CHAIRMAN OF THE JOINT CHIEFS OF STAFF INSTRUCTION

J-3 CJCSI 3225.01B
DISTRIBUTION: A, B, C, S 29 March 2023

PROCEDURES FOR MANAGEMENT OF
ILLUMINATION OF OBJECTS IN SPACE

References:
See Enclosure E

1. Purpose. This instruction establishes Chairman of the Joint Chiefs of Staff (CJCS) policy, assigns responsibilities, and defines procedures for illumination of objects in space by lasers. The instruction serves to protect satellites from a reasonable expectation of harm or disruption in accordance with references a through e.

2. Superseded/Cancellation. CJCS Instruction (CJCSI) 3225.01A, "Procedures for Management of Illumination of Objects in Space," 27 July 2020, is hereby superseded.

3. Applicability. This instruction applies to the Joint Staff, Combatant Commands (CCMDs), the Services, and all Department of Defense (DoD) agencies and activities involved in the development, acquisition, or employment of laser systems. This includes DoD or DoD-sponsored laser research, development, developmental test, operational test, evaluation, exercise, and routine operational activity that is funded by, operated under the auspices of, or conducted by DoD, with the potential to adversely affect a satellite or humans in space.

4. Policy

a. All DoD-owned, -operated, or -leased laser activities in space or that intend to direct energy above the horizon will be conducted in a safe and responsible manner, consistent with national security requirements, in order to manage the associated risks to space systems, to enable the mission effectiveness of those systems and humans in space in accordance with references a and b.

b. DoD-owned, -operated, or -leased laser activities that intend to direct energy above the horizon or in space will be registered with Commander, U.S. Space Command (CDRUSSPACECOM) for categorization. Laser activity coordination, notification, and risk mitigation requirements will be based upon the laser activity Category I, II, or III, as defined in Enclosure B.

c. Operational employment of laser activities that are approved, accepted, and integrated into a DoD "weapon system" as defined by the current DoD Dictionary of Military and Associated Terms are authorized without further coordination when operated in accordance with the applicable rules of engagement and orders. Coordinate above-the-horizon laser activities with CDRUSSPACECOM when not governed by rules of engagement or orders (e.g., testing, training, exercising, and maintenance).

d. DoD resident space object (RSO) research, development, acquisition, and operations activities will implement mission assurance measures to minimize the risk of damage from intentional and unintentional laser illumination from any source, taking into consideration the proliferation of commercial and government laser systems, both foreign and domestic. DoD activities leasing satellite services are encouraged to utilize providers that implement mission assurance measures to minimize the risk of damage from laser illumination.

e. As resources allow, CDRUSSPACECOM should consider non-DoD, civil, and international requests to review proposed laser illumination above the horizon by ground-, air-, sea-, or space-based lasers and provide necessary notification and coordination services.

(1) A CDRUSSPACECOM-developed prioritization method will be used to ensure resources remain available for DoD Components.

(2) CDRUSSPACECOM will emphasize providing services to non-DoD laser activities corresponding to Category III, followed by Category II, then Category I.

(3) CDRUSSPACECOM will forward all requests to Joint Staff Director for Operations, J-3 for information purposes.

f. DoD will use a risk management approach to control unintentional laser illumination of RSOs. This approach will:

(1) Support efficient development, acquisition, testing, and fielding of laser systems, including weapon systems. DoD-owned, -operated, or –leased laser weapon systems must participate in the operational employment decision process in accordance with reference e to ensure that management of laser illuminations of objects in space are considered during the weapon system approval process.

(2) Promote the safe and responsible use of lasers by non-DoD laser owners and operators, as illustrated by this instruction, to balance the benefits to laser and RSO activities.

(3) Implement risk management procedures in Enclosure B.

g. Deliberate laser operations illuminating RSOs, including those for space situational awareness (SSA) and space domain awareness (SDA) purposes, will be reflected in a Master Test and Operations Schedule maintained by CDRUSSPACECOM. These laser operations must be coordinated with CDRUSSPACECOM and approved at the following levels:

(1) Deliberate laser tests illuminating RSOs using Category III lasers require Secretary of Defense (SecDef) approval if:

(a) The DoD Component head determines that the activity may have an impact on foreign relations or foreign partners.

(b) The activity raises an issue of compliance with Arms Control Treaty obligations or other international legal obligations.

(c) The activity requires coordination with other U.S. Government departments and agencies.

(d) The activity may result in adverse media coverage.

(e) CDRUSSPACECOM or the Under Secretary of Defense for Policy (USD(P)) otherwise determines the laser requires SecDef approval.

(2) Secretaries of the Military Departments are the approval authority for, and must notify the USD(P) of, laser activities from Category I or II that are:

(a) The first test, series of tests, demonstration, or exercises of a kind which could reasonably cause any of the conditions cited above in 4.g.(1).

(b) Vulnerability tests illuminating an RSO in space.

(3) Laser illumination for SSA and SDA will be coordinated with CDRUSSPACECOM.

(a) Laser illumination for SSA and SDA may be conducted on RSOs, space launch vehicles, and missiles in boost phase for purposes of detection, tracking, ranging, and imaging subject to the following:

1. Laser illumination for SSA and SDA may be conducted on objects on USSPACECOM's SDA Lasing Approval List (LAL) on a routine basis, subject to the restrictions contained in this instruction and other applicable authorities, without requesting object owner approval for each illumination.

2. Laser illumination of objects not on USSPACECOM's SSA and SDA LAL may be approved by CDRUSPACECOM on a case-by-case basis if necessary to mitigate safety of flight risks. In such cases, prior consent of the RSO's owner is not required.

(b) The use of laser illumination for SSA and SDA will follow the same risk assessment process outlined in reference b and must not place the space object at undue risk:

1. RSOs with known optical payloads, such as electro-optical imaging, tracking, or laser communications, or with systems that may be impacted will not be subject to illumination for SSA and SDA purposes except when deemed necessary by CDRUSSPACECOM.

2. In cases in which it is technically possible, but unlikely, for SSA and SDA laser operations to disrupt, deny, degrade, or destroy an illuminated space object, such as situations requiring improbable chains of events or extraordinary circumstances, the "reasonable expectation" should be that the illumination will do no harm.

h. DoD-owned, -operated, or -leased laser activities must not be intentionally designed for, or used to cause, permanent blindness in humans, in accordance with reference d.

5. Definitions. See Glossary and reference b.

6. Responsibilities. See Enclosure A.

7. Summary of Changes. This revision incorporates updates in terminology and clarifies the following tables: criteria for determining probability of occurrence levels in risk assessment and the risk assessment matrix.

8. Releasability. UNRESTRICTED. This directive is approved for public release; distribution is unlimited on Non-secure Internet Protocol Router Network. DoD Components (to include the CCMDs), other Federal agencies, and the public may obtain copies of this directive through the Internet from the CJCS Directives Electronic Library at <http://www.jcs.mil/library>. Joint Staff activities may also obtain access via the Secure Internet Protocol Router Network directives Electronic Library web sites.

9. Effective Date. This INSTRUCTION is effective upon release.

For the Chairman of the Joint Chiefs of Staff:

GEORGE M. WIKOFF, RADM, USN
Vice Director, Joint Staff

Enclosures

A – Responsibilities
B – Risk Management Procedures
C – Standards for Acceptance of Risk
D – Laser Procedures
E – References
GL – Glossary

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ENCLOSURE A

RESPONSIBILITIES

1. Office of the Secretary of Defense. All laser requests requiring SecDef approval will be coordinated among USD(P), DoD Chief Information Officer, USD for Acquisition and Sustainment (A&S), USD for Research and Engineering (R&E), the General Counsel of the Department of Defense, CDRUSSPACECOM, and, as determined necessary, the Assistant Secretary of Defense (ASD) for Legislative Affairs and the ASD for Public Affairs. USD(P) will lead coordination within the Office of the Secretary of Defense (OSD). Responsibilities are further delineated in reference b.

2. Chairman of the Joint Chiefs of Staff

a. The DJ-3 will perform the following functions:

(1) Review and staff all requests for laser illumination tests, series of tests, demonstrations, exercises, and uses of operational and developmental lasers that require SecDef approval. The interagency staffing will include elements of the Joint Staff, Military Services, CCMDs, defense agencies, and OSD where appropriate.

(2) Forward the interagency-staffed request and Joint Staff recommendation through the CJCS to the SecDef for approval/disapproval.

(3) Notify the requesting organization of SecDef approval/disapproval.

(4) Ensure consistency between this instruction and reference e to ensure that weapon systems account for the risk of damage to RSOs or mission degradation of RSOs that support DoD missions due to unintentional laser illumination and the systems minimize the risk to the greatest extent practicable.

(5) When notified by CDRUSSPACECOM of a lasing outside authorized parameters (LOAP) event that likely caused harm to RSOs or humans in space, coordinate with USD(P) on notifications and follow-up actions.

(6) Provide oversight of, and revise as necessary, the tailored risk management procedures established in Enclosure B. These procedures will be implemented by CDRUSSPACECOM to reduce the risk of adverse effects due to unintentional laser illumination of RSOs and to ensure DoD-owned,

-operated, or -leased laser activities are conducted in a safe and responsible manner.

(7) Coordinate with CDRUSSPACECOM to develop and implement standards to:

(a) Define DoD-owned, -operated, or -leased RSO resiliency requirements for inadvertent laser illuminations.

(b) Enable laser testing, training, exercising, and maintaining lasers integrated into a DoD weapon system.

(8) Coordinate with CDRUSSPACECOM, USD(P), and other appropriate DoD component heads to develop guidance that encourages safe and responsible laser operations when there is a reasonable expectation that such operations could damage RSO activities covered in reference b. This guidance will be used with foreign military partners, foreign defense entities, and commercial and civil entities.

b. The Director for Strategy, Plans, and Policy, J-5 will review all laser illumination and testing issues for policy compliance and will coordinate with the appropriate Joint Staff, interagency, and OSD offices (where applicable) on policy issues.

3. Commander, U.S. Space Command. In accordance with (IAW) reference f, establish the following processes and procedures to implement all responsibilities assigned to CDRUSSTRATCOM in reference b. These roles and responsibilities may be delegated to an appropriate component.

a. Establish procedures for deliberate operational and test laser illumination of RSOs IAW section 3.4 of reference b, to include maintaining a LAL of RSOs that may serve as targets for laser illumination and an SSA and SDA LAL that may serve as targets for SSA and SDA laser illumination. Upon request, provides the LAL or SSA and SDA LAL to relevant DoD component heads.

b. Determine the disposition of events where a laser activity desires to illuminate a satellite with known optical payloads for SSA and SDA purposes. Case-by-case approval may be based on either coordination with the owner/operator or a waiver describing the risks and mitigation measures.

4. DoD Component Heads. Implement requirements in accordance with section 2.4 of reference b. Additionally:

a. Services and their respective program offices will provide RSO Component-level laser vulnerability data, safety of flight assessments, impact severity risk analysis, and mission risk assessments (to include inadvertent lasing) to CDRUSSPACECOM.

b. Services will notify CDRUSSPACECOM within 30 days when RSOs enter service end of life for inclusion to the LAL.

c. U.S. Space Force will develop and deploy laser notification, coordination, deconfliction, software, and information technology systems to meet the requirements of reference b to USD(A&S) every 180 days until deployment is complete.

5. DoD Laser Owners/Operators

a. Register DoD-owned, -leased, or -operated laser activities that intend to direct energy above the horizon or in space with CDRUSSPACECOM for categorization. See Enclosure B.

b. Notify CDRUSSPACECOM before using Category II laser types or conducting Category II activities IAW procedures established by CDRUSSPACECOM unless the laser activity is waived.

c. Notify and coordinate with CDRUSSPACECOM before using Category III laser types or conducting Category III activities IAW procedures established by CDRUSSPACECOM unless the laser activity is waived.

d. Notify CDRUSSPACECOM of all LOAP events that propagate energy above the horizon or in space.

6. DoD Satellite Owners/Operators

a. Notify CDRUSSPACECOM of a change in operational status of the RSO (e.g., active to inactive or mission ended).

b. Provide RSO technical information and concept of operations, to include the ability to avoid direct optical payload exposure to known laser sites, current assessment of nominal safety of flight and mission risks, to CDRUSSPACECOM to allow the assessment of laser vulnerability and estimation of potential mission impacts due to laser illumination.

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ENCLOSURE B

RISK MANAGEMENT PROCEDURES

1. This section describes the tailored risk management procedures for the laser illumination of RSOs and is consistent with reference c, and section 3 of reference b. The procedures include laser activity categorization as well as the assessment and mitigation of risk to RSO activities covered by reference a from DoD laser activities. Enclosure C discusses acceptance of risk standards.

2. These procedures will be implemented to reduce the risk of adverse effects due to unintentional laser illumination of RSOs and to ensure DoD-owned, -operated, or -leased laser activities are conducted in a safe and responsible manner.

3. Risk Assessment Process. The following procedure implements the Risk Management laser system classification process described in section 3.1 of reference b. The process depicted in figure 1 of reference b is reproduced below.

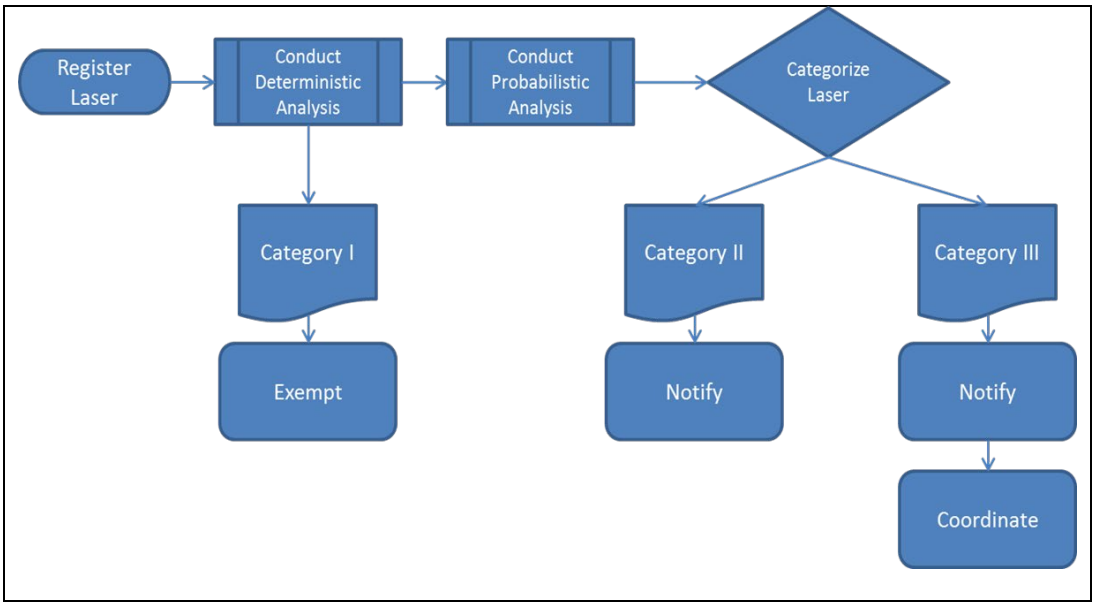

Figure 1. Laser Program Categorization Flow Chart.

a. The method consists of a two-layer risk management approach. A deterministic methodology will be used to identify laser activities that do not pose a risk to RSOs. When a hazard does exist, a probabilistic methodology will then be used to determine the level of risk. IAW reference c, the risk is

composed of two elements: the probability of occurrence and the hazard severity.

b. Based on this risk assessment, each laser program will be assigned a Laser Activity Category, using the criteria listed in Table 1. The laser program may coordinate with CDRUSSPACECOM to determine appropriate risk mitigation measures, such as satellite deconfliction, relocation of activities to a Special Use Space Range (SUSR), additional pointing restrictions, etc., if there is a desire to lower the activity category. CDRUSSPACECOM will determine the final Laser Activity Category based upon post-mitigation residual risk, which will determine notification and coordination requirements.

c. Until an approved probabilistic tool is identified and fielded, CDRUSSPACECOM will conduct deterministic analyses to establish laser activity category.

Laser Activity Category	Analysis Method	Level of Risk to RSOs	Category Criteria	CDRUSSPACECOM Oversight
I	Deterministic	No risk.	1. Laser activities assessed by deterministic analysis as posing no risk to RSOs. 2. Laser firings that are not directed above the horizon. 3. Hand-held tactical lasers. 4. Operational employment of laser activities, in actual use, that are approved, accepted, and integrated into a DoD "weapon systems" as defined by the DoD Dictionary for Military and Associated Terms, including laser weapons approved for operational use.	Exempt from further coordination with or notification to CDRUSSPACECOM.
II	Probabilistic	No greater than other nominal safety of flight and mission risks.	1. Laser activities conducted from a defined location, assessed to pose a risk to RSO activities no greater than other nominal safety of flight and mission risks. 2. Testing, training, exercising, and maintenance of laser activities conducted within the constraints of a Special Use Space Range.	Notification to CDRUSSPACECOM required before laser activity, but do not require further coordination unless deliberately targeting an RSO.
III	Probabilistic	Greater than other nominal safety of flight and mission risks.	1. Planned testing, training, exercising, and maintenance of lasers that are approved, accepted, and integrated into a DoD weapon system that have been accessed to pose a risk to RSOs greater than other nominal safety of fight and mission risks. Includes laser weapons approved for operational use. 2. Laser activities assessed to pose a risk to RSOs greater than other nominal safety of flight and mission risks. 3. Laser activities assessed to pose a risk to RSOs no greater than nominal safety of flight and mission risks but not conducted from a defined location.	CDRUSSPACECOM notification and coordination before use.

Table 1. Criteria for Assigning Laser Programs to Laser Activity Categories.

4. Procedure for Laser Activity Assessment. The following procedure implements the Risk Management process.

a. All DoD-owned, -operated, or -leased laser programs that intend to direct energy above the horizon or in space must register with CDRUSSPACECOM for purposes of participation in the Risk Assessment process.

(1) The registration will include basic system parameters and concepts of operations. Laser information may include laser type, wavelength, power, beam characteristics such as divergence, and other relevant factors. In addition, concepts of operations will be described with information such as typical target, location, mission, firing fields of view, notional target trajectories, laser movement, number of tests, duration of testing, and other related factors.

(2) Registration data requirements and forms for data submission will be defined by CDRUSSPACECOM.

b. CDRUSSPACECOM will conduct a deterministic assessment to identify lasers which are assigned to Risk Category I. The criteria for being assigned to Category I are listed in Table 1. Programs in this category are exempt from further interaction with CDRUSSPACECOM (must be reviewed every other year).

(1) CDRUSSPACECOM will coordinate with USD(A&S), USD(R&E), and the Military Departments to establish requirements for risk modeling software and information systems that perform deterministic modeling of the interactions between laser activities and RSOs. The software and information systems will be developed by the Military Departments with oversight by USD(A&S), USD(R&E), and USD for Intelligence and Security. The software and information systems will include databases of all satellites, their components, and the susceptibility of each component to laser illumination. The database will be validated and updated regularly by intelligence analysts and satellite component subject matter experts.

(2) Following are the guidelines for CDRUSSPACECOM to conduct a deterministic assessment using the software and information systems discussed in 4.b.(1).

(a) Laser registration parameters will be used to calculate the laser energy.

(b) The registered laser location will be used for fixed site (not movable or transportable) systems. Otherwise, worst-case location will be used for a movable or transportable laser or laser program with multiple systems.

(c) Laser propagation through the atmosphere (or other environments such as water) will assume conservative atmospheric absorption, transmission, and other related properties based on existing validated databases and tools. Alternately, atmospheric propagation adjustments may be made based on the fixed laser location or worst-case location assumption in 4.b.(2)(b) using approved transmission values.

(d) The effects on the RSO will be computed using suitably conservative assumptions. These assumptions will include hazard thresholds based on an RSO with a sensitive optical imaging system that is in-band to the laser and observing the laser in its field of view at the time of inadvertent illumination. The hazard thresholds will be established by CDRUSSPACECOM in conjunction with DoD-owned, -operated, or -leased RSO owners from DoD Components, DoD Departments, the National Reconnaissance Office (NRO), and intelligence analysts. The thresholds will be defined in terms of laser energy intensity at the RSO (typically in Watts per Steradian or Watts per square meter).

(e) The laser system concept of operations will be used to define a conservative value for the maximum duration that the satellite could be inadvertently illuminated by a laser firing. A “reasonable expectation” standard will be established based on the laser’s concept of operations, including beam pointing restrictions, beam divergence, laser range of movement, and similar factors.

(f) Based on the deterministic assessment of potential hazards, CDRUSSPACECOM will assign Category I status to the laser program or refer the program for probabilistic analysis. Laser programs receiving Category I status will be notified in writing.

5. CDRUSSPACECOM will conduct a probabilistic assessment on all lasers not assigned to Risk Category I as defined in Table 1. Upon completion of the probabilistic assessment, all non-Category I lasers will be binned as Category II or Category III. Programs binned in Category II will notify CDRUSSPACECOM prior to conducting the laser activity, and lasers binned in Category III will notify and coordinate with CDRUSSPACECOM prior to conducting the laser activity.

a. CDRUSSPACECOM will coordinate with USD(A&S), USD(R&E), and the Military Departments to establish requirements for risk modeling software and information systems that perform probabilistic modeling of the interactions between laser activities and RSOs as well as software and systems that ensure

effective coordination between laser programs and CDRUSSPACECOM and coordination with satellite owners. The software and information systems will include databases of all satellites, their components, and the susceptibility of each component to laser illumination. The database will be validated and updated regularly. For cases where susceptibility information is not available, CDRUSSPACECOM may apply best technical judgments to define the missing data. Prior to initial use or tool changes and upgrades, CDRUSSPACECOM will coordinate with Director, NRO, relevant DoD Component heads, and other applicable non-DoD stakeholders.

(1) A probabilistic analysis is a quantitative analysis using probabilistic distributions to estimate the effect on RSOs by specific laser systems or activities.

(2) Risk assessments will be tailored to the circumstances of each laser program. For a laser program with a single laser at a known location with defined set of targets and concept of operations, one probabilistic analysis may suffice. For a laser program with multiple laser systems, a variety of potential locations, multiple lasers that are part of a single system, or diverse targets/ concepts of operations, multiple analyses may be needed. In this case, a laser program may be assigned to one category initially, but then transition to a different category or different risk mitigation approach as the program evolves and the concept of operations changes.

b. The following are the guidelines for CDRUSSPACECOM to conduct a probabilistic risk assessment using the software and information systems discussed in 5.a.

(1) Laser registration parameters will be used to calculate the laser energy.

(2) The registered laser location will be used. At the discretion of CDRUSSPACECOM, a probabilistic analysis may be repeated multiple times for the same system but varying the location identified in the registration, the target set, or concept of operations.

(3) Laser propagation through the atmosphere (or other environments such as water) will use atmospheric propagation adjustments. Validated military-related databases of environmental characteristics will be used (e.g., standard transmission tables). The atmospheric characteristics (e.g., probability of a cloud-free line of sight and atmospheric optical turbulence) may be used for the fixed laser location or worst-case location assumption in 5.b.(2).

(4) The probabilistic analysis will consider the effects of potential laser illumination on all currently active satellites plus a reasonable projection into the future of the active satellite constellation. The constellation of satellites to be used for the probabilistic analysis will be defined by CDRUSSPACECOM. Multiple parameters such as instantaneous field of view, field of regard, laser susceptibility, ephemeris, and concept of operations will be established for each satellite in the constellation.

(5) The laser system mission, concept of operations, and anticipated target set will be used to model laser activities over a period of time. The model should include the likely laser location, pointing directions, duration of each firing, and number of firings over the time period. As an option, the analysis may include the impacts of a validated estimate of the laser energy absorbed by the target and not propagated into space. CDRUSSPACECOM will define the time period for analysis based on the laser mission, concept of operations, and life of the system. CDRUSSPACECOM will also define the number of laser systems to be used in the analysis (if the program will produce multiple systems).

(6) CDRUSSPACECOM will use the probabilistic risk assessment software or information technology tools provided in section 5.a above to compute the likelihood of exceeding a specified damage threshold for the satellite constellation of interest due to inadvertent laser illumination over the defined period.

(a) The risk assessment approach will screen the potential illuminations to determine whether a hazard existed for each instance. The database of satellite susceptibility parameters described in section 5.a. will be used to assess whether the damage threshold for any component was exceeded based on the probabilistic duration that the satellite was inadvertently illuminated by a laser firing.

(b) The threshold will be defined in terms of laser energy intensity at the RSO (typically in Watts per Steradian or Watts per square meter). CDRUSSPACECOM will define the specific application of susceptibility variables, which may include satellite field of view, field of regard, or satellite sensor wavelength band. A “reasonable expectation” standard will be established based on the satellite’s susceptibility data and the laser’s concept of operations, including beam pointing restrictions, beam divergence, laser range of movement, and similar factors. The result will be a quantitative value that estimates the likelihood of damage to each satellite over the defined time period.

(c) Based on the likelihood of damage estimates, the tools provided in section 5.a above will calculate the overall risk to the RSO.

(7) The quantitative results of the probabilistic assessment will be applied to the following table to determine the Probability of Occurrence Level IAW reference c. In each case, the probabilities are scaled to a two-year time horizon (if the analysis is repeated biennially) or one-year time horizon (if the laser system will be used less than one year).

Category	Associated Probability (P) (chance of occurring at least once in two years)
Certain	1
Probable	$1 \times 10^{-2} \leq P < 1$
Improbable	$1 \times 10^{-4} \leq P < 1 \times 10^{-2}$
Highly Unlikely	$1 \times 10^{-6} \leq P < 1 \times 10^{-4}$
Eliminated	$P < 1 \times 10^{-6}$

Table 2. Criteria for Determining Probability of Occurrence Levels in Risk Assessment

(8) CDRUSSPACECOM will use the probabilistic risk assessment software or information technology tools provided in section 5.a. to compute mission impact to the satellite constellation RSO over the defined period. Once the mission impact is determined, the laser system will be binned into the following severity categories:

(a) Extreme Harm – Complete permanent loss of mission capability.

(b) Major Harm – Significant permanent degradation of mission capability.

(c) Moderate Harm – Minor degradation or temporary loss of mission capability.

(d) Minor Harm – Partial/temporary loss.

(9) The Risk Assessment is performed by applying the Probability of Occurrence (determined in 5.b.(7) and the Severity Category (per 5.b.(8)) to the

Risk Assessment Matrix in Table 3. The result is an assessed risk for each satellite in the satellite constellation of High, Significant, Moderate, or Low.

SEVERITY / PROBABILIY OF DAMAGE	Minor Harm	Moderate Harm	Major Harm	Extreme Harm
Very Likely	MODERATE	SIGNIFICANT	HIGH	HIGH
Probable	LOW	SIGNIFICANT	SIGNIFICANT	HIGH
Improbable	LOW	MODERATE	SIGNIFICANT	SIGNIFICANT
Highly Unlikely	LOW	LOW	MODERATE	SIGNIFICANT
Eliminated	WAIVED			

CATEGORY III

CATEGORY II

Table 3. Risk Assessment Matrix

(10) The overall assessed risk, based on a statistical analysis of RSO risk assessments, is correlated to the Laser Hazard Category outlined in section 3.a. of reference b. The High and Significant levels of risk correspond to Category III; the Moderate and Low level of risk correspond to Category II. Exceptions may be approved by CDRUSSPACECOM on a case-by-case basis.

(11) At the conclusion of the probabilistic risk assessment, CDRUSSPACECOM will provide a memorandum to the laser program that documents the assigned hazard category, the rationale for the decision, and the risk mitigation steps taken which include deconfliction requirements for a Category III laser system or the movement of a Category III activity to a SUSR to reduce it to a Category II activity.

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ENCLOSURE C

STANDARDS FOR ACCEPTANCE OF RISK

1. Risk acceptance is a risk handling option exercised by an official with appropriate authority who acknowledges that the risk event or condition may be realized and willingly accepts the risk with its consequences.

2. For the management of risks defined in this instruction, acceptance of risk refers to the residual risk to RSO activities covered by reference a from inadvertent laser illuminations.

3. Risk acceptance

a. Category I Risk Acceptance. In each case, the Category I risk is accepted by CDRUSSPACECOM upon determination that at least one of the criteria in Table 1 has been met.

b. Category II Risk Acceptance. See Table 1. The risk mitigation for Category II activities is laser owner notification to CDRUSSPACECOM prior to the laser firing. Other possible risk mitigation actions include mission assurance and resilience measures taken by DoD-owned, -operated, or -leased RSO activities consistent with reference g. The Category II risk acceptance decision will be made by CDRUSSPACECOM. The risk acceptance authority may not be delegated below the general/flag officer level.

c. Category III Risk Acceptance. See Table 1.

(1) The risk mitigation for Category III activities is laser owner notification to, and coordination with, CDRUSSPACECOM prior to the laser firing. Coordination services are a process by which CDRUSSPACECOM will balance laser and satellite mission requirements to mitigate potential hazards and maximize joint force capability. Coordination may include deconfliction, a procedure that governs the firing of a laser that may intentionally or inadvertently illuminate RSOs. Deconfliction may be conducted using a centralized, decentralized, or other approved method. CDRUSSPACECOM will provide timely and accurate data to support deconfliction for Category III laser activities. Other risk mitigation actions include mission assurance and resilience measures taken by DoD RSO activities consistent with reference g.

(2) The Category III risk acceptance decision will be made by CDRUSSPACECOM, with the coordination requirements outlined in

reference a. The risk acceptance authority may not be delegated below the general/flag officer level.

ENCLOSURE D

LASER PROCEDURES

1. Subject to the restrictions contained herein, as well as in reference b and other applicable authorities, lasers may be used to illuminate approved RSOs and space launch vehicles and missiles in boost phase for SSA and SDA without coordination with the RSO's owner and operator. Laser illumination for SSA and SDA includes the detection, tracking, ranging, and imaging of the object(s) of interest. Following are the procedures for using lasers for SSA and SDA purposes. It is consistent with section 3 of reference b. These procedures are applicable to Category I, II, and III lasers.

2. This guidance covers the use of both operational and research, development, test, and evaluation (RDT&E) lasers to produce operational SSA and SDA data and seeks to ensure that SSA and SDA data will be made available to Combatant Commanders and other appropriate senior U.S. Government personnel.

a. The SDA LAL will include: rocket bodies and debris, and active-, inactive-, and mission ended-RSOs.

b. CDRUSSPACECOM will approve lasers prior to conducting SSA and SDA operations.

(1) Category I, II, and III lasers will operate in accordance with sections 3.1.a. and 3.4. of reference b.

(2) Category III lasers will use the software and information technology tools described in section 2.2.c.2 of reference b if deconfliction is required.

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ENCLOSURE E

REFERENCES

a. DoD Directive 3100.10, “Space Policy,” 30 August 2022

b. DoD Instruction 3100.11, “Management of Illumination of Objects in Space,” 24 October 2016

c. CJCSM 3105.01 Series, “Joint Risk Analysis”

d. SecDef memo, “DoD Policy on Blinding Lasers,” 17 January 1997

e. CJCSM 3230.01 Series, “Directed Energy Weapon Initial Operational Employment Review and Approval Process”

f. SecDef memo, “Establishment of U. S. Space Command,” 18 December 2018

g. DoD Directive 3020.26, “DoD Continuity Policy,” 14 February 2018

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GLOSSARY

PART I-ABBREVIATIONS AND ACRONYMS

ASD	Assistant Secretary of Defense
CCMD	Combatant Command
CDRUSSPACECOM	Commander, U.S. Space Command
CJCS	Chairman of the Joint Chiefs of Staff
DoD	Department of Defense
DoDD	Department of Defense Directive
LAL	Lasing Approval List
LOAP	lasing outside authorized parameters
NRO	National Reconnaissance Office
OSD	Office of the Secretary of Defense
RDT&E	research, development, test, and evaluation
RSO	resident space object
SDA	space domain awareness
SecDef	Secretary of Defense
SSA	space situational awareness
SUSR	Special Use Space Range
USD(A&S)	Under Secretary of Defense for Acquisition and Sustainment
USD(P)	Under Secretary of Defense for Policy
USD(R&E)	Under Secretary of Defense for Research and Engineering
USSPACECOM	U.S. Space Command

PART II-DEFINITIONS

Above-the-horizon. Direct laser energy that is not terminated by land, water, or other terrestrial backstop.

Coordination services. A process by which CDRUSSPACECOM will balance laser and satellite mission requirements to mitigate potential hazards and maximize joint force capability.

Deconfliction. A procedure that governs the firing of a laser that may intentionally or inadvertently illuminate RSOs. The procedure may be conducted using a centralized, decentralized, or other approved method.

Deterministic analysis. A quantitative analysis of the effect on RSOs by a specific laser system or activity when the laser is modeled as illuminating the RSOs. The analysis will utilize simplifying and conservative assumptions.

DoD laser activities. Laser activities receiving resources, manpower, or funding from a DoD department or agency for RDT&E purposes, or for operational employment purposes after integration into DoD weapon systems. This includes DoD or DoD-sponsored laser research, development, developmental test, operational test, evaluation, exercise, and routine operational activity that is funded by, operated under the auspices of, or conducted by DoD, with the potential to adversely affect an RSO or humans in space.

DoD-owned, -operated, or -leased RSO activities. RSO activities receiving resources, manpower, or funding from a DoD department or agency, including leased space services when appropriate. This also includes DoD or DoD-sponsored RSO research, development, acquisition, and operations.

Illumination. A laser light incident on the surface of an intentional or unintentional target.

Laser. Devices that emit coherent electromagnetic radiation of wavelengths between 10 nanometers and 1 millimeter, developed through a process of stimulated emission.

Lasing Approval List. A list of satellites that may serve as targets for laser activities such as ranging, tracking, calibration, and imaging.

Lasing outside authorized parameters. Any deviation from CDRUSSPACECOM-approved lasing parameters that results in laser energy being directed above-the-horizon or in space that was not deconflicted.

Notification services. A process by which CDRUSSPACECOM compiles and distributes information—which has been provided by laser owners and operators to CDRUSSPACECOM about upcoming laser activities—to satellite owners and operators, and satellite owners and operators are provided the opportunity to adjust mission parameters to mitigate potential risks.

Operational employment. The tactical use of laser capabilities for offensive or defensive purposes after the laser has been integrated into DoD weapon systems or other laser-based capabilities that enable DoD operations. Operational employment of laser capabilities will also adhere to applicable rules of engagement and execution orders.

Probabilistic analysis. A quantitative analysis using probabilistic distributions to estimate the effect on RSOs by specific laser systems or activities.

Probabilistic Risk Analysis. An analysis to estimate risk by computing real numbers to determine what could go wrong, how likely is it that something will go wrong, and what the consequences would be if something did go wrong. Specific to this issuance, PRA is a quantitative analysis of the potential illumination of, and effect on, RSOs by specific laser systems or activities. The analysis will utilize reasonable expectation standards and a probabilistic approach. Laser categorization and subsequent risk reduction measures will be based on this assessment.

Resident space object. A manufactured object intended to orbit the earth, the moon, or another celestial body (e.g., spacecraft) or an object that remains in orbit as a result of that intent (e.g., rocket bodies debris, whether functioning or non-functioning).

Risk acceptance. A risk handling option exercised by an official with appropriate authority who acknowledges that the risk event or condition may be realized and willingly accepts the risk with its consequences.

Risk management. A method that enables informed decisions about laser illumination above the horizon or in space to accept, reduce, or offset risk, and subsequently make decisions that weigh overall risk against mission benefits, and which includes identification of mitigation measures that can be taken to reduce risks.

Safe and responsible operations. Procedures undertaken, using the reasonable expectation standard, to protect space objects from harm by either intentional or unintentional laser illumination.

Special use space range. A specified three dimensional region defined in earth coordinates during a specified time period in which DoD-owned, -operated, or -leased laser operations will occur. Notification of satellite owners and operators of these parameters will allow operational tactics to minimize risk.

Unintentional illumination. Non-deliberate illumination of an object by a laser beam.

Waiver. A determination made and documented by CDRUSSPACECOM to authorize a laser owner or operator to conduct a specific laser activity without the need for further coordination, notification, or risk mitigation measures for a specific period of time.