



**Department of the Interior
and
United States Forest Service**

Interagency Aviation Life Support Equipment

United States Department of the Interior Handbook
United States Department of Agriculture-Forest Service Guide

March 2021
Revision 3.0

Foreword

This Handbook/Guide is a supplement for the Departmental Manual, Part 351 DM 1 and establishes standards for approval and use of aviation life support equipment when conducting Department of the Interior (DOI) aviation activities. It also serves as a supplement of USFS Manual 5700 and establishes standards for approval and use of aviation life support equipment when conducting Forest Service aviation activities.

Questions regarding the content or guidance referenced in this handbook may be directed to the

Office of Aviation Services, Aviation Safety and Evaluations Division, 300 E. Mallard Drive, Suite 200, Boise, ID 83706-3991.

Or

The USFS Aviation Safety Management Systems Branch Chief, 3833 S. Development Ave., Boise, ID 83705.

The Handbook/Guide is available on the OAS website at <https://doi.gov/aviation>.

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USFS Approval Letter



Forest Service

Washington Office

1400 Independence Avenue, SW
Washington, D.C. 20250

File Code: 5700

Date: March 2, 2021

Route To:

Subject: Approval of the U.S. Department of the Interior Handbook / U.S. Department of Agriculture's Forest Service Guide for 2021 Interagency Aviation Life Support Equipment, Aviation Flight Helmet Standard

To: Regional Fire Directors, Regional Aviation Officers, and Regional Aviation Safety Managers

The U.S. Department of the Interior's Handbook / U.S. Department of Agriculture's Forest Service Guide 2021 Interagency Aviation Life Support Equipment, Aviation Flight Helmet Standard are approved for agency use and guidance. These documents will be posted on the U.S. Department of the Interior Office of Aviation Services publications page at <https://www.doi.gov/aviation/library/guides> and on the Forest Service and Interagency Publications page at <https://www.fs.usda.gov/managing-land/fire/aviation/publications>.

The 2021 Interagency Aviation Life Support Equipment, Aviation Flight Helmet Standard identifies and establishes safety standards for the use and care of personal protective equipment during aviation operations. Forest Service employees shall comply with the updated standards and procedures per direction in the Forest Service Manual 5700 Aviation Management.

I appreciate you sharing this letter with aviation users. For more information, please contact Lori Clark, Acting Branch Chief- Aviation Safety, Washington Office Fire and Aviation Management at 406-370-1710 or lori.clark@usda.gov.

A handwritten signature in blue ink that reads "Patricia A. Grantham".

PATRICIA A. GRANTHAM

Acting Director, Fire and Aviation Management

cc: Joe Reinarz, Paul Linse, Julian Affuso, Walter Bundt, Abe Fandrich, John Nelson, Aaron Schoolcraft, Lori Clark, Tonya Rymer



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Revision History

Date	Document Version	Document Revision Description	Document Author
06/10/2008	1.01	Addition of document approving authority, review, and revision tables.	Les Herman
12/06/2012	2.01	Working draft, updated format, revised OAS website URLs, minor revisions of word usage and style.	OAS - Safety
3/11/2013	2.2	Major revision from working group to includes (referenced to page number) Purpose - Added USFS to create Interagency Manual., 5 Policy, added reference to agency policy., 5 Exceptions, removed fire-resistant clothing exception for flights beyond gliding distance to shore or offshore vessel and platform landings, 6 PPE: General, added ATGS and Fire Recon ALSE requirements, 8 Helmets: Airplane approved flight helmets formatted as table., 9; Formatted non-approved helmets for helicopter use as note to emphasize., 9; Helicopter, add table to organize currently approved helmets., 9 Hearing Protection: Added reference for hearing conservation program., 10 Fire-resistant Clothing: Removed cotton treated and altered materials. Added warning to emphasize keeping clean and away from aviation fuels etc., 10 Full body harnesses: Updated John Day information, 11 Restraint Systems: Simplified restraint diagram, 17 ELT: Added USFS note allowing use of older ELTS, 18 Removed Laser rescue light from required items to recommended items., 19; Added Signal Flare Note for USFS., 19 Survival Kit: Added Reference for Alaska Survival kit requirements., 21; Update AK req, wool blanket, 21; Updated Canadian Regulations., 22 First Aid Kits: Bandage compresses increased., 23	OAS - Safety
4/18/2013	2.3	Helmets: revised approved airplane and helicopter flight helmets, 9	OAS - Safety
6/4/2014	2.4	OAS- 3 Feedback from Bureaus Define ATGS, 6 Added reference to touchscreen flight gloves, 10 Updated hypothermia chart, 13 Aligned ELT with DOI Policy, 19 Included secondary restraint drawings, 28	OAS - Safety
10/30/2014	2.5	Added "U.S. DEPARTMENT OF THE INTERIOR HANDBOOK and U.S. DEPARTMENT OF AGRICULTURE – FOREST SERVICE GUIDE to front page title Added FSH 5709.16 to references, 1.2B, page 5. Revised Definition to include Special Use Activity or Mission Added Touch Screen Glove Military Specification MIL-DTL-81188C for flame resistance properties. Included reference for LEI National Short-Haul Guide w/ Hoist Appendix, page 11.	OAS - Safety
1/30/2015	2.6	Revised paragraph 3.3, Survival kit requirements. Page 17.	OAS - Safety
09/19/2017	2.7	Helmets: Added reference to DOI/USFS Aviation Helmet Standard 11 Revised secondary restraints 13	OAS - Safety
11/25/2017	2.8	Minor grammatical changes, updated URLs, and reformatting. Updated Drawings, Appendix G, 24. Clarified Nomex/aramid fiber requirement in fire-resistant clothing, 10	OAS-Safety

Date	Document Version	Document Revision Description	Document Author
04/29/2020	3.0	General: Fixed typos and out of date hypertext links., Page 8 Terms: Added K.L. Project Aviation Safety Plan or Mission Aviation Safety Plan (PASP or MASP)., Page 9 Waivers and Clothing: Changed underwear to base layers., Page 10 Added "Any repair or modifications to the helmet must be made by an Original Equipment Manufacturer (OEM) certified repair or maintenance technician and performed in accordance with manufacturer instructions. OEM certified technicians must be identified in writing by the OEM or designated representative(s). " Paragraph 2.2.A, page 11 Hearing Protection: Added Active Noise Reduction to approved means of providing additional hearing protection., Page 12 Removed Two-year waiver statement., Page 12 Helmets: Added note that helicopter helmets meet requirements for Fixed wing helmets but not the vice versa., Page 12 Boots: Removed Non-leather boot table and added links to Airforce and Army authorized non-leather flight boot lists., Page 14 Aircrew Secondary Restraints: Added NIA Approved equipment per NIAC Memo 18-12., Page 15 PFD: Removed time of useful consciousness chart as it could not be validated or updated., Page 16 Added "PFDs made with fire resistant fabrics are preferred." Page 16 ELT: Updated 406 MHz requirements to match contract requirements., Page 21	ALSE Working Group
12/22/2020	3.0	Helmets: Added language addressing ANR and earcup fit padding, pages 12-13	OAS-Safety/EAS

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Chapter 1. General Information

1.1 Purpose

This handbook outlines policies, procedures, and responsibilities for using aviation life support equipment (ALSE) during Department of the Interior (DOI) and U.S. Forest Service (USFS) aviation activities. It is designed to supplement the DOI and Forest Service Manuals, providing detailed information as well as specific requirements.

1.2 Policy

- A. It is DOI and U.S. Forest Service policy to provide employees with the aviation life support equipment and training necessary to promote a safe and healthy work environment free from recognized safety and health hazards during aviation operations.
- B. References:
 - 1. DOI Department Manual 351 DM 1 - <https://www.doi.gov/elips/search>
 - 2. DOI Department Manual 485 DM - <https://www.doi.gov/elips/search>
 - 3. USFS Forest Service Manual 5700 - https://www.fs.usda.gov/cgi-bin/Directives/get_dirs/fsm?5700
 - 4. USFS Forest Service Handbook 5709.16 - https://www.fs.usda.gov/cgi-bin/Directives/get_dirs/fsh?5709.16
- C. USFS Forest Service Health and Safety Code Handbook, FSH 6709.11 - https://www.fs.usda.gov/cgi-bin/Directives/get_dirs/fsh?6709.11
- D. Responsibilities.
 - 1. Bureaus, offices, and USFS Washington Office, Regions, Stations, and Programs are responsible for implementing their personal protective equipment (PPE) program.
 - 2. Supervisors:
 - (a) Supervisors are responsible for evaluating all aviation activities and providing employees with appropriate ALSE equipment in accordance with appropriate [Federal requirements for personal protective equipment \(PPE\)](#).
 - (b) Supervisors are also required to provide employee training on the proper use of ALSE equipment to include maintenance, inspection, storage, and disposal.
 - 3. Bureaus, USFS, and individuals are encouraged to supplement these requirements to better meet the needs of the mission and environment.

1.3 Scope

- A. ALSE covers a broad spectrum of equipment and procedures for protecting aircrews, passengers, and support personnel involved in aviation activities, including mishap or survival situations. While the emphasis is on special use activities, other mission-specific equipment such as fire extinguishers, first aid kits, restraint systems, and additional equipment required for flights beyond gliding distance to shore are also included.

Note:	ALSE listed in this handbook may require fitting, periodic inspections, testing, and scheduled replacement. Users must ensure that equipment is maintained in serviceable condition and in accordance with the manufacturer's guidance.
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Chapter 1. General Information

B. Document Conventions.

1. The DOI, its Bureaus and Offices, and the USFS are all participating agencies. Throughout this document, the requirements will be address to “Agencies” unless a specific requirement exists for an individual organization.
2. Notes, Cautions, and Warnings. This document will contain formatted paragraphs that highlight important information or requirements.

Note: Notes highlight important information of special interest.

Caution: Cautions provide critical information that if not followed could result in additional safety risk to employees.

Warning! Warnings provide critical information that if not followed could result in personal injury or death.

1.4 Definitions

- A. Air Tactical Group Supervisor (ATGS): Qualified aerial firefighter supervisors that coordinate and supervise aircraft operations in incident airspace and give tactical direction to aviation assets.
- B. Aircrew member. Crewmembers, other than flight crewmembers, required to be on board the aircraft to ensure the successful outcome of the mission.
- C. Anchors: An anchor system is defined as the points in the helicopter to which the tether is attached.
- D. Carabiner or quick link: An opening/closing metal link made of various metal alloys used to link one or more systems together. See specific requirements in secondary restraint section below.
- E. Extended Overwater Operations. Airplanes: Operations over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline. Helicopters: An operation over water at a horizontal distance of more than 50 nautical miles from the nearest shoreline and more than 50 nautical miles from an offshore heliport structure.
- F. Flight Crewmember. A pilot, flight engineer, or flight navigator assigned to duty in an aircraft during flight time that holds a valid Federal Aviation Administration (FAA) Airman's Certificate and flight physical.
- G. J- Shaped Safety Knife: The J-shaped safety knife is designed to quickly cut through cordage or webbing. Used for emergency cutaway from the ropes or tether.
- H. Kilonewton (kN) An international standard unit of force equal to 1000 newtons or 224.8 pounds. One newton is the force needed to accelerate one kilogram of mass at the rate of one meter per second squared.
- I. Offshore Operations. These are operations beyond a point where navigation by visual reference to landmarks can be made.
- J. Passenger. Any person aboard an aircraft who does not perform the function of a flight crewmember or aircrew member.
- K. Point-to-Point Flight. Flights between airports (excluding operations defined in 351 DM 1 as special use or defined in FSM5700 as Special Mission Flights) for which the route of flight is determined only by the pilot(s) based on navigational requirements not including IFR flights.
- L. Project Aviation Safety Plan or Mission Aviation Safety Plan (PASP or MASP). A document used to plan project or mission aviation operations with the necessary consideration given to mishap prevention and risk mitigation. Flights shall be conducted as planned and in accordance with Departmental policy and procedures.

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- M. Qualified non-crewmember. An individual, other than a member of the crew, aboard an aircraft whose presence is required to perform, or is associated with the performance of, a governmental function.
- N. Shore. That area of the land adjacent to the water, which is above the high-water mark and excludes land areas that are intermittently under water.
- O. Special Use Activity or Mission. Operations involving the utilization of airplanes and helicopters in support of Agency programs which are not point-to-point flight activities, and which require special considerations due to their functional use. [DOI Special Use Activities are defined in OPM-29. USFS Special use missions are defined in FSM 5705.](#)
- P. Tether: A commercially sewn webbing or cordage strap used to connect a person to an anchor point.

1.5 Exceptions and Waivers

A. Exceptions

1. Wildland firefighters assigned to wildland fire incidents may wear approved hardhats with chinstrap in lieu of flight helmets when being transported as a qualified non-crew member during fire operations from an established and managed helibase/helispot to another managed helibase/helispot. A managed helibase/helispot is established when there is a helicopter crewmember or helibase/helispot manager on the ground at the helibase or helispot before non-crew members are transported to these locations.
2. Personal protective equipment (PPE) is not required, but is recommended, for flights conducted entirely (less takeoff and landing) above 500 feet above ground level (AGL) in airplanes.
3. USFS: (Ref FSH5309.11 52.12) Law enforcement personnel are authorized to wear specified uniforms for special tactical operations, for emergency flights, or on flights that are short in duration.
4. USFS: Due to environmental conditions Alaska has certain PPE requirements that can be found in R-10 Supplement 5700-2006-1 5716.31

Note: The above exceptions do not authorize the wearing of outerwear or base layers made of materials with low temperature melting characteristics, such as synthetics (nylon, Dacron, polyester, and so on) and synthetic blends, as provided by paragraphs 2.3E and 2.3F, Outerwear and Base Layers on page 13 of this handbook.
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B. Waivers

1. DOI: If a DOI Bureau or Office identifies an ALSE requirement that presents a concern affecting employee safety or security, then DOI Bureau Directors have discretionary authority to grant a waiver. This authority may be exercised by the Bureau Director or by written delegation at a lower authority level. Bureau Directors may exercise this authority by providing a copy of the waiver and any written delegation to Aviation Safety, Training, Program Evaluations & Quality Management and the appropriate OAS Regional Director. Waivers will specify safety or security concern, the requirement being waived, the duration and dates of waiver, risk mitigations in lieu of the prescribed ALSE and supporting rationale.
2. DOI: all other non-ALSE waivers, such as pilot requirements, training requirements, etc., must be approved by the Director, OAS in accordance with 350 DM 1.10, "Exceptions."
3. USFS: if the use of specific ALSE is required in policy (FSM 5700, FSH 5709.16 and applicable guides) waivers shall be approved by the Deputy Chief, State and Private Forestry.

Chapter 2. Personal Protective Equipment

2.1 General

- A. Under the broader category of ALSE, Personal Protective Equipment (PPE) is certain specialized items of clothing and equipment that are required for protection against hazards in the aviation environment, such as head and hearing protection and flash fire.
- B. All personnel engaged in special use aviation activities, except airplane operations above 500 feet AGL, such as fire recon, resource recon, air tactical use, etc., are required to wear the following ALSE unless exempted or waived under the provisions of paragraph 1.5 on page 9:
 - 1. Flight helmet.
 - 2. Fire-resistant clothing.
 - 3. Fire-resistant flight gloves. All leather gloves are an approved substitution for fire-fighter and non-flight crewmembers and aircrew members.
 - 4. Leather or approved non-leather boot.

Note:	USFS does not require flight helmets for fixed wing special use missions.
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- C. ATGS Operations. Flight crewmembers and aircrew members engaged in ATGS operations and fire reconnaissance above 500 feet AGL, are required to wear: Cotton or Nomex shirt, Leather shoes or boots, and full-length cotton or Nomex pants or flight suit. (Reference [NWCG Standards for Aerial Supervision, PMS 505](#))

Note:	Waivers to these requirements for extreme environmental work conditions may be granted and should be obtained as detailed in paragraph 1.5B on page 9.
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2.2 Head, Hearing, and Eye Protection

Flight helmets provide head, hearing, and eye protection in most environments.

- A. Flight Helmets. This chapter identifies the types of approved flight helmets, but it does not address how the user should take care of the helmet. It is imperative that employees using a flight helmet ensure that the helmet is serviceable before flight. The helmet must be maintained and inspected according to the manufacturer's instructions. Any repair or modifications to the helmet must be made by an Original Equipment Manufacturer (OEM) certified repair or maintenance technician and performed in accordance with manufacturer instructions. OEM certified technicians must be identified in writing by the OEM or designated representative(s).
- B. At the discretion of the Agencies, helmet models that meet the requirements below should be selected based on the ability of Bureau/Agency to provide repair parts, tools, equipment, supplies, and trained personnel to repair and inspect helmets.
- C. Helmets must be equipped with a chinstrap, appropriately adjusted for proper fit. If a nape strap is installed, the nape strap will be adjusted appropriately for proper fit. "Shorty" (David Clark-style) helmets are not approved for either helicopter or airplane flight operations.
 - 1. Helicopter flight helmets must conform to the specification for a helmet currently approved by the U.S. Army, Air Force, Navy, Marine Corps, or Coast Guard for use in helicopters. Helmets approved for use in helicopters are listed in Table 1.

Chapter 2. Personal Protective Equipment

Table 1 Approved Helicopter Helmets

Military Service	Helmet	Commercial Specification	Military Specification
Army, Air Force, Coast Guard	HGU-56/P	PS-0127	FNS/PD 96-18
Army (Special Units)	SPH-4B	None	PS-020
Navy, Marine Corps	HGU-84/P	PS-0120	FS-0062
Coast Guard	SPH-5	PS-0058	PS-0025

2. Obsolete helmets are not approved which include the HGU-2/AP, HGU-26, HGU-33P, HGU-34P, APH series, AFH-1, SPH-3 series, and SPH-4.
3. The helmets designed for helicopters or that meet helicopter helmets requirements are also covered for use as airplane helmets. However, airplane helmets or those meeting Type II Airplane requirements are not covered for use as helicopter helmets.

Warning! Helmets designed specifically for use in airplanes, such as HGU-33P, HGU-34/P, and HGU-55P (helmets meeting the specifications in MIL-DTL-87174/A) do not provide adequate protection for helicopter occupants and are not approved for helicopter use. Additionally, helmets designed for use in a fixed-wing aircraft may not provide sufficient protection from the low frequency noise often encountered in helicopter flight.

4. Airplane flight helmets must conform to the specification for a helmet currently approved by the U.S. Army, Air Force, Navy, or Marine Corps for use in airplanes. Helmets approved by the U.S. Military for use in airplanes are listed in Table 2.

Table 2 Airplane Helmets

Military Service	Helmet	Commercial Specification	Military Specification
Air Force	HGU-55/P	N/A	MIL-DTL-87174A
Navy, Marine Corps	HGU-68/P	N/A	MIL -H- 85047A

5. Non-military approved helmets will be considered for acquisition within our aviation communities by meeting the DOI/USFS Aviation Helmet Standard. Both manufacturers and distributors can test their helmets using an ISO certified laboratory to the DOI/USFS Aviation Helmet Standard. Those meeting or exceeding these standards can be issued a certificate of compliance by the laboratory. These helmets will be identified by the manufacturer and model type on the OAS website within 30 days of receiving the certificate. The DOI/USFS Aviation Helmet Standard and the certificates of compliance are available on the OAS website at <https://www.doi.gov/aviation/safety/helmet>.
6. Active Noise Reduction (ANR) technology possess the ability to improve communication, reduce fatigue, and may also reduce hearing loss over time. Currently, most ANR earcups are manufactured with a hard/rigid material that adversely affects impact performance. The probability of needing that protection is often “low” (for most mission types) with the severity of such an event resulting in “high” (i.e. death or serious injury). In comparison, the probability of experiencing negative aspects involving the aforementioned areas without ANR are more probable, but less in severity (again, for most mission types). Flight helmets that meet the DOI USFS standard without ANR installed may be equipped with ANR technology provided by the Original Equipment Manufacturer (OEM) or designated representative(s) however, managers and

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helmet users should be aware of the degraded impact performance resulting from earcups constructed of inflexible (hard) materials associated with most ANR systems. **Please contact your respective Aviation Managers for specific agency/bureau/region/unit requirements prior to procuring any type of helmet.**

7. Additional fit padding may be used to improve comfort and proper seal around the earcup area. Fit padding is limited to the area between the speaker assembly and helmet shell and should not be used to alter the overall size (e.g. large to medium head sizing).
8. Hearing Protection. Most operating aircraft generate noise levels above 85 dB which is the threshold for hearing protection requirements and the level in which hearing impairment may occur. Hearing protection must be worn when in proximity to operating aircraft. Hearing protection in the form of an approved helmet, earplugs, or earmuffs can provide users with adequate hearing protection. Use of combination or double protection (such as helmet plus earplugs) is a good means of providing additional hearing protection. Communications Ear Plugs (CEP) or active noise reduction are also an approved means of providing additional hearing protection without impeding intercom communication quality. The requirement for hearing protection and hearing conservation programs is [29 CFR 1910.95](#).
9. When not conducting special use activities, earmuffs and earplugs may be substituted for the flight helmet. Sound barrier " earmuffs " may be worn in lieu of earplugs while performing ground operations, and in fixed wing aircraft not requiring a helmet. Earplugs are recommended to be worn with earmuffs or flight helmets for added protection.
10. Eye Protection. Eye protection is required in work environments where air particle contaminants are present. Helmets will be equipped with serviceable visors. Use of the visor is recommended during all helicopter and low-level airplane operations.

2.3 Fire-Resistant Clothing

- A. General. Fire-resistant clothing protects the wearer from flash fire burns. The preferred material is an aramid fiber which is commonly known as "NOMEX." The actual material may be NOMEX, NOMEX fleece, polyamide, aramid, polybenzimidazole, Kevlar, or blends thereof. Clothing not containing labels identifying the type of aramid fiber material either by brand name or U.S. military standards are not acceptable. These materials, while not fireproof, are inherently fire resistant and will char rather than burn at about 700 to 800 degrees Fahrenheit. Treated or altered cotton fiber materials are not acceptable.
- B. Shirt/Trousers Combination. Fire resistant clothing used by wildland firefighters and BSEE inspectors is approved for Agency aviation operations. Shirtsleeves must be long enough to overlap gloves with the cuffs fastened. Shirt cuffs shall be worn down and fastened. The shirt tail must be tucked into the trousers and the trousers must cover the boot tops.
- C. Flight Suits. For optimum protection, NOMEX coveralls must fit loosely, providing trapped air for insulation. Sleeves must be long enough to reach the first knuckle on the thumb before securing snugly over the flight gloves at the wrist. Pant legs must reach the floor while standing and secure snugly over approved boots at the ankle while seated.

Warning! All garments must be clean. Fuels, grease, oils, and other combustible materials embedded in the fabric will burn at their normal flash points even though the fire resistant clothing will not char until a higher temperature is reached.

Note: Laundering instructions for NOMEX aramid fiber clothing are provided by manufacturers and should be followed to maintain serviceability. Most items can be washed and dried by conventional home methods. Dupont, the maker of Nomex, provides a detailed [Laundering Guide](#).

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- D. **Gloves.** Flight Gloves (type GS/FRP-2) constructed of a soft leather palm and stretchable NOMEX fabric for the back are preferred. These gloves have a long cuff extending several inches above the wrist providing total coverage when the flight suit sleeve is properly worn. Gloves should fit snugly to provide maximum finger dexterity for the wearer. All-leather gloves (without synthetic liners) are acceptable if they provide the wearer with wrist coverage and finger dexterity. Gloves that meet the flame-resistant Nomex and leather design (Conforms to Military Specification MIL-DTL-81188C) are available that are compatible with modern touchscreen devices. These are preferred when touchscreen devices are mission essential.
- E. **Outerwear Garments.** Garments worn over the NOMEX flight suit, such as coats, bib pants, and coveralls, should also be made of NOMEX. Outerwear garments made from natural fibers, such as leather, cotton, wool, or wool/cotton blends, as well as from fire-resistant cotton and cotton blends, are acceptable substitutes. Materials with low temperature melting characteristics, such as synthetics (nylon, Dacron, polyester, and so on) and synthetic blends, are not approved.
- F. **Undergarments.** Base Layers, socks, and clothing worn under the flight suit and next to the skin will provide the best protection if made of NOMEX. Natural fibers, such as cotton, wool, or wool/cotton blend, silk, as well as fire-resistant cotton and cotton blends, are acceptable substitutes. Materials with low temperature melting characteristics, such as synthetics (nylon, Dacron, polyester, and so on) and synthetic blends, are not approved.

Caution: In cold climates, cotton undergarments and socks will absorb perspiration and water, subjecting the wearer to chill, hypothermia, and frostbite.

- G. **Boots.** For most special-use flight operations, boots must be constructed of full leather uppers and lowers with rubber lug soles appropriate for the ground conditions and expected weather in the area of operations; there are a few situations – as described below– in which exceptions to full leather boots may be made. Consult regional policies for additional exceptions. Many models of lightweight outdoor footwear marketed as “hiking boots” are constructed of all-synthetic or significant portions of synthetic material in the uppers and lowers and are not approved for special-use missions. Boot tops must extend above the ankle and must be constructed so that metal parts, such as shoestrings eyes or zippers, do not contact the wearer's skin. Non-leather boots must be flight approved in accordance with U.S. Military standards for aviation use. Boots made of fire-resistant rubber are also an acceptable substitute.
- H. The military has done an excellent job of specifying constructions standards and materials for non-leather flight boots. Non Leather flight boots can be found at:
 - <https://usaarl.health.mil/index.cfm/boots>
 - http://everyspec.com/MIL-SPECS/MIL-SPECS-MIL-B/MIL-B-27486C_28408/

2.4 Aircrew Member Secondary Restraint System

- A. Additional restraints are only required when performing certain duties when the aircraft doors are open or removed and the aircrew member is conducting specific duties. Some missions where doors are open or removed must use a seatbelt or secondary restraint if a seat belt is not used. If aircrew members will be leaning into the shoulder restraint performing their specific duties, then a secondary restraint provides additional protection in the event that the seat belt release mechanism is inadvertently opened. The harness must be attached to an FAA or agency approved tether and helicopter hard point.
- B. Activities which require restraint systems other than approved seat belts include, but are not limited to, helicopter rappelling, aerial ignition, ACETA missions, short-haul, cargo letdown, photography, Smokejumper Spotting, and infrared sensing. Refer to the appropriate agency directive, guide and/or handbook. Reference to secondary restraints may appear in Project Aviation Safety Plans (PASP) (or Mission Aviation Safety Plan (MASP)).

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- C. In addition to the seat belt, an approved full-body harness with daisy chain, lanyard, safety strap, tether, a gunner strap (body belt) with tether, or rappel spotter harness with tether attachment should be used as a secondary restraint. A secondary restraint tether must be properly adjusted to prevent the harness from extending past the plane of the door sill of the aircraft. The seat belt should be worn at all times when possible. Seat belts and shoulder harnesses remain required for all takeoffs and landings.
- D. Harnesses, Daisy chains, lanyards, safety straps, tethers, and gunner strap components must meet at least one of the following design and manufacturing criteria or certifying agency approval:
- MTDC – 993 Helicopter Operations Harness Tether and Tether Attachment
 - MTDC – 984 Gunner Strap
 - MTDC – 946 Rappel Spotter Tether Attachment and Installation
 - MTDC-1077 Smokejumper Spotter Tether Harness with Droop Riser
 - Be certified by one of the following approving bodies with a minimum rating of 10 kN except for harnesses:
Approving Bodies:
 - Underwriter Laboratories (UL)
 - American National Standards Institute (ANSI Z359.1)
 - American Standard for Testing and Materials (ASTM)
 - Union Internationale Des Associations D'Alpinisme (UIAA)
 - The commercially made full-body harness must conform with 29 CFR 1910.66, 1926.502
- E. The following helicopter secondary restraint equipment is approved for use by both agencies:
- Yates® 388 Heli-Ops Harness
 - Petzl® Grillon Hook/Personal Retention Lanyard(2M)
 - Air Rescue Systems® Primary Anchor
 - Petzl® Vulcan High-Strength Steel Auto-locking Three Stage Carabineer
- F. Daisy chains, lanyards, safety straps, and tether straps will be fixed to one or more FAA or agency approved aircraft attachment points using locking carabiners or quick link, daisy chain girth hitched technique, or as outlined in the MTDC drawing specifications Figure 4 MTDC 993 Harness Tether & Attachment on page 27.
- G. Carabiners or quick links will be of a locking screw-gate, twist or auto-lock design and will be certified to the following minimum standards -20kN strength major axis closed and 7 kN strength major axis open or minor axis. Both steel and aluminum are approved.

Caution: Restraint systems must be inspected before use for mildew, wear, damage, other deterioration, and defective components prior to use. Carabiners should be inspected for proper function of gate and locking mechanisms, abrasion, burrs, rough edges, fractures/cracks, etc.

- H. Commercially made item will follow the manufacturer's recommendations for proper use. Aircrew members will inspect harnesses and tether equipment frequently (e.g., stitching, buckles, webbing abrasion, etc.) for wear or other damage.
- I. The A J-shaped safety knife that is suitable for rapid cutting of the tether is required to be worn by the tethered personnel for emergency use. that is suitable for rapid cutting of the tether. The knife must be worn where it is accessible and easily removed.
- J. The gunner strap, Harness Tether, and Harness Tether Attachment can be obtained from: John Day Air Base 72000 Airport Rd John Day, OR 97845 Voice (541) 575-3384 Fax (541) 575-3382, website: <https://www.fs.usda.gov/t-d/programs/fire/rappel/equip/index.htm>

2.5 Hypothermic Exposure and Drowning Protection

- A. Many aircraft fatalities are attributed to hypothermia or drowning. The United States Search and Rescue Task Force published data shows survival time in 37°F water ranges from 30 to 90 minutes. People immersed in water below 59°F (15 °C) will immediately experience breathing difficulties, beginning with a large aspiratory (cold) gasp, increasing the potential of drowning. Disorientation, unfamiliarity with underwater escape procedures, and the lack of personal flotation devices also contribute to these statistics. For more information you can visit the International Maritime Organization web site at <https://wwwcdn.imo.org/localresources/en/publications/Documents/Newsletters%20and%20Flyers/Flyers/IB946E.pdf>.
- B. Anti-Exposure Garments. A garment's thermal protection aids in reducing cold shock by preventing cold water from touching the skin or creating a thermal barrier warming cold water trapped between the garment and the body. Figure 1 Estimated Time of Useful Consciousness, provides an estimate of the effectiveness of several survival garments at various water temperatures. There are several types of anti-exposure garments available, to include survival suits and anti-exposure flight suits.
1. A Survival (dry) suit or more specifically an immersion suit (sometimes called a "Gumby" suit) is a special type of waterproof dry suit that protects the wearer from hypothermia when immersed in cold water. Thermal performance is dependent on the thickness of the undergarment worn. Survival suits will typically be of a one-piece design made of a fire-resistant neoprene and usually not intended to be worn all the time. Quick-donning survival suits are acceptable when readily available to occupants of multiengine aircraft. (Examples of available products: Mustang Survival Products, <https://mustangsurvival.com/> or GORE-TEX military fabrics, <http://www.goremilitary.com>).
 2. An anti-exposure flight suit is comprised of a one-piece coverall constructed of a NOMEX outer shell and foam lining providing fire resistance, hypothermia protection, and some buoyancy. The user has the ability to seal the ankle and wrist cuffs so flushing of water through the suit is minimized. The body will heat entrapped water (along with the foam in the suit) to become a thermal barrier. An additional benefit of buoyancy results from the foam liner, which keeps the wearer horizontal (on top of the water). Hood and hand protection must be carried in a specific pocket provided for that purpose. (Examples of available products: Mustang Survival Products, <http://www.mustangsurvival.com/>).
- C. An anti-exposure garment must be worn in single engine aircraft and readily available to occupants of multiengine aircraft when conducting extended overwater flights (50nm from shoreline, or shoreline/platform for helicopters) when the water temperature is colder than 50°F.

Caution: Aircraft occupants wearing anti-exposure garments may have trouble exiting from an overturned or submerged aircraft.

- D. Single Engine Aircraft. An inflatable PFD must be worn by all occupants in single engine aircraft that are operating off of or to water, or that operate beyond power-off gliding distance from shore including water bucket dipping and snorkeling operations.
- E. Multi Engine Aircraft. An inflatable PFD must be immediately available to all occupants in multiengine aircraft that are operating off of or to water, or that operate beyond power-off gliding distance from shore including water bucket dipping and snorkeling operations.
- F. Aircraft occupants must wear inflatable PFDs aboard Agency flights when performing water takeoffs or landings including float and boat-hulled aircraft
- G. Personal Flotation Devices (PFDs). The PFD must use a compressed gas cartridge located in the inflation chamber to inflate. The instructions for activating the inflation cartridge must be clearly accessible and marked. The PFD must have an oral inflation tube in the event that the cartridge(s) fail

Chapter 2. Personal Protective Equipment

to inflate the inflation cells. It is recommended that the PFD have two separate inflation cells. PFDs made with fire resistant fabrics are preferred.

- H. PFDs must be maintained and inspected according to manufacturer's instructions. (Examples of available products: Switlik Parachute Company, <http://www.switlik.com>, Mustang Survival Products, <http://www.mustangsurvival.com>, Life Saving Systems Corporation, <http://www.lifesavingsystems.com>.)

Warning! PFDs equipped with an automatic (water-activated) inflation mechanism are prohibited. Aircraft occupants must not inflate PFDs in the aircraft. An occupant wearing an inflated PFD may experience difficulty exiting if the aircraft is overturned or submerged.

Caution: Users of PFDs must be briefed on how a PFD is worn, how to inflate it, and procedures to exit from an aircraft ditching in water.

Note: Inflatable PFDs are specifically required because they do not restrict the occupant's movement or egress.

Chapter 3. Survival Equipment

Survival following an aircraft mishap requires the desire to survive, training, survival items carried with you or available from the aircraft, and the use of environmental resources. When constructing a personal “survival kit,” you should consider what would be practical, comfortable, and of the highest priority (fire and signal) during an unexpected survival situation.

Note: Aircraft accident experience has shown that survival equipment carried on your person is often the only equipment available to the survivors.

3.1 General

The equipment listed in this section is the recommended minimum to enhance your chances for survival. Weather, terrain, and environment should be considered when developing your personal survival kit.

3.2 Personal Survival Equipment (Recommended)

- A. Personal Survival Items. Survival items carried in a personal survival vest, clothing, or flight suit pockets are:
- Fire starter (can be two boxes of matches in waterproof containers, “metal match” etc.)
 - Laser rescue light or key chain LED light
 - Signal mirror
 - Whistle
 - Knife or tool containing a knife blade
 - Water purification tablets
 - Sealing clear plastic bag(s)
 - Personal locator beacon (PLB)
 - 360/720/760-channel VHF-AM radio transceiver
 - or satellite telephone,
 - cell phone.
 - GPS
- B. Personal First Aid Items. In addition to personal survival items, consider the following medical items to be personally carried:
- Adhesive bandages – elastic knit – 1” x 3”
 - Alcohol towelettes, individual foil pouches
 - Handkerchief or bandanna
 - Adhesive tape, waterproof
 - Aspirin or acetaminophen
 - Compress bandage, 4” (4)

3.3 Aircraft Survival Kit (Required)

Survival kits are required for all DOI and USFS flight activities except for DOI point-to-point flights and airplane operations that remain above 500 feet AGL. Survival kits are required for all USFS flight activities other than point-to-point flights. A detailed list of requirements and recommendations is located in Appendix 1. Appendix 2 provides the Alaska Survival Kit Regulations and identifies those items that are required for every Aircrew Member operating within Alaska. Appendix 3 provides the Canadian Survival Regulations and identifies those items that are required when conducting aviation operations in Canada.

3.4 Aircraft First Aid Kits (Required)

First aid kits are required for all Agency flight activities other than point-to-point flights and airplane operations above 500 feet AGL but are recommended for all missions. Specific requirements are listed in Appendix 4 on page 24.

Caution: Do not store survival or first aid kits in seaplane float compartments. Kits stored in these compartments are often damaged or inaccessible after an aircraft mishap.

Chapter 4. Aircraft Installed ALSE

4.1 General

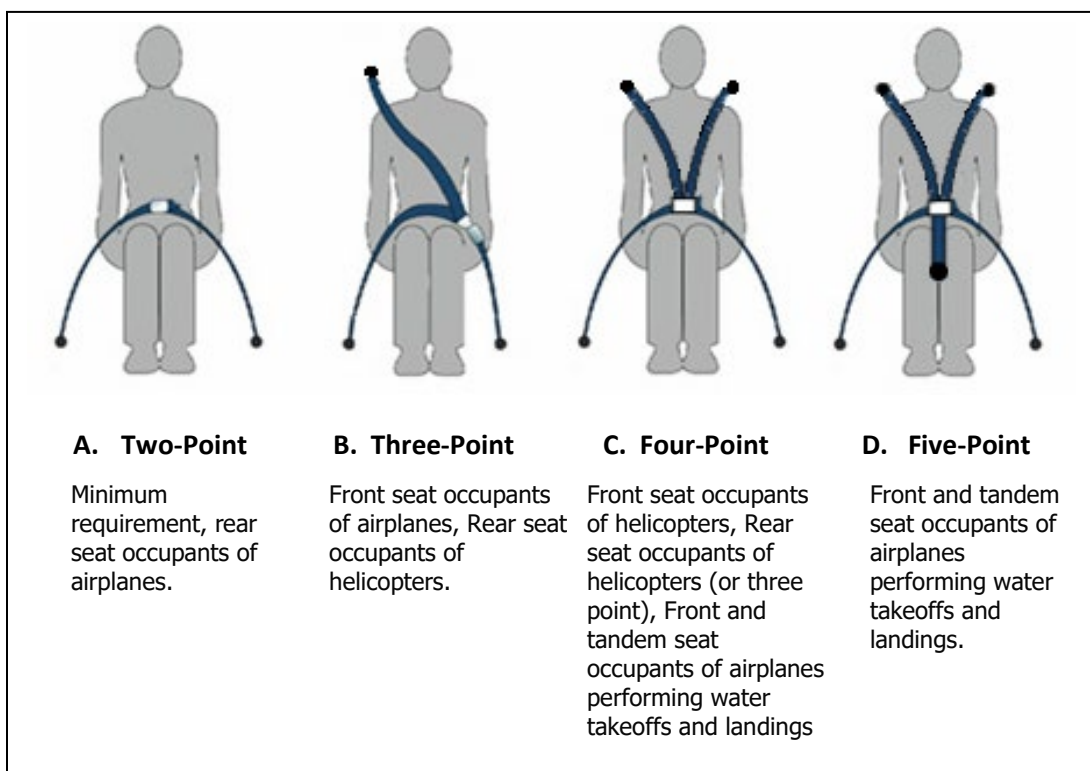
This chapter covers the ALSE required to be installed in aircraft owned or under the control of DOI or USFS. It is the responsibility of the operator to ensure the appropriate equipment is provided. The pilot-in-command must ensure the correct installation, quantity, and serviceability of the equipment. The pilot-in-command is also responsible for briefing occupants on ALSE location and use.

4.2 Restraint Systems

Aircraft must be equipped to the FAA certification standards for the specific aircraft. Restraint systems must be FAA approved and meet the installation guidance referenced in FAA Advisory Circular (AC 21-34), or its current revision. All installations must secure the occupant with a metal-to-metal buckle or latching mechanism. Occupants must wear lap belts and installed shoulder harnesses during all phases of flight unless there is a valid operational or safety requirement, which would cause the pilot-in-command to direct otherwise. Additional requirements are as follows:

- A. All occupied seats must have, at a minimum, a two-point lap belt system.
- B. Front seats must be equipped with a lap belt and shoulder harness as a minimum (three-point system) for airplanes. Helicopters must have a four-point system.
- C. Single-strap shoulder harnesses are acceptable provided they cross the chest diagonally when fastened and do not remain across the chest when the buckle is released. Lap belt and shoulder harness installations must not restrict crewmembers from performing their duties.
- D. Lap belts must fit low and snug across the waist. If the belt is loose, or high around the waist, it can cause injury. Shoulder harnesses must be snug, but not tight, across the chest.

Figure 1 Aircraft Restraint Types



4.3 Helicopter

- A. A double-strap shoulder harness with automatic or manual locking inertia reel for each front seat occupant is required. Shoulder straps and lap belts must fasten with a single-point metal-to-metal, quick-release mechanism. Heavy duty (military-style) harnesses with a fabric loop connecting the shoulder harness to the male portion of the lap belt buckle, are acceptable. Shoulder harnesses (either single-strap or double-strap) are required for each aft cabin occupant.

4.4 Airplane

- A. Shoulder harness and lap belt for front seat occupants and both occupants in tandem seat airplanes are required. The shoulder strap and lap belt must fasten with a single-point metal-to-metal, quick-release mechanism, which does not leave the shoulder strap across the chest when released. Airplanes with a factory-installed military-type shoulder harness also meet this requirement. Some tandem aircraft are also equipped with a five-point system with an additional crotch strap.

Note:	Four-point systems with shoulder harnesses permanently attached to the lap belt are prohibited when performing water takeoffs and landings in airplanes.
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4.5 Fire Extinguishers

- A. The fire extinguisher must be a hand held bottle, minimum 2-B:C rating, mounted and accessible to the flight crew when seated. The fire extinguisher must be maintained in accordance with NFPA 10: Standards for Portable Fire Extinguishers or the Contractor's Part 135 operations specifications.
- B. Aircraft with 10 to 30 passenger seats must be equipped with an additional extinguisher mounted in the passenger compartment.

4.6 Life Raft

Life rafts are required for extended overwater operations in accordance with 14 CFR 135.167.

4.7 Emergency Locator Transmitter (ELT)

- A. A 406 MHz ELT meeting the requirements of TSO-C126 must be properly installed in all DOI owned aircraft or aircraft operated on DOI contracts. Aircraft performing "extended overwater" missions are additionally required to have a survival-type ELT (ELT/S) attached to their life raft, meeting the requirement of 14 CFR 135.167 and 135.168. The ELT installation must be in accordance with the manufacturer's instructions and applicable TSOs.
- B. 406 MHz ELTs send a digital distress signal with aircraft identification information (tail number) which can be received by the Cospas-Sarsat satellite constellation. The Cospas-Sarsat system can estimate aircraft position or relay more precise location information from GPS equipment on the aircraft. Cospas-Sarsat no longer monitors 121.5 ELT beacons, but the 121.5 system is still valuable because it used by search crews to home in on the accident aircraft.

Note:	USFS requires TSO C-91a or newer ELTs. TSO C-126 ELTs are required for overwater rotorcraft operations per 14 CFR 135.168 and by some contracts. See the applicable procurement document for specific requirements.
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4.8 Automatic Flight Following

- A. All agency owned aircraft and some contracted aircraft are equipped with Iridium-satellite based Automated Flight Tracking equipment meeting the specifications of the USFS-administered Automated Flight Following (AFF) system. Since AFF equipped aircraft transmit position, speed, and altitude information at pre-determined intervals the systems provide dispatchers and other aviation managers with near real-time information on aircraft location and status. The AFF system complements the ELT system in that it may provide the only indication of a mishap if the ELT fails to function on impact.

Appendix 1 Aircraft Survival Equipment Items

These are the minimum required items for all Agency flight activities, other than point-to-point and airplane operations above 500 feet AGL, in the United States and U.S. possessions. Additional requirements for flight activities conducted in Alaska are in Appendix 2, page 22 and Canada are listed in Appendix 3, page 23.

1.1. Minimum Aircraft Survival Kit Items

- Fire starter (can be two boxes of matches in waterproof containers, “metal match” etc.)
- Magnesium fire starter
- Signal mirror
- Whistle
- One knife (includes “multi-tools” with knives)
- Wire saw, axe, hatchet, or machete
- Nylon rope or parachute cord (50 feet, minimum 1/8 inch [3mm] thick)
- Collapsible water container
- Water purification tablets
- Water (one quart per occupant required except when operating over areas with adequate drinking water)
- Food (2 days emergency rations per occupant, with a caloric value of 1,000 calories per day)
- At least one of the following will be in the aircraft:
 - Automated flight following system
 - Satellite phone
 - 406 MHz personal locator beacon (PLB) with GPS or aircraft-mounted 406 MHz ELT
 - Handheld UHF or VHF radio

1.2. Recommended Items

In addition, recommended items to consider depending on environmental factors:

- Flashlight with spare batteries, chemical light sticks, or LED light
- Signal flares (consider fusees and road flares for starting fires in any weather condition)
- Laser Rescue Light
- Signal panels
- Large plastic trash bags
- Collapsible shovel
- Insect repellent (can be used for fire starter)
- Sunblock
- Sleeping bag (one bag per two people)
- Snowshoes
- Survival manual or guide

Note:	Signal Flares may be required by USFS. Survival kits requirements for the USFS will be found in the procurement document. Refer to procurement document for a description of required survival kits items.
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Appendix 2 Alaska Survival Regulations

2.1. Alaska Survival Kit Regulations

Note: These are not Agency requirements, but Alaska State Government requirements and are provided as reference only. <https://www.akleg.gov/basis/statutes.asp#02.35.110>

Alaska law (Alaska Statute 02.35.110 Emergency Rations and Equipment) requires that no airman (Aircrew Member) may make a flight inside the State with an aircraft unless emergency equipment is carried as follows:

- A. The following minimum equipment must be carried during summer months:
- Rations for each occupant to sustain life for one week
 - One axe or hatchet
 - One first aid kit
 - An assortment of tackle such as hooks, flies, lines, and sinkers
 - One knife
 - Fire starter
 - One mosquito headnet for each occupant
 - Two small signaling devices such as colored smoke bombs, railroad fusees or Very pistol shells in sealed metal containers
- B. In addition to the above, the following must be carried as minimum equipment from October 15 to April 1 of each year:
- One pair of snowshoes
 - One sleeping bag
 - One wool blanket or equivalent for each occupant over four.

Note: Operators of multiengine aircraft licensed to carry more than 15 passengers need carry only the food, mosquito nets, and signaling equipment at all times other than the period from October 15 to April 1 of each year, when two sleeping bags and one blanket for every two passengers must also be carried. All of the above requirements as to emergency rations and equipment are considered to be minimum requirements that are to remain in full force and effect, except as further safety measures may be from time to time imposed by the State of Alaska.

Appendix 3 Canadian Survival Regulations

3.1. Excerpted Canadian Regulations

Canadian Aviation Regulations, VI, subpart 2, 602.61 Survival Equipment - Flights Over Land.

Note: These are not Agency requirements, but Canadian Government requirements and are provided as reference only. The requirements can be found at <http://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/FullText.html#s-602.61>

(1) Subject to subsection (2), no person shall operate an aircraft over land unless there is carried on board survival equipment, sufficient for the survival on the ground of each person on board, given the geographical area, the season of the year and anticipated seasonal climatic variations, that provides the means for

- (a) starting a fire;
- (b) providing shelter;
- (c) providing or purifying water; and
- (d) visually signaling distress.

(2) Subsection (1) does not apply in respect of

- (a) a balloon, a glider, a hang glider, a gyroplane or an ultra-light aeroplane;
- (b) an aircraft that is operated within 25 nautical miles of the aerodrome of departure and that has the capability of radio communication with surface-based radio station for the duration of the flight;
- (c) a multi-engined aircraft that is operated south of 66° 30' north latitude
 - (i) in IFR flight within controlled airspace, or
 - (ii) along designated air routes;
- (d) an aircraft that is operated by an air operator, where the aircraft is equipped with equipment specified in the air operator's company operations manual, but not with the equipment required by subsection (1); or
- (e) an aircraft that is operated in a geographical area where and at a time of year when the survival of the persons on board is not jeopardized.

If you plan to carry firearms in an aircraft, included as part of your survival equipment, you must be aware that hand guns and fully automatic weapons are not legal to be carried or worn in Canada. As for any long guns, when entering Canada you must register each firearm with Canadian Customs or face severe penalties if caught.

On a related issue, the "flare gun" found in many life rafts and survival kits is not a "firearm," so do not refer to it as such when asked by Canadian Customs if you have any firearms on board. If the subject comes up, and only if it comes up, you must always refer to it as a "pyrotechnic signaling device" as in "There is a pyrotechnic signaling device in the life raft survival kit in accordance with Canadian, U.S., and international regulations."

Appendix 4 Aircraft First Aid Kit Requirements

4.1. Aircraft First Aid Kits

The kit items must be stored in a dust-proof and moisture-proof container. It must be readily accessible to the aircraft occupants. Kits are available through commercial sources. The kit's contents must include the items listed below plus additional equipment appropriate to the route and number of occupants aboard the aircraft.

Table 3 First Aid Kits Required Contents

Item	Passenger Seats 0-9	Passenger Seats 10-50
Adhesive bandage strips, (3" long)	8	16
Antiseptic or alcohol wipes (pkts)	10	20
Bandage compresses, 4" (aka "field dressing")	4	8
Triangular bandage, 40" (sling)	2	4
Roller bandage, 4"x 5 yd (gauze)	2	4
Adhesive tape, 1"x 5 yd (std roll)	1	2
Bandage scissors	1	1
Body fluids barrier kit: 2 - pair nitrile or nonlatex surgical gloves 1 - face shield 1 - mouth-to-mouth barrier 1 – protective gown 2 – antiseptic towelettes 1 – biohazard disposable bag	1	1
NOTE: Splints are recommended if space permits.		

Appendix 5 Secondary Restraint Systems

5.1. Secondary Restraint System Drawings

Figure 3 on page 26 and Figure 4 on page 27 represent acceptable secondary restraint systems that can be used when required by Special Use activity profiles.

Figure 2 MTDC-984 Gunner Strap

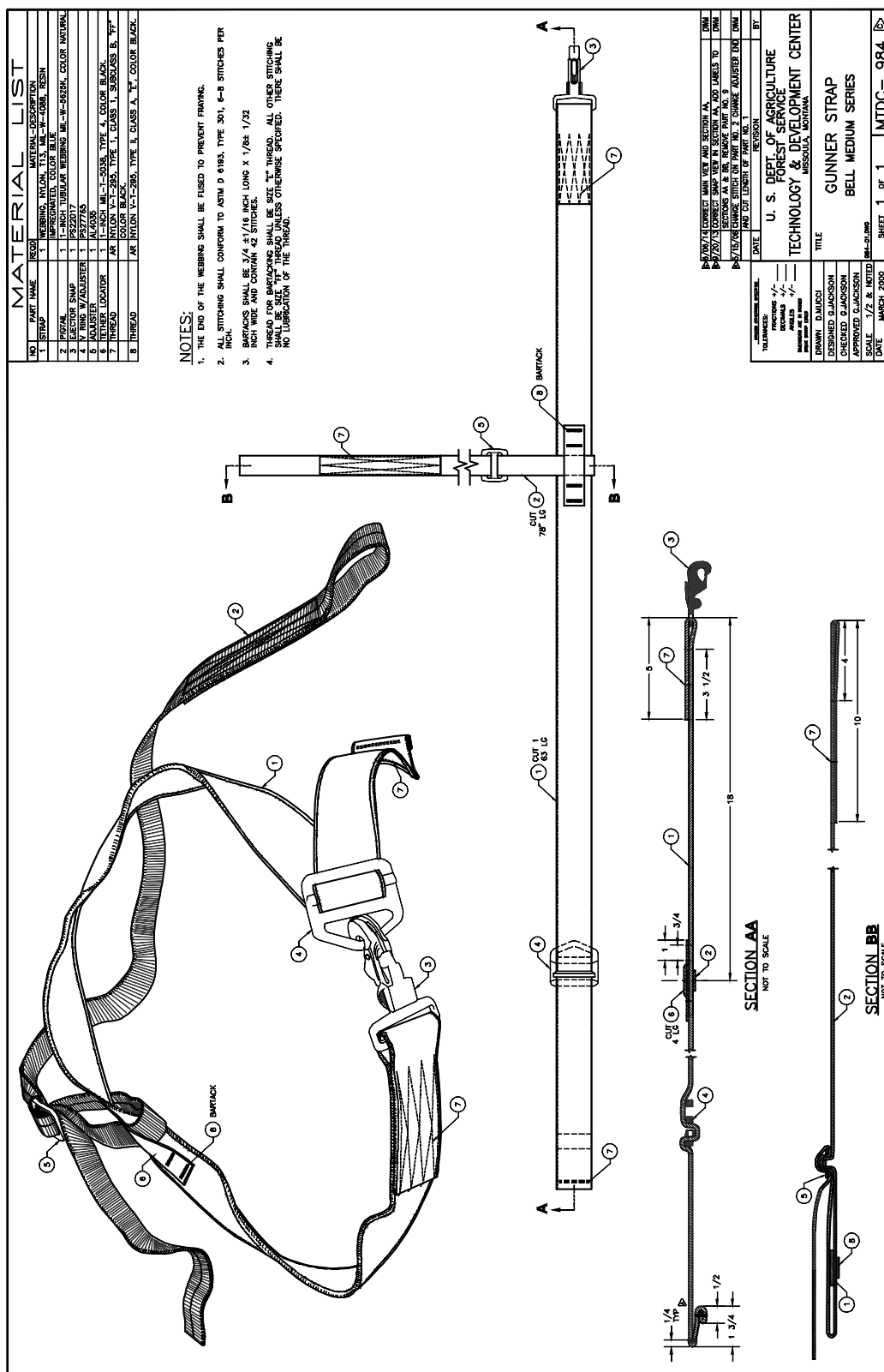


Figure 3 MTDC 993 Harness Tether & Attachment

