual Network TSDF). Network designs may be developed that allocate each of the 1536 timeslots more than once (i.e. TSDF greater than 100%) however, during operations, no more than 100% Potential Network TSDF may be allocated for use. Additionally, no one user is to be allocated a Potential Platform TSDF of greater than 50%.

6 Timeslot Re-Use/Simultaneous Transmissions

6.1 No timeslot (regardless of net number) is to be used by more than one user at any one time, except for network entry purposes, in which case multiple transmissions may occur in the A-000-6 "Network Entry Slot Time Slot" and in "Round Trip Timing (RTT) Addressed" exchanges that occur within a single timeslot. In the case of ECM-Resistant Voice (ERV), timeslots may be allocated for operation in "Dedicated Slot Re-use" (DSR), but user communications discipline is to be strictly exercised in order to ensure that only one ERV user is transmitting at any one time. With the exception of network entry and ERV purposes, users allocated the same timeslots for use (either "Dedicated" or "DSR") must be separated by a minimum distance of 300nm.

7 Multiple Networks/Network Separation

7.1 A network is defined as a group of MIDS/JTIDS users operating together using a common time source[4], a common network design (or compatible ID loads) and common cryptographic material for Transmission/Message Security (TSEC/MSEC) (for RTT and Precise Participant Location Identifier (PPLI) exchanges). Users operating in a network as described are said to be "synchronised". Users separated by a distance of less than 300nm are to be synchronised (i.e. operating in the same network) in order to ensure that simultaneous transmissions (other than those allowed for in Para 3 above) do not occur. When users, or groups of users, are not synchronised to each other, a minimum separation distance of 300nm must be maintained unless specific authorisation from the CAA has been granted for a reduced network separation distance.

8 Use of Multiple Nets

8.1 The use of multiple nets (i.e. 0–126) within the same network is authorised provided that this use does not give rise to simultaneous transmissions within the stipulated minimum separation distance of 300nm.

[4] A network can either be a System Time Reference Network (STRN) or an External Time Reference Network (ETRN). A STRN is one in which a single JU is assigned the role of NTR. An ETRN is one in which all JUs are synchronized to an external absolute time source via a Precise Time and Frequency Service (PTFS), which is utilized as the NTR.

9 Message Packing

9.1 The maximum message packing level authorised for use under this FCA is that utilising 258 pulses per time slot. The use of message packing structures that utilise 444 pulses per timeslot is prohibited.

10 Operating Mode

10.1 Operations are to be in Mode 1 only.

11 Maximum Radiated Power

11.1 This Agreement stipulates the maximum Effective Isotropic Radiated Power (EIRP) that MIDS/JTIDS platforms must not exceed:

a. **Ground Platform**: A maximum permitted EIRP of 61.5dBm.

(Note: This can be achieved using either:

A 100W terminal with a maximum antenna system gain of +10.3 dBi or;
A 200W terminal with a maximum antenna system gain of +7.3 dBi or;
A 1 kW terminal with a maximum antenna system gain of +0.3 dBi.)

b. **Airborne Platform**: A maximum permitted EIRP of 57.5dBm

(Note: This can be achieved using either:

A 100W terminal with a maximum antenna system gain of +6.3 dBi or;
A 200W terminal with a maximum antenna system gain of +3.3 dBi.)

11.2 Maximum antenna system gain is taken as the sum of peak antenna gain and minimum feeder loss across the frequency range 969 to 1206 MHz.

12 Interference Protection Features (IPF)

12.1 All terminals are to operate with IPF that ensures that:

a. Frequency hopping algorithms are dispersed and single frequencies are not re-used more than a set number of times in a given period. These algorithms vary according to the terminal:

(1) **MIDS LVT/JTIDS Class 2 Terminal**: IPF ensures that four or more frequencies are not used less than twice or more than 38 times in a group of 1020 transmitted pulses.

(2) **HIT**: IPF ensures that any frequency is not used more than 20 times in each of four consecutive groups of 510 transmitted pulses.

b. The width of the radiated pulse is within the range 6.08 to 6.72 microseconds.

c. The JTIDS transmitter does not exceed its specified output power by 0.2 dB.

d. The terminal cannot transmit in more than 50% of the time slots in any frame.

e. Transmissions only occur in dedicated time slots.

f. The energy radiated in either of the frequency bands 1023 to 1037 MHz or 1083 to 1097 MHz is more than 60 dB (when measured in a 300 kHz bandwidth) below the peak level of the JTIDS spectrum. In the case of HIT Terminals this level is 55dB.

13 Operating Restrictions – Surface Platforms

13.1 Surface platforms (either land or maritime) may not transmit MIDS/JTIDS when:

a. Within 1nm of any of the SSR installations listed at Annex C.

b. Within 21nm of any of the DME installations listed at Annex D. However, for cleared UK Royal Navy and marine mobile MIDS/JTIDS surface platforms listed at Annex A, where the maximum Actual Platform EIRP is 57.5 dBm this minimum separation distance can be reduced to 12.5nm.

c. Within a circle of 10nm radius from any aerodrome operating Instrument Approach procedures as published in Table 2 of Annex E.

13.2 MIDS/JTIDS transmissions are not permitted from a moving land platform.

14 Operating Restrictions – Air Platforms

14.1 Air platforms may not transmit MIDS/JTIDS when:

a. Within a slant range of 3nm (18,216ft) of a civil aircraft or a military aircraft operating as “General Air Traffic” (GAT) as defined within JSP552. However, when Actual Platform TSDF is between 10% and 20%, the minimum slant range separation between the air platform and a GAT aircraft is 0.66nm (4000ft). When Actual Platform TSDF is less than 10%, the minimum slant range separation between the air platform and a GAT aircraft is 0.33nm (2000ft) (See Figure 4 on page 4-7).

b. Within a slant range of 1nm of any of the SSR installations listed at Annex C.

c. Within a slant range of 12.5nm of the DME installations listed at Annex D, unless the Actual Platform TSDF is less than 20%, in which case, the minimum slant range separation between the air platform and a DME is 3nm (See Figure 5 on page 4-7)

d. Within Protected Airspace volumes listed at Annex E.

e. Within a slant range of 3nm (18,216ft) of the lateral or vertical limits of Protected Airspace. However, where the Actual Platform TSDF is between 10% and 20%, the minimum slant range separation between the platform and Protected Airspace is 0.66nm (4,000ft). Furthermore, where the Actual Platform TSDF is less than 10%, the minimum slant range between the platform and Protected Airspace is 0.33nm (2,000ft) (See Figure 3 on page 4-6).

14.2 All MIDS/JTIDS ground transmissions, including those from air platforms, must adhere to the restrictions detailed paragraph 15.1.

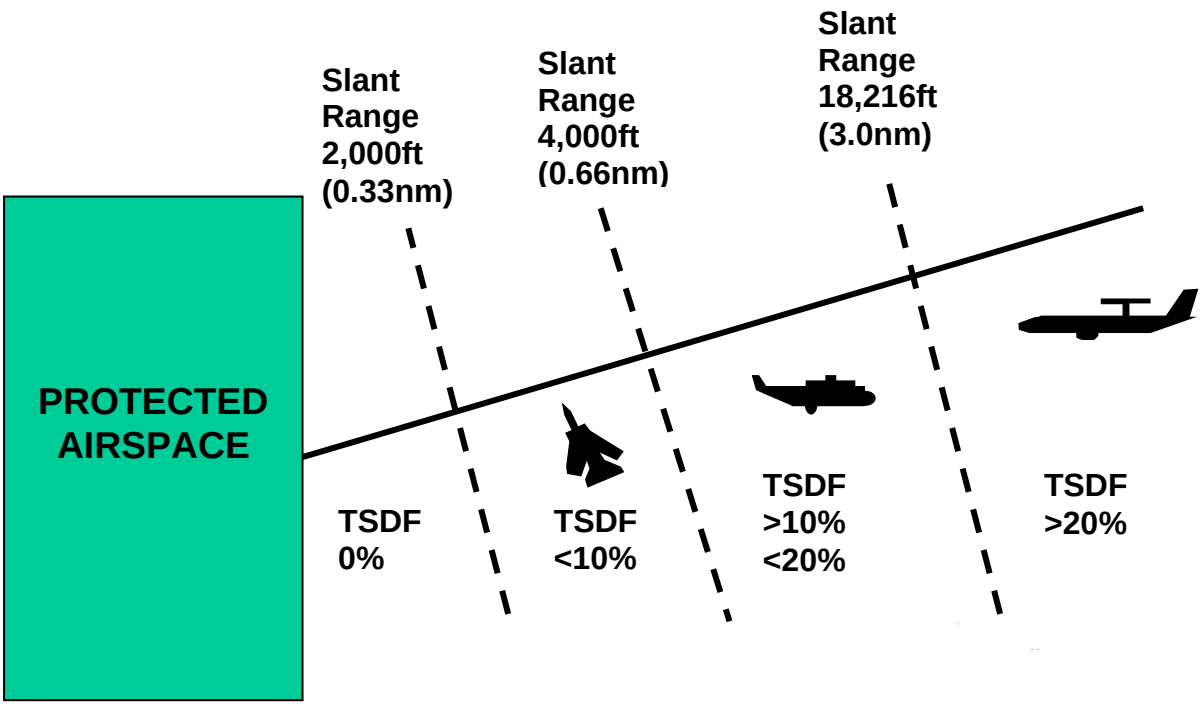

Figure 3 - Air Platform Separation from Protected Airspace

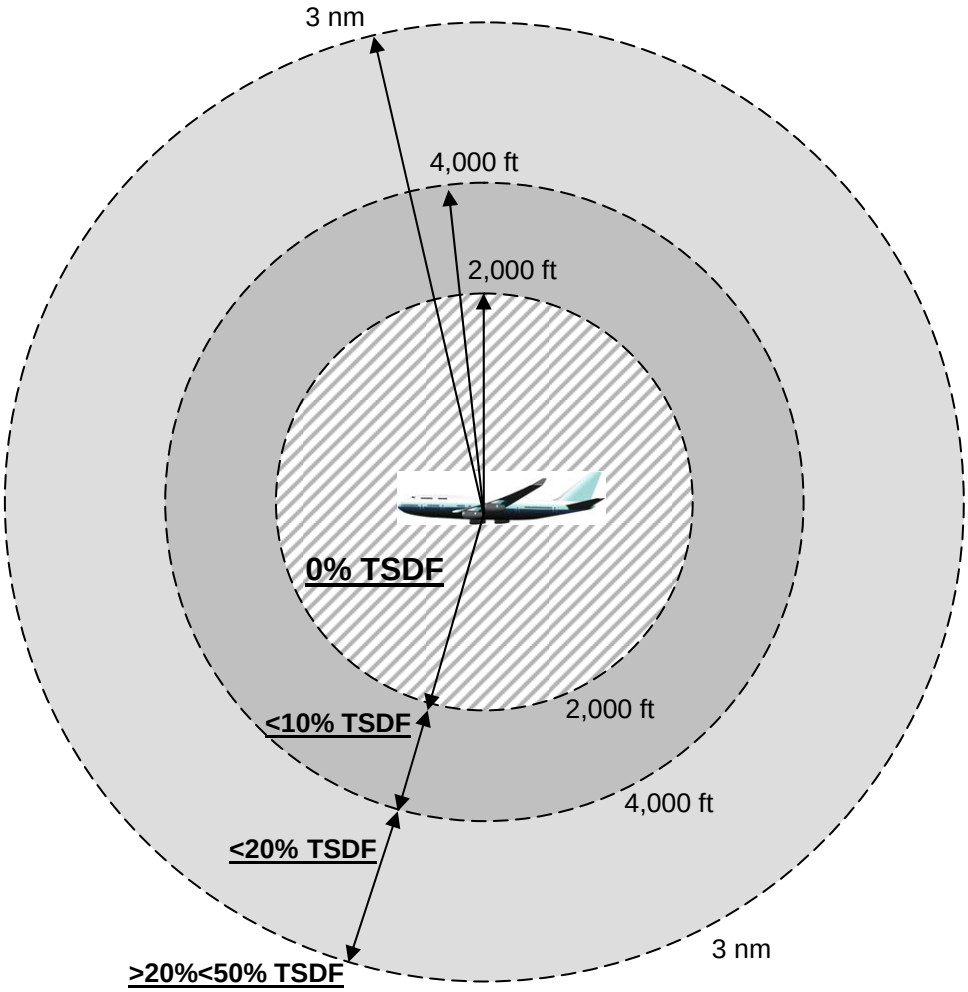

Figure 4 - Air Platform Separation from Civil/Military Aircraft

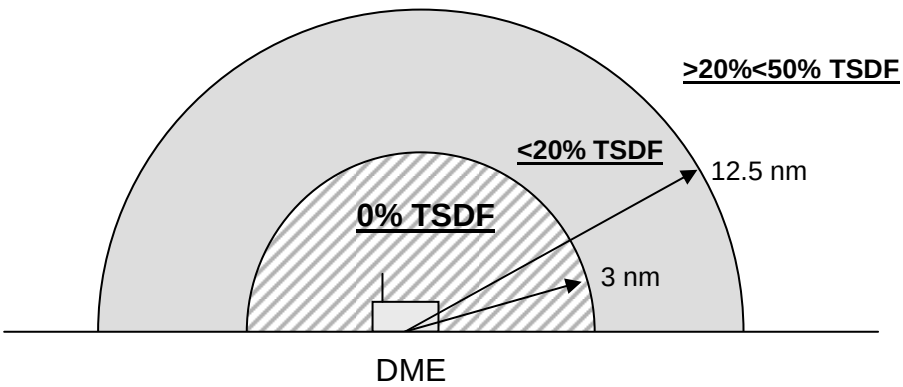

Figure 5 – Air Platform Separation from DME Beacons

15 MIDS/JTIDS Transmissions from UK Ground Sites

15.1 Certain specified MoD and contractor sites within the UK have been assessed for MIDS/JTIDS transmissions – these sites are listed at Annex B. Some sites have been cleared for MIDS/JTIDS operations without restriction (List 1 – “Cleared Sites”); some sites have been cleared for use but with certain restrictions (List 2 – “Restricted Sites”); some sites, have been declared as unsuitable for any MIDS/JTIDS operations due to the proximity of Protected Airspace or navigational aids (List 3 – “Prohibited Sites”). MIDS/JTIDS transmissions from sites other than those listed at Annex B, Lists 1 and 2, must be authorised by the CAA, in advance of any operations. Requests for permanent and temporary clearance must be submitted through JDLMO (See Section 2) at least 4 months in advance of the activity.

16 Peacetime Exercises

16.1 For large-scale exercises, expected to occur infrequently, permission may be granted by the CAA for the removal of certain Interference Protection Features (IPF), the lifting of the restrictions regarding TSDF or the use of multiple networks. Such dispensations are expected to be for short periods only and in all cases must be agreed in advance between CAA and the MoD. Applications for any relevant waivers must be submitted to the CAA at least 4 months before the activity is due to commence. The CAA will retain full rights to object to any proposed removal of restrictions for exercise purposes, either in general or particular, where it is not satisfied that in its opinion the parameters concerned, or the area of deployment, or the times at which it is planned to occur, do not fully safeguard civil aviation radio-navigation services. To provide protection during the periods when restrictions are removed, a control, warning and co-ordination procedure embodying a "stop radiation" requirement is to be included in the Exercise Operations Order covering the effective period. The procedures to be used are to be submitted to DAP together with request for relaxation of restrictions (See Section 5). Such procedures are to be complied with by the MoD during all times when an approval is granted under this section of the Agreement.

17 Jamming Exercises

17.1 MIDS/JTIDS jamming exercises may take place in UK Airspace as defined in this Agreement only in accordance with UK Procedures for the Control of Jamming Transmissions[5] and with special provisions to be agreed in advance between the CAA and the MoD. However, the CAA will retain full rights to object to any proposed jamming exercise, either in general or in particular, where it is not satisfied that in their opinion the means, the areas of deployment, or the particular exercise proposed fully safeguard the civil aviation radio-navigation services.

18 System Technical Parameters

18.1 The system technical parameters used for the calculations contained in this section and the frequencies used for MIDS/JTIDS transmissions are listed at Annex F.

[5] Update to Peacetime Control of Jamming Warning Procedures D/DJW/046/09.

SECTION 5: WAIVER PROCEDURES

1 Introduction

1.1 There will be occasions when MoD and its defence contractors need to operate MIDS/JTIDS outwith the terms and restrictions of this agreement for a temporary period. In order to permit this activity, the CAA will need to conduct an in-depth technical assessment to determine whether or not the proposed activity will cause intolerable interference to civil aeronautical services. These assessments are necessarily complex and take considerable time and effort to complete and are initiated by the submission of a request for a MIDS/JTIDS Operating Waiver.

2 Applicability

2.1 The requirement to seek MIDS/JTIDS Operating Waivers is applicable to all UK operators. In addition, it applies to all non-UK operators, whether they are resident in or temporarily detached to the UK. The operators may be members of the armed forces or civilian personnel working within the defence industry.

2.2 Visiting forces that have been assessed by JDLMO as capable of complying with the terms and restrictions of this agreement may not need an operating waiver. However, they will be required to conduct operational co-ordination with JDLMO for their MIDS/JTIDS activity.

3 Waiver Requirement

3.1 Permission to operate MIDS/JTIDS in a manner that is not in accordance with this agreement may need to be sought for a variety of reasons. A non-exhaustive list of potential circumstances is as follows:

a. New MIDS/JTIDS terminals, which have not been incorporated into this agreement, may need to be tested or evaluated before being brought into service. In addition, a waiver might be required to support the operational use of a new terminal for which a Terminal Safety Case has not yet been completed and approved.

b. MIDS/JTIDS activity involving platforms that are not listed in this agreement will need a MIDS/JTIDS Operating Waiver. In addition, a waiver might be required to support the operational use of MIDS/JTIDS on a platform for which a Platform Safety Case has not yet been completed and approved. This will particularly be the case for equipage associated with Urgent Operational Requirements.

c. There may be a requirement to operate MIDS/JTIDS equipment temporarily from locations that have not been cleared by the CAA for MIDS/JTIDS transmissions. Such waivers may be associated with exercises or locations where new MIDS/JTIDS platforms or terminals will be based.

d. There may be circumstances where operators need to use MIDS/JTIDS in a manner that is outwith the technical operating restrictions set out in this agreement. The use of non-UK compliant IPF is a typical example. Alternatively, operators may wish to operate the MIDS/JTIDS equipment within the approved separation ranges from aeronautical radio-navigation aids at very low power or duty cycle settings.

3.2 The CAA will not normally consider waiver requests until the appropriate Safety Case strategy for the terminal or platform in question has been initiated. For non-compliant visiting

forces that operate in the UK FIR regularly the Safety Case strategy should also be pursued, as the CAA will not issue waivers for activity that occurs on a regular basis.

4 Application Procedure

4.1 In general, waiver requests are to be kept to an absolute minimum. The CAA will issue waivers sparingly and will only grant them to meet exceptional or unusual circumstances. In the first instance, operators should pursue the Safety Case route to have the MIDS/JTIDS equipment incorporated into this Agreement. MIDS/JTIDS operations should also be designed to meet the terms and restrictions of this Agreement to the maximum possible extent before waiver requests are submitted.

4.2 Requests for MIDS/JTIDS Operating Waivers are to be submitted to the CAA through the JDLMO at RAF High Wycombe. Operators will need to provide enough information with which to permit the JDLMO staff to construct a waiver request in the appropriate format. An application that lacks the essential detailed information will delay the CAA's assessment process.

4.3 The CAA will not accept waiver requests direct from operators. Furthermore, requests for waivers are to reach the CAA at least 4 months in advance of the planned activity. The CAA cannot guarantee that the assessment of waivers submitted within this time frame will be completed before the MIDS/JTIDS activity is due to commence. Exceptionally, waiver applications to support high operational priorities will be considered where advance notice of between 1 and 4 months can be provided. However, in these cases the JDLMO must seek the prior authority of IA6 to submit the application to the CAA. The JDLMO shall reject all waiver applications for MIDS/JTIDS activity with a notice period of less than 1 month.

5 Required Information

5.1 The JDLMO shall submit all requests for MIDS/JTIDS Operating Waivers to the CAA in the form shown at Annex G. In order to prevent processing delays, only information classified as RESTRICTED and below should be included in the initial application. Should the CAA subsequently require details of a higher classification, then this will be co-ordinated through the JDLMO staff. Where positional information is supplied, the data must be provided to WGS84 standards.

6 Period of Validity

6.1 MIDS/JTIDS operating waivers will necessarily only be temporary in nature. Typically, waivers will have a period of validity of not longer than 6 months. This period is generally sufficient to permit the Safety Case process for terminals and equipment to be completed. Only in exceptional circumstances will waivers be extended beyond the original period of validity.

SECTION 6: COMPLIANCE MONITORING OF MIDS/JTIDS ACTIVITY

1 Introduction

1.1 In order to permit the continued operation of MIDS/JTIDS equipment in the frequency band allocated to aeronautical radio-navigation aids, MIDS/JTIDS transmissions must not cause intolerable interference to those aids. In the UK FIR, MIDS/JTIDS equipment that is operated in accordance with the terms and restrictions of this agreement or those temporary waivers issued by the CAA, will meet this requirement.

1.2 Within the UK FIR, all MIDS/JTIDS activity has to be monitored to optimise the data link operation and to ensure compliance with the terms and restrictions of this agreement. It also supports MoD's Safety Case strategy. This compliance monitoring is undertaken jointly by the MoD and the CAA on an ongoing basis. Notwithstanding, as the national authority for aviation in the UK, the CAA reserves the right to conduct periodic inspections of MIDS/JTIDS operations, both concurrently and retrospectively. MoD has therefore undertaken to make available sufficient records and access to MIDS/JTIDS user units to permit the CAA inspections.

2 Purpose

2.1 The purpose of compliance monitoring of MIDS/JTIDS activity is as follows:

a. To detect potential violations of the terms and restrictions of this agreement before they occur. This allows preventative actions to be undertaken to ensure that intolerable interference is not caused to aeronautical radio-navigation services.

b. To detect actual violations of the terms and restrictions of this agreement as early as possible. This allows immediate actions to be taken to minimise any potential interference caused to aeronautical radio-navigation services.

c. To record all MIDS/JTIDS activity to permit subsequent analysis, reporting and audit of MIDS/JTIDS operations.

2.2 The MoD has provided a Safety Case that concludes that MIDS/JTIDS operations under the terms and restrictions of this agreement present a tolerable level of risk. Therefore, compliance monitoring is also required to ensure that MoD has put in place effective processes such that the requirements and assumptions of Safety Cases remain valid.

3 Responsibility

3.1 IA6 is the MoD agency with the executive responsibility for MIDS/JTIDS operations in the UK. However, the primary MoD agency for conducting compliance monitoring tasks is the JDLMO at RAF High Wycombe. In this capacity, the JDLMO exercises delegated authority for the co-ordination, management and monitoring of all MIDS/JTIDS activity in the UK FIR on a day-to-day basis. Consequently, the Network Managers at the JDLMO are to be consulted by all users prior to any MIDS/JTIDS operations to ensure that activities are co-ordinated properly and safely.

3.2 Where the nature of MIDS/JTIDS activity makes it necessary for the JDLMO to appoint other personnel or agencies to assist in the compliance monitoring task, those personnel or agencies shall act in a subordinate role to the JDLMO. In general, this role should only be delegated to other appropriately equipped Network Managers, such as those located on command and control sensors or deployed with network management-capable equipment.

When operating with this delegated responsibility, the role will be known as the Sub-Network Manager (SubNM).

3.3 Personnel employed on compliance monitoring duties are to be trained and qualified accordingly. Their responsibilities for compliance monitoring are to be defined clearly and they must have access to sufficient equipment to ensure that all MIDS/JTIDS activity complies with the terms and restrictions of this Agreement. Where the JDLMO delegates the compliance monitoring task to other personnel or agencies, only suitably qualified and experienced individuals are to be employed and they should only monitor sub-sets of the UK MIDS/JTIDS operations.

3.4 The CAA has a responsibility to ensure that MIDS/JTIDS activity does not cause intolerable interference to aeronautical radio-navigation services in the UK FIR. In discharging this responsibility, it will conduct periodic inspections and audits of all aspects of MIDS/JTIDS operations.

4 Methodology

4.1 The compliance monitoring task is to be undertaken by employing a variety of procedural and real-time methods. The procedural methods must incorporate Quality Management techniques and detailed record keeping. The real-time methods must comprise observation by suitably trained and qualified personnel, together with manual and electronic recording of MIDS/JTIDS activity.

4.2 Quality Management techniques are to be applied to all MIDS/JTIDS activities that are related to maintaining compliance with the terms and restrictions of this agreement. In particular, the following principles are to be employed:

a. A safety management system shall be devised and promulgated.

b. Only suitably trained and qualified personnel are to be employed in MIDS/JTIDS activities that have a bearing on compliance with the terms and restrictions of this Agreement.

c. Independent checks and validations of the compliance of MIDS/JTIDS network designs are to be made.

d. Configuration control must be exercised over all MIDS/JTIDS initialisation data loads originating from JDLMO. Appropriate precautions are to be taken to prevent deliberate and inadvertent changes to the initialisation data loads.

e. There should be an audit trail from an initial request for MIDS/JTIDS frequency clearance, through to the actual activity being conducted and recorded.

f. The responsibilities of all personnel involved in MIDS/JTIDS activities for maintaining compliance with this Agreement must be defined and promulgated clearly.

g. Records should be kept that demonstrate that all personnel involved in MIDS/JTIDS activity have read and understood their responsibilities for complying with this Agreement.

4.3 All MIDS/JTIDS users are to be issued with orders and Standard Operating Procedures (SOP) to ensure that they are fully conversant with the terms and restrictions contained within this Agreement. In addition, users are to periodically sign as having read and

understood the contents of the orders and SOP. In the case of visiting forces, all reasonable steps must be taken to obtain confirmation that those personnel involved in MIDS/JTIDS activities in the UK FIR are aware of the terms and conditions of this Agreement. Copies of orders, SOP and signature sheets are to be made available to the CAA for inspection on request.

4.4 All records of MIDS/JTIDS activity are to be held for a period of at least 30 days. This will permit retrospective investigation by the MoD or CAA into reports of interference where MIDS/JTIDS may have been a contributory factor. Furthermore, these records will permit the undertaking of investigations into violations of the terms and restrictions of this Agreement. Finally, the CAA may wish to review specific records as part of its requirement to conduct periodic audits of the MoD's MIDS/JTIDS activity. Records of the following aspects of MIDS/JTIDS activity must be maintained:

a. MIDS/JTIDS network designs utilised.

b. MIDS/JTIDS User (JU) callsigns.

c. JU network entry and exit times.

d. JU positions and areas of operation, including the locations of ground terminals.

e. JU Initialization Data load allocations, including any subsequent amendments.

f. JU network function and role allocations, including any subsequent amendments.

g. Full details of all violations of the terms and restrictions of this Agreement. This should be sufficient to permit potential future analysis and audit.

h. Copies of all orders and SOP related to compliance with this agreement, including any associated signature sheets.

i. Test reports and design certificates on terminal IPF features for all MIDS/JTIDS terminals operating in the UK FIR.

4.5 Real time observation of MIDS/JTIDS activity must be employed to detect potential and actual violations of the terms and restrictions of this agreement.

5 Violation Procedures

5.1 All violations or breaches of the conditions of this Agreement are to be recorded and reported to the CAA. The severity and effect of any violation will be dependent upon the type of occurrence and the prevailing operational situation. Different processes will exist for different occurrences and violations will be categorised as either "Minor" or "Major". At Table 1, guidance is given to assist in the assessment of violations. Not all circumstances can be foreseen, therefore, in situations when the categorisation of the violation is in doubt, OC JDLMO is to exercise their discretion.

Table 1 – Guidance for Minor and Major Violation Definition

MINOR VIOLATION	MAJOR VIOLATION
Temporary use of an unauthorised Initialisation Data load by a JU	Persistent use of an unauthorised Initialisation Data load by a JU whereby the conditions of use of this Agreement are breached
Temporary, erroneous selection of Relay	Persistent operation by a JU as Relay whereby the conditions of use of this Agreement are breached
Temporary infringement of NavAid or SSR separation distance minima	Persistent infringement of the NavAid or SSR separation minima
Temporary establishment of two or more networks, by use of different Time References or otherwise at less than the required separation distance	Persistent operation of two or more networks at less than the required separation distance
Temporary infringement of Protected Airspace	Persistent infringement of Protected Airspace
Temporary erroneous selection of NTR by an unauthorised user	Persistent selection of NTR by an unauthorised user.
Infringement of air-to-air separation criteria	Any unauthorised use of 444-pulse message packing
	Any unauthorised use of RTT-B
	Any unauthorised use of High Power radiation
	Operation from unauthorised location
	Operation of unauthorised terminal/platform
	Any unauthorised use of Contention Access Mode

5.2 “Major” violations are to be notified by JDLMO to IA6 as soon as practicable, noting any immediate NM corrective actions. The IA6 team is to instruct the JDLMO whether any further action is required to safeguard the FCA (e.g. the operational clearance for a user community may be withdrawn or all MIDS/JTIDS operations may be ceased). Thereafter, IA6 will, at the earliest opportunity, inform the CAA (DAP) of the violation and of any safeguard actions undertaken. If the IA6 team are not available in the short-term, SO2 TDL, JDLMO is authorised to contact the CAA directly. The JDLMO is to send a copy of the violation report, the format for which is at Annex H, to both the CAA and IA6. “Minor” violations need not be reported immediately, but must be recorded. The JDLMO is to forward a copy of the violation report to the violating platform’s unit JTIDS/MIDS POC.

5.3 The JDLMO is to maintain a database of all violations (both those monitored by JDLMO and those reported by SubNMs) for further action and analysis. If an incident is deemed a “Major” violation, any hand-written logs and automatic recording tapes or files are to be held for further evaluation for at least 6 months. The JDLMO is to instruct SubNMs to safeguard this data, noting where it is to be stored and how access to it may be gained. Although the processes for analysing data from platforms may differ, the MoD will be responsible for undertaking any data extraction and analysis required to fully document and report the violation to the CAA. SO2 TDL, JDLMO is to produce a periodic summary of all incidents to be presented to the CAA, DPA and IA6 at each JFMC meeting. This report will allow any

violation 'trends' to be identified and corrective actions or procedures implemented if necessary.

5.4 Violation reports raised by the JDLMO are sent to unit JTIDS/MIDS POCs for information and, if necessary, remedial action. When the report is sent a recommendation of how this type of violation can be prevented from re-occurring will be included. The unit JTIDS/MIDS POC is to pay due cognisance to this recommendation and take whatever action they feel appropriate to minimise the risk of a repeated violation occurring. Ordinarily this will involve a face-to-face de-brief with the platform crew to advise them of the violation and to double check that the procedures they followed remain extant. In extreme circumstances the unit JTIDS/MIDS POC may be required to hold a unit training day to reinforce unit personnel's understanding of the FCA and the procedures under which they are allowed to operate the Link within the UK FIR.

6 Audits of MIDS/JTIDS Activity

6.1 The MoD will conduct internal audits of the compliancy of MIDS/JTIDS activity within the terms and restrictions of this Agreement. Similarly, the CAA will conduct external audits. These audits may either focus on specific activity or on routine operations. For instance, an audit may only cover MIDS/JTIDS by particular users and units. Alternatively, a wider audit of a particular exercise or of the overall routine activity on a particular day may be undertaken. These audits could take place retrospectively or in real time.

6.2 Typically, the audit of MIDS/JTIDS activity will take place at the JDLMO. Copies of all relevant records and recordings will need to be made available at the JDLMO during these audits. Nevertheless, the MoD and CAA may wish to inspect MIDS/JTIDS activity at other locations in order to verify the type and position of equipment. They may also wish to view the status local configuration control procedures, orders and SOP.

6.3 Audits of MIDS/JTIDS activity will generally be conducted with advance notice but the CAA reserves the right to conduct short notice inspections.

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ANNEX A: CLEARED MIDS/JTIDS TERMINALS AND PLATFORMS

1 Safety Cases

1.1 The Safety Cases listed in the following table (Table 1) underpin the continued operation of MIDS/JTIDS within the UK airspace and are the key components of the UK FCA Safety Plan. This table will be amended as required when new terminals are introduced to service or when the operating environment changes, such that Safety Case Reports require amendment.

Table 1 – Baseline Safety Cases and Terminal Safety Cases

SAFETY CASE REPORT TITLE	REFERENCE	DATE
FCA Baseline Safety Case for DME Air Navigation Aids	TDL/7/5/23/4, Issue 1, Amdt 0	Jul 02
Safety Case Report for the URC 138-C (UK LVT) Terminal	D/DMCP/25/3/2/12, Issue 2, Amdt 0	Sep 05
Safety Case Report for the Fighter Data Link Terminal	DPA/18/09/10, Issue 1, Amdt 0	Sep 02
Safety Case Report for the Class 2/2H Terminal	TDL18/09/15 Issue 1 Amdt 0	Mar 03
Safety Case Report for the DLS MIDS LVT	EFIPT-ABW/06/04/04/15, Issue 1	Nov 03

2 Cleared MIDS/JTIDS Platforms

2.1 The platforms listed below (Table 2) have had Safety Case Reports raised that provide evidence and arguments to support the MoD contention that operation of MIDS/JTIDS from the said platforms is tolerably safe with respect to this Agreement. The existence (after formal acceptance) of these Reports means that there is no longer a requirement for units operating the respective platforms to seek ongoing MIDS/JTIDS operating waivers and that the platform may be considered 'cleared' for operations in the UK airspace subject to the normal restrictions and caveats detailed within this Agreement.

Table 2 – Cleared MIDS/JTIDS Platforms

PLATFORM	REPORT REFERENCE	DATE
RN Sea King ASaCS.7	D/DMCP/25/3/2/12 Annex A, Issue 1	Nov 02
USAF F-15A/B/C/D/E	DPA/18/09/10 Annex A, Issue 1, Release 3	15 Nov 02
Tornado F3	DPA/TDL18/09/15 Annex A, Issue 1 Amdt 0	Jul 03
E-3D Sentry	DPA/TDL18/09/15 Annex B, Issue 1 Amdt 0	Jul 03
Nimrod R1	D/DMCP/25/3/2/12 Annex C, Issue 1, Amdt 0	Jul 03
Typhoon	EFIPT-ABW/06/04/04/15 Annex A, Issue 1	Oct 03
GRAP IOC	D/DMCP/25/3/2/12 Annex E, Issue 1	Oct 03
TDL Mobile Cabins (JPC & MJC and FDL Van)	DPA/TDL/17/10/01 Annex B, Issue 2, Amdt 0	Sep 05
UK RAF VC10, TriStar & C130K	DPA/TDL/16/10/01 Annex H, Issue 1	Jan 04
E-3A	DPA/TDL18/09/15 Annex C, Issue 1 Amdt 0	Apr 04
RC135	DPA/TDL18/09/15 Annex D, Issue 1 Amdt 0	Apr 04
Nimrod MRA4	D/DMCP/25/3/2/12 Annex D Issue 1 Amdt 0	Aug 04
RN L16 SAC Platform Interface	D/DMCP/25/3/2/12 Annex G Issue 1 Amdt 0	Oct 04
Portable Network Monitoring Facility	D/DMCP/25/3/2/12 Annex L Issue 1 Amdt 0	Oct 04
Transportable JAPNMS Facility	DPA/TDL18/09/15 Annex E, Issue 1 Amdt 0	Oct 04
RN T42, CVS and Supporting Sites Platform Interface	DPA/TDL/18/09/15 Annex F, Issue 1 Amdt 0	Oct 04
Sentinel R Mk1 ASTOR Platform (Sentinel R1)	D/DMCP/25/3/2/12 Annex F, Issue 1, Amdt 0	Feb 05
Eurofighter Typhoon MIDS Ground Reference Cabin (MGRC)	EFIPT-ABW/06/04/04/15 Annex B, Issue 1	Feb 05
Air Defense Systems Integrator Technology Demonstrator Platform (ADSI TDP)	EFIPT-ABW/06/04/04/15 Annex C, Issue 1	Feb 05
Battlefield Operations Simulation System (BOSS)	DPA/18/09/10 Annex B, Issue 2, Amdt 0	Mar 05
UASF F16 A/B/C/D	EFIPT-ABW/06/04/04/15 Annex D, Issue 2	Mar 05
F123 Class Frigate	EFIPT-ABW/06/04/04/15 Annex G, Issue 1	Mar 05
Class 2/2H Platform Generic Safety Case	TDL18/09/15/01, Issue 1 Amdt 0	Mar 05

F124 Class Frigate	TDL18/09/15 Annex H, Issue 1 Amdt 0	Mar 05
Nimrod MRA4 Weapons System Integration Interface (WSIR)	D/DMCP/25/3/2/12 Annex J, Issue 1, Amdt 0	Apr 05
Typhoon Systems Integrator (SI) Rig	EFIPT-ABW/06/04/04/15 Annex E, Issue 1	Jun 05
MIDS LVT Platform Generic Safety Case	TDL 18/09/15/03 Issue 1, Amdt 0	Jun 05
F122 Class Frigate	Annex A to TDL 18/09/15/03, Issue 1	Jun 05

3 Legacy Platforms

3.1 The platforms listed below were introduced to operation before Safety Cases were developed. By agreement with the CAA, the platforms may continue to operate MIDS/JTIDS within the UK airspace pending development of their supporting Safety Case Reports.

Table 3 – Legacy Platforms

PLATFORM	COMMENT
JTIDS Air Platform Network Management System (JAPNMS)	Static system utilises 4 UKADGE Class 2 terminals located at RAF Saxa Vord, RAF Buchan, RAF Staxton Wold and RAF Neatishead. Safety Case commenced.
Air Mobile Recognised Air Picture Flight (AMRAP Flt) [16 AAB]	1 x transportable system using URC-138 terminal - similar to GRAP. Safety Case commenced.
TJATS/JATS	
UK ASACS IJMS Buffers (ADGE DLBS)	3 x static systems at RAF Neatishead, RAF Boulmer and RAF Saxa Vord. Utilises Class 1 Hughes Improved Terminals (HITs)
Transportable Interoperability Monitor (TIM)	1 x transportable system operated by QinetiQ Malvern. May utilise Class 2 or URC-138 terminal.
Mission Equipment Facility	1 x static system at RAF Waddington. Operates as E-3D simulator, utilises Class 2H terminal
EWAD	1 x static systems at RAF Waddington. Operates as Nimrod R1 simulator, URC-138.

ANNEX B: MIDS/JTIDS OPERATING SITE LOCATIONS

Refer to Section 4, Paragraph 15.1, for details of definition of Cleared, Restricted and Prohibited sites.

1 Cleared Sites

SITE	CLEARED AREA	NEAREST DME/SSR
Aberporth		
Surveyed DERA/SS/CS/CR00 0058/1.0 – AUG 00	Within 1nm radius of N52 08.44 W004 34.33 Max antenna height 15m Max EIRP 61.5 dBm	Strumble VOR/DME~22.5nm
Barkston Heath		
Surveyed QINETIQ/FST/CR0 35630/1.0 – NOV 03 8AP/88/02/03 – 22 SEP 03	Within 1nm radius of N52 57.74 W000 33.70 Max antenna height 15m. Max EIRP 61.5dBm	Gamston VOR/DME~26nm
Bedford		
No survey 8AP/88/02/03 – 14 SEP 05	Within 1nm radius of N52 13.80 W000 26.67 Max antenna height 15m. Max EIRP 61.5dBm	Luton ILS/DME~21.6nm Debden SSR~29.8nm
Boulmer		
No Survey	Within 1nm radius of N55 24.37 W001 37.55 Max antenna height 45 m. Max EIRP 61.5 dBm	Newcastle ILS/VOR/DME~25.5nm
Brunton		
Surveyed QINETIQ/FST/MCS C/TRD011722/1.0 – AUG 01 8AP/88/02/03 – 16 JUN 03	Within 1nm radius of N55 31.00 W001 40.00 Maximum antenna height 45 m. Maximum EIRP 61.5 dBm	St Abbs VOR/DME~33nm Newcastle ILS/VOR/DME~33nm Newcastle SSR ~42nm
Brizlee Wood		
Surveyed QINETIQ/FST/MCS C/TRD011722/1.0 – AUG 01	Within 1nm radius of N55 25.08 W001 46.11 Maximum antenna height 45 m Maximum EIRP 61.5 dBm	Newcastle ILS/VOR/DME~42nm Newcastle SSR ~42nm
Buchan		
No Survey	Within 1nm radius of N57 27.49 W001 48.52 Maximum antenna height 45 m Maximum EIRP 61.5 dBm	Aberdeen VOR/DME~20nm

SITE	CLEARED AREA	NEAREST DME/SSR
Bulford Camp		
No Survey 8AP/88/02/03 – 24 APR 03	Within 1nm radius of N51 11.83 W001 42.18 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Southampton ILS/VOR/DME~24nm Boscombe Down SSR~2nm
Chivenor		
No survey 8AP/88/02/03 – 5 JAN 05	Within 1nm radius of N51 05 14 W004 09 01 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Swansea DME~31.25nm Burrington SSR~11.08nm
Collingwood		
Surveyed DERA/SS/CS/CR00 0058/1.0 – AUG 00	Within 1nm radius of N50 50.294 W001 11.60 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Southampton ILS/VOR/DME~10nm
Coningsby		
Surveyed DERA/SS/CS/CR01 0018/1.0 – Jan 01	Within 2nm radius of N53 05.40 W000 10.00 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Gamston VOR/DME~35nm
Credden Hill		
No Survey 8AP/88/02/03 – 11 APR 05	Within 1nm radius of N52 04.95 W002 48.25 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Gloucester DME~26.1nm Clee Hill SSRs~20.4nm
Davidstow		
No survey 8AP/88/02/03 – 5 JAN 05	Within 1nm radius of N50 37 54 W004 36 46 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Plymouth DME~22.78nm St Mawgan SSR~19.53nm
Dishforth		
No Survey 8AP/88/02/03 – 25 FEB 04	Within 1nm radius of N54 08.00 W001 25.00 Max Antenna Height 15m Max EIRP 61.5 dBm	Leeds/Bradford ILS/DME ~ 18nm Teesside ILS/DME ~22nm
Dunkeswell		
No Survey 8AP/88/02/03 – 11 APR 05	Within 0.5nm radius of N50 51.67 W003 13.40 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Exeter ILS/DME~10.45nm Yeovilton SSR~23.8nm
Faslane		
Surveyed DERA/SS/CS/CR01 0018/1.0 – Jan 01	Within 1nm radius of N56 03.50 W004 49.17 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Glasgow ILS/VOR/DME~18nm Glasgow SSR ~18nm

SITE	CLEARED AREA	NEAREST DME/SSR
Featherwood Hide		
No Survey 8AP/88/02/03 – 30 NOV 04	Within 1nm radius of N55 19 15 W002 18 03 Max Antenna Height 15m Max EIRP 61.5 dBm	Newcastle DME~27nm Newcastle SSR~27nm
Keevil Airfield		
No Survey 8AP/88/02/03 – 24 FEB 05	Within 1nm radius of N51 18 24 W002 06 42 Max Antenna Height 15m Max EIRP 61.5 dBm	Bristol/Filton DME~22nm Boscombe Down SSR~16.5nm
Kinloss		
Surveyed QINETIQ/FST/MCSC/TRD011722/1.0 – AUG 01	Within 1nm radius of N57 39.00 W003 33.50 Max antenna height 15 m Max EIRP 61.5 dBm	Inverness VOR/DME~19nm Kinloss SSR ~6nm
Kirton-in-Lindsey		
Surveyed QINETIQ/FST/MCSC/TRD011722/1.0 – AUG 01 8AP/88/02/03 – 12 FEB 03	Within 1nm radius of N53 27.70 W000 33.50 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Humberside ILS/DME~12.5nm Scampton SSR ~9nm
Leeming		
Surveyed DERA/SS/CS/CR010018/1.0 – Jan 01	Within 2nm radius of N54 17.54 W001 32.11 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Teesside ILS/DME~25.5nm
Llanbedr		
Surveyed DERA/SS/CS/CR000058/1.0 – AUG 00	Within 2nm radius of N52 48.00 W004 07.00 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Hawarden ILS/DME~53nm
Loch Ewe		
Surveyed QINETIQ/FST/MCSC/TRD011722/1.0 – AUG 01 8AP/88/02/03 – 16 JUN 03	Within 5nm radius of N57 49.00 W005 38.00 Maximum antenna height 15m. Maximum EIRP 61.5dBm	Tiree VOR/DME~53nm
Lossiemouth		
No Survey 8AP/88/02/03 – 9 JUN 03	Within 1nm radius of N57 42.92 W003 20.08 Maximum antenna height 15m. Maximum EIRP 61.5dBm	Inverness VOR/DME~27.5nm Kinloss SSR ~18nm

SITE	CLEARED AREA	NEAREST DME/SSR
Malvern – Enigma Business Park		
No Survey	Within 50 m radius of N52 07.42 W002 18.07 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Gloucester DME~24nm
Malvern – St Andrews Road		
Surveyed DERA/SSWI/DGPS /SP –03/98-1.0 – JUL 98	Within 1nm radius of N52 06.04 W002 18.75 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Gloucester DME~24nm
Merryfield		
No survey 8AP/88/02/03 – 5 JAN 05	Within 1nm radius of N50 57 45 W002 56 08 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Yeovil DME~10.71nm Yeovil SSR~11.51nm
Marham		
No Survey 8AP/88/02/03 – 1 JUN 04	Within 1nm radius of N52 38.90 E000 33.03 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	
Portreath		
Surveyed DERA/SS/CS/CR01 0018/1.0 – Jan 01	Within 1nm radius of N50 16.00 W005 16.00 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	St. Mawgan SSR~9nm
Portsmouth		
Surveyed DERA/SSWI/DGPS /06/04/98-1.0 – APR 98	<u>South Railway Jetty (South)</u> N50 47.88556 W001 06.57746 <u>South Railway Jetty (North)</u> N50 48.00099 W001 06.60863 <u>Boat House Jetty</u> N50 48.05373 W001 06.61204 <u>Pitch House Jetty</u> N50 48.11945 W001 06.61011 <u>Middle Slip Jetty (South)</u> N50 48.22633 W001 06.60356 <u>Middle Slip Jetty (North)</u> N50 48.38273 W001 06.60049W <u>Junction of North Corner Jetty and South Wall Jetty</u> N50 48.38253 W001 06.38202 <u>North West Wall (South)</u> N50 48.50711 W001 06.25497 <u>Junction of North West Wall and Fountain Lake Jetty</u> N50 48.61203N W001 06.12035	Southampton ILS/VOR/DME~15nm Goodwood VOR/DME~15nm

SITE	CLEARED AREA	NEAREST DME/SSR
	Fountain Lake Jetty (West End) N50 48.50057 W001 05.60298 **All permitted with a maximum antenna height of 50 m above mean sea level.** **Maximum EIRP 61.5 dBm**	
Portsdown East		
Surveyed DERA/SS/CS/CR01 0018/1.0 – Jan 01	Within 1nm radius of N50 51.40977583 W001 05.567882158 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Southampton ILS/VOR/DME~11nm Goodwood VOR/DME~16nm
Portsdown West		
Surveyed DERA/SSWI/DGPS /06/04/98-1.0 – APR 98	Within 1nm radius of N5051.6 W00107.4 Maximum antenna height 5 m Maximum EIRP 61.5 dBm	Southampton ILS/VOR/DME~10nm Goodwood VOR/DME~15nm
Salisbury Plain		
No Survey 8AP/88/02/03 – 12 FEB 03	Area bounded by N51 18.816 W002 11.533 N51 18.816 W001 36.033 N51 10.266 W001 36.033 N51 10.266 W002 11.533 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Southampton ILS/VOR/DME~18nm Compton VOR/DME~20nm Bristol ILS/DME~23nm Filton ILS/DME~23nm Yeovil DME~25nm Boscombe Down SSR ~2nm
Saxa Vord		
No Survey	Within 5nm radius of N60 49.52 W000 50.38 Maximum antenna height 60 m Maximum EIRP 61.5 dBm	Sumburgh ILS/VOR/DME~67nm
Sculthorpe		
No Survey 8AP/88/02/03 – 1 JUN 04	Within 1nm radius of N52 50.67 E000 45.62 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	
South Cerney		
No Survey	Within a 1nm radius of N51 40.00 W001 55.00 Maximum antenna height 60 m Maximum EIRP 61.5 dBm	Brize Norton SSR ~13nm
Spadeadam		
Surveyed QINETIQ/FST/CR0 24406/1.0 – AUG 02	Within 1nm radius of N55 02.30 W02 36.50 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Carlisle ~9nm

SITE	CLEARED AREA	NEAREST DME/SSR
Stanta		
No Survey 8AP/88/02/03 – 1 JUN 04	Area bounded by N52 34 47 E000 05 28 N52 34 47 E000 39 10 N52 25 37 E000 53 52 N52 25 37 E000 39 10 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Cambridge DME~21nm Norwich DME~21nm Lakenheath SSR~19nm
Staxton Wold		
No Survey	Within a 2nm radius of N54 10.00 W000 26.5 Maximum antenna height 60 m Maximum EIRP 61.5 dBm	
Tregantle Fort		
Surveyed QINETIQ/FST/CR036075/1.0 – DEC 03 8AP/88/02/03 – 24 FEB 04	Within 1nm radius of N50 21 27 W004 16 15 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Plymouth ~ 12nm
Valley		
Surveyed DERA/SS/CS/CR000058/1.0 – AUG 00	Within 1nm radius of N53 14.8 W004 32.1 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Isle of Man VOR/DME~57.5nm Valley SSR ~5nm
Waddington		
Surveyed DERA/SS/CS/CR010018/1.0 – Jan 01	Within 1nm radius of N53 10.0 W000 31.5 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Gamston VOR/DME~19nm
Watton		
No Survey	Within a 1nm radius of N52 35.00 E000 48.00 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Norwich ILS/DME ~ 17nm Honington SSR ~13nm
Wattisham		
No Survey	Within 1nm radius of N52 07.63 E000 57.36 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Clacton VOR/DME~14nm Honington SSR ~14nm
Wells		
Surveyed DERA/SS/CS/CR010018/1.0 – Jan 01	Within 1nm radius of N51 12.98 W002 39.92 Maximum antenna height 10 m Maximum EIRP 61.5 dBm	Bristol ILS/DME~12nm Yeovil DME~17nm

SITE	CLEARED AREA	NEAREST DME/SSR
West Freugh		
Surveyed DERA/SS/CS/CR01 0018/1.0 – Jan 01	Within 5nm radius of N54 51.00 W004 56.00 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	
Willsworthy Camp		
No Survey 8AP/88/02/03 – 11 APR 05	Within 1nm radius of N50 38.23 W004 05.37 Maximum antenna height 15m Maximum EIRP 61.5 dBm	Plymouth ILS/DME~12.8nm Burrington SSRs~18.14nm
Woodbridge		
No Survey 8AP/88/02/03 – 1 JUN 04	Within 1nm radius of N52 05.38 E001 24.50 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Clacton DME~17nm

2 Restricted Sites

SITE	AREA/POSITIONS	RESTRICTION/REMARKS
Boscombe Down		
	Permitted within the airfield boundary but excluding the area within 1 nm radius of the SSR antenna, centred on N51 08.80 W001 45.233 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Southampton ILS/VOR/DME~21nm No transmissions permitted within 1nm radius of the SSR antenna.
Cawdor Barracks		
No Survey 8AP/88/02/03 – 28 JAN 05	Within 1nm radius of N51 53 25 W005 07 31 Maximum antenna height 5 m Maximum EIRP 61.5 dBm	Haverford West & Strumble DME~7nm Antenna height shall not exceed 5m
Culdrose	JATS Cabin	
Surveyed DERA/SS/CS/CR01 0018/1.0 – Jan 01	Antenna Location: N50 05.333 W005 14.033 Maximum output power 20W at JATS Cabin.	Transmissions limited to 20W due to proximity to Culdrose SSR. No equipment or antenna changes permitted.
Surveyed QinetiQ/FST/CR04 1361/1.0	Within 50 m radius of N50 04.434 W005 14.353 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	Lands End DME ~15nm Culdrose SSR ~1.2nm
Devonport		
Surveyed DERA/SS/CS/CR01 0018/1.0 – JAN 01 QinetiQ/FST/CR01 41361/1.0	Area bounded by N50 23.84 W004 12.79 N50 23.84 W004 10.85 N50 21.66 W004 10.85 Maximum antenna height 50 m above mean sea level Maximum EIRP 57.5 dBm	Ships that have antennas that are in excess of 50 m above mean sea level, or operate with an EIRP in excess of 57.5 dBm will need to apply for a MIDS/JTIDS operating waiver.
Lakenheath		
Surveyed QINETIQ/FST/CR0 40745/1.0 – FEB 04	Within 50 metres radius of N52 23.92773 E000 33.01592. Maximum antenna height 40 m Maximum EIRP 61.5 dBm	Cambridge ILS/DME~18nm Honington SSR ~8nm Transmissions only permitted within 50 metres of the listed lat/long on the airfield.
Lyneham		
No Survey	Within 2 nm radius of N5130.31 W00159.60 Maximum antenna height 10 m Maximum TSDF = 0.4% per platform Maximum EIRP 57.5 dBm	Site is located under Protected Airspace and, therefore, only a low level of transmissions for functional testing and end-to-end system checks is permitted: - TSDF shall not exceed 0.4% per platform, whilst on the ground. - Transmissions shall be stopped immediately each time a civil

SITE	AREA/POSITIONS	RESTRICTION/REMARKS
		aircraft flies within the relevant separation distance of the airfield.
Neatishead		
No Survey	Legacy site cleared for the use of JAPNMS and IJMS only at position N52 42.89 E001 28.32 Maximum antenna height 45 m Maximum EIRP 61.5 dBm	Norwich ILS/DME~8nm
St Mawgan		
Surveyed DERA/SS/CS/CR01 0018/1.0 – APR 02	Permitted within the airfield boundary but excluding the area within 1 nm radius of the SSR antenna, centred on N50 26.15 W005 01.33 Maximum antenna height 15 m Maximum EIRP 61.5 dBm	No transmissions permitted within 1 nm radius of the SSR antenna
Warton		
Surveyed DERA/SSWI/DGPS /23/04/98-1.0, APR 98	N53 44.8957 W002 52.0130 (Rwy 26 Threshold) N53 44.8684 W002 51.9470 (Caravan Hard Standing) Maximum antenna height 7 m Maximum EIRP 56 dBm	Transmissions permitted at these locations and under these conditions only whilst the Warton DME is out-of-service. Prior notification of any JTIDS activity must be provided to Blackpool ATC and contact details must be provided in case Blackpool ATC needs to operate outside of its published hours or report any interference to its DME.
	N53 44.9200 W002 52.1840 (Bungalow Site) Maximum antenna height 11 m Maximum EIRP 56 dBm	Transmissions permitted at these locations and under these conditions only whilst the Warton DME is out-of-service. Prior notification of any JTIDS activity must be provided to Blackpool ATC and contact details must be provided in case Blackpool ATC needs to operate outside of its published hours or report any interference to its DME.
	N53 44.4962 W002 54.0204 (Rwy 08 Threshold) N53 44.6650 W002 53.7050 (Case White Apron – Stand 14) N53 44.6733 W002 53.7166 (Case White Apron – Stand 15) N53 44.6783 W002 53.7283 (Case White Apron – Stand 16) N53 44.6850 W002 53.7383 (Case White Apron – Stand 17) N53 44.6916 W002 53.7500 (Case White Apron – Stand 18) N53 44.6967 W002 53.7617 (Case White Apron – Stand 19) N53 44.7033 W002 53.7750 (Case White Apron – Stand 20) N53 44.5650 W002 53.9910 (Canberra Pan) N53 44.5380 W002 52.6970 (Gun Butts) N53 44.6951 W002 53.5702 (Nimrod Apron – Stand 10) N53 44.6873 W002 53.6098 (Nimrod Apron – Stand 11)	Transmissions permitted at these locations only whilst the Warton DME and SSR are out-of-service. Prior notification of any JTIDS activity must be provided to Blackpool ATC and contact details must be provided in case Blackpool ATC needs to operate outside of its published hours or report any interference to its DME.

SITE	AREA/POSITIONS	RESTRICTION/REMARKS
	N53 44.6794 W002 53.6495 (Nimrod Apron – Stand 12) N53 44.7750 W002 53.7167 (Sat Com Test Area) N53 44.1910 W002 53.0450 (Sunset Strip) Maximum antenna height 7 m Maximum EIRP 56 dBm	
	Within 1.5 nm radius of N5344.75 W00253.00 Maximum antenna height 100 m Maximum EIRP 61.5 dBm	Transmissions permitted at these locations and under these conditions only whilst the Warton DME and SSR and the Blackpool DME are **all** out-of-service. Prior notification of any JTIDS activity must be provided to Blackpool ATC and contact details must be provided in case Blackpool ATC needs to operate outside of its published hours or report any interference to its DME.
	N53 44.390 W002 52.952 (Electronic Warfare Test Facility) No antenna height restrictions but entire JTIDS platform under test shall be contained inside the EWTF building. Maximum EIRP 61.5 dBm	Transmissions permitted at this location at any time, provided that platform is contained entirely within EWTF building.

3 Prohibited Sites

Sites listed as Prohibited, below, are sites that have previously been assessed as unsuitable for MIDS/JTIDS operations. The list is NOT exhaustive. If a site is not listed as Prohibited, this does not mean that it is permitted to operate MIDS/JTIDS from this site. MIDS/JTIDS may only radiate from the sites listed as Cleared or Restricted. If a required site does not appear on any list it should be referred to the CAA via JDLMO for assessment.

SITE	REASON TRANSMISSIONS ARE NOT PERMITTED
Albermarle Barracks	Located within Newcastle CTZ
Brize Norton	Located within Brize Norton CTZ / Proximity of Brize Norton SSR
Cambridge	Proximity to Cambridge DME
Colchester	Proximity of Clacton and Southend DMEs
Fairford	Located within Brize Norton CTZ
Leuchars	Proximity to Leuchars SSR
South Clettreval	Proximity to Benbecula VOR/DME
Woodford Aerodrome	Located within Manchester CTZ / Proximity of Woodford ILS/DME
Woolwich Arsenal	Located within London City CTZ
Yeovilton	Proximity to Yeovilton SSR and Yeovil DME

INTENTIONALLY BLANK

ANNEX C: LIST OF PROTECTED SSR INTERROGATORS

SITE NAME	LAT/LONG	REMARKS
ALLANSHILL	57 38 33.00 N 002 09 50.00 W	ENR
BELFAST INTERNATIONAL	54 39 21.00 N 006 12 21.00 W	ENR, APP
BOSCOMBE DOWN	51 08 48.00 N 001 45 14.00 W	LARS
BOURNEMOUTH	50 46 44.00 N 001 50 04.00 W	APP, LARS
BRIZE NORTON	51 45 01.00 N 001 35 47.00 W	LARS
BURRINGTON 1 *	50 55 58.00 N 003 59 13.00 W	ENR, APP, LARS
BURRINGTON 2 *	50 56 00.00 N 003 59 15.00 W	ENR, APP, LARS
BURRINGTON 3 (COMBINED - MODE S)	50 56 02.00 N 003 59 10.00 W	ENR, APP, LARS
BURRINGTON 4 **	50 55 58 N 003 59 13.00 W	ENR, APP, LARS
CARDIFF	51 23 54.00 N 003 20 22.00 W	APP, LARS
CLAXBY	53 27 00.58 N 000 18 29.00 W	ENR, APP, LARS
CLEE HILL 1	52 23 51.12 N 002 35 56.44 W	ENR, APP, LARS
CLEE HILL 2 *	52 23 51.39 N 002 35 54.43 W	ENR, APP, LARS
CLEE HILL 3 MODE S **	52 23 54.00 N 002 35 51.00 W	ENR, APP, LARS
CRANWELL	53 01 04.00 N 000 30 28.00 W	LARS
CROMER *	52 54 38.65 N 001 21 00.32 E	ENR, APP, LARS
CROMER MODE S	52 54 39.00 N 001 21 00.00 E	ENR, APP, LARS
CULDROSE	50 05 19.00 N 005 15 27.00 W	LARS
DEBDEN	51 59 25.00 N 000 15 50.00 E	ENR, APP
EDINBURGH	55 57 05.28 N 003 22 44.60 W	APP
GATWICK (CCF)	51 08 42.00 N 000 11 24.00 W	APP
GLASGOW	55 52 21.00 N 004 26 07.00 W	APP
GREAT DUN FELL	54 41 03.00 N 002 27 03.00 W	ENR
HEATHROW (T2)	51 28 20.60 N 000 26 36.80 W	ENR, APP
HEATHROW 23CM	51 28 22.00 N 000 27 13.00 W	ENR, APP
HMS CAMBRIDGE (PLYMOUTH)	50 19 03.00 N 004 06 24.00 W	LARS
HONINGTON	52 20 39.00 N 000 44 53.00 E	LARS
ISLE OF MAN	54 04 52.00 N 004 37 06.00 W	APP
JERSEY AIRPORT	49 12 01.10 N 002 12 09.60 W	APP
JERSEY LES PLATONS	49 14 52.00 N 002 06 17.00 W	ENR, APP
KINLOSS	57 39 44.00 N 003 31 13.00 W	LARS
LAKENHEATH	52 24 58.00 N 000 32 46.00 E	LARS
LEUCHARS	56 22 10.00 N 002 51 11.00 W	LARS
LINTON-ON-OUSE	54 03 20.00 N 001 15 55.00 W	LARS
LOWTHER HILL	55 22 41.00 N 003 45 03.00 W	ENR
MANCHESTER	53 21 02.54 N 002 17 23.28 W	APP
NEWCASTLE	55 02 14.00 N 001 42 30.00 W	APP, LARS
PEASE POTTAGE	51 05 00.30 N 000 12 51.75 W	ENR
PEASE POTTAGE (MODE S) **	51 05 00.00 N 000 12 52.00 W	
PERWINESS HILL	57 12 40.00 N 002 07 45.00 W	ENR
PORTLAND	50 33 25.00 N 002 26 12.00 W	LARS
SANDWICK 1 (STORNOWAY)	58 12 37.25 N 006 21 28.03 W	ENR, APP
SANDWICK 2 (STORNOWAY)	58 12 35.73 N 006 21 26.27 W	ENR, APP
SCAMPTON	53 18 00.00 N 000 33 00.00 W	LARS
SHAWBURY	52 48 12.00 N 002 40 33.00 W	LARS
ST. ANNES	53 46 07.10 N 002 59 23.99 W	ENR, APP
ST. MAWGAN	50 26 09.00 N 005 01 20.00 W	LARS

STANSTED	51 52 53.00 N 000 13 28.00 E	ENR, APP
SUMBURGH (COMPASS HEAD) *	59 52 04.00 N 001 16 23.00 W	ENR, APP
SUMBURGH (FITFUL HEAD)	59 54 21.00 N 001 22 57.00 W	ENR, APP
TIREE	56 27 19.00 N 006 55 22.00 W	ENR
VALLEY (MONA)	53 15 15.00 N 004 23 10.00 W	LARS
WARTON	53 44 21.00 N 002 53 40.00 W	LARS
YEOVILTON	51 00 38.00 N 002 38 25.00 W	LARS

* Temporary sites (check with CAA for up to date information as to whether operational).

** Planned sites or ones undergoing approval process prior to activation (positions are approximate).

ANNEX D: LIST OF DME BEACONS

SITE NAME	LAT/LONG	REMARKS
ABERDEEN	57 12 04.35N 002 12 02.38W	ILS/DME
ABERDEEN	57 18 37.62N 002 16 01.95W	VOR/DME
BARKWAY	51 59 23.00N 000 03 43.00E	VOR/DME
BARROW/WALNEY IS.	54 07 37.80N 003 15 53.50W	DME
BELFAST	54 39 40.12N 006 13 47.66W	VOR/DME
BELFAST CITY	54 37 10.29N 005 52 29.94W	ILS/DME
BELFAST/ALDERGROVE	54 39 37.54N 006 12 01.33W	ILS/DME
BELFAST/ALDERGROVE	54 39 18.81N 006 13 44.60W	ILS/DME
BENBECULA	57 28 40.57N 007 21 55.08W	VOR/DME
BENBECULA **	57 28 30.31N 007 22 13.16W	ILS/DME
BERRY HEAD	50 23 55.00N 003 29 37.00W	VOR/DME
BIGGIN	51 19 51.15N 000 02 05.32E	VOR/DME
BIGGIN HILL	51 20 13.28N 000 02 06.10E	ILS/DME
BIRMINGHAM	52 27 15.81N 001 45 08.49W	ILS/DME
BLACKBUSHE	51 19 24.24N 000 50 41.51W	DME
BLACKPOOL	53 46 12.93N 003 01 42.36W	ILS/DME
BOURNEMOUTH/HURN	50 46 55.73N 001 50 27.86W	ILS/DME
BOVINGDON	51 43 34.00N 000 32 59.00W	VOR/DME
BRECON	51 43 32.00N 003 15 47.00W	VOR/DME
BRISTOL	51 22 53.59N 002 43 11.85W	ILS/DME
BRISTOL/FILTON	51 31 14.81N 002 35 28.53W	ILS/DME
BROOKMANS PARK	51 44 59.00N 000 06 24.00W	VOR/DME
CAERNARFON **	53 06 00.00N 004 20 00.00W	DME
CAMBRIDGE	52 12 26.21N 000 10 54.37E	ILS/DME
CAMPBELTOWN	55 25 48.08N 005 39 01.49W	VOR/DME
CARDIFF	51 23 55.79N 003 20 26.28W	ILS/DME
CARLISLE	54 56 24.10N 002 48 18.69W	ILS/DME
CLACTON	51 50 55.00N 001 08 51.00E	VOR/DME
COMPTON (NORRY)	51 29 30.00N 001 13 11.00W	VOR/DME
COVENTRY	52 22 13.89N 001 28 50.69W	ILS/DME
CUMBERNAULD	55 58 32.14N 003 58 27.52W	DME
DAVENTRY	52 10 49.00N 001 06 50.00W	VOR/DME
DEAN CROSS	54 43 19.00N 003 20 26.00W	VOR/DME
DERRY/EGLINGTON	55 02 30.55N 007 09 33.61W	ILS/DME
DETLING	51 18 14.00N 000 35 50.00E	VOR/DME
DOVER	51 09 45.00N 001 21 33.00E	VOR/DME
DUNDEE	56 27 05.76N 003 01 33.03W	ILS/DME
EAST MIDLANDS	52 49 57.99N 001 19 40.24W	ILS/DME
EDINBURGH	55 57 06.23N 003 22 22.77W	ILS/DME
EXETER	50 44 07.16N 003 24 51.74W	ILS/DME
FAIROAKS	51 20 49.00N 000 33 50.00W	DME
FARNBOROUGH	51 16 35.65N 000 46 40.65W	ILS/DME
FINNINGLEY **	53 28 44.00N 001 00 03.00W	ILS/DME
GAMSTON	53 16 53.00N 000 56 50.00W	VOR/DME
GLASGOW	55 52 13.81N 004 26 44.61W	VOR/DME
GLASGOW	55 52 10.74N 004 26 02.27W	ILS/DME
GLOUCESTER	51 53 31.89N 002 10 04.54W	DME

GOODWOOD	50 51 18.78N 000 45 24.25W	VOR/DME
GUERNSEY	49 26 13.85N 002 36 13.30W	VOR/DME
HAVERFORDWEST	51 49 55.22N 004 58 12.42W	DME
HAWARDEN	53 10 43.90N 002 58 44.32W	ILS/DME
HONILEY	52 21 24.00N 001 39 49.00W	VOR/DME
HUMBERSIDE	53 34 26.16N 000 21 12.60W	ILS/DME
INVERNESS	57 32 30.47N 004 2 46.46W	ILS/DME
INVERNESS	57 32 33.45N 004 02 29.55W	VOR/DME
IOM/RONALDSWAY	54 04 51.45N 004 37 22.06W	ILS/DME
ISLAY	55 40 58.68N 006 14 57.89W	DME
ISLE OF MAN	54 04 00.72N 004 45 48.51W	VOR/DME
JERSEY	49 12 34.32N 002 11 17.13W	ILS/DME
JERSEY	49 12 29.94N 002 12 10.87W	ILS/DME
JERSEY	49 13 15.97N 002 02 46.15W	VOR/DME
KIRKWALL	58 57 34.82N 002 53 38.21W	VOR/DME
KIRKWALL	58 57 32.39N 002 53 57.40W	ILS/DME
LAMBOURNE	51 38 46.00N 000 09 06.00E	VOR/DME
LANDS END	50 08 10.52N 005 38 13.15W	VOR/DME
LASHENDEN	51 09 17.00N 000 38 53.00E	DME
LEEDS & BRADFORD	53 52 00.78N 001 39 31.46W	ILS/DME
LIVERPOOL	53 19 56.86N 002 50 57.14W	ILS/DME
LONDON	51 29 14.00N 000 28 00.00W	VOR/DME
LONDON/CITY	51 30 21.05N 000 03 19.48E	ILS/DME
LONDON/GATWICK	51 09 09.62N 000 11 31.71W	ILS/DME
LONDON/HEATHROW	51 28 43.78N 000 27 32.86W	ILS/DME
LONDON/HEATHROW	51 27 49.56N 000 27 30.76W	ILS/DME
LONDON/HEATHROW **	51 28 25.76N 000 26 01.12W	ILS/DME
LONDON/STANSTED	51 53 09.33N 000 14 01.03E	ILS/DME
LONDON/STANSTED **	51 53 00.00N 000 14 00.00E	ILS/MLS/DME
LUTON	51 52 23.32N 000 22 06.26W	ILS/DME
LYDD	50 59 59.00N 000 52 43.00E	VOR/DME
LYDD	50 57 31.19N 000 56 20.92E	ILS/DME
MANCHESTER	53 21 25.29N 002 15 44.24W	VOR/DME
MANCHESTER	53 21 11.40N 002 16 23.02W	ILS/DME
MANCHESTER	53 20 21.16N 002 17 34.02W	ILS/DME
MANSTON	51 20 27.92N 001 20 45.08E	ILS/DME
MAYFIELD	51 01 02.00N 000 06 58.00E	VOR/DME
MIDHURST	51 03 14.00N 000 37 30.00W	VOR/DME
NEWCASTLE	55 02 13.03N 001 41 20.91W	ILS/DME
NEWCASTLE	55 02 18.41N 001 41 54.13W	VOR/DME
NORTHOLT	51 33 12.60N 000 24 37.60W	ILS/DME
NORWICH	52 40 39.63N 001 16 59.53E	ILS/DME
OBAN **	56 27 23N 005 07 54W	DME
OCKHAM	51 18 18.00N 000 26 50.00W	VOR/DME
OTTRINGHAM	53 41 54.00N 000 06 13.00W	VOR/DME
OXFORD	51 49 56.76N 001 19 22.14W	DME
PEMBREY **	51 42 00.00N 004 18 00.00W	DME
PLYMOUTH	50 25 27.67N 004 06 42.85W	ILS/DME
POLE HILL	53 44 38.00N 002 06 12.00W	VOR/DME
PRESTWICK	55 30 28.61N 004 35 37.94W	ILS/DME
PRESTWICK (TURNBE)	55 18 48.00N 004 47 02.00W	VOR/DME

REDHILL**	51 12 00.00N 000 08 00.00W	DME
SEAFORD	50 45 38.00N 000 07 19.00E	VOR/DME
SHAWBURY	52 47 52.81N 002 39 45.15W	VOR/DME
SHEFFIELD CITY **	53 23 34.73N 001 22 59.31W	ILS/DME
SHOREHAM	50 50 09.96N 000 17 36.54W	DME
SOUTHAMPTON	50 57 18.64N 001 21 21.38W	ILS/DME
SOUTHAMPTON	50 57 18.90N 001 20 42.19W	VOR/DME
SOUTHEND	51 34 13.10N 000 41 51.65E	ILS/DME
ST. ABBS	55 54 27.00N 002 12 23.00W	VOR/DME
ST ATHAN**	51 24 23.00N 003 26 02.00W	ILS/DME
STORNOWAY	58 12 54.56N 006 19 44.77W	LLZ/DME
STORNOWAY	58 12 25.01N 006 10 58.97W	VOR/DME
STRUMBLE	51 59 41.00N 005 02 25.00W	VOR/DME
SUMBURGH	59 52 56.41N 001 17 43.26W	ILS/DME
SUMBURGH	59 52 43.52N 001 17 11.52W	VOR/DME
SWANSEA	51 36 21.36N 004 4 14.24W	ILS/DME
TALLA	55 29 57.00N 003 21 10.00W	VOR/DME
TEES SIDE	54 30 29.99N 001 25 40.97W	ILS/DME
TIREE	56 29 35.56N 006 52 32.12W	VOR/DME
TRENT	53 03 14.00N 001 40 12.00W	VOR/DME
WALLASEY	53 23 31.00N 003 08 04.00W	VOR/DME
WARTON	53 44 39.54N 002 52 54.38W	ILS/DME
WELSHPOOL **	52 37 47.00N 003 09 14.00W	DME
WICK	58 27 31.74N 003 06 01.34W	VOR/DME
WOLVERHAMPTON	52 30 56.86N 002 15 42.54W	DME
WOLVERHAMPTON **	52 31 00.00N 002 16 00.00W	ILS/DME
WOODFORD	53 20 19.70N 002 09 00.08W	ILS/DME
YEOVIL	50 56 26.63N 002 39 14.46W	DME

* Temporary sites (check with CAA for up to date information as to whether operational).

** Planned sites or ones undergoing approval process prior to activation (positions are approximate).

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ANNEX E: LIST OF PROTECTED AIRSPACE

1 Protected Airspace – CTR/CTA/TMA

LOCATION	AIRSPACE	VERTICAL LIMITS	REMARKS
Aberdeen	CTR/CTA	SFC-FL115	
Belfast	CTR/CTA	SFC-FL105	
Birmingham	CTR/CTA	SFC-FL145	
Bournemouth	CTR	SFC-FL55	
Bristol	CTR/CTA	SFC-FL65	
Brize-Norton	CTR	SFC-3500ft	
Cardiff	CTR/CTA	SFC-FL55	
East Midlands	CTR/CTA	SFC-FL75	
Isle of Man	CTR/CTA	SFC-FL65	
Leeds Bradford	CTR/CTA	SFC-FL85	
London	TMA	SFC-FL245	Inclusive of: Heathrow CTR Gatwick CTR/CTA Stansted CTR/CTA Luton CTR/CTA City CTR
Lyneham	CTR/CTA	SFC-FL65	Extremely low levels of MIDS/JTIDS transmissions (up to 0.4% TSDF per platform) are permitted for testing purposes on the surface of the airfield itself. (See the Restricted Site list in Annex B.)
Manchester	TMA	SFC-FL245	Inclusive of: Manchester CTR/CTA Manchester Woodford CTR Liverpool CTR
Newcastle	CTR/CTA	SFC-FL75	
Scottish	TMA	SFC-FL245	Inclusive of: Edinburgh CTR Glasgow CTR Prestwick CTR/CTA
Solent	CTA	SFC-FL55	
Southampton	CTR	SFC-FL55	
Sumburgh	CTR/CTA	SFC-FL100	
Teesside	CTR/CTA	SFC-6000ft	

2 Protected Airspace – IAP

LOCATION	LAT/LONG	REMARKS
ABERDEEN	57 12 7N 2 11 52W	Within Aberdeen CTR/CTA
BARROW/WALNEY IS. **	54 07 37N 003 15 53W	
BELFAST ALDERGROVE	54 39 27N 6 12 57W	Within Belfast CTR/CTA
BELFAST CITY	54 37 5N 5 52 21W	Within Belfast CTR/CTA
BENBECULA	57 28 52N 7 21 46W	
BIGGIN HILL	51 19 51N 000 01 57E	Within London TMA
BIRMINGHAM	52 27 14N 1 44 53W	Within Birmingham CTR/CTA
BLACKPOOL	53 46 17.62N 3 1 42.82W	
BOURNEMOUTH	50 46 48N 1 50 33W	Within Bournemouth CTR
BRISTOL	51 22 58N 2 43 9W	Within Bristol CTR/CTA
BRIZE NORTON	51 45 0N 1 35 1W	Within Brize Norton CTR
CAMBRIDGE	52 12 18N 0 10 30E	
CAMPBELTOWN **	55 26 14N 005 41 11W	
CARDIFF	51 23 48N 3 20 36W	Within Cardiff CTR/CTA
CARLISLE	54 56 15N 2 48 33W	
COVENTRY	52 22 11N 1 28 47W	Overlaps with Birmingham CTR/CTA
CRANFIELD	52 4 20N 0 37 0W	Overlaps with London TMA
DONCASTER SHEFFIELD	53 28 29N 001 00 16W	
DUNDEE	56 27 9N 3 1 33W	
DURHAM TEES VALLEY	54 30 33N 1 25 46W	Within Durham Tees Valley CTR/CTA
EDINBURGH	55 57 0N 3 22 21W	Within Edinburgh CTR & Scottish TMA
EXETER	50 44 4N 3 24 50W	
FARNBOROUGH	51 16 33N 000 46 35W	Within London TMA
FILTON	51 31 10N 2 35 27W	Overlaps with Bristol CTR/CTA
GLASGOW	55 52 19N 4 25 59W	Within Glasgow CTR & Scottish TMA
GLOUCESTERSHIRE	51 53 39N 2 10 2W	
GUERNSEY	49 26 06N 002 36 07W	Within Guernsey CTR & Channel Islands CTR
HAWARDEN	53 10 41N 2 58 40W	Overlaps with Manchester TMA
HUMBERSIDE	53 34 28N 0 21 3W	
INVERNESS	57 32 24N 4 3 0W	
ISLAY **	55 40 55N 006 15 24W	
ISLE OF MAN	54 5 0N 4 37 26W	Within Isle of Man CTR/CTA
JERSEY	49 12 29N 002 11 44W	Within Jersey CTR & Channel Islands CTR
KIRKWALL	58 57 29N 2 54 18W	
LANDS END	50 6 10N 5 40 14W	
LEEDS BRADFORD	53 51 57N 1 39 38W	Within Leeds Bradford CTR/CTA
LIVERPOOL	53 20 1N 2 50 59W	Within Liverpool CTR & Manchester TMA
LONDON CITY	51 30 19N 0 3 19E	Within City CTR & London TMA
LONDON GATWICK	51 8 53N 0 11 25W	Within Gatwick CTR/CTA & London TMA
LONDON HEATHROW	51 28 39N 0 27 41W	Within London CTR & London TMA
LONDON LUTON	51 52 29N 0 22 6W	Within Luton CTR/CTA & London TMA
LONDON STANSTED	51 53 6N 0 14 6E	Within Stansted CTR/CTA & London TMA
LONDONDERRY EGLINTON	55 2 34N 7 9 40W	
LYDD **	50 57 22N 000 56 21E	
LYNEHAM	51 30 19N 1 59 36W	Extremely low levels of MIDS/JTIDS transmissions are permitted for testing purposes on the surface of the airfield itself. (See the Restricted Site list at Annex B.)

MANCHESTER	53 21 13N 2 16 30W	Within Manchester CTR/CTA & TMA
MANCHESTER WOODFORD	53 20 17N 2 8 56W	Within Manchester CTR & Manchester TMA
MANSTON	51 20 32N 1 20 46E	
NEWCASTLE	55 2 15N 1 41 30W	Within Newcastle CTR/CTA
NORWICH	52 40 33N 1 16 58E	
NOTTINGHAM EAST MIDLANDS	52 49 52N 1 19 41W	Within Nottingham East Midlands CTR/CTA
OXFORD KIDLINGTON	51 50 13N 1 19 12W	Overlaps with Brize Norton CTR
PEMBREY	51 42 50N 4 18 44W	
PLYMOUTH	50 25 22N 4 6 21W	
PRESTWICK	55 30 34N 4 35 40W	Within Prestwick CTR/CTA & Scottish TMA
SCATSTA	60 25 58N 1 17 46W	
SHOREHAM	50 50 8N 0 17 50W	Overlaps with London TMA
SOUTHAMPTON	50 57 1N 1 21 24W	Within Southampton CTR
SOUTHEND	51 34 17N 0 41 44E	Overlaps with London TMA
ST MARYS	49 54 48N 6 17 30W	
STORNOWAY	58 12 56N 6 19 51W	
SUMBURGH	59 52 44N 1 17 44W	Within Sumburgh CTR/CTA
TIREE **	56 29 36N 006 52 32W	
WARTON	53 44 42N 2 53 2W	
WICK	58 27 32N 3 5 35W	
WOLVERHAMPTON	52 31 3N 2 15 35W	Overlaps with Birmingham CTR/CTA
YEOVIL	50 56 24N 2 39 31W	

* Temporary sites (check with CAA for up to date information as to whether operational).

** Planned sites or ones undergoing approval process prior to activation (positions are approximate).

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ANNEX F: SYSTEM TECHNICAL PARAMETERS AND CALCULATIONS

1 Type of Modulation, Mode and Signal Architecture

1.1 MIDS/JTIDS employs a TDMA transmission with a fundamental time slot duration of 7.8125 milliseconds. The transmission within a time slot consists of a sequence of 72, 258 or 444 pulses, depending upon the message structure. Each pulse is of 6.4 microsecond duration and is carrier Modulated by continuous phase shift keying (also known as minimum phase shift Modulation) at a rate of 5 Megabits per second to produce a 32-bit message symbol.

1.2 The signal format accommodates up to 128 time slots per second, and 1536 time slots constitute a frame of 12 seconds duration. The number of time slots occupied per frame determines the time slot duty factor (TSDF).

1.3 In UK networks, Standard Packed Double Pulsed (SPDP) messages are used having 258 pulses per timeslot, and a pulse rate of 33,024 pulses per second. Each data pulse is transmitted on two frequencies for enhanced ECM performance, and consequently the system data rate is halved.

2 Operating Frequencies

2.1 Operation is in Mode 1 using a pseudorandom hopping sequence amongst the 51 carrier frequencies designated at Table 1.

Table 1 - MIDS/JTIDS Carrier Frequencies

Frequency Number (f_n)	Frequency (MHz)	Frequency Number (fn)	Frequency (MHz)	Frequency Number (fn)	Frequency (MHz)
0	969	17	1062	34	1158
1	972	18	1065	35	1161
2	975	19	1113	36	1164
3	978	20	1116	37	1167
4	981	21	1119	38	1170
5	984	22	1122	39	1173
6	987	23	1125	40	1176
7	990	24	1128	41	1179
8	993	25	1131	42	1182
9	996	26	1134	43	1185
10	999	27	1137	44	1188
11	1002	28	1140	45	1191
12	1005	29	1143	46	1194
13	1008	30	1146	47	1197
14	1053	31	1149	48	1200
15	1056	32	1152	49	1203
16	1059	33	1155	50	1206

3 Pulse Spectrum.

3.1 MIDS/JTIDS terminals comply with the following power spectrum mask (as measured in a 300 kHz bandwidth):

a. At ± 3 MHz from carrier frequency - At least 10 dB below peak carrier level.

b. At ± 5 MHz from carrier frequency - At least 23 dB below peak carrier level.

c. At ± 13 MHz from carrier frequency - At least 55 dB below peak carrier level.

d. Beyond ± 15 MHz from carrier frequency - At least 60 dB below peak carrier level.

3.2 HIT Terminals comply with the following power spectrum mask (as measured in a 300 kHz bandwidth):

a. At ± 3 MHz from carrier frequency - At least 10 dB below peak carrier level.

b. At ± 5 MHz from carrier frequency - At least 23 dB below peak carrier level.

c. At ± 13 MHz from carrier frequency - At least 55 dB below peak carrier level.

d. Beyond ± 15 MHz from carrier frequency - At least 55 dB below peak carrier level.

4 The Basis For Acceptance - DME

4.1 UK frequency clearance for MIDS/JTIDS to operate in the frequency band 960-1215 MHz is on the basis of tolerable interference to existing and future aeronautical radio-navigation services. In order to determine the conditions under which MIDS/JTIDS operations will satisfy this requirement, it is necessary to have some measurable value of normal DME performance and a definition of what constitutes a state of tolerable interference; the definition of tolerable interference, accepted by the CAA, is interference that can be technically defined as not causing a reduction in, or loss of, an operational service.

4.2 In general the user of a navigation service is unable to detect deterioration in performance unless gross abnormalities are evident. It is the responsibility of the civil aviation regulatory and planning authorities to establish and maintain a reliable service and to develop safe operational procedures for its use. The authorities base their planning and maintenance criteria on the operating characteristics, performance standards and tolerances, which are specified for each element of the system.

4.3 Testing to date has shown that MIDS/JTIDS transmissions are insufficient to corrupt the DME identification or measurably degrade accuracy performance. However, MIDS/JTIDS pulses can impede a beacons' ability to detect and reply to valid DME pulse pairs, and similarly, MIDS/JTIDS pulses can impede an interrogators' ability to decode valid replies. Such effects can be measured in various ways; a drop in beacon reply efficiency (BRE), an increased Time to Acquire (TTA) for interrogators, or a reduction in DME equipment sensitivity.

4.4 The test data used to support this Frequency Clearance Agreement is solely based on the effects of DME equipment desensitisation in a laboratory environment. It is likely that future Agreements may be based on alternative data such as actual reply efficiency and sensitivity of operational DME equipment. Such a fundamental change is likely to impact on the operating restrictions contained within future versions of this Agreement.

5 DME/Narrow (DME/N) Transponder

5.1 **Derivation of Acceptance Criteria**. It is necessary to determine the maximum MIDS/JTIDS signal which can be present at the DME receiver without reducing its sensitivity below the minimum specified in ICAO Annex 10. It is a requirement of Annex 10 that the transponder shall reply with an efficiency of at least 70% when the power density of the interrogation

signal at the transponder antenna has a minimum value of -103 dBW/m^2. For the purpose of testing, it is necessary to express this sensitivity in terms of an absolute power level at the transponder receiver. The power density at the antenna can be converted to a power level as follows:

$$P_a = P_d + 10\log\left(\frac{\lambda^2}{4\pi}\right)$$

where: P_d = power density in dBW/m^2
P_a = power at receiving point in dBW
λ = wavelength in metres at mid-band frequency ~ 1087 MHz

P_a = -125.2 dBW; P_a = -95.2 dBm

5.2 **Antenna Gain and Cable Loss**. In order to translate power at the antenna into a power level at the receiver, antenna gain and cable losses must be taken into account. The peak gain of a typical en-route antenna of the type normally used with ground beacons in the UK is 9.5 dBi. Cable losses are dependent upon the installation, but are in the order of 2 dB. Therefore, the sensitivity of the transponder expressed as a power level at the receiver is -87.7 dBm, which shall be rounded to -88 dBm.

5.3 **Acceptance Criteria**. The transponder acceptance criteria is as follows:

a. If the transponder sensitivity is a signal lower than -88 dBm, then the MIDS/JTIDS signals shall be allowed to desensitise the transponder until the sensitivity is -88 dBm. However, if the transponder sensitivity is a signal at or higher than -88 dBm, then the MIDS/JTIDS signals must not desensitise the transponder by more than 1 dB.

b. The acceptance criteria must be met for all transponder types licensed for use by CAA in the UK.

5.4 Tests performed by the RAE determined that the sensitivity of the Butler 1020 DME transponder was around -88 dBm without MIDS/JTIDS signals. Therefore in accordance with the acceptance criteria, MIDS/JTIDS signals must not desensitise the transponder by more than 1dB. The tests showed that when MIDS/JTIDS signals of up to -32dBm were applied in DME mode X, the transponder sensitivity was not reduced by more than 1dB; however, in DME mode Y, the 1 dB allowance was reached at a MIDS/JTIDS signal level of -50 dBm. Subsequent testing performed by GEC-Marconi confirmed these results.

5.5 The value of -50 dBm has been taken as the threshold between interference and non-interference. After applying a 6 dB protection margin, the MIDS/JTIDS signal level that is acceptable becomes -56 dBm. If future tests show that MIDS/JTIDS signals of a format different to those tested produce greater interference to DME then the above acceptance criteria shall be re-examined.

6 DME/N Interrogator

6.1 **Derivation of Acceptance Criteria**. It is necessary to determine the maximum MIDS/JTIDS signal which can be present at the DME interrogator receiver without reducing its sensitivity below the minimum specified in ICAO Annex 10. It is a requirement of Annex 10 that the airborne equipment sensitivity shall be sufficient to acquire and provide distance information when the peak pulse power density of the transponder signal at the interrogator antenna has a minimum value of -89 dBW/m^2; this requirement shall be met for a minimum beacon reply efficiency of 70%. For the purpose of testing, it is necessary to express this sensitivity in

terms of an absolute power level at the interrogator receiver. The power density at the antenna can be converted to a power level as follows:

$$P_a = P_d + 10\log\left(\frac{\lambda^2}{4\pi}\right)$$

where: Pd = power density in dBW/m2
Pa = power at receiving point in dBW
λ = wavelength in metres at mid-band frequency ~ 1087 MHz

Pa = -111.2 dBW; Pa = -81.2 dBm

6.2 **Antenna Gain and Cable Loss.** In order to translate power at the antenna into a power level at the receiver, antenna gain and cable losses must be taken into account. The centre band gain of a typical antenna of the type used with interrogators in the UK was measured during RAE tests to be around 5.0 dBi. Cable losses are dependent upon the installation, but are in the order of 2 dB. Therefore, the sensitivity of the interrogator expressed as a power level at the receiver is -78.2 dBm, which shall be rounded to –78 dBm.

6.3 **Acceptance Criteria**. The interrogator acceptance criteria is as follows:

a. If the interrogator sensitivity is a signal lower than -78 dBm, then the MIDS/JTIDS signals shall be allowed to desensitise the interrogator until the sensitivity is -78dBm. However, if the interrogator sensitivity is a signal at or higher than -78 dBm, then the MIDS/JTIDS signals must not desensitise the interrogator by more than 1dB.

b. The acceptance criteria must be met for all interrogator types.

6.4 Of the equipments tested by the RAE, the King KN65A interrogator was shown to be the most susceptible to MIDS/JTIDS interference. Analysis of the initial tests performed by the RAE shows that the sensitivity of the King KN65A was around -80 dBm without MIDS/JTIDS signals. Therefore in accordance with the acceptance criteria, MIDS/JTIDS signals shall be allowed to desensitise the interrogator until its sensitivity is -78 dBm.

6.5 The tests show that the interrogator sensitivity was reduced to -78 dBm for MIDS/JTIDS signal levels of -36 dBm and higher in mode Y; however, in mode X, the sensitivity was reduced to -78 dBm for MIDS/JTIDS signals of -42 dBm and lower. The value of -42 dBm has been taken as the threshold between interference and non-interference. After applying a 6 dB protection margin, the MIDS/JTIDS signal level that is acceptable becomes -48 dBm. If future tests show that MIDS/JTIDS signals of a format different to those tested produce greater interference to DME, then the above acceptance criteria shall be re-examined.

7 Geographical Separation for DME

7.1 Channel assignment planning for international civil aeronautical radio services is based upon the concept of geographical separation where simple formulae are defined to govern assignments and the deployment of ground stations. Such formulae avoid the necessity to take account of ground and airborne antenna patterns, day to day propagation variations, fluctuations in transmitted power levels and so on. Adapting this concept to MIDS/JTIDS operations, the CAA believes that the simple application of generalised separation criteria between MIDS/JTIDS and civil facilities provides a manageable planning basis for the future. It is very much preferred that any criteria imposed to control MIDS/JTIDS should be in a form which is concise, unambiguous and permits reasonable freedom to the military authorities to

plan and operate MIDS/JTIDS without day to day consultation or co-ordination with the civil authorities.

7.2 For a given TSDF, test data shows that receiver desensitisation is only dependent upon the strength of the MIDS/JTIDS signal. Geographical separation can always ensure that MIDS/JTIDS will not degrade DME performance.

7.3 To minimize co-ordination and ensure that MIDS/JTIDS operations can be planned and executed more easily, the CAA believes that there are clearly defined areas of airspace where the provision of high integrity civil services is extremely important; these areas include controlled airspace, especially the approaches to major aerodromes where the carriage of DME is mandatory for certain flights. The CAA has a responsibility to ensure that operators can use the DME services in these areas without the risk of them being adversely affected by MIDS/JTIDS or any other potential source of interference.

7.4 In order to provide DME with the level of protection necessary to ensure that MIDS/JTIDS will not cause interference beyond tolerable limits under any condition, the separation criteria shall be calculated based upon maximally coupled antennas. In other words, the point of maximum MIDS/JTIDS antenna gain shall coincide with the point of maximum DME antenna gain. Thus particular values of geographical separation which are specified will in general be related to particular volumes of airspace that are readily identified in published documentation.

8 Calculation of Required Separations for DME

8.1 JTIDS Effective Isotropic Radiated Power (EIRP). Under the conditions of the Frequency Agreement, the maximum transmitter output power from a MIDS/JTIDS terminal operating in low power mode is 200 Watts +1 dB (i.e. 54 dBm). In order to determine the radiated power, the characteristics of the ground and airborne antenna installations must be specified. To maintain consistency, the antenna gains and cable losses used in the derivation of the acceptance criteria shall be used in the calculation of required separation distances. The values to be used are therefore 9.5 dBi for the antenna gain of a ground station, 5.5 dBi for the antenna gain of an airborne installation and 2 dB cable losses for ground and airborne installations. These gains and losses shall be applied to both DME and MIDS/JTIDS installations. Therefore maximum permitted radiated power is:

a. Airborne JTIDS EIRP = 57.5 dBm.

b. Ground JTIDS EIRP = 61.5 dBm.

8.2 Transponder Separation Criteria. Having determined the maximum allowable MIDS/JTIDS signal strength at the interrogator and transponder receivers, and the EIRP of ground and airborne MIDS/JTIDS installations, the required free space attenuation can be calculated. The two transmission paths to be considered are MIDS/JTIDS ground terminal to transponder and MIDS/JTIDS airborne terminal to transponder as follows:

a. <u>JTIDS Ground to Transponder</u>:

Required Attenuation = $JTIDS_{EIRP(ground)} - JTIDS_{DME(ground)} + DME_{gain\ (ground)}$
= 61.5 dBm – (-56 dBm) + 7.5 dB dBm
= 125 dB

b. JTIDS Air to Transponder:

Required Attenuation = $JTIDS_{EIRP(air)}$ - $JTIDS_{DME(ground)}$ + $DME_{gain(ground)}$
= -57.5 dBm – (-56 dBm) + 7.5 dB
= 121 dB

where: $JTIDS_{DME(ground)}$ = allowed JTIDS signal strength at transponder receiver
$DME_{gain(ground)}$ = net antenna system gain of transponder installation
$JTIDS_{EIRP(ground)}$ = EIRP of JTIDS ground installation
$JTIDS_{EIRP(air)}$ = EIRP of JTIDS airborne installation

8.3 Interrogator Separation Criteria. The two transmission paths to be considered are MIDS/JTIDS ground terminal to interrogator and MIDS/JTIDS airborne to interrogator.

a. JTIDS Ground to Interrogator:

Required Attenuation = $JTIDS_{EIRP(ground)}$ - $JTIDS_{DME(air)}$ + $DME_{gain(air)}$
= 61.5 dBm– (-48 dBm) + 3.0 dB
= 112.5 dB

b. JTIDS Air to Interrogator:

Required Attenuation = $JTIDS_{EIRP(air)}$ - $JTIDS_{DME(air)}$ + $DME_{gain(air)}$
= 57.5 dBm – (-48 dBm) + 3.0 dB
= 108.5 dB

where: $JTIDS_{DME(air)}$ = JTIDS signal strength at interrogator receiver
$DME_{gain(air)}$ = net antenna gain interrogator installation
$JTIDS_{EIRP(ground)}$ = EIRP of JTIDS ground installation
$JTIDS_{EIRP(air)}$ = EIRP of JTIDS airborne installation

8.4 The geographical separations needed to achieve the above attenuations can be calculated using the following basic equation for Free Space Path Loss (FSPL):

$$\mathrm{FSPL} = 10\log\left(\frac{4\pi d}{\lambda}\right)^2 \mathrm{dB}$$

where: d = separation in metres
λ = wavelength in metres

Assuming a frequency of 1087 MHz (mid band frequency), the required separations are:

JTIDS Ground to Transponder = 21.0 nm
JTIDS Air to Transponder = 13.2 nm
JTIDS Ground to Interrogator = 5.0 nm
JTIDS Air to Interrogator = 3.1 nm

8.5 The aforementioned calculations differ from those stated in previous editions of this Agreement in that a discrepancy in the figure for $JTIDS_{EIRP(air)}$ has now been corrected. Therefore, the calculated results for JTIDS air to transponder and interrogator separation distances in this Agreement have increased slightly. However, in mitigation the previous separation distances have been in use for many years and no interference reports have been generated that would justify any proposed change to these distances. Furthermore, the risks of interference being caused at these ranges are considered to be low and

transitory in nature. Therefore, the CAA has agreed to maintain the original separation distances as follows:

JTIDS Ground to Transponder = 21.0 nm
JTIDS Air to Transponder = 12.5 nm
JTIDS Ground to Interrogator = 5.0 nm
JTIDS Air to Interrogator = 3.0 nm

8.6 Notwithstanding the above, if there are any subsequent changes in any other elements of these calculations in the future, the CAA will need to review these separation distances and, if necessary, amend them accordingly.

9 The Basis for Acceptance - SSR

9.1 UK frequency clearance for MIDS/JTIDS to operate in the frequency band 960-1215 MHz is on the basis of tolerable interference to existing and future aeronautical radio-navigation. Additionally, as MIDS/JTIDS signals contain some residual power at SSR frequencies, there is a need to ensure that SSR ground stations and transponders do not suffer from harmful interference.

9.2 If SSR systems detect JTIDS pulses there is a risk of interference that could result in a transponder failing to detect an interrogation, or a SSR ground station failing to detect a transponder reply. Either outcome could lead to a loss of separation, and measures are necessary to ensure that sufficient separation is maintained between MIDS/JTIDS, SSR ground stations and transponder equipped aircraft.

10 Basis for Determining Required Separation - SSR

10.1 In 1999, the CAA sponsored QinetiQ Ltd to carry out field trials to determine the separation required between JTIDS and SSR transponders and ground stations. The trial involved the use of mobile JTIDS ground stations that were operated at a range of distances from SSR equipment, including the Mode S ground station at Malvern.

10.2 The trials determined the separation distance below which MIDS/JTIDS interference could be detected by the SSR systems when operated at maximum permitted power and TSDF. The trial concluded that the following minimum separation distances are required:

MIDS/JTIDS ground station and SSR interrogator = 720 metres
MIDS/JTIDS ground station and SSR transponder = 240 metres

(Note: No trials were performed between MIDS/JTIDS airborne platforms and SSR systems.)

11 Application of Separation Distances - SSR

11.1 Whilst the above separation distances have been determined with a high level of accuracy, it is recognised that they were obtained under a particular set of conditions. Consequently, slightly different results might be expected if the trial was repeated with different MIDS/JTIDS or SSR equipment at a different location. Furthermore, any application of minimum separation distance needs to include a safety margin.

11.2 **Separation between MIDS/JTIDS Ground Stations and SSR Ground Stations**. A 6 dB safety margin would necessitate a doubling of the minimum separation distance to 1440 metres. Allowing for the sort of variations described in paragraph 11.1, and cognisant of the

need to specify separation distances in practical units, a minimum separation of 1.0 nm (1852 metres) between JTIDS terminals and SSR installations has been agreed.

11.3 **Separation between MIDS/JTIDS Ground Stations and SSR Transponders**. Applying similar criteria to the above, a separation distance of at least 500 metres would be required between a MIDS/JTIDS terminal and a transponder equipped aircraft. However, given that restrictions already exist to prevent MIDS/JTIDS operation taking place in the vicinity of DME beacons, SSR Ground Stations and inside Protected Airspace, an assessment is required to quantify the risk of interference to SSR transponders occurring outside these areas. Consequently, it is the CAA's view that:

a. An aircraft transponder will be interrogated at least 4 times per scan, and the likelihood of MIDS/JTIDS interference preventing it replying to 4 or more successive interrogations is improbable.

b. An aircraft will only remain within 500 metres of a JTIDS station for a short period of time, which is unlikely to be for more than two scans of the SSR antenna.

c. Aircraft operating away from major airports and outside Protected Airspace are unlikely to be in an approach phase of flight whilst operating under instrument flight rules. Consequently, such aircraft are unlikely to be reliant on the provision of SSR services to maintain safe separation from terrain and other obstacles.

d. In recognition of the above, it has been agreed that no specific separation is required between MIDS/JTIDS ground stations and aircraft carrying SSR transponders.

11.4 **Separation Between MIDS/JTIDS Airborne Platform and SSR Ground Station**. Until trials are conducted with airborne MIDS/JTIDS platforms, it is safe to apply the separation distances agreed for MIDS/JTIDS Ground Stations in paragraph 11.2. Therefore, a minimum separation of 1.0 nm (1852 metres) shall apply.

11.5 **Separation Between MIDS/JTIDS Airborne Platform and SSR Transponders**. DME separation requirements already dictate that an airborne MIDS/JTIDS platform must maintain at least 2,000 feet (602 metres) of separation from any civil aircraft. Furthermore, MIDS/JTIDS operation is not permitted in the vicinity of DME beacons, SSR Ground Stations and inside Protected Airspace. Until trials are conducted with airborne MIDS/JTIDS platforms, it is the CAA's view that existing DME separation requirements between airborne MIDS/JTIDS platforms and civil aircraft are adequate to protect SSR transponders.

ANNEX G: WAIVER REQUEST FORMAT

1 Format

1.1 Requests for waivers or temporary clearances to operate MIDS/JTIDS within the UK FIR/UIR should be made at least 4 months prior to the planned activity. The following format is to be used when applying for a waiver to the current FCA:

WAIVER/TEMPORARY FREQUENCY CLEARANCE REQUEST	
Distribution:	
Action:	
JDLMO JFACHQ	(Freq Clearance Co-ord)
Information:	
DPA	(TDL13)(IA6b)
1.	Reason for Waiver/Clearance.
2.	Participating Units.
3.	Dates of Activity.
4.	Operating Areas/Locations.
5.	Daily Operating Periods.
6.	Special Network Requirements.
7.	Power Setting.
8.	IPF Setting.
9.	Height of Antenna Above the Surface.
10.	Additional Information.
11.	Deadline for Clearance Notification.
12.	Point of Contact.

2 Guidance Notes

PARAGRAPH HEADING	CONTENT
Reason for Waiver/Temporary Clearance	To include Operational Requirement, Trial Requirement and why this requirement cannot be met using extant agreement.
Participating Units.	To include numbers, types and location or basing of all participating MIDS/JTIDS platforms.
Dates of Activity.	To include transit/deployment dates if MIDS/JTIDS is required for use on inbound and outbound transits.
Operating Areas	To include Lat & Long (in accordance with WGS84) of operating areas or name of recognized op areas especially if notified as protected airspace. (See Appendix I to Annex D.)
Daily Operating Periods	To include description of daily activity and sorties rates if applicable. (e.g. “1 X wave of 4 ac 0800Z – 1000Z, 1 X wave of 4 ac 1300Z – 1500Z”, or “ daily operations between 0700Z and 1600Z”.)
Special Network Requirements	Any special network requirements (e.g. Allocation of NTR, NC, Relay etc).
Power Setting	MIDS/JTIDS Power setting - Low (200W)/High (1KW)/Other. EIRP, cable loss and antenna gain.
IPF Setting	MIDS/JTIDS IPF setting – Combat/Exercise/Peacetime. (to include details of ‘peacetime’ characteristics [100/50 TSDF, RTT-B, Contention, High packing levels permitted or prohibited.])
Height of Antenna Above the Surface	The maximum height of the MIDS/JTIDS antenna that will be used during the activity.
Additional Information	Any additional information relevant to the activity. (e.g. Exercise or Deployment name, relative priority of activity, associated activities).
Deadline for Clearance Notification	Date by which response is required.
Point of Contact	Full contact details. (Authority/Agency, Name, Rank, Telephone number [commercial and military], E-mail address, Signal address.)

ANNEX H: FREQUENCY CLEARANCE VIOLATION REPORT FORMAT

Frequency Clearance Violation Report

Violation Number	Note 1

Date		**Type**	Minor / Major
Sqn/ Unit		**Callsign(s)**	

Chronology of Events

Follow-up Action

Submitted By: -

Name:-

Rank:-

Note:
1. The Violation Number will be issued by JDLMO and will relate to the Violations Database entry number.

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ANNEX I: BIBLIOGRAPHY

A. Civil Aviation Authority (Air Navigation) Directions 2001, issued jointly under section 66(1) of the Transport Act 2000 by the Secretary of State for the Environment and the Regions and the Secretary of State for Defence.

B. STANAG 4175 Technical Characteristics of the Multifunctional Information Distribution System.

C. Update to Peacetime Control of Jamming Warning Procedures D/DJW/046/09.

D. CAA CAP 32-UK Aeronautical Information Publication (“The Air Pilot”).

E. RAF Flight Information Publication - En Route Supplement - British Isles and North Atlantic.

F. UK MIDS/JTIDS Management Standard Operating Procedures – CAOC9.1253.60.1, dated 1 Nov 02.

G. JSP 550.

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ANNEX J: DEFINITION AND GLOSSARY OF TERMS

AIP	Aeronautical Information Publication
APP	Approach
ATC	Air Traffic Control
ATS	Air Traffic Services
BSC	Baseline Safety Case
BRE	Beacon Reply Efficiency
CA	Co-ordination Area
CAA	Civil Aviation Authority
CAL	Clearance Amendment List
CAP	Civil Aviation Publication
CAOC	Combined Air Operations Centre
CRC	Control and Reporting Centre
CTA	Control Area
CTR	Control Zone
DAP	Directorate of Airspace Policy
DGICS	Director General Information and Communication Services
DLM	Data Link Manager
DLMC	Data Link Management Cell
DME	Distance Measuring Equipment
DME/N	DME/Narrow - the version of DME used to support en-route navigation and landing applications
DME/P	DME/Precision - a precision version of DME designed as the ranging element of the Microwave Landing System (MLS)
DPA	Defence Procurement Agency
DSM	Defence Spectrum Management
DSR	Dedicated Slot Re-use
DTDMA	Distributed Time Division Multiple Access
ENR	En Route
EIRP	Effective Isotropic Radiated Power
ERV	ECM-Resistant Voice
ETA	Estimated Time of Arrival
ETRN	External Time Reference Network
FAT	UK Frequency Allocation Table
FCA	Frequency Clearance Agreement
FIR	Flight Information Region
FL	Flight level
GAT	General Air Traffic
HIT	Hughes Improved Terminal
ICAO	International Civil Aviation Organisation
IA	Integration Authority
IAP	Instrument Approach Procedures
ID	Initialisation Data
ITU	International Telecommunications Union
IPF	Interference Protection Features
ISD	Into Service Date
JAPNMS	JTIDS Air Platform Network Management System
JAF	JTIDS Assurance Facility
JDLMO	Joint Data Link Management Organisation
JFMC	JTIDS Frequency Clearance Agreement Management Committee
JFPM	JTIDS FCA Programme Manager
JFSC	JTIDS FCA Safety Committee
JFTWG	JTIDS FCA Technical Working Group

JTIDS	Joint Tactical Information Distribution System - a particular form of MIDS
JU	JTIDS Unit
LARS	Lower Airspace Radar Service
LVT	Low Volume Terminal (MIDS/JTIDS terminal variant)
MIDS	Multifunctional Information Distribution System - A generic description for all communication equipments compliant with STANAG 4175.
MoD	Ministry of Defence
MSEC	Message Security
NAA	Network Acquisition Authority
NATO	North Atlantic Treaty Organisation
NATS	National Air Traffic Services
NDC	Network Design Cell
NETWORK	A group of 2 or more terminals using the same pseudo random frequency hopping pattern
NFPG	National Frequency Planning Group
NM	Network Manager
NTR	Network Time Reference
OOA	Out of Area
OPNET	Operational Network
Packed-2(SP)	A message format, similar to the standard format in which each pulse carries different information
PPLI	Precise Participant Location Identicator
RAE	Royal Aerospace Establishment
RE	Reply Efficiency
RTT	Round Trip Timing
SOP	Standard Operating Procedure
SSR	Secondary Surveillance Radar
Standard Message	A message format in which 258 pulses are transmitted in a period of 3.354 milliseconds in each time slot. Each even numbered pulse carries the same information as the previous odd numbered pulse.
STRN	System Time Reference Network
SubNM	Sub-Network Manager
TACAN	Tactical Air Navigation System - provides range and angular information the range element is compatible and interoperable with DME.
TBA	To Be Allocated
TBD	To Be Decided
TCC	Times of Crisis and Conflict
TDMA	Time Division Multiple Access - a specific type of MIDS/JTIDS architecture
TMA	Terminal Manoeuvring Area
TS	Time Slot
TSDF	Time Slot Duty Factor - The percentage of total time slots that can be used. It is expressed in the form n/m where ’n’ represents the total percentage that can be used by the network and ’m’ represents the maximum percentage to be used by a specific user within that network.
TSEC	Transmit Security
Type 2A RTT	Round trip timing – format used to achieve fine synchronisation with other JU’s.
TTC	Time of Crisis and Conflict
UIR	Upper (Air Space) Information Region
WGS84	World Geodetic Survey of 1984

ANNEX K: POINTS OF CONTACT

JTIDS Frequency Clearance Programme Manager		
Defence Procurement Agency Larch 3a #1351 MoD Abbey Wood BRISTOL BS34 8JH	+44 (0) 117 91+ Ext or Military 9352 + Ext	
TDL13	31283	tdl13@dpa.mod.uk
UK Joint Data Link Management Organisation		
JFACHQ RAF High Wycombe NAPHILL Buckinghamshire HP14 4UE	+ 44 (0) 1494 461461 Ext via Military Operator or Military 95221 + Ext	ukdloc@lineone.net
SO2 TDL, JDLMO	Ext 2091	
OC NDC	Ext 2353	
OC DLMC	Ext 2567	
DPA Integration Authority 6		
Defence Procurement Agency Larch 3a #2308 MoD Abbey Wood BRISTOL BS34 8JH	+44 (0) 117 91 + Ext or Military 9352 + Ext	
IA6	34177	ia6@dpa.mod.uk
IA6b	34187	ia6b@dpa.mod.uk

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7.22
THE UNITED STATES FREQUENCY CLEARANCE

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, D.C. 20230

MAY 25 2004

Bruce L. Swearingen
IRAC Representative
Department of the Navy
Naval Electromagnetic Spectrum Center
2461 Eisenhower Avenue
Alexandria, Virginia 22331-1400

SUBJECT: Request for international release of the JTIDS/MIDS IRAC Document 33583/1

Dear Mr. Swearingen:

The National Telecommunications and Information Administration (NTIA) has participated and contributed to the Multinational Working Group (MNWG) since it began in 1984. The stated objectives of the MNWG include discussions of Common Frequency Clearance (CFC) efforts among the participating nations. As your associate Mr. Quan Vu indicated in his letter, the NTIA Certification of Spectrum Support (IRAC Document 33583/1) allows new flexibility, and removed or relaxed some restrictions previously imposed on Joint Tactical Information Distribution System/Multifunction Information Distribution System (JTIDS/MIDS) operations in the United States.[1] Therefore, IRAC Document 33583/1 represents a new CFC for JTIDS/MIDS in the United States, superseding IRAC Documents 27439 and 28843. As such, NTIA concurs that revising the MNWG notebook to include new information contained in IRAC Document 33583/1 is appropriate and would familiarize potential guest forces with the conditions for JTIDS/MIDS operations in the United States. Accordingly, NTIA does not object to the Navy-Marine Corps Spectrum Center (NMSC) releasing IRAC Document 33583/1 for the purposes specified in your letter.

Per your request, NTIA hereby gives NMSC permission to release IRAC Document 33583/1 for inclusion in the MNWG notebook. However, NTIA would like to request that Navy associate the following statement with IRAC Document 33583/1 in the MNWG notebook: "***Specific inquiries regarding a referenced document in Sections of the NTIA Certification of Spectrum Support (IRAC Document 33583/1) should be referred to the originating agency.***"

If you have any questions regarding this matter, please contact me at (202) 482-1850 or Ed Juleau at (202) 482-1694.

Sincerely,

Karl B. Nebbia
Deputy Associate Administrator
Office of Spectrum Management

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[1] See Letter, From Quan Vu, Department of Navy IRAC Alternate Representative to Karl Nebbia, Deputy Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration, Dated May 10, 2004.

FORM NTIA-44 (3/91)	U.S. DEPARTMENT OF COMMERCE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION	Classification	Control Number
	CERTIFICATION OF SPECTRUM SUPPORT	**UNCLASSIFIED**	SPS-14260

Recipient Agency	System	Stage of Review
Navy	**Joint Tactical Information Distribution System (JTIDS)/Multi-Function Information Distribution System (MIDS)**	4 – Operational

Section 1: OPERATING CHARACTERISTICS FOR WHICH SUPPORT IS CERTIFIED

Frequency (MHz)	Emissions	Power	Station Class (Stage 4)	Operating Location
969	9M00Q1D	200W	FL, MO, FA	US&P
969-1206	237MQ1D		MA, FX	
1025-1150	750KV1D	500W	AM	

Section 2: SOURCE DOCUMENTS

Docket Number	Description of Document	Dated
SPS-04280	Original Stage 4 NTIA Spectrum Support Certification for JTIDS	6 December 1979
SPS-08891	NTIA Letter to Air Force Expanding Spectrum Support Certification for JTIDS	30 July 1991
Doc. 28843/1	Updated Stage 4 NTIA Spectrum Support Certification for JTIDS	7 June 1994
SPS-11737	Navy JTIDS Updated Stage 4 Request	6 October 1998
SPS-12421	FAA Comments/Questions on Navy JTIDS Updated Stage 4 Request	20 June 2000
SPS-12439	DOD response to FAA Comments/Questions (SPS-12421)	11 July 2000
SPS-14123/3	SPS Review of the Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS)	3 December 2003
SPS-14226/2	NTIA JTIDS/MIDS TDMA Architecture and Waveform Spectrum Support Certification Document (SPS WG-1 03-001)	31 December 2003
SPS-14184	Revised DOD Request for Updated Stage 4 Review of JTIDS/MIDS	23 January 2004
SPS-14216	EMC Certification Guidance and Requirements for JTIDS/MIDS TDMA Waveform Equipment (SPS WG-1 TR-03-001)	3 February 2004

Section 3: SPS RECOMMENDATIONS

Working Group One of the Spectrum Planning Subcommittee (SPS WG-1) reviewed this system under the provisions of Chapter 10 of the NTIA Manual, and recommends that:

1. NTIA certify Stage 4 Spectrum Support for the Department of Defense (DoD) JTIDS/MIDS in the 960-1215 MHz band as specified in Section 1 and in accordance with SPS-14226/2 (attached).
2. NTIA further notes that JTIDS/MIDS operating in the Mobile and Aeronautical Mobile services falls under the provisions of footnote US 224 and therefore is in conformance with the National table of frequency allocations.
3. Navy be aware that:
   a. The use of JTIDS/MIDS TDMA equipment in the 960-1215 MHz band shall be in accordance with the Memorandum of Agreement (MOA) entered into by the Department of Transportation (DoT) and Department of Defense (DoD) and NTIA policy in Section 4.3.17 of the NTIA Manual (including the re-mapping capability requirement). Per the MOA, "FAA and DOD systems dependent upon the 960-1215 MHz spectrum must be coordinated to assure mutual spectrum access". Therefore, any future deviations or proposed changes to the conditions and requirements contained in this Spectrum Support Certification shall be coordinated between the Federal Aviation Administration (FAA) and DoD. Such coordination between FAA and DoD is intended to allow maximum flexibility in the use of the 960-1215 MHz band, while preserving the safety and integrity of the National Airspace System.

b. JTIDS/MIDS/TDMA specifically relates to equipment covered by the JTIDS/MIDS TDMA Architecture and Waveform and applies only to equipment that utilize the TDMA fixed time slot architecture and pulse waveform that has been extensively tested in the SPS WG-1 Joint EMC Test Programs. This Spectrum Certification does not apply to other system architectures that utilize the same pulse waveform.

c. Transmitter power up to 1000 W may be authorized on a coordinated basis.

4. Navy ensure that personnel are protected from radiation levels that exceed generally accepted exposure levels.

Name/Title of Recommending Official	Signature	Date
Richard A. Lancaster, Chairman Spectrum Planning Subcommittee	R A Lancaster	MAR 25 2004

Section 4: NTIA CERTIFICATION

The Office of Spectrum Management certifies Stage 4 spectrum support for this system.
This office concurs with the SPS recommendations in Section 3 and in the conditions with SPS-14226.

Name/Title of Certifying Official	Signature	Date
Karl B. Nebbia Deputy Associate Administrator		MAR 25 2004

Distribution	Classification	Page Number
IRAC, SPS, FAS	**UNCLASSIFIED**	2 of 2 pages

FOR AGENDA **SPS-14226/2**

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington D.C. 20230

DATE: February 17, 2004

MEMORANDUM

TO: Alan R. Frable
Secretary, Spectrum Planning Subcommittee

FROM: Ed Juleau
Systems Engineering and Analysis Branch

SUBJECT: Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS).

Dear Mr. Frable:

This is to request a separate Spectrum Planning Subcommittee (SPS) number for the "*JTIDS/MIDS TDMA Architecture and Waveform Spectrum Support Certification Document*".

This document was provided to the SPS as one of several enclosures to SPS-14123/2 (Letter from Robert Seach to Richard Lancaster, SPS Chairman). As you assign a separate SPS number to the "*JTIDS/MIDS TDMA Architecture and Waveform Spectrum Support Certification Document*", please update SPS-14123/2 to reflect that one document has been removed.

Thank you, and if you have any questions please contact me at 21694.

NTIA JTIDS/MIDS TDMA ARCHITECTURE AND
WAVEFORM SPECTRUM SUPPORT CERTIFICATION
DOCUMENT

Ref: SPS 14216
(SPS WG-1 TR-03-001)

1. The Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS) is the primary Department of Defense (DoD) data link. JTIDS/MIDS employs a Time Division Multiple Access (TDMA) modulation architecture. The National Telecommunications and Information Administration (NTIA) established the Spectrum Planning Subcommittee Working Group One (SPS WG-1) to evaluate the Electromagnetic Compatibility (EMC) of systems operating in the 960 to 1215 Megahertz (MHz) band. The EMC evaluation of JTIDS/MIDS with Air Traffic Control (ATC) equipment has involved extensive bench tests and flight tests. At the completion of the evaluation program, conditions were placed on JTIDS/MIDS usage in the 960 to 1215 MHz band during peacetime operations within the United States and Its Possessions (US&P). These conditions encompass the following items: Operational Controls, EMC Acceptance and Maintenance Testing, Siting and Collocation Requirements, the Process for Implementing Design Changes, the Handling of Future Systems in the Band and the Reporting of Changes in Terminal EMC Features, Spectral Characteristics, and Operational Deployments. These conditions are important elements to ensure the compatibility of JTIDS/MIDS usage with ATC equipment. Any DoD proposed changes to the conditions and requirements contained and referenced in this document require the approval of NTIA.

2. The use of JTIDS/MIDS TDMA equipment in the 960-1215 MHz band shall be in accordance with the Memorandum of Agreement (MOA) entered into by the Department of Transportation (DoT) and Department of Defense (DoD) and NTIA policy in Section 4.3.17 of the NTIA Manual. Per the tenets of the MOA, "FAA and DOD systems dependent upon the 960-1215 MHz spectrum must be coordinated to assure mutual spectrum access". Therefore, any future deviations or proposed changes to the conditions and requirements contained in this Spectrum Support Certification shall be coordinated between the Federal Aviation Administration (FAA) and DoD. Such coordination between FAA and DoD is intended to allow maximum flexibility in the use of the 960-1215 MHz band, while preserving the safety and integrity of the National Airspace System.

3. NTIA "approval" is referenced several times in this document. Recognizing the MOA, for the purposes of this document, NTIA approval will be assumed if both parties can agree. Only if both DoD and FAA agree that an impasse has been reached will NTIA become a party to the discussions.

4. In this document the term "JTIDS/MIDS/TDMA (and/or simply TDMA) Terminal" specifically relates to equipment covered by the JTIDS/MIDS TDMA Architecture and Waveform and applies only to equipment that utilize the TDMA fixed time slot architecture and pulse waveform that has been extensively tested in the SPS WG-1 Joint EMC Test Programs. This Spectrum Certification does not apply to other system architectures that utilize the same pulse waveform.

5. JTIDS/MIDS TDMA usage is defined in terms of Time Slot Duty Factor (TSDF). TSDF is a percentage based on the sum total of pulses contained in assigned time slots, relative to the maximum number of pulses allowed in a 12 second TDMA frame (396,288)[1]

6. Spectrum support for Uncoordinated Operations is granted to TDMA Terminals subject to the following conditions.[2]

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[1] 1536 time slots (12 sec frame) x 258 pulses (per time slot) = 396,288 pulses per 12 second frame.

[2] Uncoordinated Operations only need to be coordinated within DoD.

I. OPERATIONAL CONTROLS

1. EMC Features Controls shall be implemented in all TDMA Terminals in order to ensure the radiated signal is in accordance with the requirements in this Certification and in the Document SPS WG-1 TR 03-001 *"EMC Certification Guidance and Requirements for JTIDS/MIDS TDMA Waveform Equipment."*

2. Exceptions to EMC Features Controls shall only be granted for Coordinated Operations.[3]

3. When EMC controls are overridden and/or when the TDMA Terminal controls have inhibited transmissions, DoD shall document these occurrences and make the information available to FAA and NTIA upon request.

4. DoD shall periodically verify the TDMA Terminal spectral characteristics and EMC Features as required in SPS WG-1 TR 03-001.

5. The operation of any type of TDMA Terminal covered under this Certification shall require specific EMC Features and Terminal spectral characteristics to be approved for Uncoordinated Operations. The Government shall conduct and document a formal demonstration of these EMC Features and spectral characteristics to ensure that the Terminal meets the guidance and requirements of SPS WG-1 TR 03-001.

6. TDMA Terminals shall be built so that if platform TSDF restrictions are required to comply with this Certification, the necessary EMC Features can be easily activated.

II. TDMA TERMINAL SPECTRUM CERTIFICATION CONDITIONS FOR UNCOORDINATED OPERATIONS

1. The total TDMA Terminal community within a Geographic Area defined in Paragraph II.2 shall be limited to a 100 percent (%) TSDF.

2. The Geographic Area limitation for the 100 % TSDF utilization shall be a radius of 185 kilometers (100 nautical miles). Thus if a circle with a 185 kilometer radius is constructed around any Point A, the TSDF resulting from the summed assigned time slots, as delineated in this Certification and in SPS WG1 TR 03-001, for all the TDMA Terminals within the circle cannot exceed a pulse limit of 396,288 pulses during any 12 second "Time Frame" interval. In addition, the total TSDF within a circle of radius 370 kilometers (200 nautical miles) constructed around any Point A shall not exceed 400 % TSDF. At this time, Point A is defined as any TDMA Terminal. By the Global Positioning System Civil Downlink (GPS L5) Initial Operational Capability (IOC) date, or no later than January 1, 2008, Point A becomes any point in space.

3. Any TDMA Terminal, or closely spaced group of ground or stationary/slow moving TDMA Airborne Terminals, within a 3 nautical mile radius about each TDMA Terminal, shall be limited to a total 50 % TSDF (198,144 pulses per 12 second "Time Frame" interval). In total (Paragraphs II.1, II.2 and II.3), this limitation on TSDF is referred to as 100/50(300).

4. Terminal transmit time slots containing up to and including 444 pulses shall be permitted.

5. Multinet transmissions shall be permitted.

[3] Coordinated Operations are coordinated with FAA.

6. Contention transmissions, limited to Repromulgation Relay, Time Slot Reallocation (TSR) and Machine Controlled, shall be permitted. Machine Controlled Contention, also known as "random access", shall include, but not be limited to, Round Trip Timing Broadcast Mode (RTT-B), Precise Participant Location and Identification (PPLI), Initial Net Entry (INE), Fighter to Fighter (Ftr to Ftr), and Conditional Paired Slot Relay (CPSR).[4] In general, the total contention transmission TSDF, which is the sum of II.6a.1, II.6a.2 and II.6a.3, shall not exceed 25%. If however all Machine Controlled Contention other than RTT-B, PPLI and INE is limited to use by fast-moving aircraft, contention transmission TSDF can be increased as long as it does not exceed a total of 33% TSDF. The TSDF for contention transmissions, the participating platforms, and the geographic area shall be counted as follows.

a) Contention Transmission TSDF

(1) Repromulgation Relay contribution to contention transmission TSDF count shall equal the total TSDF in which relaying could occur (i.e., the originator time slots) times one-third. The granularity of the repromulgation relay jitter step size shall not be less than 10 microseconds.
(2) TSDF from centralized TSR shall not be counted toward the contention transmission TSDF count. For decentralized TSR, the contention transmission TSDF count shall equal the total TSDF in which TSR could occur times a factor X. X=1/4 if the number of TSR participants does not exceed the capacity of the reallocation message; X=1/3 otherwise.
(3) The Machine Controlled Contention contribution to contention transmission TSDF shall equal the TSDF of the contention pool times one half.

b) Platform TSDF

(1) The platform TSDF from repromulgation relay shall equal the TSDF of the time slots in which the platform could originate or relay (i.e., ½ of the time slots assigned to the originator plus ½ the sum of all the time slots assigned to other originators in which the Terminal could be instructed to relay)

(2) The platform TSDF from TSR transmissions shall equal the TSDF of the TSR time slots in which the platform could transmit (i.e., 22% or 60% of the TSR pool size depending on the specific platform initialization).

(3) The platform TSDF from Machine Controlled Contention shall equal the platform contention access rate over a 12-second frame for that platform.

c. Geographic Area TSDF due to contention equals the sum of II.6c.1, II.6c.2 and II.6c.3.

(1) The geographic area TSDF contribution due to repromulgation relay shall equal the sum of all platform repromulgation relay TSDFs.

(2) The geographic area TSDF contribution from centralized TSR transmissions shall equal the total TSDF of all the centralized TSR pools. The geographic area TSDF contribution from decentralized TSR transmissions shall equal the total TSDF of all the decentralized TSR pools times a factor X. X=1.25 if the number of TSR participants does not exceed the capacity of the reallocation message; X=1.33 otherwise.

(3) The geographic area TSDF contribution due to Machine Controlled Contention shall equal the sum of the platform Machine Controlled Contention TSDFs.

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[4] Further explanation on contention transmissions can be found in SPS-14123/3.

7. TDMA Terminal voice operations are allowed on up to two channels (time slot pools) subject to an overall Geographic Area TSDF calculation that is based on the number of voice nets in use, times the voice pool TSDF, times a use factor which is dependent on the number of users assigned to a particular voice net. The Usage Factor shall be 1 when the number of users equals 1 to 12, 2 when the number of users equals 13 to 20, and 3 when the number of users is greater than 20. In determining platform compliance with the TSDF restrictions of this document, platforms will include each TDMA voice transmission.

8. Surface-based TDMA Terminals shall be located such that Tactical Air Navigation (TACAN), Conventional Distance Measuring Equipment (DME/N) and Precision Distance Measuring Equipment (DME/P) Beacons will be protected from TDMA signals that exceed a peak power level of -33 decibels relative to a milliwatt (dBm) with up to 50 % TSDF at the beacon receiver input. In the event that this signal condition cannot be complied with, 20 % TSDF at up to -24 dBm is allowed, however, these installations must be identified to NTIA. Installations where these required conditions need to be exceeded will be addressed on a case-by-case basis.

9. Surface-based TDMA Terminals shall be located such that Air Traffic Control Radar Beacon System (ATCRBS) Interrogators and Mode Select (Mode S) Sensors will be protected from TDMA signals that exceed a peak power level of -20 dBm at the ATCRBS Interrogator/Mode S Sensor receiver input.

10. The TDMA Terminal peak transmitter power shall not exceed 200 watts + 1 decibel (dB) at the Terminal output for TDMA signals. The Effective Isotropic Radiated Power (EIRP) for each Terminal/platform installation shall be limited to the 200 watts + 1 dB transmitter power for TDMA signals adjusted for the line loss and antenna gain values listed in the applicable Defense Department (DD) Form 1494 or the equivalent NTIA Frequency Allocation documentation.

11. Within the 960 to 1215 MHz band, the Terminal transmitted spectrum about any authorized TDMA carrier frequency shall be unrestricted out to but not including ± 3 MHz. The spectrum shall be down at least 10 dB at ± 3 MHz, down at least 23 dB at ± 5 MHz, down at least 55 dB at ± 13 MHz and down at least 60 dB at and beyond ± 15 MHz from the transmitted peak carrier power of the TDMA signal. The specified ratios shall be measured by comparing the maximum pulse power within 3 MHz of the carrier frequency during a pulse transmission with the signal level centered at the specified offset frequency. These power levels shall be measured in a 300 kiloHertz (kHz) bandwidth segment for a continuous phase shift modulated carrier power signal with random message content modulation. In addition, any TDMA signals emitted from the Terminal between transmitted pulses and during non-transmit intervals shall comply with the guidance and requirements of SPS WG-1 TR 03-001.

12. Out of Band Emission Characteristics - Except the second and third harmonics, for each selected power level, the out-of band harmonics and all other spurious emissions below 920 MHz and above 1266 MHz shall be at least 80 dB down from the level at the fundamental. The second and third harmonics shall be suppressed 50 +10 log p (where p = peak power output in watts, at the fundamental) or 80 dB, whichever requires less suppression.

13. TDMA Terminals operating in the 51carrier frequency-hopping mode shall distribute the spectrum uniformly across the 51 TDMA carrier frequencies. Terminals operating in a mode that uses a reduced hopset will distribute the spectrum uniformly across the applicable subset of TDMA carrier frequencies. When using a reduced hopset, the excluded carriers shall be treated by the TDMA Terminal as out-of-band frequencies for the purposes of determining uniform frequency distribution.

14. Any TDMA Terminal transmissions within ± 7 MHz of either 1030 or 1090 MHz shall be suppressed by at least 60 dB below the peak transmitted power consistent with Paragraph II.11. Monitoring levels of the Terminal EMC Features for these frequency bands shall be at least 60 dB below 200 watts (i.e., -7 dBm per 3 MHz) as specified in SPS WG-1 TR 03-001.

15. The radiated TDMA pulses shall be limited to a width of 6.4 microseconds ± 5 % at the 95 % voltage amplitude (90 % power) level. Ensuring compliance with this pulse width requirement by measuring at a different percent voltage amplitude level will be considered on a case-by-case basis.

16. TDMA Terminal transmissions in adjacent time slots are permitted.

17. TDMA Terminals are approved for operation on an uncoordinated basis for any mobile or stationary platform or site identified within its associated NTIA approved DD Form 1494. Restrictions shall be applied to TDMA Terminal use on airborne platforms that have not demonstrated collocation compatibility in accordance with National Airspace System (NAS) performance requirements and SPS WG-1 TR 03-001. No special standoff distances between airborne platforms and ground ATC systems are required except for stationary/slow-moving airborne TDMA Terminal platforms. Standoff distances for those platforms will be based on ensuring that the specified protection limits for ATC systems are not exceeded (see Paragraphs II.8 and II.9).

18. DoD will certify that ATC functions performed by equipment collocated with TDMA Terminals on airborne platforms meet the NAS performance requirements. Such Certification testing will be accomplished with all systems operating normally and the TDMA Terminal transmitting either at 20 % TSDF or at 50 % TSDF depending on the maximum TSDF that demonstrates compatibility. This data will be made available to FAA and NTIA upon request.

19. Blanking of the Low Level Detector (LLD) EMC Feature is permitted, if required, to ensure the TDMA transmissions are not inhibited due to interference from collocated ATC transmitters. The blanking signal sources are limited to only ATC transmitters operating in the 1030/1090 MHz bands, that is, Identification Friend or Foe (IFF), ATCRBS, Mode S, Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Alert and Collision Avoidance System (TCAS) functions. The duty cycle of this blanking function shall not exceed 6 % in a 12 second frame.[5] TDMA Terminal platforms that require additional blanking will be addressed on a case-by-case basis. TDMA Terminals shall not blank ATC systems in the 1030 MHz and 1090 MHz bands.

20. Except for the EMC Features specifically identified for automatic reset in SPS WG-1 TR-03-001, automatic reset of TDMA waveform transmission inhibits is strictly prohibited. Manual transmission inhibit resets shall be allowed as identified in SPS WG-1 TR-03-001, subject to the following conditions:
    - For single-seat fighter aircraft, at least one action is required for reset
    - For all other terminal platforms, at least two actions are required for reset

III. EMC ACCEPTANCE AND MAINTENANCE TESTING

Each TDMA Terminal configuration shall demonstrate the spectral characteristics, along with the proper functioning of the EMC Features, in accordance with SPS WG-1 TR 03-001.

IV. SITING AND COLLOCATION REQUIREMENTS

Engineering investigations and analyses shall be performed by DoD to properly address the EMC aspects of siting and aircraft platform collocation of TDMA Terminals with ATC equipment. Results of these efforts shall be provided to FAA and NTIA upon request.

[5] Exceptions to the 6 % requirement may be made for EMERGENCY IFF transmission conditions consistent with SPS WG-1 TR 03-001.

V. PROCESS OF IMPLEMENTING DESIGN AND OPERATIONAL DEPLOYMENT CHANGES

Proposed changes or waiver requests of any requirement defined in the SPS WG-1 TR 03-001 or the DoD *Link 16 Electromagnetic Compatibility Features Performance Specification* shall be submitted to NTIA for "approval" prior to funding commitments for implementation and/or any production contract actions (including Low Rate Initial Production (LRIP)). Operations with TDMA Terminals that may have any potential to affect EMC or do not comply with the conditions of this Certification shall not be allowed to use Frequency Assignments that are for Uncoordinated Operations.

VI. HANDLING OF FUTURE SYSTEMS

Continued coordination shall be maintained between DoD, the Federal Aviation Administration (FAA) and NTIA to ensure that potential EMC problems do not develop between TDMA Terminals and ATC systems (includes new, updated and redesigned FAA/DoD Legacy systems). Evaluations and analyses shall be accomplished in accordance with SPS WG-1 TR 03-001.

VII. CERTIFICATION REVIEW

NTIA/FAA/DoD can request a review of this Certification at any time. The continuation of the Certification is dependent upon DoD complying with SPS WG-1 TR 03-001 and the following items.

1. Ensuring compliance with the documented and approved procedures and verifying that the requirements for the EMC of cosited and collocated TDMA Terminals with ATC equipment are not waived.

2. Ensuring that the routine maintenance, calibration, verification and reporting functions of the TDMA Terminal EMC Features and spectral characteristics are properly performed and documented and the information and data are made available and readily accessible to FAA and NTIA upon request.

3. Ensuring that the final SPS WG-1 TDMA Terminal EMC Test Program Reports are properly documented and approved by FAA and NTIA.

4. Ensuring that resources are provided such that necessary evaluations of the terminal and operations with ATC equipment can be performed to show compliance with this Certification.

5. Ensuring NTIA/FAA access to a mutually acceptable de-confliction server.

8.0

LIST OF CONTACTS FOR GUEST FORCES OPERATIONS

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL
AUSTRALIA	Frequency George Wardle	DRFSM (CP1-4-019) Campbell Park Offices Department of Defence Canberra ACT 2600 Australia	61–2–6266–4764 Fax – 61–2–6266–3646	George.Wardle@ties.itu.int
	Operations Lt Col Alan Black		61–2–6265–0544 Fax – 61–2–6265–0517	Spectrum.planners@defence.gov.au
AUSTRIA	Walter Guggi Information Transmission & Spectrum Management J6 Division / Joint C² Staff Federal Ministry of Defense	Rossauer Lände 1 AT-1090 Vienna	43 – 1 – 5200 - 24651 Fax: 43 - 1 - 5200 - 17268 Mobile: 43 – 664 - 622 - 1533	Fgg6.spectrum@bmlv.gv.at

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL

BELGIUM	O/I (1)	Name	Address	Tel	Fax	E-mail
BIPT	I	Gino Ducheyne	Sterrenkundelaan 14 Bus 21 1210 Brussel	+32 2 2268818	+32 2 2268882	gino.ducheyne@bipt.be
COMIXTELEC	I	Herwig De Leersnyder	KKE Permanent Secretariat COMIXTELEC DGMR C & I Everestraat 1 1140 Brussel	+32 2 701 3624	+32 2 701 4815	herwig.deleersnyder@mil.be
Military	**O**	Cosyns J-F **Master Controller (MC) (24/24)**	BE-DLMC CRC Glons Blaarstraat 99 3700 Tongeren	+32 4 2893214 +32 4 2893211/3213	+32 4 2893001 +32 4 2893001	be-dlmc@mil.be
	I	Ralph Briers	HQ COMOPSAIR A3.21 KKE Blok 1 Everestraat 1 1140 Brussel	+32 2 7014085	+32 2 7017266	ralph.briers@mil.be
Directoraat-Generaal Luchtvaart/ FOD Mobiliteit en Vervoer	O	Roland Moineau	CCN Vooruitgangstraat 80 Bus 5 1030 Brussel	+32 2 2063259	+32 2 2063295	r.moineau@vici.fgov.be
	I	Willy De Moerloose (TO BE MODIFIED)	Raketstraat 90 1130 Brussel	+32 2 7240208	+32 2 724 0201	willy.demoerloose@vici.fgov.be
Belgocontrol	O	Technical Watch Operator (24/24)	Belgocontrol Tervuursesteenweg 303 1820 Steenokkerzeel	+32 2 206 9090		twc@belgocontrol.be
	I	Alain Vandenabeele Martial Malchair Johan Van Der Heyden	Belgocontrol Tervuursesteenweg 303 1820 Steenokkerzeel	+32 2 206 90 00 +32 2 206 92 00 +32 2 206 22 65	+32 2 206 90 09 +32 2 206 29 48 +32 2 206 22 01	vda@belgocontrol.be mlc@belgocontrol.be vdh@belgocontrol.be

Shaded area is first contact. (1) O=Operations/I=for Information

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL
CANADA	Mr Ed Kemmis Directorate Telecommunications and Spectrum Engineering and Support (DTSES)	Director Electronics, Communications and Spectrum Services (DTSES 5 – 3) NDHQ Ottawa, Canada KIA OK2	613–992–8744 Fax – 613–991–3961	Kemmis.Ed@ic.gc.ca MSG: NDHQ OTTAWA//DTSES 5–3//
CYPRUS	Dr Stelios Himonas	Ministry of Communications and Works CY–1424 Nicosia Cyprus	357–2–280–0203 Fax – 357–2–277–6254	dirtelecom@mcw.gov.cy
CZECH REPUBLIC	Lt Col Jaroslav Susen Navigation Systems Specialist	Czech Armed Forces Command and Control Division PO Box 69 Vítezué námestí 5 16000 Prague Czech Republic	42-02-2021-7353 Fax 42-02-2021-7377	SusenJ@army.cz
DENMARK	Frequency Management Maj Ole Johansen Send Message to RDFKA HQ Chief of Defense NARFA Denmark	HQ Chief of Defense RDFKA NARFA Denmark PO Box 202 DK 2950 Vebaek, Denmark	45–4567–4426 Fax – 45–4567–4409	is@fko.dk
FRANCE	Capt Bruno Lecinana	CDAOA / CGRLD BA 921 95155 Taverny Cedex France	33–1–3040 – 3607 Fax – 33–1–3417 – 3122	ccoa@worldnet.fr

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL
GERMANY	FAFCISO15/NARFA GE Lt Col Benno Edelmann 1. SHAPE 2. Copy to FAFCISO 15 / NARFA GE	Tomburg Kaserne Munstereifeler Strasse 75 North Rhine Westfalio D – 53359 Rheinbach, Germany	49–2226–88–2150 Fax – 49–2226–88–2510	AFmISBwNARFAGE@bwb.org
GREECE	Lt Col George Vlahakis Hellenic Air Force General Staff Communications Branch (C3/2) TGA 1010 Athens, Greece		30–1–659–3321 IVSN: 448–3321 Fax – 30–1–659–3339	HAFGSc3b@otenet.gr For: Lt Col Vlahakis
	Frequency Dr Dimitriss Boukis	Hellenic National Defense General Staff Communications & Information Systems Directorate Athens, Greece	30–1646–8660 IVSN: 442–0111 Fax – 30–1645–7517	
HUNGARY	Col (ret) József Bajó Director of GFMA/NARFA Hungary	Governmental Frequency Management Agency/NARFA HU BUDAPEST 1885 Hungary	36–1–391–4901 IVSN:925-360-022-22232 or 31501 Fax – 36–1–275–0964	narfa@kfgh.gov.hu
ICELAND	George Stroebel NARFA	Commander Iceland Defense Force PSC 1003 PO Box # 1 FPO AE 09728 – 0301 ATTN: J – 6T	354–425–4313 Fax – 354–425–2862	Msg Address RUCOPKB / COMICEDEFOR KEFLAVIK IC George.Stroebel@

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL
				idfcfk.navy.mil
ITALY	For Frequency Clearance Aspect: Lt Col Renato Salatino	Stato Maggiore Difesa Reparto T.E.I. Agenzia Mi.R.F.A. 00100 Roma	39–06–4691–4056 39–06–4691–6059 fax – 39–06–4691–4188	rreemmaattoo@Aiscaline.it
	For Air OPS Related Aspects: ???	Stato Maggiore Aeronautica 3rd Reparto viale dell Università 4 00185 Roma		
JAPAN	Maj Nobuhito Ide Communication and Electronics Division Frequency Manager	JASDF Air Staff Office C & E Division 5 – 1 ICHIGAYA Honmuro – Cho Shinjuku Ku, Tokyo 162–8804 Japan	81 – 3 – 3268–3111 Ext 60656 Fax – 81–3–3268–3111 Ext 60659	Ide@aso.jasdf.go.jp
LUXEMBOURG	René Laux NARFA	Center de Communications du Government Chateau de Senningen L–6961 Senningen Luxembourg	352–34–478–7137 Fax – 352–34–0080	Rene.Laux@ccg.etat.lu
NETHERLANDS Tactical Air Force	Maj Gert–Jan Wolkers Frequency Manager	Royal Netherlands Air Force HQ Tactical Air Force CIS DIV Radio Systems & Frequency Management Office PO Box 20703 2500 ES The Hague The Netherlands	31–70–339–6214 Fax – 31–70–339–6574	acis@stl.af.disp.mindef.nl [Attn: Wolkers]

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL
NEW ZEALAND	Bruce Emirali	Headquarters New Zealand Defense Force Private Bag 39997 Wellington New Zealand	64 – 4496 – 0189 Fax – 64 – 4496 – 0159	B.EMIRALI@ NZDF.mil.nz Msg Address: HQNZDF//SIC SAA//
NORWAY	Frequency LtCom Waage, Reidar NARFA/J-6	JHQ J_6 Postbox 8080 N-4068 Stavanger NORWAY	47 5134 3683 47 5134 3659 (Fax)	Rewaagw@milo.no
	Operations Maj Jamtli, Stale		47 5134 3712 47 5134 3739 (Fax)	sjamtli@mil.no
POLAND	FMMO/NARFA PL	WBZC ul. Pulawska 4/6 00-909 Warszawa	48 - 22 – 68 - 71488 IVSN: 925 480 7871488 Fax: 48 22 6870246 IVSN: 925 480 7870246	WGZC@wp.mil.pl or m.otreba@wp.mil.pl CRONOS: PL MOD NARFA
PORTUGAL	Operations Lt Col Barbas Fernandes	Portuguese Air Force Comando Operacional da Forca Aerea Monsanto 1500 Lisbon, Portugal	351–2–1778–7111 Ext 3260 or 3205 Fax – 351–2–1778–6056	

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

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	NAME	ADDRESS	PHONE	E–MAIL
SINGAPORE	TBD			
SPAIN	Maj Venancio Ramos	CEAR Carretera N – 320 KM 274 19145 Bellavista Guadalajara Spain	34–949–22–2828 Fax: 34–949–22–3783	
SWEDEN	Lt Col Anders Eklund	Swedish Armed Forces HQ SE – 10785 Stockholm Sweden	46–8788–7889 Fax: 46–8788–7703	Anders.Eklund@HKV.mil.se
SWITZERLAND	Lt Col Peter Egli	Air Force Brigade 31 Military Base CH 8600 Dubendorf Switzerland	41 – 1823 – 2742 Fax – 41 – 1823 – 2552	Peter.Egli@Lw.admin.ch
TURKEY	Col Nuri Turker NARFA	Turkish General Staff CEIS DIV National Radio Frequency Agency 06100 Ankara Turkey	90–312–414–3179 Fax: 90–312–414–0842	NTurker@hvkk.tsk.mil.tr
UNITED KINGDOM	OC DLMC (Officer Commanding Date Link Management Cell)	HQ Joint Force Air Component Data Link Operations Cell JTIDS Co-ordination Office (UK Network Design Facility) RAF High Wycombe Maphill Buckinghamshire HP14 4UE	44-1495-46-1461 via a MOD operator ask for Ext 2567 Fax: 44–1494–56–4473	ukdloc@lineone.net

POINTS OF CONTACT FOR GUEST FORCES OPERATIONS

COUNTRY	POINTS OF CONTACT			
	NAME	ADDRESS	PHONE	E–MAIL
UNITED STATES	Mr Tom Downie	Navy & Marine Corps Spectrum Center Director 2461 Eisenhower Ave Alexandria, VA 22331 – 1408	703–325–2750 Fax – 703–325–2667	Tom.downie@nmsc.navy.mil
	Perry Lemmons		Fax – 703–325–2815	Perry.lemmons@nmsc.navy.mil

9.0

EMC RELATED DOCUMENTS

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
1 *	Band Selection	OT Report 78-138	Assessment of the Bands 225-4990 MHz for Possible JTIDS Application	The report documents the analysis to determine the feasibility of accommodating Joint Tactical Information Distribution System (JTIDS) in the frequency range from 225 Megahertz (MHz) to 4990 MHz. 97 pages
2 *	EMC with all ATC Equipment in the 960 - 1215 MHz Band	OT Report 78-140 (7 Volumes & Executive Summary)	EMC Analysis of JTIDS in the 960 - 1215 MHz Band	The report documents the tests and analyses accomplished to establish the Electromagnetic Compatibility (EMC) of JTIDS transmissions with a number of navigational aids and Air Traffic Control (ATC) equipment in support of the initial JTIDS Frequency Clearance for a 40/20 Time Slot Duty Factor (TSDF). The tests/analyses were accomplished during the mid to late 1970's. 2,100 pages
3 *	EMC with all ATC Equipment in the 960 - 1215 MHz Band	SPS WG-1 TR-87-001	JTIDS 100/50 TSDF Spectrum Supportability Risk Assessment	This report (and supporting documents) documents the tests and analyses performed to establish the EMC of JTIDS transmissions with a number of navigational aids and ATC equipment in support of expanding the uncoordinated operation of JTIDS to a 100/50 TSDF. 92 pages
4 *	Effects of JTIDS Signals on 1030&1090 MHz Avionics	SPS WG-1 AR-85-001	Effects of JTIDS Signals on 1030 and 1090 MHz ATC Avionics	The objective of this report was to establish the potential effect of JTIDS signals on ATCRBS transponders, the Mode S transponder and the TCAS avionics. 63 pages
5	Interrogator effects test for Air Force training scenarios	SPS WG-1 87-10	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, TACAN/DME Interrogator, Air Force 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document represents the measured data indicating the effects of JTIDS signals on a set of specified TACAN/DME interrogators using a simulated Air Force training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 190 pages

***** Public document

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
6	Interrogator effects test for Army training scenarios	SPS WG-1 87-11	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, TACAN/DME Interrogator, Army 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the measured data indicating the effects of JTIDS signals on a set of specified TACAN/DME interrogators using a simulated Army training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 150 pages
7	Interrogator effects test for Navy training scenarios	SPS WG-1 87-12	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, TACAN/DME Interrogator, Navy 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the measured data indicating the effects of JTIDS signals on a set of specified TACAN/DME interrogators using a simulated Navy training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 75 pages
8	Interrogator effects test for Joint Air Force, Army and Navy training scenarios	SPS WG-1 87-13	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, TACAN/DME Interrogator, Joint 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment as part of an effort to determine the risk associated with proceeding into production of JTIDS Class 2 terminals prior to receiving expanded frequency support. This document presents the measured data indicating the effects of JTIDS signals on a set of specified TACAN/DME interrogators using a simulated Joint training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 77 pages

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
9	Interrogator effects test for Air Force training scenarios	SPS WG-1 87-14	JTIDS Spectrum Supportability, Risk Assessment Operational Analysis, TACAN/DME Interrogator, Air Force 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granted of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on a specified set of TACAN/DME interrogators in a simulated Air Force training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 270 pages
10	Interrogator effects test for Army training scenarios	SPS WG-1 87-15	JTIDS Spectrum Supportability, Risk Assessment Operational Analysis, TACAN/DME Interrogator, Army 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on a specified set of TACAN/DME interrogators in a simulated Army training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 370 pages
11	Interrogator effects test for Navy training scenarios	SPS WG-1 87-16	JTIDS Spectrum Supportability, Risk Assessment Operational Analysis, TACAN/DME Interrogator, Navy 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on a specified set of TACAN/DME interrogators in a simulated Navy training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 207 pages

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
12	Interrogator effects test for Joint Air Force, Army and Navy training scenarios	SPS WG-1 87-17	JTIDS Spectrum Supportability, Risk Assessment Operational Analysis, TACAN/DME Interrogator, Joint 100/50 TSDF Tests	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on a specified set of TACAN/DME interrogators in a simulated Joint training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 252 pages
13	Second Generation VORTAC	SPS WG-1 87-18	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, Second Generation VORTAC Beacon	A test program was conducted to determine the effects of JTIDS signals on ATC equipment as part of an effort to determine the risk associated with proceeding into production of JTIDS Class 2 terminals prior to receiving expanded frequency support. This document presents the measured data indicating the effects of JTIDS signals on the Second Generation VORTAC (SGV) beacon. 388 pages
14	Cardion Beacon	SPS WG-1 87-19	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, Cardion DME Beacon	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the measured data indicating the effects of JTIDS signals on the Cardion DME beacon. 810 pages
15	Second Generation VORTAC	SPS WG-1 87-20	JTIDS Spectrum Supportability, Risk Assessment Operational Analysis, Second Generation VORTAC Beacon	A test program was conducted to determine the effects of JTIDS signals on ATC equipment as part of an effort to determine the risk associated with proceeding into production of JTIDS Class2 terminals prior to receiving expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on a Second Generation VORTAC (SGV) beacon. 57 pages

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
16	Cardion Beacon	SPS WG-1 87-21	JTIDS Spectrum Supportability, Risk Assessment Operational Analysis, Cardion DME Beacon	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on a Cardion DME beacon. 69 pages
17	ATCRBS	SPS WG-1 87-22	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, Effects of JTIDS Signals on the ATCRBS Interrogator Receiver System	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on an ATCRBS interrogator/processor system. 307 pages
18	ATCRBS and Mode S	SPS WG-1 87-23	Test and Analysis Results of the Effects of JTIDS Signals on ATCRBS and Mode S Transponders	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on ATCRBS and Mode S transponders. 85 pages
19	Mode S Interrogator	SPS WG-1 87-25	Analysis of the Effects of JTIDS Signals on the Mode S Interrogator	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the results of an analysis of the effects of JTIDS signals on the Mode S sensor. 50 pages

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
20	Snapshot Variations	SPS WG-1 87-26	JTIDS Spectrum Supportability, Risk Assessment Measured Data Packet, TACAN/DME Interrogator Snapshot Variations	A test program was conducted to determine the effects of JTIDS signals on ATC equipment and to support a risk assessment associated with the granting of expanded frequency support. This document presents the measured data indicating the variability of the effects of JTIDS signals on a specified set of TACAN/DME interrogations for parametric variations of a simulated Air Force training environment with JTIDS terminals operating at a time slot duty factor (TSDF) of 100/50. 161 pages
21	JTIDS EMC Features Guidelines	SPS WG-l TR-91-001 Revision A	JTIDS EMC Features Guidelines (and Addendums)	This document provides guidelines for the design of the future JTIDS terminals to assure that Time Division Multiple Access (TDMA) transmissions will be EMC with civil and military radio navigation equipment in the 960 to 1215 MHz band. 29 pages
22	Class 2 Terminal EMC Feature Demonstrations	SPS WG-1 90-16	EMC Features Demonstration Report for JTIDS Class 2 Follow-On Terminal	This report documents the JTIDS Class 2 Follow-On terminal EMC features demonstration to ensure compliance with those controls restricting terminal emissions. 170 pages
23	Class 2H Terminal EMC Feature Demonstrations	SPS WG-1 92-02	EMC Features Demonstration Report for the Class 2H TDMA Terminal	This report documents the JTIDS Class 2H TDMA terminal EMC features demonstration to ensure compliance with those controls restricting terminal emissions. 385 Pages
24 *	EMC with Mode S Sensor	SPS WG-l TR-98-002	MIDS / JTIDS Spectrum Supportability Documentation Mode S Sensor System	This report documents the tests and analyses performed to establish the EMC of JTIDS transmissions with the Mode S Sensors in support of expanding the uncoordinated operation of JTIDS to a 100/50 TSDF. 130 pages

***** Public document

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
25 *	EMC with ATCRBS Interrogators	SPS WG-1 TR-92-001	Effects of JTIDS on the ATCRBS Interrogator Receiver System	This report documents the tests and analyses performed to establish the EMC of JTIDS transmissions with the Air Traffic Control Radar Beacon System (ATCRBS) interrogator receiver in support of expanding the uncoordinated operation of JTIDS to a 100/50 TSDF. 115 pages
26 *	EMC with DME/P Beacons	SPS WG-1 TR-98-001	JTIDS DME/P Beacon EMC Test Report	This report contains an appraisal of the available data and information for DME/P beacons in support of expanding the uncoordinated operations of JTIDS to a 100/50 TSDF. 100 Pages
27	Spectrum Users Guide	N/A	JTIDS / MIDS Spectrum Users Guide	The purpose of this guide is to provide the United States (US) JTIDS users with a single document that details the current procedures for planning and conducting operations. Specifically, this document provides guidance to US JTIDS operators which leads them through the procedures involved when obtaining permission to operate. Understanding the procedures ensures users are aware of applicable JTIDS restrictions and coordination requirements prior to beginning operations. 50 Pages
28 *	EMC with ATCRBS Interrogators – Appendix E (Parts 1 & 2)	SPS WG-1 TR-92-001	Effects of JTIDS on the ATCRBS Interrogator Receiver System, Appendix E (Parts 1 & 2)	This report documents the tests and analyses performed to establish the EMC of JTIDS transmissions with the Air Traffic Control Radar Beacon System (ATCRBS) interrogator receiver in support of expanding the uncoordinated operation of JTIDS to a 100/50 TSDF. 595 Pages

***** Public document

List of Available EMC Related Documentation

#	Report Subject	Control Number	Report Title	Comments
29	Class 2M EMC Features Demonstration	SPS WG-1 93-01	EMC Features Demonstration Report for the Class 2M Terminal	This document provides the results of the tests conducted in conformance with the configuration and procedures to demonstrate the Class 2M Terminal's EMC features implementation to the EMC Features Subworking Group. 330 pages
30	Class 2/2H/2M 100/50 and 100/20 EMC Features Demonstration	SPS WG-1 94-02	EMC Features Demonstration Report for the Terminal Operation Changes to Support the 100/50 and 100/20 Full Protection EMC Features of the JTIDS Class 2, 2H and 2M TDMA Terminals to the EF SWG	This document provides the results of the tests conducted to demonstrate the Class 2, 2H, and 2M Terminal's EMC features implementation to the EMC Features Subworking Group. 75 pages
31 *	EMC with TACAN/DME Beacons	SPS WG-1 TR-96-001	JTIDS Spectrum Supportability Documentation, TACAN/DME, Beacons	This report contains an appraisal of the available data and information for Tactical Air Navigation / Distance Measuring Equipment (TACAN/DME) beacons in support of expanding the uncoordinated operations of JTIDS to a 100/50 TSDF. 155 pages
32 *	EMC with TCAS	SPS WG-1 89-03	Analysis of JTIDS EMC with TCAS Receivers	This report updates the analyses performed to establish the EMC of JTIDS transmissions with the Traffic Alert and Collision Avoidance systems (TCAS) revised and updated receiver information. 30 pages

***** Public document

List of Available EMC Related Documentation

SWEDISH EMC TEST DATA

Report Subject:	Coexistence with GSM 900 MHz Base station
Control Number:	FMV 33200:42112/00 (AerotechTelub KF/00:524)
Report Title:	Samexistens mellan GSM 900 basstation och MR90
Comments:	This report documents an interference resistance measurements between a GSM900 base station (BTS), a GSM900 mobile station (MS) and a Swedish Air force ground based terminal (MR90). The MR90 uses the JTIDS/MIDS signal-in-space characteristics. The purpose of the measurement was to measure and compute the separation distance in order to avoid interference in the communication within the GSM900 system. Approx 20 pages.
Releasable:	Unclassified and releasable through Swedish HOD or FMV on a case by case basis
Language:	Original report in Swedish, but English translation available (AerotechTelub E017-TR-2001036).

We also have the EMC Features Test report for the Ra90 system that could be of interest for the reference list.

Report Subject:	Ra90 EMC Features Demonstration
Control Number:	FMV 33200:10221/03 (Rockwell Collins CPN 963-0696-001, Rev D)
Report Title:	EMC Features Demonstration Final Test Report for the Ra90 Communication System
Comments:	This report documents the Ra90 TDMA terminal EMC features demonstration to ensure compliance with those controls restricting terminal emissions. 376 pages.
Releasable:	Unclassified and releasable through Swedish HOD or FMV on a case by case basis. US export restrictions may apply.
Language:	In English only.

10.0

GLOSSARY

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ACAS – Airborne Collision Avoidance System. See definition for TCAS.

Area of Operations – See Geographic area of JTIDS / MIDS Operations.

ARTS – Automated Radar Terminal System. The portion of the ATCRBS interrogator receiver system that is responsible for generating target reports and target tracks. It receives quantized video and mode triggers from the interrogator receiver and provides target report and tracking information to the display software.

ASIT – Adaptable Surface Interface Terminal. A terrestrial military command and control element which includes a JTIDS Class 1 terminal.

ASOP – Acquisition Stable Operating Point. The weakest beacon signal level that an interrogator can acquire within a specified time limit (usually five seconds), five out of five consecutive trials with the identification (ID) Tone Off and then can remain in track for 60 seconds with the ID Tone On.

ATCRBS – Air Traffic Control Radar Beacon System. An ATC system consisting of ground-based interrogators and airborne transponders. The interrogator can transmit in several different modes to obtain aircraft identification and/or pressure altitude responses. The ground interrogator then receives and decodes the transponder replies. All ATCRBS interrogators transmit on 1030 MHz and receive on 1090 MHz. All ATCRBS transponders transmit on 1090 MHz and receive on 1030 MHz.

ATC System – Air Traffic Control System. The national system that is used to provide information to aircraft and to air traffic controllers to enable them to provide safe separation distances between aircraft that are en route or within the terminal areas.

Background Level – JTIDS / MIDS signal levels that are weaker than the Foreground signal level when received at the ATC receiver during a JTIDS / MIDS operation.

BRE – Beacon Reply Efficiency. The percentage ratio of the number of replies transmitted by a beacon transponder over the number of valid interrogations to that beacon.

Breaklock Point – The strongest beacon signal level at which an interrogator will not track a beacon signal for 60 seconds with the ID Tone On.

CAOC – The Combined Air Operations Center (CAOC) is the NATO MultiNational organization where the Air Commander resides. Within the CAOC is the SubRegional Data Link Management Cell (DLMC) which is responsible for the day - to - day management and deconfliction of data link operations.

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Class 1 Terminal – A JTIDS terminal developed for use in large airborne and surface command and control elements. The Class 1 terminal uses IJMS and has a nominal output power of 200 watts or 1000 watts.

Class 2 Terminal – A JTIDS terminal developed for use in fighter aircraft and small mobile command and control elements. The Class 2 terminal uses TADIL J and has a nominal output power of 200 watts. Some Class 2 terminals will also have the capability to use IJMS.

Class 2H Terminal – A JTIDS Class 2 terminal equipped with a High Power Amplifier Group (HPAG) for use in large airborne and surface command and control elements. The Class 2H terminal uses TADIL J and has a nominal output power of 200 watts or 1000 watts. Some Class 2H terminals will also have the capability to use IJMS.

Class 2M Terminal – A JTIDS terminal developed for Army ground mobile applications. The Class 2M is a single LRU version of the Class 2 terminal without TACAN or voice capability. The Class 2M terminal uses IJMS and TADIL J and has a nominal output power of 42 watts or 200 watts.

CMN – Control Motion Noise. That portion of a DME/P equipment error which could affect aircraft attitude angles and cause control wheel and column motion during coupled flight, but which does not cause aircraft displacement from the desired flight path.

Contention – A term used to denote multiple JTIDS / MIDS transmissions that use the same frequency hopping pattern in the same time slot.

Contention Access – A JTIDS / MIDS transmit access mode in which a group of JTIDS / MIDS users is assigned a pool of time slots to satisfy their transmission requirements. Time is divided into access intervals (e.g., once every 3 seconds). A user may transmit only once per access interval. Users randomly select their transmit time slots from the pool.

Coordinated Operation – A military operation using JTIDS / MIDS equipment that is subject to prior coordination with National Regulatory Agencies because one or more aspects of the National JTIDS / MIDS Frequency Clearance / Certification of spectrum support must be exceeded to satisfy operational requirements.

Cull Criteria – A conservative value or threshold used to determine if test results indicate little or no effect on the performance of the unit. If the cull criteria is exceeded, additional testing is often needed to accurately quantify the effect.

Dedicated Access – A JTIDS / MIDS transmit access mode in which each JTIDS / MIDS terminal is assigned time slots for its exclusive use in a given net. This mode is used to specify no more than one terminal transmission per time slot per net.

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Dedicated Time Slot Reuse – Two or more JTIDS / MIDS units initialized for dedicated access to a common pool of time slots.

Defruiter – A portion of the ATCRBS/IFF/SSR interrogator system that is used to filter out reply signals which are not synchronous to the transmissions of the interrogator.

DFR – Data For Record. All EMC data, as determined by the SPS WG – l Test Planning Subworking Group (TP SWG), that are used to evaluate the performance of ATC systems operating in National environments that may include JTIDS / MIDS signals.

DME – Distance Measuring Equipment. An ATC system operating in the 960 – 1215 MHz band. DME is the internationally accepted means of determining the slant range between an aircraft and a known ground station.

DME/N – Designation for the conventional (narrowband) DME system. This designation is used to distinguish it from the precision DME system.

DME/P – Precision Distance Measuring Equipment. This system provides a higher accuracy range measurement through the use of a wider bandwidth and a faster rise time signal. The system is to be used with the Microwave Landing System (MLS).

EMC – ElectroMagnetic Compatibility. The condition which prevails when equipment is performing its individually designed function in a common electromagnetic environment without causing or suffering unacceptable degradation due to unintentional electromagnetic interference.

EMC Features – The hardware and software controls in a JTIDS / MIDS Terminal that are used to detect Terminal faults which affect the JTIDS / MIDS time/frequency waveform. Software operational controls may also be used to lockout Terminal capabilities and control pulse transmission limits to ensure compliance with the Frequency Clearance / Certification. Also called IPF or EPF.

EMC Maintenance Testing – EMC testing of ATC equipment to assure that JTIDS / MIDS continues to be compatible with future ATC systems.

Enhanced Repromulgation Relay – A JTIDS / MIDS relay technique identical to repromulgation relay except that an additional time delay is used on subsequent retransmissions. Use of the additional time delay enables the originating Terminal to donate fewer (compared to repromulgation relay) assigned time slots for retransmission of the message thus increasing the message throughput from the originating Terminal.

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EPE – Extraneous Pulse Environment. The undesired background environment at an ATC receiver. The EPE represents all undesired signals seen by the ATC receiver except JTIDS / MIDS signals. The TACAN/DME EPE consists of On–channel Off–code and adjacent–channel On-code DME/N and DME/P type pulses and ATCRBS pulses.

EPF – EMC Protection Feature. An alternate term for EMC Feature.

Epoch – A 12.8 minute interval consisting of 98,304 time slots.

Equivalent TSDF – The pulse transmission rate that is equivalent to the same number of pulses that would be transmitted if each time slot contained 258 pulses. The equivalent TSDF of 100/50 is 33,024 pulses per second for the JTIDS / MIDS community and 16,512 pulses per second for a single Terminal when averaged over a 12 second frame. The term "Equivalent TSDF" should be used whenever operations include 444 pulse time slots or multiple transmissions in a time slot.

FDR – Frequency Dependent Rejection. The rejection provided by a receiver because of the bandwidth difference between the receiver and received signal and by the tuned frequency of the receiver with respect to the received signal.

Foreground Level – The highest TSDF and/or the strongest received JTIDS / MIDS signal level at an ATC receiver during a JTIDS / MIDS operation.

Frame – A 12 second subdivision of an epoch. The frame is the basis for the calculation of TSDF. A frame contains 1536 time slots.

Frequency Allocation – An entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more radio communications services.

Frequency Assignment – An authorization given by the responsible administration for a transmitter (radio station) to use radio frequencies or frequency channels under specified conditions.

Frequency Clearance – Governs the use of frequencies or radio frequency channels for a radio system to operate and provide a specified class of service.

Fruit – False replies that are uncorrelated in time are extraneous pulses detected by an ATCRBS/IFF/SSR interrogator or Mode S sensor receiver. This term is sometimes used interchangeably with the term TACAN/DME extraneous pulse environment.

General Exercise – A military exercise that exceeds the criteria for a routine training operation. The JTIDS / MIDS TSDF of a General Exercise is approximately 200/50.

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Geographic Area – See Geographic area of JTIDS / MIDS Operations.

Geographic Area Application – When the geographic area of JTIDS / MIDS operations cylinder is constructed around each JTIDS / MIDS terminal, the TSDF shall be consistent with and not exceed the Frequency Clearance / Spectrum Support Certification Limits

Geographic Area of JTIDS / MIDS Operations – A cylinder with no altitude limit and a specified radius covering the total territory and airspace around a JTIDS / MIDS terminal on the surface of the earth or airborne.

Guest Forces – Military forces, land, sea or air, that are invited / authorized to operate in another country's territory or airspace controlled by that country for the purpose of assistance or for Joint / NATO / International exercises / operations.

Harmful Interference – Interference which endangers the functioning of a radio navigation service or other safety service or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with International Telecommunications Union (ITU) regulations.

IFF – Identification Friend or Foe. A military identification system which operates in the Civil / SSR band (1030/1090 MHz). This system also has a secure mode of operation (Mode 4) which is subject to a special Frequency Clearance.

IJMS – Interim JTIDS Message Specification. A message format developed for use in the JTIDS Class 1 terminal that utilizes the standard single or double pulse structure.

Individual Nets – The exclusive use of time slot blocks by JTIDS/MIDS users on separate Nets which are part of the same Network.

Initial Net Entry Process – Initial Net entry is the process through which the terminal achieves coarse synchronization with the network time. Coarse synchronization is normally achieved through successful reception of the TADIL J Initial Entry Message or the IJMS Net Entry Message. The Network Time Reference (NTR) will automatically transmit the Initial Entry Message. Any terminal may be initialized to transmit the Initial Entry Message to facilitate Network Entry for terminals that are not within Line of Sight (LOS) of the NTR. A Class 1 terminal equipped NTR must be specifically initialized to transmit the Net Entry Message.

Initial Net Entry Time Slot – A specific time slot that is used for the Network synchronization process that all terminals are inherently capable of receiving. Each terminal must be specifically initialized to transmit in this specific Net entry time slot.

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IPF – Interference Protection Features. An alternate term for EMC Features.

IRAC – Interdepartment Radio Advisory Committee. A forum represented by US government agencies and departments which assists the National Telecommunications and Information Administration's Office of Spectrum Management in discharging its responsibilities pertaining to the use of the electromagnetic spectrum.

JTIDS – Joint Tactical Information Distribution System. An advanced radio system which provides information distribution, position location and identification capabilities in an integrated form for application to military tactical operations. The system is designed to distribute information at high rates, encrypted in such a way as to provide secure, jam resistant and reliable communications in a hostile electromagnetic environment.

JTIDS / MIDS Net – One of the 128 unique pseudorandom sequences used to determine the time, phase and frequency parameters for JTIDS / MIDS transmissions.

JTIDS / MIDS Pulse – A 6.4 microsecond wide burst of energy at a carrier frequency. The carrier is Continuous Phase Shift Modulated (CPSM) by a 32 chip binary pseudorandom sequence at a 5 megabit per second rate. The 32 chip sequence represents a 5 bit data symbol. The pulse also contains 5 additional chips in the leading edge and trailing edge for control of soft turn – On and turn – Off. The interpulse period for JTIDS / MIDS pulses is 6.6 microseconds.

Link 16 – A formal message standard that was developed for NATO JTIDS / MIDS operations. It is essentially the same as TADIL J.

LRU – Line Replaceable Unit. A subassembly of a JTIDS / MIDS Terminal that can be removed and replaced at the JTIDS / MIDS platform.

Mechanisms Test – A technique used to determine why a receiver does or does not respond to a specific type of signal. A specific type of test that is used to determine how JTIDS / MIDS signals affect an ATC receiver.

Message Structure – The organization of JTIDS / MIDS pulses within a time slot to provide for different information capacities and performance levels. The Class 1 Terminal can transmit 72, 129 or 258 JTIDS pulses in a time slot. The JTIDS Class 2 Terminal family and the MIDS Low Volume Terminal Family can transmit 72, 258 or 444 JTIDS / MIDS pulses in a time slot.

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MIDS – Multifunctional Information Distribution System. An advanced information distribution system, using the JTIDS waveform, that provides navigation, communication and identification capabilities in an integrated form for application in air, land and maritime tactical operations. STANAG 4175 defines the minimum electric and physical system characteristics required for interoperability, electronic countermeasures resistance, security and electromagnetic compatibility. STANAG 5516 defines the message standards for use in the Terminals.

MIDS Low Volume Terminal – A small military terminal, using the JTIDS waveform, that is being developed for applications with severe space constraints. The MIDS Low Volume Terminal (LVT) meets STANAG 4175 and STANAG 5516 requirements, may use IJMS and Link 16 messages and has a nominal output power of either 1 watt, 25 watts or 200 watts. An external amplifier, to produce a 1000 watt output, can be connected to the MIDS LVT.

Mode S – Mode Select. A surveillance and communication system for air traffic control. Mode S is an ATCRBS system employing ground–based sensors (interrogators) and airborne transponders. Each Mode S equipped aircraft is assigned a unique address code. The ground-based sensors are able to solicit replies from selected aircraft in the environment thus reducing the amount of pulses being generated.

MOPS – Minimum Operational Performance Standards. Documents written by the Radio Technical Commission for Aeronautics (RTCA) and the European Organization for Civil Aviation Equipment (EUROCAE) that recommend system characteristics to assure satisfactory equipment performance under all normally encountered conditions. For example, RTCA/DO-151A and DO-189 are two documents written for airborne DMEs. The RTCA MOPS are normally coordinated with the appropriate EUROCAE Working Group.

MTL – Minimum Triggering Level. The weakest ATCRBS/IFF/SSR interrogator signal level to which an ATCRBS/IFF/SSR transponder will reply 90 percent of the time.

MTPA – Mobile Transponder Performance Analyzer. A test set used by the Federal Aviation Administration (FAA) to evaluate the performance of ATCRBS and Mode S transponders.

MultiNet (Multiple Nets) – A term used to denote multiple JTIDS / MIDS transmissions in a time slot within the same Operations Area each transmission using a different frequency hopping pattern.

Needline – An information distribution link that must have direct (Terminal to Terminal) or indirect (Terminal to relay to Terminal) connectivity.

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Net – A time division structure consisting of a single continuous sequence of time slots with a unique pseudorandom frequency hopping pattern. Any one of the unique pseudorandom frequency hopping patterns that may be generated by a JTIDS / MIDS terminal as a complex function of several elements which include Net number, cryptovariable and time. JTIDS / MIDS terminals that employ all of the same elements on a time slot by time slot basis are participants on the same JTIDS / MIDS Net.

Network – A community of JTIDS / MIDS users synchronized to a common network time reference to exchange information.

Network Management – The process used to select appropriate Terminal parameters for member Terminals, assign time slots to provide for the transmission and reception requirements of each Terminal, and to assure that all Terminals are initialized in a compatible manner so that a JTIDS / MIDS communication network is established and maintained within the National Frequency Clearance authorization limits.

Network Participation Group (NPG) – The organization of functional message categories that are associated with a Participation Group number. The NPG is functionally oriented and based on the kind of data (message type) required.

NGIFF – Next Generation Identification Friend or Foe. See definition for IFF.

NIB – NonInterference Basis. A radio system that is authorized to be operated on a noninterference basis shall not cause harmful interference to or claim protection from other radio services to which the frequency band is allocated.

Nominal – The typical value measured over a sample size. The measured value may be at variance with the specified value. In general, the measured value will approximate but will not necessarily be identical to the specified value.

OFR – Off Frequency Rejection. The rejection provided by a receiver due to the difference in the tuned frequency of the receiver with respect to the frequency of the received signal.

OTR – On Tune Rejection. The rejection provided by the receiver selectivity characteristics with respect to a received On–frequency signal.

Output Power – The peak power measured at the terminal output port.

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Pack 2 Double Pulse Message – A JTIDS / MIDS message structure comprised of 444 pulses. This message structure contains the same amount of information as the Pack 2 single pulse message, but information transfer reliability is enhanced by retransmitting each bit of information on the adjacent pulse.

Pack 2 Single Pulse Message – A standard message structure comprised of 258 pulses. This message structure transmits twice as much information as the standard double pulse message because each bit of information is transmitted only once.

Pack 4 Single Pulse Message – A message structure comprised of 444 pulses. This message structure holds twice as much information as the Pack 2 double pulse message and four times as much as the standard double pulse message because each bit of information is transmitted only once.

Paired Slot Relay – Retransmission of a message in a time slot block of the same size as the block of time slots designated for receiving the message to be relayed.

Parametric Testing – A test method in which JTIDS / MIDS parameters such as the percentage of multinet and / or contention transmissions are varied to assess their effect on ATC equipment.

PFE – Path Following Error. That portion of the DME/P system error which could cause aircraft displacement from the desired flight path.

Precoordinated Operation – A military operation that remains within the JTIDS / MIDS Frequency Clearance / Spectrum Certification Limits so that additional coordination with regulatory agencies is not required. Coordination of JTIDS / MIDS operations within the Department / Ministry of Defense will ensure that the Clearance Limitations are not exceeded. (Also referred to as an uncoordinated operation.)

PTTA – Principal Time To Acquire. The weakest TACAN/DME beacon signal level at which an interrogator can consistently acquire lock within 120 seconds.

Pulse Density – See TSDF and Equivalent TSDF definitions.

Recurrence Rate – A parameter that indicates the total number of time slots per epoch in a single block assignment of periodically spaced time slots. This is specified as an integer R, where 2^R is the number of assigned time slots per epoch in the block. The interval between time slots is $3 \times 2^{15-R}$.

Relay – Retransmission of a message at a fixed number of time slots after its initial reception.

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Repromulgation Relay – A JTIDS relay technique which includes random jitter and is used to extend information transfer beyond line–of–sight distances. A Terminal receiving a repromulgation relay message retransmits it in a later time slot donated by the originating Terminal, unless the Terminal received the identical message earlier or unless the specified number of retransmissions has been satisfied.

Routine Training – A precoordinated JTIDS / MIDS training operation that is conducted on a daily basis. The TSDF of routine operations and training remains within the National Frequency Clearance.

RTBG – Retriggerable Blanking Gate. A circuit in a TACAN beacon designed to prevent the generation of replies to multipath signals that develop from airborne interrogations. The RTBG circuit is activated when a valid interrogation signal level exceeds the established threshold (e.g., -70 dBm). During the time that the RTBG circuit is activated, an interrogation can be decoded only if it exceeds the threshold value. This interrogation would "retrigger" the RTBG circuit.

RTT Message – Round Trip Timing Message. Messages required for Terminal synchronization. An RTT message is either an interrogation which requests time–of–arrival information or a reply. RTT interrogations and replies each contain 72 pulses. A reply message is transmitted in the same time slot as the requesting interrogation.

RTT–A – Round Trip Timing Addressed Mode. Supports active fine synchronization of all JTIDS / MIDS users in the Network through addressed round trip timing interrogations.

RTT–B – Round Trip Timing Broadcast Mode. Supports active fine synchronization of all JTIDS / MIDS users in the Network through broadcast round trip timing interrogations.

Scenario – A representative use of military equipment in a training operation or a simulated wartime exercise.

Snapshot – The 60 second time period taken from an operational scenario which causes the highest pulse density to be detected by an ATC receiver.

Special Exercise – A military operation that exceeds the criteria for a General Exercise. The JTIDS / MIDS TSDF of a special operation and training exercise is approximately 400/50.

Spectrum Support Certification – The Certification by the National Regulatory Administrations that a given type of electronic equipment can be operated in a given frequency band to provide a specified class of service. (Synonymous with Frequency Clearance.)

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SPS WG – 1 – Spectrum Planning Subcommittee Working Group One. A working group of the United States Spectrum Planning Subcommittee (SPS) which the National Telecommunications and Information Administration (NTIA) established to evaluate all systems that operate in the 960 – 1215 MHz band. NTIA reviews federal systems for frequency supportability and electromagnetic compatibility.

Squitter (TACAN/DME Pulse Pairs) – In addition to reply pulse pairs generated in response to interrogations, the TACAN/DME beacon generates random pulse pairs, referred to as squitter, in order to maintain a total minimum pulse pair count. The squitter rate is adjusted in order to maintain a nominal minimum beacon operational transmission rate of 2700 pulse pairs per second (ppps) for TACAN beacons and 1000 ppps for DME beacons.

SSR – Secondary Surveillance Radar. See definition for ATCRBS.

SSTF – Software Support and Training Facility.

Stacked Nets – A function of multinet, coordinating the simultaneous use of time slot blocks by a specific Participation Group operating on different Nets within a Network. (This is a special terminology used by operators to denote a specific application of Multinet.)

Standard Double Pulse Message – A message structure comprised of 258 pulses. Information transfer reliability is enhanced by transmitting each bit of information on two consecutive pulses.

Standard Single Pulse Message – A message structure comprised of 129 pulses. Each bit of information is only transmitted on one pulse. This message structure is only used in the JTIDS Class 1 Terminal.

STC – Sensitivity Time Control. A circuit in an ATCRBS/IFF/SSR interrogator receiver that can gradually increase the gain of the receiver after an interrogation. This circuit prevents receiver saturation from close–in targets.

Symbol packet – A single element containing either one (single pulse symbol packet) or two (double pulse symbol packet) 6.4 microsecond pulses. The single pulse packet (13 microseconds) consists of a 6.4 microsecond pulse followed by a 6.6 microsecond interval of Off time. The double pulse packet (26 microseconds) consists of two 6.4 microsecond pulses, each followed by 6.6 microsecond intervals of Off time.

TACAN – Tactical Air Navigation. A worldwide navigation system that incorporates the standard international DME function with a bearing determination capability on a single RF carrier in the 960 – 1215 MHz band.

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TADIL J – JTIDS / MIDS Tactical Digital Information Link. A formal message standard that was developed for multiService JTIDS / MIDS operations.

TCAS – Traffic Alert and Collision Avoidance System. TCAS airborne equipment interrogates ATCRBS/Mode S transponder equipped aircraft in its vicinity to determine which aircraft represent potential collision threats and provides appropriate display indications (or advisories) to the flight crew to ensure aircraft separation. TCAS units transmit interrogations on 1030 MHz and receive replies on 1090 MHz. The European version of this system is called ACAS.

Time Slot – A 7.8125 millisecond time interval during which JTIDS / MIDS messages may be transmitted or received.

Time Slot Block – A collection of time slots spaced uniformly in time. A block is defined by an indexing time slot number (0 to 32,767), a time slot set (A, B or C), and a recurrence rate (0 to 15).

Time Slot Reuse – See the definitions of multinet and contention.

TSDF – Time Slot Duty Factor. A two term parameter that specifies the number of pulse transmissions allowed for a community of JTIDS / MIDS Terminals during each 12 second frame. The first term is a percentage indicator of the number of transmissions allowed for the total community. The second percentage term indicates the limit for a single Terminal. The 100/50 TSDF notation specifies that the total community is limited to a pulse density of 396,288 (258 x 1536) transmitted JTIDS / MIDS pulses in a 12 second frame and a single Terminal is limited to 198,144 (50 percent x 396,288). The TSDF is always stated in terms of a standard time slot containing 258 pulses. Therefore, the total number of pulses can be derived for a 100/50 TSDF by considering the 100 percent for the total community as:

$$100\%\ TSDF = \frac{258\ pulses}{time\ slot} x \frac{128\ time\ slots}{second} x \frac{12\ seconds}{frame} = 396{,}288\ pulses\ /\ frame$$

Using this total, the maximum percentage of time slots that is available to the JTIDS / MIDS community for a 100/50 TSDF if all Terminals are programmed for Pack 4 single pulse messages can be derived by:

$$Pack\ 4\ time\ slot\ limitation = \frac{396{,}288\ pulses\ /\ frame}{\frac{444\ pulses}{time\ slot} x \frac{128\ time\ slots}{second} x \frac{12\ seconds}{frame}} = 58\%\ TSDF$$

Also known as Equivalent TSDF.

Multinational Working Group
Glossary Of Terms And Definitions

TSO – Technical Standard Order. An FAA document which states the general requirements and minimum performance standards needed for all parts and equipment used on civil aircraft. For example, TSO – C66a and TSO – C66b are two standards written specifically for airborne DME/N units.

TSR – Time Slot Reallocation. This is an access mode in which users share a predefined pool of time slots that are allocated to them dynamically, according to their current demands. The TSR protocol attempts to assure that users have dedicated access to their allocated time slots. After the network is designed and the pool of TSR time slots is determined, entry to and exit from the TSR community is automatic.

TTA – Time To Acquire. The time (up to 120 seconds) required for a TACAN/DME interrogator to acquire a beacon signal at a particular desired signal level with the ID Tone Off. Breaklock data is taken with the ID Tone On during the TTA test.

Uncoordinated Operation – See Precoordinated operation definition.

11.0

MASTER ACRONYM LIST

Multinational Working Group
Master Acronyms

$	Dollars
%	Percent
°C	degrees Celsius
µs	microseconds
A/A	Air - to - Air
AAG	Aeronautical Assignments Group
AAMD	Army Air and Mobile Defense
AAR	Air to Air Refueling
AB	Air Base
ABCCC	Airborne Battlefield Command and Control Center
ABL	Airborne Laser
ACAS	Aircraft Collision Avoidance System
ACC	Air Combat Command
ACCS	Air Command and Control System
ACE	Allied Command Europe
ADatP	Allied Data Publication
ADatP-16	Allied Data Publications for Link 16
ADCP	Air Defense Communications Platform
ADD	Airborne Derived Data
ADF	Australian Defence Force
ADIZ	Air Defense Identification Zone
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance Broadcast
ADSIA	Allied Data Systems Interoperability Agency
AEW	Airborne Early Warning
AF	Air Force
AF FMA	Air Force Frequency Management Agency
AFAPD	Air Force Application Program Development
AFB	Air Force Base
AFCS	Air Force Communications Service
AFMO	Area Frequency Management Office
AFOTEC	Air Force Operational Test and Evaluation Center
AGC	Automatic Gain Control
AGE	Automatic Ground Equipment
AIC	Aeronautical Information Circular

Multinational Working Group
Master Acronyms

AJ	AntiJam
ALUC	Arrow Link 16 Upgrade Converter
AMX	Aeronautica Militarie Xavantes
APO	Arrow Program Office
ARB	Auxiliary Reference Burst
ARFA	Allied Radio Frequency Agency
ARIES	Aircraft Reply and Interference Environment Simulator
ARINC	Aeronautical Radio Incorporated
ARIP	Action Route Indicator Parameter
ARNS	Aeronautical RadioNavigation Services
ARRC	Automatic Reply Rate Control
ARSCOMP	ARIES/Mode S Compare Program
ARSR	Air Route Surveillance Radar
ARSR - 4	Air Route Surveillance Radar Version Four
ARTS	Automated Radar Tracking System
ASCIET	All Service Combat Identification Evaluation Team
ASCII	American Standard Code for Information Interchange
ASD	Assistant Secretary of Defense
ASIT	Adaptable Surface Interface Terminal
ASO	Air Staff Office
ASOP	Acquisition Stable Operating Point
ATACC	Advanced Tactical Air Control Center
ATC	Air Traffic Control
ATCBI	Air Traffic Control Beacon Interrogator
ATCBI - 5	Air Traffic Control Beacon Interrogator Version 5
ATCRBS	Air Traffic Control Radar Beacon System
ATDL 1	Army Tactical Data Link One
ATI	Automated Terminal Initialization
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATMD TOC	Advanced Theatre Missile Defense Tactical Operations Center
ATN	Aeronautical Telecommunications Network
ATO	Air Tasking Order
AWACS	Airborne Warning And Control System
AWM	Alternate Waveform Modification

Multinational Working Group
Master Acronyms

BADGE	Base Air Defense Ground Environment
BCAS	Beacon Collision Avoidance System
BI-MNC	Two Major NATO Commanders
BIT	Built-In Test
BMDO	Ballistic Missile Defense Organization
BRE	Beacon Reply Efficiency
BT	Bench Tests
C2	Command and Control
C2I	Command, Control and Intelligence
C2P	Command and Control Processor
C3	Communications, Command and Control
C3I	Communications, Command and Control and Intelligence
C3S	Consultation, Command and Control Staff
C4	Computer, Communications, Command and Control
CAA	Civil Aviation Administration
CAA	Civil Aviation Agency
CAA	Civil Aviation Authority
CAOC	Combined Air Operations Center
CAP	Combat Air Patrol
CAS	Commercial Access Service
CAS	Controlled Access Service
CBA	Cost Benefit Analysis
CCEB	Combined Communications Electronics Board
CE	Communications Electronics
CEAC	Committee for European Airspace Control
CEC	Cooperative Engagement Capability
CECOM	Communications Electronics Command
CELAR	Centre d'Electronique de l'Armement
CEPT	Conference of European Postal and Telecommunications
CERP	European Committee on Postal Regulations
CG	Guided Missile Cruiser
CGN	Guided Missile Cruiser, Nuclear
CIC	Combat Information Center
CID	Communication Interface Driver
CINC	Commander in Chief

Multinational Working Group
Master Acronyms

CINCEASTLANT	Commander in Chief Eastern Atlantic Region
CINCEUR	Commander in Chief European Command
CINCFLEET	Commander in Chief Fleet
CINCLANT	Commander in Chief Atlantic Command
CINCPAC	Commander in Chief Pacific Command
CINCS	Commander in Chiefs
CJCS	Chairman of the Joint Chiefs of Staff
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chief of Staff Memorandum
CMN	Control Motion Noise
CMSEL	Civil Military SSR Environment Liaison
CNDL	Central Network Design Library
COEA	Cost and Operational Effectiveness Analysis
COMNAV WG	Communications/Navigation Working Group
COMSEC	Communications Security
CP SWG	Coordination Procedures Subworking Group
CPA	Communications Planning Aid
CPG	Conference Preparatory Group
CPM	Conference Preparatory Meeting
CPSM	Continuous Phase Shift Modulation
CPU	Computer Processor Unit
CRC	Control and Reporting Center
CSSA	Centralized Software Support Activity
CTT	Capability To Transmit
CV	Aircraft Carrier
CVBG	Carrier Battle Group
CVN	Aircraft Carrier, Nuclear
CW	Continuous Wave
CY	Calendar Year
DAB	Defense Acquisition Board
DABS	Discrete Address Beacon System
DAC	Delay Attenuate Compare
DAP	Downlink Aircraft Parameters
dB	decibels
dBc	decibels relative to the Peak of the Carriers

Multinational Working Group
Master Acronyms

dBi	decibels relative to an isotropic antenna
dBm	decibels relative to a Milliwatt
dBW	decibels relative to a Watt
DC	District of Columbia
DDG	Guided Missile Destroyer
DERA	Defence Evaluation and Research Agency
DFR	Data For Record
DFS	German Air Navigation Services
DFSM	Directorate of Frequency Spectrum Management
DISA	Defense Intelligence Security Agency
DIU	Digital Interface Unit
DL WG	Data Link Working Group
DLCP	Data Link Change Proposals
DLM	Data Link Management
DLM & IC	Data Link Management and Interoperability Cell
DLMC	Data Link Management Cell
DLWG	Data Link Working Group
DME	Distance Measuring Equipment
DME/N	Conventional Distance Measuring Equipment
DME/P	Precision Distance Measuring Equipment
DMPPD	Director Maritime Plans and Policy Development
DMPPD 6	Director Maritime Plans and Policy Development 6
DNA	Direction de la Navigation Aérienne
DND	Department of National Defense
DOC	Department Of Commerce
DoD	Department of Defense
DOS	Department Of State
DOS	Disk Operating System
DOT	Department Of Transportation
DPG	Data Processor Group
DRA	Defence Research Agency
DRC	Data Review Committee
DTSES	Directorate of Telecommunications and Spectrum Engineering Support
E-2C	Airborne Early Warning Aircraft

Multinational Working Group
Master Acronyms

E-3	Generic AWACS
E-3A	US and NATO AWACS
E-3D	UK AWACS
E-3F	French AWACS
E-8C	JSTARS
e-mail	electronic mail
E3	Electromagnetic Environmental Effects
E5	Galileo Downlink
EC	European Commission
ECAC	Electromagnetic Compatibility Analysis Center
ECAC	European Civil Aviation Council
ECCM	Electronic Counter-Counter Measures
ECM	Electronic Counter Measures
ECP	Engineering Change Proposal
ECTRA	European Committee for Telecommunications Regulatory Affairs
EF SWG	EMC Features Subworking Group
EF-2000	EuroFighter 2000
EFA-2000	European Fighter Aircraft 2000
EGNOS	European Geostationary Navigation Overlay Service
EIRP	Effective Isotropic Radiated Power
ELTA	Israeli Avionics Manufacturer
EMC	Electromagnetic Compatibility
EMD	Engineering Manufacturing and Development
EME	Electromagnetic Environment
EMI	Electromagnetic Interference
EPE	Extraneous Pulse Environment
EPF	EMC Protection Feature
EPLRS	Enhanced Position Location Reporting System
EPM	Electronic Protection Measures
EPROM	Electronic Programmable Read Only Memory
EPS	Extraneous Pulse Source
ERC	European Radiocommunications Committee
ERO	European Radiocommunications Office
ESC	Electronic Systems Center
ESM	Electronic Support Measures

Multinational Working Group
Master Acronyms

ETCAS	Enhanced Traffic Alert and Collision Avoidance System
ETNOA	European Telecommunications Network Operators Association
ETO	European Telecommunications Office
ETSI	European Telecommunications Standardization Institute
ETSS	Enhanced TDMA Signal Source
EU	European Union
EUCOM	European Command
EUROCAE	European Organization for Civil Aviation Equipment
EUROfighter	European Fighter Aircraft
EW	Electronic Warfare
F-3	Tornado Aircraft
FA	Final Approach
FAA	Federal Aviation Administration
FAAD	Forward Area Air Defense
FACS FAC	Fleet Area Control Surveillance Facility
FARs	Federal Aviation Regulations
FAS	Frequency Assignment Subcommittee
FASS	Frequency Agile Signal Simulator
FCA	Frequency Clearance Agreement
FCA	Function Configuration Audit
FCC	Federal Communications Commission
FDL	Fighter Data Link
FDR	Frequency Dependent Rejection
FEC	Forward Error Correction
FIR	Flight Information Region
FM	Frequency Modulation
FMB	Frequency Management Branch
FMECA	Failure Mode Effects and Causes Analysis
FMOPT	Federal Ministry of Posts and Telecommunications
FMOT	Federal Ministry of Transport
FMS	Foreign Military Sales
FMSC	Frequency Management Subcommittee
FMV	Sweden Defense Materiel Administration
FORSCOM	NATO Forces Command
FORSCOM	US Forces Command

FP	Frequency Panel
FR	France
FRP	Full Rate Production
Fruit	Asynchronous Replies From Aircraft That Are Responding To ATCRBS Interrogators In The Area
FSD	Full Scale Development
FSK	Frequency Shift Keying
ft	feet
FVL	Swedish Air Staff
FY	Fiscal Year
GAAC	Geographic Area Assignment Coordinator
GaAs	Gallium Arsenide
GAS	Government Application Service
GBDL	Ground-Based Data Link
GCCS	Global Command and Control System
GCI	Ground Control Intercept
GE	Germany
GEC	General Electric Company
GEO	Geographic Area
GESM	Ground Environment Systems Manager
GFMA	Government Frequency Management Agency
GHz	Gigahertz
GLONASS	Global Orbiting Navigation Satellite System
GMH	GEC Marconi Hazeltine
GMSK	Gaussian Minimum Shift Keying
GNSS	Global Navigation Satellite System
GPIB	General Purpose Interface Bus
GPS	Global Positioning System
GSM	Global System For Mobile Communications
HAC	Hughes Aircraft Company
HALS	High Approach Landing System
HAVE QUICK	AJ UHF Radio
HF	High Frequency
HIT	Hughes Improved Terminal
HP	Hewlett Packard

HPA	High Power Amplifier
HQ	Headquarters
HTML	HyperText Markup Language
Hz	Hertz
I	Intelligence
I/O	Input/Output
IA	Initial Approach
IADS	Icelandic Air Defense System
IAF	Israeli Air Force
IATA	International Air Transport Association
IATA	International Air Transportation Association
IBM	International Business Machine
IBS	Integrated Broadcast Service
IC	Interoperability Cell
ICAO	International Civil Aviation Organization
ICNI	Integrated Communications, Navigation, and Identification
ID	Identification
IDF	Iceland Defense Force
IDF	International Design File
IDIQ	Indefinite Delivery Indefinite Quantity
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
IGEB	Interagency GPS Executive Board
II	Interrogator Identifier
IIMSES	Initial Implementation of Mode S Surveillence
IJMS	Interim JTIDS Message Specification
ILS	Instrument Landing System
IMDO	Israeli Missile Defense Organization
INDF	Italian Network Design Facility
INMARSAT	International Marine/Maritime Satellite Organization
IOC	Initial Operational Capability
IOT&E	Initial Operational Test and Evaluation
IPF	Interference Protection Features

Multinational Working Group
Master Acronyms

IPO	International Program Office
IPT	Integrated Product Team
IRAC	Interdepartment Radio Advisory Committee
IRFM	Interservice Radio Frequency Management
IRIP	Interest Route Indicator Parameter
ITT	International Telephone and Telecommunications
ITU	International Telecommunications Union
IVIS	Inter Vehicular Information System
JADO	Joint Air Defense Operations
JAFAR	JTIDS/MIDS Forecast Activity Report
JAPNMS	JTIDS Air Platform Network Management System
JARs	Joint Aviation Regulations
JASDF	Japan Air Self Defense Force
JCS	Joint Chiefs of Staff
JCSI	Joint Chiefs of Staff Instruction
JDA	Japan Defense Agency
JEZ	Joint Engagement Zone
JFMO	Joint Frequency Management Office
JICO	Joint Interface Control Officer
JICRB	Joint International Configuration Review Board
JIEO	Joint Interoperability Engineering Organization
JISS	JTIDS Integrated Support System
JITS	JTIDS Integrated Test Set
JMSDF	Japan Maritime Self Defense Force
JNDA	Joint Network Design Aid
JNDF	JTIDS Network Design Facility
JNDL	JTIDS/MIDS Network Design Library
JNDS	JTIDS Network Design Station
JNL	JTIDS Network Library
JNL	JTIDS Network Load
JPO	Joint Program Office
JSC	Joint Spectrum Center (formerly ECAC)
JSCCB	Joint Service Configuration Control Board
JSDA	JTIDS Scenario Development Aid
JSG	JTIDS/MIDS Steering Group

JSPM	JTIDS Signal Presence Monitor
JSTARS	Joint Surveillance Target Attack Radar System
JSUG	JTIDS/MIDS Spectrum Users Guide
JTAGS	Joint Target Acquisition Ground System
JTD	JTIDS Test Device
JTIDS	Joint Tactical Information Distribution System
JWID	Joint Warrior Interoperability Demonstration
kbps	kilobits per second
KGV - 8C	Cryptographic Key Generator
kHz	kilohertz
km	Kilometers
kw	kilowatts
L-5	GPS Civilian Frequency
L2	GPS downlink
L5	GPS Civil Downlink
LAN	Local Area Network
LCD	Liquid Crystal Display
LCSA	Life Cycle Support Agent
LFV	Swedish Civil Aviation Authority
LLD	Low Level Detector
LORAN	Long Range Navigation
LOS	Line - of - Sight
LRIP	Low Rate Initial Production
LRU	Line Replaceable Unit
LUT	Limited Users Test
LV	Low Volume
LVT	Low Volume Terminal
m	meters
M DEMO	Maintainability Demonstration
m2	Square Meters
MAGDLM	MNC Advisory Group On Data Link Matters
MAJCOM	Major Command
MAOC	Modular Air Operations Center
MCEB	Military Communications / Electronics Board
MCTSSA	Marine Corps Tactical Software Support Facility

MDP	Maintenance Data Processor
MEADS	Medium Extended Air Defense System
METAR	Meteorological Aviation Routine
MEZ	Missile Engagement Zone
MHz	Megahertz
MID	Marconi Italtel Defensa
MIDS	Multifunctional Information Distribution System
MIL - HDBK	Military Handbook
MIL - STD	Military Standard
MIS	MIDS Interface Simulator
MIT	Massachusetts Institute of Technology
MITS	Multifunction Integrated Test System
MLRS	Multiple Launch Rocket System
MLS	Microwave Landing System
MMLS	Mobile Microwave Landing System
MNC	Major NATO Commanders
MNWG	MultiNational Ad Hoc Spectrum Support Working Group
MOA	Memorandum of Agreement
MOC	Ministry of Communications
MOD	Ministry of Defense
Mode S	Mode Select
MOPS	Minimum Operational Performance Standard
MOPT	Ministry of Posts and Telecommunications
MOT	Ministry of Transport
MOU	Memorandum of Understanding
MPT	Ministry of Posts and Telecommunications
MRB	Main Reference Burst
ms	milliseconds
MSC	Major Subordinate Command
MSEC	Message Security
MSK	Minimum Shift Keying
MSS	Mission Support Systems
MSSS	Mode S Specific Services
Mt	Mountain
MTBF	Mean Time Between Failure

MTCW	Ministry of Transport, Communications and Water Management
MTI	Moving Target Indicator
MTL	Minimum Triggering Level
MTS	Marine Tactical System
NACMA	NATO Acquisition Management Agency
NADGE	NATO Air Defense Ground Environment
NAEW	NATO Airborne Early Warning
NAEW&C	NATO Airborne Early Warning and Control
NAEW&CFC	NATO Airborne Early Warning and Control Force Command
NAPMA	NATO AEW Program Management Agency
NARFA	National Allied Radio Frequency Authority
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NATMC	NATO Air Traffic Management Committee
NATO	North Atlantic Treaty Organization
NATS	National Air Traffic Services
NAVCAN	Navigation Canada
NAVEMSCEN	Naval Electromagnetic Spectrum Center
NCCOSC	Naval Command, Control and Ocean Surveillance Center
NCG	Navy Network Configuration Generator
NCIDPF	Network Control and Initialization Data Preparation Facility
NCIDPSS	Network Control and Initialization Data Preparation Subsystem
NCS	Network Control Station
NCSJ	Net Control Station JTIDS
NCTSI	Navy Center for Tactical System Interoperability
NDA	Network Design Aid
NDB	NonDirectional Beacon
NDF	Network Design Facility
NDHQ	National Defense Headquarters
NEA	Northeast Asian
NEC	Nippon Electronics Corporation
NFA	Notch Filter Assembly
NHQ	NATO Headquarters
NIB	NonHarmful Interference Basis
NICP	Network Interface Control Program

NILE	NATO Improved Link Eleven
NIPO	Naval International Programs Office
NJFA	NATO Joint Frequency Agreement
NL	The Netherlands
nm	nautical miles
NMGB	Network Management Ground Buffers
NMS	Network Management System
NORAD	North American Aerospace Defense Command
NOTAM	Notice to Airmen
NPG	Network Participation Group
NPRM	Notice Of Proposed Rulemaking
NPTA	National Post and Telecommunications Agency
NRaD	Naval Command, Control and Ocean Surveillance Center Research, Development, Test, and Evaluation Division
NRL	Naval Research Lab
ns	nanoseconds
NTIA	National Telecommunications and Information Administration
NTR	Network Time Reference
OAS	Open Access Service
OASD	Office of the Assistant Secretary of Defense
OCE	Officer in Charge of the Special Exercise
OPEVAL	Operational Evaluation
OPNET	Operations Net
OPTASK	Operations Task
OR	Out of Routes
OSD	Office of the Secretary of Defense
OSP	Operational Support Program
OT	Office of Telecommunications
OT&E	Operational Test and Evaluation
OTAR	Over The Air Rekeying
P&T	Postes and Telecommunications
P-messages	Position and Status messages
PACAF	Pacific Air Force
PACOM	Pacific Area Command
PACRIM	Pacific Rim

Multinational Working Group
Master Acronyms

PADIL	Patriot Automated Digital Information Link
PAF	Peak Amplitude Find
Patriot	Ground-to-Air Air Defense System
PC	Personal Computer
PCA	Physical Configuration Audit
PCMCIA	Personal Computer Memory Card International Association
PCO	Procurement Contracting Officer
PCS	Personal Communication Services
PDF	Adobe Acrobat Reader Format
PE	Procurement Executive
PELV	Portable Electronic Loader Verifier
PEO	Program Executive Officer
PEO-SCS	Program Executive Office-Space Communications Sensors
PFD	Power Flux Density
PFE	Path Following Error
PFP	Partnership For Peace
PG	Participation Group
PIP	Product Improvement Program
PLRACTA	Position, Locating, Reporting and Control of Tactical Aircraft
PLRS	Position Location Reporting System
PMW 159	Advanced Tactical Data Link Systems Program Office
PN	Pseudorandom Noise
POC	Point of Contact
POEMS	PreOperational European Mode S Station
POSNAV	Position Navigation
PPLI	Precise Participant Location and Identification
ppps	pulse pairs per second
PR	Effective Power at the Receiver Input
PRF	Pulse Repetition Frequency
PSC	Principal Subordinate Commander
PTTA	Principal Time To Acquire
QPSK	Quadrature Phase Shift Keying
R&D	Research and Development
R/T	Receiver / Transmitter

Ra90	Swedish terminal for the JAS39 Gryphen fighters and Erieye AEW aircraft and ground facilities
RAF	Royal Air Force
RAFALE	French Fighter Aircraft
RAM	Random Access Memory
RATP	Regulatory Administration for Telecommunication and Post
RDT&E	Research, Development Test And Evaluation
RF	Radio Frequency
RFIU	Radio Frequency Interface Unit
RFP	Request for Proposal
RFT	Request For Tender
RLMC	Regional Link Management Cell
RLOS	Radio Line - of - Sight
RN	Royal Navy
RNAV	Area Navigation
RNLAF	The Royal Netherlands Air Force
RNSS	Radio Navigation Satellite Service
ROK	Republic of Korea
ROM	Read Only Memory
RRIP	Relay Route Indicator Parameter
RTCA	Formerly the Radio Technical Commission for Aeronautics
RTT	Round Trip Timing
RTT-A	Round Trip Timing Address Mode
RTT-B	Round Trip Timing Broadcast Mode
RWR	Radar Warning Receiver
S/N	Signal to Noise Ratio
SACEUR	Supreme Allied Commander Europe
SACLANT	Supreme Allied Commander Atlantic
SACP	Stand Alone Control Panel
SAM	Surface - to - Air Missile
SARPS	Standards And Recommended Practices
SAS	Safety Application Service
SATCOM	Satellite Communications
SATURN	AJ UHF Radio
SBC	Single Board Computer

SCAPDLM	Strategic Commanders Advisory Panel on Data Link Management
SCDL	Surveillance and Control Data Link
SCS	Space Communications and Sensors
SEL	Standard Elektrik Lorenz
SFAF	Standard Frequency Action Form
SGV	Second Generation VORTAC
SHAPE	Supreme Headquarters Allied Powers Europe
SHAR	UK LVT terminal for the Sea King Whiskey helicopter and the Sea Harrier
SHORAD	Short Range Air Defense
SI	Surveillance Identifier
SICP	Subscriber Interface Control Program
SIMPLE	Standard Interface for Multiple Platform Link Evaluation
SLS	Sidelobe Suppression
SMD	Italian Defense Frequency Office
SOP	Standard Operating Procedure
SPAWAR	Space And Naval Warfare Systems Command
SPS	Spectrum Planning Subcommittee
SPS WG - 1	Spectrum Planning Subcommittee Working Group One
SRAP	Sensor Receiver and Processor
SRU	Shop Replaceable Unit
SSR	Secondary Surveillance Radar
SSU	Signal Source Unit
STANAG	NATO Group Standard
STC	SHAPE Technical Center
STNA	Service Technique de la Navigation Aérienne
Stric	Swedish Ground Control Centres
SWA	Southwest Asian
SWG	Subworking Group
SYNC	Synchronization
T&E	Test and Evaluation
TAC	Tactical Control Center
TACAN	Tactical Air Navigation
TACFIRE	Tactical Artillery Fire Direction
TAD	Theater Air Defense

TADIL	Tactical Digital Information Link
TADIL - J	JTIDS Tactical Digital Information Link
TAMPS	Tactical Air Mission Planning System
TAOC	Tactical Air Operations Centers
TARAS	Tactical Radio System
TBD	To Be Determined
TBM	Tactical Ballistic Missiles
TCAS	Traffic Alert and Collision Avoidance System
TDL	Tactical Data Link
TDMA	Time Division Multiple Access
TDS	Tactical Data System
TEK	Tektronix
THAAD	Theater High Altitude Air Defense
TIM	Transportable Interoperability Monitor
TMD	Theater Missile Defense
TOA	Time - Of - Arrival
TOR	Terms of Reference
Tornado	F-3 Fighter Aircraft
TP SWG	Test Planning Subworking Group
TSA	Time Slot Allocator
TSDF	Time Slot Duty Factor
TSEC	Transmission Security
TSG	Theatre Systems Group
TSO	Technical Standard Order
TSR	Time Slot Reallocation
TSRD	Test Support Recording Device
TTA	Time To Acquire
TTL	Transistor to Transistor Logic
TTW	Times of Tension and War
TV	Television
UAT	Universal Access Transceiver
UHF	Ultra High Frequency
UK	United Kingdom
UKADGE	UK Air Defense Ground Environment
US	United States

Multinational Working Group
Master Acronyms

US & P	United States and Its Possessions
USAF	United States Air Force
USAFE	United States Air Forces Europe
USEUCOM	US European Command
USFJ	United States Forces Japan
USMC	US Marine Corps
USN	United States Navy
USS	United States Ship
UUT	Unit Under Test
VFR	Visual Flight Rules
VGA	Video Graphic Array
VHF	Very High Frequency
VMF	Variable Message Format
VNTSC	Volpe National Transportation Systems Center
VOR	Very High Frequency Omni Directional Radio Range
VORTAC	Very High Frequency Omni Directional Radio Range TACAN
VSWR	Voltage Standing Wave Ratio
WAAS	Wide Area Augmentation System
WAN	Wide Area Network
WG	Working Group
WM	Western Microwave
WRC	World Radio Conference
WS	Work Station
WT	Waveform Tests