BY ORDER OF THE COMMANDER
EGLIN AIR FORCE BASE

AIR FORCE INSTRUCTION 48-139

EGLIN AIR FORCE BASE
Supplement

1 JULY 2025

Aerospace Medicine

LASER AND OPTICAL RADIATION PROTECTION PROGRAM

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms are available on the e-Publishing website at **www.e-Publishing.af.mil**

RELEASABILITY: There are no releasability restrictions on this publication

---

OPR: 96 OMRS/SGXB

Certified by: 96 MDG/CC
(Colonel Bradley Brough)

Supersedes: AFI48-139_ EGLIN AFBSUP, 19 January 2018

Pages: 11

AFI 48-139, 30 September 2014, Certified Current 22 April 2020, is supplemented as follows:

This instruction implements Air Force Policy Directive (AFPD) 48-1, *Aerospace Medicine Enterprise*. This supplement is applicable to all organizations on Eglin AFB, FL, property which own and operate laser systems. AFI 48-139_EGLINAFBSUP, serves to establish an installation laser and optical radiation safety program for Eglin AFB, FL. It expands the guidance provided in AFI 48-139, *Laser and Optical Radiation Protection Program*. Refer recommended changes and questions about this publication to the OPR using the AF Form 847, *Recommendation for Change of Publication*. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the Air Force Records Disposition Schedule, which is located in the Air Force Records Information Management System.

SUMMARY OF CHANGES

This document is substantially revised and must be completely reviewed.

2.15.3.2. (**Added**) Further guidance on Installation Laser Safety Officer (ILSO) training qualifications are detailed in Attachment 2.

2.17.5.1. (**Added**) The Eglin AFB LSC will be comprised of an ILSO (will function as chairman), 96 TW/SE, Public Health, Flight Medicine, Occupational Health, AFRL Unit Laser Safety Officer (ULSO), 96 MDG ULSOs, 96 AMXS ULSO, 96 CEG ULSO, and the 96th Range Group ULSO. The Eglin AFB LSC will meet twice a year (once physically and once by virtual conference). ULSOs will work with the ILSO to ensure all laser safety program compliance requirements are met, training is documented, ULSO appointment letters remain current, and Class 3B/4 lasers are assessed and inventoried effectively.

2.17.6.1. (**Added**) Notifies 96 TW Safety Office within one working day of suspected laser accidents/incidents.

2.18.3.3. (**Added**) Through the Occupational Health Working Group, ensures eye exams are conducted pre- and post-employment for people who work with Class 3B or 4 laser systems. In addition, for contractors, the decision on whether to require such examinations is left to the individuals' employer (ANSI Z136.1, F2.1.3).

2.18.3.4. (**Added**) Reports suspected non-ionizing radiation overexposures brought to their attention to the ILSO, 96 OMRS/SGXB, 883-8607.

2.18.3.5. (**Added**) Prepares and distributes reports (AF Form 190, Occupational Illness/Injury Report) of suspected and actual overexposures to appropriate authorities within 45 days following a reported overexposure.

2.19.1.1. (**Added**) Reviews test directives involving the use of nonionizing radiation sources on the Eglin reservation and makes appropriate recommendations with regard to personnel safety.

2.19.1.2. (**Added**) Coordinates with or consults the ILSO, 96 OMRS/SGXB, prior to recommending or implementing controls for potential nonionizing radiation hazards.

2.21.2.1. (**Added**) When a project or program requires the purchase/use of Class 1M, 2M, 3B, or 4 FDA-Compliant laser systems on Eglin AFB reservation by contractors, ensure appropriate contract documents include the requirement for obtaining ILSO written approval, with at least 30 days advance notice of operations, prior to using military-specific lasers or Class 3B or 4 FDA-Compliant Laser systems that impact Eglin AFB property or personnel.

2.22.1.1. (**Added**) Monitors workplace enforcement of this supplement and other restrictions and requirements imposed by the ILSO based on their interpretation of applicable AF or federal directives.

2.22.1.2. (**Added**) Makes resources available for purchasing safety equipment necessary for safe use of non-ionizing radiation equipment. Refer questions regarding the need for specific equipment items to the ILSO at 883-8607.

2.22.1.3. (**Added**) Contact the Installation Weapons Safety Office, 96 TW/SEW, prior to using, testing, or training with lasers - developmental or non-developmental - intended primarily to kill, injure, disable, or temporarily incapacitate people or destroy, damage, disable or temporarily incapacitate property or materiel.

2.22.1.4. **(Added)** Coordinate with the Installation Safety Office for evaluation and documentation of operational capability if ordnance, electronics, or fuel storage are likely to be in the operating or maintenance environment of unit lasers or laser systems.

2.22.2.1. (**Added**) Designates ULSO in writing for units that use Class 3B or Class 4 lasers (or as determined by the ILSO) and provides current copy to ILSO, 96 OMRS/SGXB.

2.22.2.2. (**Added**) Commanding Officers and Directors of DHA facilities/ activities will appoint a site ULSO in writing, whenever a Class 3B or Class 4 laser is owned or operated within their respective unit.

2.22.4. (**Added**) Ensures all personnel, including aircrew, who use, operate, repair lasers, or might otherwise be exposed to lasers in their duties, receive initial and annual laser safety training.

2.22.5. (**Added**) Ensures all personnel that have a potential exposure to lasers are equipped with appropriate personal protective equipment (PPE) including laser eye protection (LEP) as determined by the supporting Bioenvironmental Engineering (BE) Flight.

2.23.3.1. (**Added**) Prepares proposed laser safety Standard Operating Procedures (SOP) and training plans and send them to 96 OMRS/SGXB for review and approval.

2.23.3.2. (**Added**) Coordinates with the ILSO prior to initiating projects or work processes involving new laser radiation equipment covered under the Laser Radiation Safety Program. This includes changes to existing equipment, working conditions or activities. AFRL shall be exempt from this requirement.

2.23.3.3. (**Added**) Update the workplace laser radiation systems inventory as changes occur and submit an annual summary to the ILSO by 1 October of each year.

2.24.2.1. (**Added**) Develops standard operating procedures and training plans to supplement existing system specific technical orders and publications to include, as applicable:

2.24.2.2. (**Added**) Calibration, firing, and system, alignment, maintenance procedures.

2.24.2.3. (**Added**) Laser control measures, such as key controls, nominal hazard zone areas, interlocks, beam stops, warning systems, service access panels, protective housing, emission delays, and remote firing.

2.24.2.4. (**Added**) Protective equipment, such as laser eye protection, skin protection, and ancillary hazard protection from non-beam hazards of the laser system.

2.24.15. (**Added**) Develops a Laser Radiation Protection Program when operating ANSI class 3B or 4 lasers. The Laser Radiation Protection Program must be approved and reviewed by the ILSO. (T-2).

2.24.16. (**Added**) Maintains a copy of ULSO appointment letter signed by the unit commander.

2.24.17. (**Added**) Maintains a copy of AFI 48-139, Eglin Supplement.

2.24.18. (**Added**) Maintains copies of any manuals that were provided with the laser, incident reports, investigations, and references to any classified documents.

2.24.19. (**Added**) Maintains a laser inventory. At a minimum, the laser inventory will contain the following:

2.24.19.1. (**Added**) Quantity of lasers or laser systems that have an operational or military training use.

2.24.19.2. (**Added**) System classification, system manufacture (if applicable), serial number (if applicable), model, wavelength, power, pulse width, pulse repetition frequency, beam distribution, beam profile, beam divergence, beam diameter, NOHD, NHZ, and OD.

2.24.19.3. (**Added**) Intended operational use of the laser. (Illuminator, designator, Visible Pointer, IR Pointer, etc.). If applicable for AFRL only.

3.2.3. (**Added**) ULSO training is required upon initial duty assignment. A course outline is provided at Attachment 2, highlighting the different topic areas that should be covered.

3.6.1. (**Added**) When a lasing incident occurs during a flying mission, the aircraft commander must make the operational risk management decision to continue or abort the mission. This assessment must include human performance limitations from any apparent injuries (e.g., vision loss, skin burns), sensor damage, and the possibility that the lasing may be repeated.

3.6.2. (**Added**) All cases of suspected lasing incidents shall be reported by the involved aircrew to the Command Post as soon as operationally feasible. Command Post will immediately notify Chief of Safety, Chief of Aerospace Medicine (or on-call Flight Surgeon) and ILSO.

MARK A. MASSARO, Brigadier General, USAF
Commander, 96th Test Wing

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Air Force Instruction (AFI) 33-322, *Records Management and Information Governance Program*, 22 March 2020

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

CPR—Cardiopulmonary Resuscitation

HPW—Human Performance Wing

LGAC—Laser Generated Air Contaminants

LSSRB—Laser System Safety Review Board

OPR—Office of Primary Responsibility

SORN—System of Records Notices

ULSO—Unit Laser Safety Officer

USAF-SAM/OE—United States Air Force School of Aerospace Medicine/Occupational and Environmental Health

Attachment 2 (Added)

TRAINING

A2.1. Training Documentation. Training will be documented on AF Form 55, *Employee Safety and Health Record* or equivalent.

A2.2. ILSO shall meet the following criteria:

A2.2.1. Training commensurate with the types of laser systems that are present or associated with their installations.

A2.2.1.1. Installation Laser Safety Officer (ILSO) knowledge topics required by the ANSI Z136 Series. Laser safety training topics for Class 3B and 4 users should include but are not limited to:

A2.2.1.1.1. Fundamentals of laser operation to include physical principles, construction, etc.

A2.2.1.1.2. Bio effects of laser radiation on the eye and skin;

A2.2.1.1.3. Significance of specular and diffuse reflections;

A2.2.1.1.4. Non-beam hazards of lasers;

A2.2.1.1.5. Laser and laser system classifications;

A2.2.1.1.6. Control measures;

A2.2.1.1.7. Overall responsibilities of management and employee;

A2.2.1.1.8. Medical surveillance practices;

A2.2.1.1.9. Cardiopulmonary Resuscitation (CPR) for personnel servicing lasers with the capability of exposure to high voltage;

A2.2.1.1.10. Procedures to follow in case of a suspected laser incident;

A2.2.1.1.11. Establishing a laser safety program;

A2.2.1.1.12. Laser injury reporting and investigations;

A2.2.1.1.13. Laser program audits;

A2.2.1.1.14. Laser eye protection (military and commercial);

A2.2.1.1.15. AF process and requirements for military specific lasers;

A2.2.1.1.16. Federal, state, and local standards and regulations [OSHA, Federal Aviation Agency (FAA), State, installation, ANSI, American Conference of Government Industrial Hygienists (ACGIH), etc.];

A2.2.1.1.17. FAA and Laser Clearinghouse (LCH) requirements and coordination for outdoor use of lasers;

A2.2.1.1.18. Assisting in the development of ULSO and user specific laser safety training;

A2.2.1.1.19. Specific laser safety issues related to types of laser activities performed on the installation, refer to paragraph A2.3 for examples.

A2.2.1.2. Unit Laser Safety Officer (ULSO). ULSOs may fall under one of the following categories: Aircrew LSO, Industrial LSO, Medical LSO, Range LSO, Research LSO, or Tactical LSO. The ILSO will determine/designate ULSO category as necessary. A ULSO shall be able to demonstrate thorough laser safety knowledge within their specialized area of expertise as follows:

A2.2.1.2.1. LSO Knowledge Topics required by the ANSI Z136 Series.

A2.2.1.2.2. Laser Hazards and Controls commensurate with the laser hazards accessible at the unit level.

A2.2.1.2.3. Aircrew laser safety (if applicable to the unit). Aircrew LSOs will typically work in units where lasers are mounted to or used from aircraft and will require specialized knowledge on laser designation procedures, infrared pointing, laser footprints, laser surface danger zones, reflection hazards, and air-to-air lasing procedures.

A2.2.1.2.4. Industrial laser safety (if applicable to the unit). Industrial LSOs will typically work in units that use lasers to cut or weld materials and will require specialized knowledge on the Laser Generated Air Contaminants (LGAC), and ancillary hazards that are produced by their lasers.

A2.2.1.2.5. Medical laser safety (if applicable to the unit). Medical LSOs will typically work in a medical facility and will require specialized knowledge on the LGAC, to include biological contaminants that are produced by their lasers.

A2.2.1.2.6. Range laser safety (if applicable to the unit). Range LSOs will typically be assigned to a research or training range and will require specialized knowledge on laser footprints, laser surface danger zones, reflection hazards and target maintenance.

A2.2.1.2.7. Research laser safety (if applicable to the unit). Research LSOs will typically be assigned to a research facility and will require specialized knowledge on optics, beam geometry, hazard calculations and possibly LGACs.

A2.2.1.2.8. Tactical laser safety (if applicable to the unit). Tactical LSOs will typically be assigned to a combat unit and will require specialized knowledge on laser designation procedures, infrared illumination and pointing, reflection hazards, of controls for military specific lasers.

A2.2.1.3. If the ILSO or ULSO has determined that laser pointer awareness education is needed, suggested topics can include:

A2.2.1.3.1. Simple explanation of a laser;

A2.2.1.3.2. Compare difference of laser light from other light sources;

A2.2.1.3.3. Precautions for use;

A2.2.1.3.4. Effects of exposure;

A2.2.1.3.5. Misuse/FDA warning on misuse of pointers;

A2.2.1.3.6. FDA limit of 5 mW;

A2.2.1.3.7. Local ordinance limitations

A2.2.1.4. Laser safety training topics for ULSOs, supervisors or individuals responsible for laser safety programs, evaluation of hazards and implementation of control measures may include but are not limited to:

A2.2.1.4.1. Laser terminology;

A2.2.1.4.2. Types of lasers, wavelengths, pulse shapes, modes, power/energy;

A2.2.1.4.3. Basic radiometric units and measurement devices;

A2.2.1.4.4. Maximum Permissible Exposures (MPE);

A2.2.1.4.5. Laser hazard evaluations and other calculations;

A2.2.1.4.6. Optical radiation hazard identification and evaluation;

A2.2.1.4.7. Additional training topics can be coordinated with the 711 Human Performance Wing (HPW) and/or United States Air Force School of Aerospace Medicine/Occupational and Environmental Health (USAF SAM/OE).

A2.2.1.4.8. Fundamentals of laser operation to include physical principles, construction, etc.

A2.2.1.4.9. Bio effects of laser radiation on the eye and skin;

A2.2.1.4.10. Significance of specular and diffuse reflections;

A2.2.1.4.11. Non-beam hazards of lasers;

A2.2.1.4.12. Laser and laser system classifications;

A2.2.1.4.13. Control measures;

A2.2.1.4.14. Overall responsibilities of management and employee;

A2.2.1.4.15. Medical surveillance practices;

A2.2.1.4.16. Cardiopulmonary Resuscitation (CPR) for personnel servicing lasers with the capability of exposure to high voltage;

A2.2.1.4.17. Procedures to follow in case of a suspected laser incident.

A2.2.1.4.18. Optional laser safety training with potential topics for Classes 1M, 2, 2M and 3B include:

A2.2.1.4.18.1. Simple explanation of a laser and a comparison of the differences between laser light and other light sources;

A2.2.1.4.18.2. Explanation of the different laser classes and any potential viewing hazard that could exist if exposed to a laser for greater than the human aversion response time of 0.25 seconds.

Attachment 3 (Added)

CONTROL MEASURES

A3.1. Purpose. The purpose of control measures shall be to reduce the risks of exposure to the skin and eyes even with the presence of PPE, and to prevent exposure to visible laser radiation at levels that interfere with critical tasks. For this supplement, PPE is generally considered a tertiary control, to be used in the event other controls fail or cannot be implemented due to negative mission impact. The following requirements for laser hazard controls exceed those listed in the ANSI Z136 Series and shall be followed to ensure compliance with this supplement.

A3.2. Engineering Control Measures.

A3.2.1. Beam stop or attenuator. All Class 3B and Class 4 lasers should be provided with beam stop or attenuator. (Note: The same exception to this requirement listed in the ANSI Z136 Stds. 4.4.3.5.1.(g) applies to this supplement.)

A3.2.2. Activation warning systems. An activation warning system shall be used with all Class 3B and Class 4 lasers. Compliance with this requirement is not required if the activation warning system can negatively affect the mission use of the laser or laser system (typically refers to military specific lasers, which have DoD exemption notifications).

A3.2.3. Laser area warning signs and activation warnings. All Class 3B, and 4 lasers shall adhere to the laser area warning signs and activation warnings criteria described in ANSI Z136.1, except in the event of mission employment of military specific lasers.

A3.2.4. Protective barriers and curtains. A blocking barrier, screen, or curtain should be used for all Class 3B and Class 4 lasers used in a laboratory, research, medical, or industrial center, and where possible outdoors. The ILSO can approve exceptions to this requirement based on the impact the operation of the laser or laser system has on critical tasks.

A3.3. Administrative and Procedural Controls.

A3.3.1. Standard operating procedures. The ILSO shall require and approve written Standard Operating Procedures (SOP) for all Class 3B and Class 4 FDA compliant lasers and military specific lasers approved by the AF Laser System Safety Review Board (LSSRB).

A3.3.2. Administrative controls shall also be employed within sensitive operating zones (such as near flight operations) to prevent exposures to visible lasers that interfere with critical tasks.

A3.3.3. Education and training. Education and training shall be provided for operators, maintenance, and service personnel for all Class 3B and Class 4 lasers. In addition, education and training shall be provided for the use of any military specific laser regardless of classification.

A3.3.4. Spectators. Spectators shall not be permitted within a laser controlled area which contains a Class 3B or Class 4 laser or laser system unless:

A3.3.4.1. Appropriately stated and approved in the laser program SOP.

A3.3.4.2. Degree of hazard and avoidance procedure has been explained to all spectators.

A3.3.4.3. Appropriate protection measures are taken.

A3.3.4.4. All unit and installation requirements governing demonstrations have been followed.

A3.4. Protective equipment. Appropriate protective equipment shall be provided for operators, maintenance, and service personnel using all Class 3B and Class 4 lasers. Refer to recommendations specified in Section 4 of ANSI Z136.1 for guidance.

A3.4.1. Laser Eye Protection (LEP). If the potential for overexposure to the eye exists, LEP shall be worn for all Class 3B and 4 lasers. AF ground personnel may acquire LEP through the military supply system or commercially. LEP, including visors and spectacles, may not be used by aircrew without a higher HQ Safe-to-Fly approval. Refer to recommendations specified in Section 4 of ANSI Z136.1 for guidance.

Attachment 4 (Added)

INVESTIGATION OF PERSONNEL FOLLOWING SUSPECTED OVEREXPOSURE

A4.1. Personnel Overexposures. In the event of a suspected overexposure of an individual to laser or optical radiation, the following steps will be taken:

A4.1.1. Flight Surgeon's Office (FSO) shall coordinate the event with the ILSO. In the absence of an ILSO, the FSO shall coordinate the event directly with AFMSA/SG3PB, and as appropriate, with the MAJCOM/SG, USAFSAM/FECO, USAFSAM/OE, and the Tri-Service Laser Injury Hotline.

A4.1.2. Workplace supervisor shall be notified immediately, and ensure action is taken to prevent injury to other personnel. The laser or optical radiation source shall be taken out of service until the accident/incident has been investigated and corrective actions made, as necessary. Workplace supervisor shall notify the unit commander, safety officer, ULSO and ILSO as soon as possible, but at least within 8 hours of the accident/incident.

A4.1.3. Exposed individuals shall seek medical care immediately at the closest medical treatment facility (MTF); a military MTF is preferred. Aircrew or other operational personnel who receive a laser exposure from friendly or hostile sources should report to the FSO or Squadron Medical Element, if available.

A4.1.3.1. The medical unit examines the patient and implements procedures for reporting and investigating occupational health occurrences. If the exposure was to the eye and a military optometrist/ophthalmologist is not available, then the member shall be sent to a contract ophthalmologist or military optometrist/ophthalmologist at an alternate installation for examination.

A4.1.3.2. If the individual is not being cared for at an AF MTF, the host AF MTF shall ensure an AF physician contacts the attending physician immediately to coordinate required medical examinations and treatments.

A4.1.3.3. MTFs shall report any injuries to 96th Test Wing Safety Office as required. The individual's injury disclosures to the 96th Test Wing Safety must be tracked IAW DODM 6025.18, *Implementation of the Health Insurance Portability and Accountability Act (HIPAA)* Privacy Rule DOD Health Case Programs, 4.4 a. and k., and DHAI 5400.01, Enclosure 2.6.c. Safety personnel shall ensure additional reporting is accomplished IAW current requirements. A flight surgeon and/or aerospace physiologist shall conduct a human factors evaluation of the incident/accident.

A4.1.3.4. The ILSO shall notify the installation Safety (SEG), Public Health (PH), Judge Advocate (JA), and applicable MAJCOM, AFRC, or ANG medical staff.

A4.1.4. ILSO shall notify the Tri-Service Laser Injury Hotline (1800-473-3549) and forward a completed DoD laser accident/incident reporting form within 3 duty days following a laser accident/incident because immediate indicated care is critical. The DoD laser accident/incident reporting form can be found on the Environmental, Safety, and Occupational Health (ESOH) website (esoh.service.center@us.af.mil) or by contacting the Tri-Service Laser Injury Hotline. This form does not replace the required final report, nor does it replace the AF Form 190, *Occupational Injury/Illness Report*.

A4.1.5. Notify the Air Force Safety Center (AFSEC) and ensure initial mishap information is entered into the AF Safety Automated System (AFSAS) IAW timelines mandated in AFI 91-204, *Safety Investigation and Reports*.

A4.1.6. Additional information concerning laser injuries can be found in the USAFSAM Laser Injury Guidebook that is posted on the ESOH website.

A4.2. Investigation. Upon notification of a suspected exposure event identified in paragraph 3.6., the ILSO and/or Installation SEG respectively shall investigate to determine event characteristics, root cause, contributing factors, and corrective measures. ILSO and/or Installation SEG shall involve the MTF, as needed. Indications of malicious intent require involvement of security forces in the investigation. This investigation is separate from, but may become a part of, a mishap investigation conducted under AFI 91-204; however, in addition to this supplement, accident/incident investigations shall mirror the guidance regarding mishap investigations in AFI 91-204. For the investigation the ILSO shall follow guidance in chapter 12 of the Bioenvironmental Engineering Guide for Lasers and Optical Radiation.

A4.3. Final Report. Upon completion of the investigation and within 30 workdays, the ILSO shall forward a detailed report to the Installation PH, BE, SEG, JA, MAJCOM BE, and AFMSA/SG3PB with a courtesy copy to ESOH Service Center for entry into the laser and optical radiation exposure investigation repository. The report should be IAW guidance from chapter 12 of the Bioenvironmental Engineering Guide for Lasers and Optical Radiation.

A4.4. Individual Medical Records. ILSO shall provide an unclassified copy of forms and reports, related to the investigation, to the military MTF medical records section for inclusion in each individual’s medical record.

A4.5. Material Damage. For material damage, the installation safety office shall coordinate the event response with affected installation and MAJCOM offices.