



UNITED STATES MARINE CORPS

2D MARINE AIRCRAFT WING
II MARINE EXPEDITIONARY FORCE
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WgO 5104.1A
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WING ORDER 5104.1A

From: Commanding General, 2d Marine Aircraft Wing
To: Distribution List

Subj: LASER HAZARD SAFETY PROGRAM

Ref: (a) SECNAVINST 5100.14D
(b) COMNAVAIRFORINST 4790.2 Series
(c) OPNAVINST 5100.27A
(d) MCO 5104.1B
(e) OPNAVINST 5100.19E
(f) OPNAVINST 5100.23
(g) BUMEDINST 6470.23
(h) MIL-HDBK-828 (1993) Military Handbook: LASER Range Safety
(i) ANSI Z136.1-2000, American National Standard for the Safe Use of LASERS (NOTAL)
(j) WgO 5100.29A

Encl: (1) Definitions
(2) 2d MAW LASER Standard Operating Procedures
(3) Safety Procedures for LASER Range Use
(4) Annual LASER Audit Checklist
(5) Suspected LASER Exposure or Incident Pre-Mishap Plan
(6) LASER Operator Qualification Sheet
(7) Command LASER Safety Program Requirements

1. Situation. To prescribe 2d Marine Aircraft Wing (2d MAW) policy and procedures while assigning responsibilities to commanders for the safe storage, use, and operations of Light Amplification by the Stimulated Emission of Radiation (LASER) systems per references (a) through (j).

2. Cancellation. WgO 5104.1

3. Mission. This Order amplifies or clarifies existing higher headquarters directives and provides guidance where no instructions are published. This revision contains a number of changes and should be thoroughly reviewed. It is recommended that all of the references be fully reviewed to ensure compliance.

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

4. Execution

a. Commander's Intent and Concept of Operations.

(1) Commanders Intent. The purpose of this order is to describe the overall LASER Hazard Control Program within 2d MAW. Definitions to better understand are located in Enclosure (1).

(2) Concept of Operations

(a) Portions of this Order dealing with LASER safety matters are applicable to all units of 2d MAW.

(b) As LASER systems proliferate within the Department Of Defense, the potential for LASER overexposure injuries significantly increases. When LASER energy is absorbed by the biological tissue, the energy is transformed into heat. If the heat does not dissipate, then blisters or toxic reactions within the tissue can occur. The tissue of greatest concern is the eye. If the retina becomes damaged, permanent visual changes or blindness could occur.

(c) In addition to the eyes, the skin may also be affected by the LASER energy. The LASER effects to the skin are similar to that of the sun. The level or severity of the injury will be dependent on the exposure time and distance from the aperture of the LASER. Most skin injuries can be prevented by wearing fire retardant clothing, minimizing exposure time, and ensuring all personnel are outside of the Skin Hazard Distance. Currently, most of the operational LASER systems being used do not operate at energy levels that exceed the skin Maximum Permissible Exposure (MPE). However, personnel need to know both the ocular and skin hazard distances of the systems they are working with.

(d) 2d MAW units currently utilize various LASER systems that are employed through hand held, crew served weapons, or aircraft mounted systems. Therefore, 2d MAW Technical Laser Safety Officer (TLSO) and the Assistant TLSO (ATLSO) will provide program oversight to all 2d MAW units that utilize LASER systems.

b. Tasks

(1) Bureau of Medicine and Surgery (BUMED-212)

(a) To ensure the safe and effective use of LASER systems, reference (c) designates the BUMED-212 as the Administrative Lead Agency (ALA) for LASER safety within the Navy and Marine Corps and grants military exempt status for LASER systems.

(b) Reference (c) prescribes BUMED-212 policy and guidance for the identification and control of LASER radiation hazards. It applies to the design, use and disposal of all equipment and systems capable of producing LASER radiation, including LASER fiber optics.

(c) BUMED and reference (c) and enclosures (4) through (6) also provide the guidance and requirements for establishing LASER Hazard Control Program for commands utilizing military exempt LASER systems within the Navy and Marine Corps. This includes requirements for an Administrative LASER Safety Officer (ALSO). Enclosure (2) specific LASER Standard Operating Procedures (SOP) and safety regulations, personnel safety training, operator medical surveillance, LASER Eye Protection (LEP), LASER warning signs, and administrative protection and control measures.

(d) Technical information on measurements, calculations, and biological effects is provided in reference (d).

(e) Reference (f) established medical surveillance requirements and notification procedures for suspected LASER overexposure injuries.

(f) Reference (g) provides procedures for LASER system use on DOD ranges.

(g) Reference (h) issues MPE limits and establishes LASER standards defining the control measures necessary for each LASER class.

(2) 2d MAW. Provide oversight to all 2d MAW groups and units that utilize LASER systems.

(3) Marine Aircraft Groups/Marine Wing Control Group/Marine Wing Support Group. Provide oversight to subordinate units with regards to the management of their LASER programs.

(4) Individual Unit

(a) The unit ALSO shall be appointed in writing by the commanding officer after attaining certification as an ALSO. The unit ALSO is responsible for establishing and managing the Unit LASER Hazard Control Program. The LASER Hazard Control Program shall consist of the following documents or procedures:

(1) A LASER Standard Operating Procedures instruction signed by the unit's commanding officer. This instruction should be reviewed and updated annually or when significant changes to the governing instructions/orders occur. Specific requirements are listed in enclosure (7).

(2) The LASER binder is a one-stop reference for the unit personnel who handle or operate LASERS. The specific contents of the binder will be addressed in enclosure (7) of this instruction.

(3) Review specific SOPs, operator training, and equipment condition.

(b) The ALSO shall manage the program in accordance with references (a) through (j).

(c) Forward requests to higher headquarters of all requests for evaluating new or additional LASER systems.

(d) Utilize enclosure (7) for identifying the command's LASER Safety Organization. Maintain and update as required. Ensure the unit duty binder contains information on emergency procedures and recall of essential personnel in the event of a LASER incident.

(e) Utilize enclosure (3) and reference (g) for LASER range information (LASER target areas, buffer zones, operating, and safety procedures). The safe use of LASER systems on the target ranges is the joint responsibility of the Range LASER Safety Officer, Command ALSO, Command Safety Officer, and the aircrew.

(f) No attempt shall be made to disassemble the LASER system at any time.

5. Administration and Logistics. Recommendations for changes to this order are invited and should be submitted to the 2d MAW TLSO via the chain of command.

6. Command and Signal

a. Command. This Order is applicable to all units assigned or attached to 2d MAW that utilize LASERs.

b. Signal. This Order is effective the date signed.


R. W. REGAN
Chief of Staff

DISTRIBUTION: A

DEFINITIONS

1. LASER. Is the acronym Light Amplification by the Stimulated Emission of Radiation. LASERS are any device that can be made to produce or amplify electromagnetic radiation in the X-ray, ultraviolet, visible, and infrared or other portions of the electromagnetic spectrum by the process of stimulated emission of photons.

2. LASER Classifications. There are seven LASER hazard classifications that determine the required extent of radiation safety controls. These range from class one LASERS that are considered safe for direct beam viewing under most conditions to class four LASERS that require the strictest of controls. LASER product classification pertains to intended use only. When a LASER product is disassembled for maintenance, etc., and protective features removed, the LASER classification may change to a more hazardous class. Reference (h) should be reviewed for current LASER system classification definitions.

3. Military Exempt LASER. LASER systems designated for combat, combat training, or classified in the interest of national security are exempted from the regulatory obligations of the Federal Performance Standard for Light Emitting Products 21 CFR Part 1040. Military exempt LASER systems must comply with the design requirements provided in enclosure (2) of Reference (c) and must be maintained under the strictest controls.

4. Maximum Permissible Exposure (MPE). The level of LASER radiation to which a person may be exposed without hazardous effect or adverse biological changes in the eyes or skin. The Bureau of Medicine and Surgery (BUMED-212) adopts through reference (f) the MPE thresholds and determination methods outlined in reference (h).

5. Nominal Ocular Hazard Distance (NOHD). The distance along the axis of the unobstructed beam from a laser, fiber end, or connector to the human eye beyond which the irradiance or radiant exposure, during installation or service, is not expected to exceed the appropriate MPE. The NOHD for individual LASER systems can be found in the corresponding LASER Safety Review Board (LSRB) letter.

6. Optical Density (OD). OD is a measure of the capability of a material to block the transmittance of light energy (visible and infrared). It is a logarithm to the base ten of the reciprocal of the transmittance. OD is the physical property of a substance. The OD for individual LASER systems can be found in the corresponding LSRB letter.

7. LASER Eye Protection (LEP). A protective barrier which has design characteristics to block, absorb or reflect away LASER energy that may cause damage to eye. The most common designs take the form of spectacles or visors. These are designed to protect against specific wavelengths and LASER power. Compatibility with aircraft systems must be considered in LEP choice. Flight clearances will establish which LEPs are authorized for flight in each aircraft, only those LEPs authorized will be ordered and used.

8. Laser System Safety Officer (LSSO). A generic term used throughout this instruction. It can refer to personnel functioning as an Administrative LASER Safety Officer (ALSO), Technical LASER Safety Officer (TLSO), LASER Safety Specialist (LSS), or Range Laser Safety Specialist (RLSS).

9. Composite Squadron. This term refers to an aviation squadron that is reinforced by assets from other squadrons (for example MEU VMM squadrons).

10. LASER Safety Review Board (LSRB). The LSRB examines every Navy and Marine Corps laser system during development, operational testing, and before initial deployment. The LSRB will issue an approval letter for each LASER system they evaluated prior to operational fielding.

2D MAW LASER STANDARD OPERATING PROCEDURES

1. Operational Airborne LASER firing

a. Mission Planning and Briefing. The mission commander (certified LASER operator) shall ensure the following procedures are followed for all LASER missions.

(1) Contact squadron ALSO or range RLSO for specific LASER range safety procedures and regulations for the applicable LASER range complex for use during mission planning.

(2) Ensure compliance with the 2d MAW Safety Procedures for LASER Ranges outlined in enclosure (3) and the applicable LASER system procedures.

(3) Brief mission personnel on the appropriate LEP (LASER system, wavelength, and optical density) to be used (when required) as determined by the LSRB and appropriate flight clearances.

(4) Ensure that LASER firing is being logged in accordance with the LASER range regulations and reference (c).

b. Authorized LASER Firing Areas. Only certified and approved indoor and outdoor ranges may be used for any LASER firing. Field expedient bore sighting will take place with ALSO approval and at least a LASER Safety Supervisor present. Only command trained personnel shall conduct field bore sight operation when a certified indoor range is unavailable and bore sight retention of the system has been compromised.

2. Maintenance or Open Beam Bore sight Ground LASER Firing.

The following procedures shall be used when LASERS are fired on the ground during open beam bore sighting procedures:

a. An ALSO shall be present during all maintenance ground LASER firing.

b. All specular reflectors shall be removed. Targeting area shall be matte finished and nonreflective.

c. During all maintenance LASER firings, there will be a minimum of two and a maximum of five individuals in the LASER area. All non-essential personnel shall vacate the spaces during ground LASER firings. Additionally, only certified operators shall be authorized to trigger the LASER system during the ground firing. All personnel present shall be familiar with the LASER safety regulations and the specific system shut-down procedures.

d. The ALSO shall ensure the lasing area is properly labeled and secured during all maintenance LASER firings.

e. All personnel present during maintenance LASER firing shall utilize LEP sufficient to protect from the LASER system in use.

f. Maintenance LASER Firing Procedures

(1) LASER Safety Supervisor shall ensure all personnel have done LEP (if required).

(2) LASER Safety Supervisor shall give the command to **"ARM LASER"**.

(3) LASER Safety Supervisor shall give a five count to **"FIRE"**.

(4) LASER Safety Supervisor shall give command to **"CEASE FIRE"**.

(5) Upon cease firing, the LASER Safety Supervisor shall give the command **"DISARM LASER"** and ensure the LASER is properly stowed with batteries removed.

(6) LASER Safety Supervisor can give the command to **"REMOVE LEP"** if used.

(7) Following all LASER firing, the LASER Operator shall ensure entries are made in the LASER firing log as required by reference (c)

SAFETY PROCEDURES FOR LASER RANGE USE

1. In addition to the usual requirements for prior permission, target identification, and adherence to scheduled target times, the following precautions apply to LASER range operations and for LASER targets:

a. Only targets surveyed and approved on certified LASER Ranges may be lased by aircraft. All lasing must be within the LASER certification parameters of the range being used.

b. A clearing pass over the target is required for the purpose of target identification and to ensure no unauthorized vehicles or personnel are in the target area or buffer zone.

c. Lasing will be terminated, if necessary, to preclude any possibility of the LASER beam leaving the immediate area. In no case shall the beam be directed at or above the horizon.

d. Care shall be exercised that no specular reflectors (still water, flat glass mirrors, glazed ice, Plexiglas, or other shiny surfaces) are lased. The target and vicinity should be inspected on the clearing pass with this in mind. For example, standing water could conceivably reflect the beam outside the permissible lasing area.

e. Deliberate lasing of wildlife is strictly forbidden.

f. Lasing will not be allowed until the LASER system has locked onto a target designation, and must cease if the lock on target designation is lost.

2. Additional procedures are required for lasing manned targets. The lasing of manned targets shall be permitted only when the following criteria are met.

a. The mission commander or forward air controller has verification from the target personnel that they have and are using the proper LEP, and all personnel have been briefed concerning its use and the possible consequences of not using the LEP.

b. Positive two-way radio communication is established immediately prior to each LASER firing, and permission to fire is received from the mission commander.

3. The mission commander or forward air controller shall act as a LASER safety observer, ensuring that safe operating procedures are implemented. He shall provide adequate control of the target area to ensure unauthorized personnel do not enter the area. He shall maintain radio contact with ground units to ensure protective eyewear is worn during LASER operations as necessary. LASER operations shall cease when unauthorized personnel enter the operating area. Any unprotected exposure or suspected LASER overexposure incident shall be immediately reported to the command ALSO.

Annual LASER Audit Checklist

** The inspecting TLSO shall ensure the unit has completed the checklist items listed below to ensure compliance with this order.

LASER SAFETY PROGRAM - UNIT LEVEL

1. A LASER hazard control program SOP addresses a minimum of the following topics:
 - a. LASER safety program command policy/safety regulations/SOP
 - b. Documented duties of the LASER System Safety Officer (LSSO)
 - c. LASER classifications and labeling
 - d. Personal protective equipment (PPE)
 - e. Safety inspections and surveys
 - f. Medical Surveillance Program
 - g. LASER inventory
 - h. Warning devices and signs
 - i. Operator training and certification
 - j. Emergency procedures and pre-mishap plan
 - k. LASER Safety Committee
 - l. LASER mishap investigation and reporting
 - m. Disposal of military exempt LASER systems
 - n. LASER Firing Log
2. The LSSO has successfully completed an approved LASER Systems Safety Officer Course.
3. The LSSO has been designated in writing after graduating from the approved LASER systems Safety Officer Course and has direct access to the CO.
4. A LASER Safety Committee has been established to assist the LSSO in discharging his/her responsibilities. Members of this committee are designated in writing by the CO.
5. The LSSO maintains copies of the LSRB findings for all class 3B and 4 LASER systems utilized by the command.
6. The LSSO maintains copies of current applicable flight clearances.
7. The LSSO maintains a current inventory including serial number and location of all command-held LASER devices.

8. A list of class 3B, class 4 and Military Exempt LASER systems shall be submitted annually via the Chain of Command (CoC) to the 2d MAW LSSO NLT 01 December.
9. Squadron LASER safety regulations, including SOPs for specific LASER operations, are being maintained and current.
10. All LASER systems are properly labeled.
11. The LSSO has a current Range LASER Safety Officer (RLSO) contact list for ranges frequently utilized by the squadron, to include the tri-annual range re-certification date.
12. The squadron has received an annual LASER site survey by a TLSO, LSSO, or RLSO from higher headquarters.
13. Warning signs are placed in appropriate locations (i.e. entrances to spaces utilized for storage of LASER systems and/or bore-sighting) to protect unsuspecting personnel from LASER radiation.
14. A LEP Program has been established and is in use.
15. All personnel in areas using class 3B and 4 LASER systems attended annual training about the potential hazards associated with accidental exposure to LASER radiation. The rosters are maintained for the previous two years.
16. The LASER firing log shall include the following information for aviation units: Command, Range, Date, System, User, Mission Commander, Firing number, Time, Target, Location, Firing Position/Heading. The LASER firing log shall include the following information for non-aviation units: Unit, Range, Date, System, Operator, Firing number, Time, Target, Location, Firing Position/Heading and are maintained for three years.
17. Unit ALSO maintains a copy of all technical manuals for squadron LASER systems.

MEDICAL SURVEILLANCE

1. All personnel who routinely work with class 3B or 4 LASER systems are enrolled in the appropriate medical surveillance program and the commanding officer has signed the LASER personnel roster.
2. All required medical examinations are performed following all overexposure and suspected overexposure incidents.
3. The LSSO has submitted records of personnel exposed to LASER emissions to a medical officer for examination and surveillance.
4. All initial notification messages, reporting an overexposure or suspected overexposure, were sent to BUMED (MED-212) within four hours of a LASER incident.
5. All follow-on written reports were submitted via the chain of command to BUMED (MED-212) within 30 days of the LASER incident, with a copy to CMC (SD), COMMARFORCOM Aviation Logistics Department/Department of Safety and Standardization (ALD/DSS) and 2d MAW LSSO.

LASER SAFETY PROGRAM - GROUP LEVEL

In addition to the unit required inspection items, the Group shall be inspected on the following topics:

1. The Group LASER Safety Order was submitted to the 2d MAW LSSO.
2. The LSSO has successfully completed an approved TLSO Course
3. The LSSO has been designated in writing after graduating from an approved TLSO course and has direct access to the CO.
4. The LSSO maintains copies of the LSRB findings for all class 3B and 4 LASER systems utilized within the Group.
5. The LSSO maintains an inventory including serial number and location of all LASER devices utilized within the Group.
6. A TLSO, LSS or RLSS has conducted an annual LASER site survey of each subordinate squadron utilizing lasers.

7. A TLSO, LSS or RLSS has conducted a LASER site survey of each composite squadron prior to deployment.
8. The LSSO maintains LASER site surveys of each squadron and composite squadron for a period of two years.
9. The LSSO has consolidated input from squadrons and submitted an annual list of all Military Exempt class 3B and 4 LASER systems to the 2d MAW LSSO by 01 December.
10. Approval has been received from the ALA via the chain of command prior to the transfer or disposal of any Military Exempt LASER system.
11. If LASERS are directly assigned to the Group, has the Group received an annual LASER site survey by a TLSO, LSS, or RLSS from higher headquarters?
12. The Group LSSO has ensured all subordinate units that have LASERS assigned have received an annual LASER site survey by a TLSO, LSS, or RLSS from higher headquarters.
13. Warning signs are placed in appropriate locations (i.e. entrances to spaces utilized for storage of LASER systems and/or bore-sighting) to protect unsuspecting personnel from LASER radiation both in the headquarters area and subordinate units areas as applicable.

SUSPECTED LASER EXPOSURE OR INCIDENT PRE-MISHAP PLAN

Purpose:

This enclosure is intended to provide additional guidance and procedures in the event of an actual or suspected LASER overexposure incident. Personnel that receive medical treatment and evaluation shortly after injury allow for more treatment options. This document will include the requirements from the following instructions:

OPNAVINST 5100.27(series)
OPNAVINST 3750.6 (series)
BUMEDINST 6470.23(series)

Action:

If there is a suspected or confirmed case of a LASER overexposure, the unit ALSO shall ensure the following procedures are completed. The unit ALSO shall also ensure that all required reports are submitted within the established timeline. Chain of Command shall be immediately notified. Next higher level LSSO shall be notified. An initial notification report shall be released within four hours of the incident to BUMED and/or Tri-service hotline. The Naval Message containing the final mishap investigation report on the incident shall be released within 30 days of the incident. If additional time is required to complete the investigation, an extension shall be requested from BUMED. In the event additional information or medical changes occur a supplemental letter should be sent to BUMED. Flash reports and OPREP 3 reports shall be reported IAW governing directives.

Procedures:

1. Ensure that the power is secured to the LASER system and all safeties are engaged.
2. Provide initial first aid to injured personnel. If there is leakage of fluid from the eye, cover both eyes with a sterile dressing. If injured personnel show any signs or symptoms of shock, treat appropriately.
3. If airborne, land the aircraft ASAP at an airfield closest to appropriate medical facility.

4. Escort injured personnel to medical for evaluation. When transporting the injured personnel, have them in a face-down position to prevent blood from pooling on the retina.

5. Notify the following personnel:

a. Unit ALSO

b. Duty Flight Surgeon shall notify the Duty Optometrist/Ophthalmologist

1. If Duty Optometrist/Ophthalmologist is unavailable due to non-availability of on base appropriate medical treatment (i.e. after clinic hours) pre-mishap plan should include the closest medical facility that can give appropriate ocular care. Duty Flight Surgeon should then notify that medical facility's Duty Optometrist/Ophthalmologist.

c. Unit Aviation Safety Officer (ASO) or Safety Officer (SO)

d. Unit Commanding Officer/Executive Officer/Sergeant Major

e. Group ALSO/TLSO

f. 2d Marine Aircraft Wing ALSO/TLSO

g. 2d Marine Aircraft Wing DSS/ASO

h. Commanding General, 2d Marine Aircraft Wing

i. BUMED (MED212) or Tri-service LASER hotline. This notification shall occur within four hours of the incident. The primary telephone number at BUMED (M3F72) is (202) 762-3448 and DSN 762-3448 or (202) 762-0931 (DSN 762) if the report is being faxed. Notification also should be made to the Tri-service LASER Hotline at commercial (800) 473-3549 or DSN 240-4784. Additionally contact unit ALSO, unit duty officer, and Group LSSO.

6. Ensure that the injured personnel receive a complete eye examination by an optometrist or ophthalmologist. This examination shall include visual acuity, fundus test, ophthalmoscope examination, amsler grid, and color retinal photos (or at least a diagram of the eye documenting the injury).

7. Collect the following information for the initial mishap report:

- a. Aircraft type and BUNO (if applicable)
- b. Name, Rank, SSN of injured personnel
- c. LASER System used
- d. LASER Wavelength, power output, and the operation mode
- e. LASER Eye Protection used
- f. Length of time exposed to LASER energy in relation to the MPE
- g. Distance personnel were from the aperture of the LASER
- h. Injuries or medical conditions determined by medical evaluation.
- i. Summary of the incident events
- j. Safety procedures that were in effect

8. The unit ALSO will also initiate an investigation into the LASER incident. In the event an Aviation Mishap Board (AMB) is convened, the TLSO shall be a member along with any other personnel assigned by the senior member. If an AMB is not convened, the TLSO shall assist with the investigation.

9. A final report is required to BUMED within 30 days of the incident that shall address the below information that was not addressed in the initial mishap report:

WgO 5104.1A
AUG 13 2010

- a. Include a privileged information summary of events that will include photographs of the equipment used, settings, and details regarding the safety procedures and PPE used.
- b. Recommended corrective actions taken.
- c. Copies of all medical documents and photos from the incident.
- d. Lessons learned.

10. All information shall be included in message traffic and a hard copy shall also be mailed to BUMED.

11. If the incident meets the requirements for an aviation or ground mishap report, then follow all additional reporting requirements contained in OPNAVINST 3750.6, OPNAVINST 5100.23, or OPNAVINST 5100.1.

All information that is collected during the investigation is considered privileged and shall not be released. Also any information that is collected during the safety investigation cannot be used during a punitive investigation.

2D MAW LASER INCIDENT CHECK LIST

YES	NO	TASKS TO BE COMPLETED FOR ANY SUSPECTED LASER OVEREXPOSURE
		Power secured to LASER and safeties engaged
		First aid given to injured personnel
		Utilize Unit LASER SOP Emergency Procedure section, injured personnel transported to be seen at ophthalmology department
		* Unit SOP Emergency Procedure section should be referenced on where and how to transport.
		* Primary concern for any personnel over-exposure to LASER energy is to get them to medical care. They should preferably see an ophthalmologist. If one is unavailable then they can see an optometrist. A visual acuity test, ocular history, and external ocular/fundus exam should be conducted at a minimum.
		Duty flight surgeon notified
		Unit ALSO notified
		Unit ASO/DSS notified
		Unit XO notified
		Unit CO notified
		Unit SgtMaj notified (if enlisted personnel)
		GROUP TLSO Notified
		GROUP ASO/DSS Notified
		GROUP XO Notified
		GROUP CO Notified
		GROUP SgtMaj notified (if enlisted personnel)
		2D MAW TLSO Notified
		2D MAW ASO/DSS Notified
		2D MAW Chief of Staff Notified
		CG 2D MAW Notified
		2D MAW SgtMaj notified (if enlisted personnel)
		FLASH REPORT RELEASED
		Initial Notification to BUMED within four Hours Contact BUMED (M3F72) at (202) 762-3448 or DSN 762-3448 (leave message if receive voicemail), then contact Tri-service LASER at (800) 473-3549 or DSN 240-4784. If report is being faxed, send to (202) 762-0931 and DSN 762-0931.
		Investigation has been initiated by Unit
		Unit has copies of all medical documentation
		OPREP/PCR released if applicable
		Final Investigation message release and report mailed to BUMED within 30 days from incident

SAMPLE LASER EXPOSURE INCIDENT FINAL REPORT MESSAGE (due within 30 days)

FROM VMA XXXXXX XXXXXX XXXXXX//DSS/ALSO//
TO BUMED WASHINGTON DC(UC)
CMC WASHINGTON DC SD(UC)
COMNAVSAFECEN NORFOLK VA(UC)
CG 2ND MAW DSS(UC)
MAG XX(UC)
BT//

UNCLAS//FOUO//REPORT SYMBOL MED 6470-23//
SUBJ//LASER EXPOSURE INCIDENT//
REF/A/DOC/OPNAVINST/MCO/021024//
REF/B/DOC/BUMED/990818//
NARR/REF A IS OPNAVINST 5100.27A/MCO 5100.1B. REF B IS
BUMEDINST 6470.23.

RMKS/*****

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1. THIS REPORT CONCERNS A SEVERE/ROUTINE HAZARD TO NAVAL OPERATIONS. RISK ASSESSMENT CODE (I, II, III, IV). 2D MAW ENDORSEMENT REQUESTED. SUMMARY: Summarize the contents of the report in two lines or less of this paragraph.
2.
 - A. UIC (reporting activity)
 - B. TYPE OF MISHAP: LASER OVEREXPOSURE
 - C. LOCAL TIME OF MISHAP
 - D. GEOGRAPHIC LOCATION: (region, lat/long, and grid. If classified, give general area)
 - E. EVOLUTION AT TIME OF MISHAP: (combat, training, maintenance, etc.)
3. EQUIPMENT
 - A. LASER NOMENCLATURE: IZLID II, NITEHAWK, ATFLIR, LANTRIN (if known)

- B. WAVE LENGTH: (870, 1064, 1540, 1570) NANOMETERS (if known)
 - C. MODE OF OPERATION: CW, PULSED, TRAINING, COMBAT (if known)
 - D. ENERGY/POWER OUTPUT: WATTS, JOLES (if known)
 - E. ESTIMATE OF EXPOSURE. DURATION/DISTANCE (as it relates to MPE/NOHD)
 - F. PROTECTIVE EQUIPMENT: (LEP: EDU-1, EDU-5, FV-9, Nd: YAG VISOR, OR NONE)
4. REPORTABLE INJURIES
- A. PERSONNEL: (1) name, (2) SSN, (3) age, (4) sex, (5) rank/rate/grade, (6) designator, (7) duty status, (8) service, (9) parent command
 - B. MEDICAL DIAGNOSIS
 - C. EXTENT OF INJURIES
 - D. ESTIMATE OF LOST TIME
5. CAUSE(S) OF MISHAP (Personnel error, material failure, inadequate procedures/precautions; other-specify. Refer to NAVSAFCEN Aviation or or U.S. Navy & Marine Corps School of Aviation Safety web page, OPNAVINST 3750.6 Who, What, Why/Component, Mode, Agent. Refer to OPNAVINSTs 3750.6, 5100.23, and 5100.19 as applicable for format of accepted and rejected causal factors).
6. PRIVILEGED NARRATIVE. Provide details concerning the chain of events leading up to, through, and subsequent to mishap. Elaborate with remarks to include the: who, what, were, when, why, and how's of mishap. List all factors which caused or contributed to the events. Include details regarding safety procedures and equipment used.
7. CORRECTIVE ACTION: Recommended actions to prevent similar or related LASER mishaps from re-occurring. Prioritize in order of engineering, procedural, and protective equipment controls. Each of the causal factors should be addressed with a corrective action.
8. REMARKS. Add any further remarks, which may clarify any of the above, such as date of last LASER safety training, certification, and estimated experience with mishap LASER system.
9. POINTS OF CONTACT. List the rank, name, title and the DSN or commercial number and electronic mail or the individual designated to answer inquiries of the report.
10. COMMANDING OFFICER'S COMMENTS.
11. MEDICAL EXAMINATION.

WGO 5104.1A
AUG 13 2010

- A. ENCLOSURES HAVE BEEN MAILED TO BUMED M3F72 UNDER
SEPARATE COVER
- (1) MEDICAL EXAMINATION SF 600
 - (2) MEDICAL PHOTOGRAPHS (color if possible)
 - (3) LASER PHOTOGRAPHS (show LASER settings)//
BT//NNNN//

WgO 5104.1A
AUG 13 2010

SAMPLE ADDENDUM REPORT OF LASER EXPOSURE INCIDENT (to be used
if additional information is gained after final report message
is released)

From: Commanding Officer, Marine Fighter Attack Squadron XXX
To: Chief, Bureau of Medicine and Surgery (BUMED M3F72),
Washington, DC. 20372-5120
Via: Commanding General, 2d Marine Aircraft Wing DSS/TLSO
Commanding Officer, Marine Aircraft Group-XX (Attn:
DSS/TLSO)

Subj: SUSPECTED/CONFIRMED LASER OVEREXPOSURE INCIDENT REPORT

Ref: (a) BUMEDINST 6470.23
(b) Suspected LASER Exposure MSG (DTG)

Encl: (1) SF-600 Chronological Record of Medical Care
(2) Medical Examination Photographs (color)
(3) LASER System Photographs

1. Per reference (a), the following suspected LASER overexposure report is submitted for further documentation of the reference (b) incident. Enclosure (1) is the post incident Chronological Record of Medical Care (SF-600) report with the examination physician's comments. Enclosure (2) contains summary medical photographs post-incident. Enclosure (3) contains photographs and illustrations of the LASER system employed during this suspected incident.

2. Background Data

- a. Reporting activity:
- b. Type of incident: Suspected/Confirmed LASER overexposure
- c. Incident time:
- d. Geographic location:
- e. Evolution at time of incident:

3. Equipment

- a. Aircraft:
 - (1) Model Series
 - (2) BUNO (if applicable)
- b. LASER system:
- c. Wavelength:
- d. Mode of operation:
- e. Exposure duration:

f. Protective equipment used:

4. Reportable Injuries

a. Personnel: (Provide the following information of each individual involved)

- (1) Full name
- (2) SSN
- (3) Age
- (4) Sex
- (5) Rank/Grade
- (6) NEC/Designator
- (7) Duty Status
- (8) Service
- (9) Parent Organization

b. Medical Diagnosis:

c. Extent of Injuries:

d. Recovery Prognosis:

5. Causal Factors. (Personnel error, failure, inadequate procedure/precaution; other-specify. Refer to Naval Safety Center Aviation or U.S. Navy & Marine Corps School of Aviation Safety web page, OPNAVINST 3750.6 Who, What, Why/Component, Mode, Agent. Refer to OPNAVINSTs 3750.6, 5100.23, and 5100.19 as applicable for format of accepted and rejected causal factors).

6. Privileged Narrative. Give brief overview of operations leading up to and during incident. Ensure discussion of pertinent SOP and safety regulations.

7. Corrective Actions. Prioritize in order of engineering, procedural, and protective equipment controls. Each of the causal factors should be correlated to a corrective action.

8. Remarks. Add any further remarks, which may clarify any of the above, such as date of last LASER safety training, certification, and estimated experience with mishap LASER system.

9. Points of Contact.

10. Commanding Officer's Comments.

Copy to: Naval Safety Center
LNTL, Naval Surface Warfare Center, Dahlgren Division

NOTE: This report is for Official Use Only. The classification level is contingent of the LASER system data included.

LASER OPERATOR QUALIFICATION SHEET (NON-AVIATORS)

NAME: _____

RANK: _____

COMMAND: _____

Initial LASER Safety Overview Training Date: _____

Conducted By: _____

PQS/OJT/Course Qualification for LASER systems:

PQS/OJT/Course Date Completed: _____

(Attach PQS/OJT/Course Completion letter/Certificate)

ALSO Signature: _____

.....

PQS/OJT/Course Re-Qualification for LASER systems:

PQS/OJT/Course Date Compiled: _____

(Attach PQS/OJT/Course Completion letter/Certificate)

ALSO Signature: _____

.....

PQS/OJT/Course Re-Qualification for LASER systems:

PQS/OJT/Course Date Compiled: _____

(Attach PQS/OJT/Course Completion letter/Certificate)

ALSO Signature: _____

.....

PQS/OJT/Course Re-Qualification for LASER systems:

PQS/OJT/Course Date Compiled: _____

(Attach PQS/OJT/Course Completion letter/Certificate)

ALSO Signature: _____

.....

COMMAND LASER SAFETY PROGRAM REQUIREMENTS

1. The command LSSO shall ensure that the following components are included in their LASER Hazard Safety Program

a. The command shall establish a command LASER SOP that discusses the duties of the command's LSSO. The commanding officer will approve the LASER SOP. The SOP should be reviewed annually. The command will forward the SOP to the next level on their chain of command. The SOP must address all of the topics that are discussed in this enclosure.

b. A LASER Hazard Program Binder shall be compiled that contains the below listed documents. Electronic copies of these documents are authorized in which case the binder shall be an electronic folder. In the event that the documents are classified, reference the location of the document within the binder.

1. Command SOP/Order. The current version of the command LASER SOP will be maintained in the LASER binder. This order will be reviewed annually or when there are significant changes to the governing instructions. This SOP will address the safety duties and responsibilities of the command ALSO.

2. ALSO/TLSO Designation Letter. A command Administrative LASER Safety Officer (ALSO) shall be a graduate of the ALSO Course given by a Technical LASER Safety Officer, which is approved by the Administrative Lead Agent (ALA). Recertification is required every four years. The command ALSO shall be appointed in writing by the commanding officer after graduating the ALSO class. The command ALSO is responsible for establishing and managing the Squadron LASER Hazard Control Program. The ALSO shall have direct access to the commanding officer on all issues pertaining to LASER operations and LASER safety.

3. ALSO/TLSO Course Completion Certificate. A copy of the certificate is required to be filed in the LASER binder. This certification is valid for four years.

4. Training Rosters. All personnel that are operating or handling LASER's are required to attend annual training. The initial and annual refresher training is required to address the following topics: LASER Physics/Mechanics/Terminology, Viewing/Hazards Distances, Classifications, Biohazards, Medical Surveillance, Eye Protection/PPE, Hazard Prevention, Range Safety, must be addressed during the training. The command is authorized to tailor the brief to address the systems being utilized. Records of LASER safety training with attendance rosters shall be maintained for two years.

5. Roster of Authorized LASER Operators. Per reference (c), commands will utilize enclosure (6) for non-aircrew LASER personnel (LASER personnel as defined above) and documentation for aircrew LASER personnel will be IAW reference (i). Ensure formal and practical (OJT) training is logged and maintained in each member's training/qualification/NATOPS jacket.

6. Medical Surveillance Personnel Roster. All personnel who routinely use 3B and 4 LASERs, are at a higher risk to be exposed to 3B & 4 LASER energy, or whose office space includes storage of 3B & 4 LASERs shall be designated as LASER personnel and shall be enrolled in a Medical Surveillance program. LASER personnel who are in this program will be listed on a memorandum signed by the commanding officer. If the personnel are utilizing the LASER on an approved range, are behind the system, and are following the approved procedures, they are not required to have a LASER eye examination but must be designated and enrolled in the Medical Surveillance program. If the LASER personnel are deploying to combat zones where there is a probability that LASERs will be used, then they shall receive pre-employment and a post-employment LASER eye exam. If personnel are transferring to another command within 2d MAW within 90 days of the post-employment eye exam, then the pre-employment examination after attaching to the new command can be waived. LASER personnel are also required to receive annual LASER training.

7. Emergency procedures and pre-mishap plan. A pre-mishap plan that includes the emergency procedures must be established. This plan needs to be reviewed annually to ensure the information is accurate. Additionally, the squadron should perform training on the mishap plan as well as running a drill with a simulated casualty.

8. LASER mishap investigation and reporting. In the event that there is a mishap/overexposure initial notification will occur within four hours of the incident to BUMED (MED212) or Tri-service LASER hotline. The primary telephone number is at BUMED (MED212) is (202) 762-3448 and DSN 762-3448 or (202) 762-0931 (DSN 762) if the report is being faxed. Notification also should be made to the Tri-service LASER Hotline at commercial (800) 473-3549 or DSN 240-4784. This notification can be either voice, fax, or via electronic mail. Enclosure (5) of this instruction contains additional information for submission of the required reports. Notification via flash reports and OPREP 3 shall be conducted IAW governing instructions.

9. Designation Letter for LASER Safety Committee. All commands will establish a LASER Safety committee. At a minimum there should be three members on the committee. Committee members shall be designated in writing by the commanding officer. Command ALSO's will be the chairperson for the command committee and shall also be a member of the group LASER safety committee. A description of Committee responsibilities shall be listed in the command SOP and listed on the LASER Safety Committee designation letter. The LASER Safety Committee shall communicate quarterly.

10. Points of Contact for LASER Information or Mishap Support. There should be a point of contact listing in the LASER binder of important personnel for LASER mishaps. Commands can use page 4 of enclosure (5) to build the contact list.

11. Copies of LASER Overexposure Incident Reports. Command LSSO's are required to maintain copies of mishap/overexposure reports for their commands. Due to the nature of this material, the information contained within shall be safeguarded IAW OPNAVINST 3750.6. Specific requirements for mishap/overexposure reporting are contained in enclosure (5) of this instruction as well as references (b), (c), (d), and (f).

12. LEP Program. LASER Eye Protection (LEP) program will be established. This program will include maintaining a current inventory, annual inspections, and procurement of assets as needed. LEP will be made available for all personnel who are at risk for exposure to LASER energy. Each of the LASER systems used will require LEP that provided protection for a specific

wavelength. The LSSO will ensure that the appropriate LEP are ordered and on hand. Additionally all of the LEP shall be labeled with either the OD and wavelength or the appropriate LEP code as required in reference (c). LEP shall be inspected prior to usage as well as annually. Conduct (at a minimum) annual audits of the command's LEP to ensure that the assets are labeled with either the OD and Wavelength or the LEP code. LEPs should also be inspected for integrity as well as for scratches or lens bleaching. Restrictions on maximum depth of scratches for aviation LEP can be found in NAVAIR 13-1-6.10. If the command has EDU-5 glasses, this audit should also ensure that the aircrew are properly fit (the AMSO or AMSC from either a MAG or 2d MAW can assist with the fitting process). Documentation of LEP inspection results shall be kept for three years.

13. LEP Ordering Information. Commands should maintain information for ordering the required LEP for the systems being utilized. The two primary factors that need to be considered when ordering are the wavelength and OD requirements for the LASER systems being used. Compatibility with aircraft systems must also be considered. Only authorized LEPs with appropriate flight clearances are allowed.

14. LASER Firing Log. Every LASER operation or series of laser firings using class 3B or class 4 LASER systems shall be logged for all outdoor range operations by the hosting range and operational commands, and for all laboratory firings/tests by laboratory personnel. Documentation for training and combat operations shall include the start and stop time of the exercise/operation regardless of the number of firings; documenting each on/off cycle of the LASER is preferred and should be done whenever practical. The LASER firing log shall include the following information for aviation commands: Command, Range, Date, System, User, Mission Commander, Firing number, Time, Target, Location, Firing Position/Heading. The LASER firing log shall include the following information for non-aviation commands: Command, Range, Date, System, Operator, Firing number, Time, Target, Location, Firing Position/Heading and are maintained for three years. The firing log information is the minimum required per reference (c).

15. LASER classifications and labeling. All LASER assets shall have an approved warning label. This label shall be replaced when it falls off or becomes unreadable. This label should be in a visible location. Refer to the appropriate manufacturer's manual on replacement procedures.

16. Warning devices and signs. Warning labels are required on all LASER systems. The label will contain the LASER class, wavelength, power output. This same information shall be posted in a visible location on the storage container/area and any entryways leading in to the area the LASERs are stored. A warning sign is also required at any entry point to areas that LASER's are being fired or bore sighted. Procedures also should be established to ensure there is limited access to the area when the LASER is being fired.

17. Site Survey Reports. All commands that utilize LASER will ensure a higher headquarters TLSO, RLSS, or LSS conduct an annual LASER site survey. Commands should utilize the checklist from enclosure (4) of this instruction. Results of these surveys will be maintained in the LASER binder. Results from Commanding Generals Inspections will also be retained in the binder. Annual LASER audits and safety surveys shall be maintained on file for three years. The LSSO should utilize the checklist from enclosure (4) for this audit/survey. A certified TLSO or higher are the only authorized individuals to conduct the annual safety survey.

18. Contact Information for LASER Ranges. The command will maintain a current listing for the points of contact for all LASER ranges the command frequently uses.

19. Latest Range LASER Certification Report. Commands utilizing LASER certified ranges need to maintain a copy of the current range certification. This certification is valid for a period of three years. The command ALSO will provide input to the range officials prior to recertification if there is a new LASER system the command wants to utilize on the range. The copy of the report can be in an electric format.

20. Current Inventory. A current inventory of all Class 3B, 4, and all Military Exempt LASER systems shall be maintained by the command. Aviation Commands shall use the Gun Inventory And Tracking Reporting System (GITR) to track their crew served weapon LASERs. This inventory shall include the

AUG 13 2010

serial number, physical location of the assets, and command responsible for the LASER. This inventory shall be forwarded to the Commanding General 2d Marine Aircraft Wing (Attention TLSO/AMSO) via the Group Commanding Officer (Attention TLSO/AMSO) by 1 December each year. This does not preclude any other inventory requirements. Inventory reports will be held on file for five years following submission.

21. Documentation of Disposal of Military Exempt LASER Assets. Disposal of Military Exempt LASERS requires authorization from the Bureau of Medicine and Surgery (BUMED) prior to any disposal or demilitarization. Aviation commands shall request directions for disposal from the MALS Ordnance Officer or the 2d MAW Ordnance Officer. Ground commands shall submit a request for disposal of military exempt LASERS utilizing enclosure (2) of reference (a). This request must be submitted through the chain of command to BUMED prior to disposal or destruction of any assets. The command shall maintain documentation of the authorization and/or transactions in their LASER Binder.

22. LASER Instructions/Orders. Command shall maintain a current copy of all pertinent LASER instructions. Additionally the command ALSO will review their SOP annually to ensure all of the information is accurate and current.

23. LASER System Technical Manual. Technical manuals for all LASER systems utilized by the command shall be maintained. If the manual is classified, a locator document should be located in the command LASER binder. This manual will provide information that would be required in the event of a LASER mishap/overexposure.

24. LSRB Finding Letters/Flight Clearances. All commands that utilize LASER's shall maintain the current LSRB Letter for all systems being utilized. Aviation commands shall also maintain the current flight clearance for all systems utilized. If the flight clearance for a particular LASER system has been incorporated into the NATOPS/TACMAN, this shall be noted in the LASER binder.