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Change:

Helicopters provide a means of transporting people in urgent need of medical assistance. These operations are unique due to the urgent nature of the flight. Each year thousands of patients are transported by helicopter while being attended by medical personnel trained to respond to their needs. Helicopter air ambulances (HAA) are equipped with medical monitoring and support systems to ensure proper care en route.

The HAA industry continues to expand. In response to the dynamic growth of this industry, the Federal Aviation Administration (FAA) has issued this advisory circular (AC) to provide information and guidelines to assist existing HAA operators, other Title 14 of the Code of Federal Regulations (14 CFR) part 135 operators considering becoming an HAA operator and those considering new-startup HAA operations. To address an increase in fatal HAA accidents, the FAA has implemented new operational procedures and additional equipment requirements for HAA operations. The FAA, HAA operators and medical community all play vital roles in applying these changes to ensure safety. Implementing a safety culture will benefit all aspects of HAA operations.

Part 135 subpart L addresses safety improvements for commercial helicopter operations through requirements for equipment, pilot testing, alternate airports and increased weather minimums for all General Aviation (GA) helicopter operations. Many of these requirements also address National Transportation Safety Board (NTSB) safety recommendations directed at improving HAA safety.

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CHAPTER 1. GENERAL

1-1. PURPOSE.

a. Background. This advisory circular (AC) provides information and guidance material specifically applicable to helicopter air ambulance (HAA) operations. The Federal Aviation Administration (FAA) issued a final rule in 2014: Helicopter Air Ambulance, Commercial Helicopter, and Part 91 Helicopter Operations. The bulk of the 2014 HAA rule package codifies requirements formerly contained in Operations Specification (OpSpec) A021, Helicopter Air Ambulance Operations, and which are now in Title 14 of the Code of Federal Regulations (14 CFR) Part 135 Subpart L, Helicopter Air Ambulance Equipment, Operations, and Training.

b. Phraseology Changes.

(1) The term Emergency Medical Service/Helicopter (EMS/H or HEMS) is obsolete. It is being replaced with HAA because, though a critical life and death medical emergency may exist, air ambulance flights are not operated as an emergency. Pilots and operator management personnel should not make flight decisions based on the condition of the patient, but rather upon the safety of the flight.

(2) Management should discourage the use of the term “mission” to describe flight assignments in operator manuals, training, and risk analysis programs. The emphasis should be on providing air transportation rather than completing a “mission.” The mission concept has been derived from military tactical or combat aviation policies that factor in “acceptable losses,” and may affect the normal commercial civil air transportation go/no-go decisionmaking process.

c. Scope. AC 135-14B supports the 2014 final rule. The information provided in this AC cites the associated regulations and other sources for easy reference. This AC is not mandatory and does not constitute a regulation. Nothing in this AC alters legal requirements for HAA operators to comply with regulations. This AC also refers to recommended practices that are not mandatory and do not reflect regulations and their requirements. When properly followed, these compiled industry best practices can enhance safety and reduce the number of HAA accidents.

1-2. CANCELLATION. AC 135-14A, Emergency Medical Services/Helicopter (EMS/H), dated June 20, 1991, is canceled.

1-3. OBJECTIVE. The primary objective of this AC is to provide information on policy and identify best practices for HAA operations based on multiple sources including the HAA rules published in 2014.

1-4. AUDIENCE. This AC is addressed to existing HAA operators and prospective part 135 certificate holders intending to conduct HAA operations, their employees, employees of associated medical services and public service.

1-5. RELATED 14 CFR PARTS. Title 14 CFR parts 1, 27, 29, 43, 61, 65, 91, 119, 120, 135 and 157.

1-6. DEFINITIONS/ABBREVIATIONS.

a. Accident/Incident Plan/Post-Accident/Incident Plan (AIP/PAIP). Includes emergency response procedures that should be used as a basis for training or for reference in the event of a mishap or other emergency.

b. Advisory Circular (AC).

c. Aeromedical Director. A licensed medical professional associated with a HAA operation, ultimately responsible for patient care during air transport. The Aeromedical Director has no operational control authority or influence over decisionmaking related to conduct of flights.

d. Air Ambulance. An aircraft used in air ambulance operations. The aircraft need not be used exclusively as an air ambulance aircraft, and the equipment need not be permanently installed.

e. Air Ambulance Operations. Air transportation of a person with a health condition that requires medical personnel as determined by a health care provider or transportation of human organs; or holding out to the public as willing to provide air transportation to a person with a health condition that requires medical personnel or transplant organs including, but not limited to, advertising, solicitation, association with a hospital or medical care provider.

f. Air Medical Resource Management (AMRM). A dynamic process including pilots, medical personnel (not limited to those participating in HAA flights), maintenance technicians, operational support personnel and management staff that optimizes human–machine interface and related interpersonal issues, with maximum focus on communication skills and team-building curricula. (Refer to the current edition of AC 00-64, Air Medical Resource Management.)

g. Autorotational Distance. The distance a rotorcraft can travel in autorotation as described by its manufacturer in the approved Rotorcraft Flight Manual (RFM). (Refer to part 135, § 135.168.)

h. Certificate-Holding District Office (CHDO). The FAA Flight Standards Service (AFS) CHDO with responsibility for management of an air carrier's certificate, charged with the overall inspection and surveillance of that certificate holder's operations. (Refer to part 1, § 1.2.)

i. Code of Federal Regulations (CFR).

j. Communications Specialist. An individual trained and qualified by the operator to receive and coordinate one or more of a range of activities, including but not limited to receiving flight requests for HAA operations, communications with medical, first response and other HAA organizations, communications with HAA crews and flight locating. The employment and training of communications specialists has been identified as an HAA industry best practice. (See paragraph 3-2f in this AC.)

k. Crew Resource Management (CRM). The use of all the available resources, information, equipment and people to achieve safe and efficient flight operations; approved CRM training is required for flightcrews in accordance with § 135.330. (Refer also to § 135.330 and the current edition of AC 120-51, Crew Resource Management Training, for more information.)

l. Datalink. A general term referring to a variety of technologies used to transmit and receive wireless electronic data between on-aircraft systems and off-aircraft systems.

m. Extended Overwater Operation. Per § 1.1, with respect to helicopters, an operation over water at a horizontal distance of more than 50 nautical miles (NM) from the nearest shoreline and more than 50 NM from the nearest offshore heliport structure.

n. Flight Following. Active contact with an aircraft throughout all of a flight (including time on the ground), either through voice radio contact with the pilot or through automated flight following systems. Considered a best practice in the HAA industry.

o. Flight Locating. The certificate holder is required by regulation to use flight locating procedures (refer to § 135.79), unless an FAA flight plan is filed and activated. Flight locating by HAA operations, even where it is not required by regulation, is recommended as an HAA industry best practice.

p. Flight Standards District Office (FSDO).

q. General Operations Manual (GOM). Required to be compiled to include, at minimum, sections mandated by regulation, including visual flight rules (VFR) flight planning procedures (§ 135.615) and an FAA approved preflight risk analysis (§ 135.617). A GOM requires acceptance by the FAA to be valid.

r. Geographic Information Systems (GIS). A collection of computer hardware, software and geographic data designed to efficiently capture, store, manage, map, analyze and display geographically referenced information.

s. Helicopter Air Ambulance (HAA). A helicopter, defined for the purposes of § 135.619, that is identified in the operator's OpSpecs. It need not be used exclusively as an HAA. HAA-specific equipment need not be permanently installed.

t. Helicopter Air Ambulance (HAA) Operation. A flight or sequence of flights, with a patient, donor organ or human tissue, or medical personnel on board for the purpose of medical transportation, conducted by a part 135 certificate holder authorized by the Administrator to conduct HAA operations. A HAA operation also includes, but is not limited to:

(1) Flights conducted to position the helicopter at a site where medical personnel, a patient, donor organ or human tissue will be picked up;

(2) Flights conducted to reposition the helicopter after completing transportation of the medical personnel, patient or donor organ or human tissue transport; and

(3) Flights initiated for the transport of a patient, donor organ or human tissue that are terminated due to weather or other reasons. (Refer to § 135.601.)

u. Helicopter Emergency Medical Service (HEMS). Obsolete term. The FAA and industry are moving to the term HAA for enhanced accuracy. HAA flights do not constitute an emergency flight. Replacement of the term HEMS with HAA will take place over the next several years as each relevant document is updated. The term HAA will be used exclusively throughout this document.

v. Helicopter Landing Area (also Heliport or Landing Zone (LZ)). An area of land or water or a structure used or intended to be used for the landing and takeoff of helicopters. OpSpec A021 grants latitude to a helicopter operator for landing site selection as well as the authority to land on appropriate sites during both day and night in HAA operations. (Refer to § 1.1; the current edition of AC 150/5390-2, Heliport Design; and OpSpec A021.)

w. Helicopter Night Vision Goggle Operations (HNVGO). That portion of a flight that occurs during the time period from one hour after sunset to one hour before sunrise where the pilot maintains visual surface reference using night vision goggles (NVG) in an aircraft that is approved for such operations. (Refer to part 61, § 61.1.)

x. Helicopter Terrain Awareness and Warning System (HTAWS). A terrain and obstacle database-driven awareness and warning system configured specifically for a helicopter's operating environment. This system correlates ship's position, altitude, direction of flight and speed with digital obstacle and terrain maps.

y. Inadvertent Instrument Meteorological Condition (IIMC). An emergency condition when an aircraft inadvertently transitions from visual meteorological conditions (VMC) into instrument meteorological conditions (IMC).

z. Instrument Flight Rules (IFR). Operations when weather conditions are below the minimum for flight under VFR.

aa. Instrument Meteorological Conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from clouds and ceiling that are less than that specified for VMC, requiring flight to be conducted under IFR.

bb. Landing Zone (LZ). See subparagraph 1-6v, Helicopter Landing Area.

cc. Local Flying Area (LFA). A geographic area of not more than 50 NM in any direction from a location designated by a HAA operator and approved by the FAA in OpSpec A021. (Refer to § 135.609(b)(1).)

dd. Medical Crewmembers. Also referred to as medical flight personnel, as opposed to flightcrew members. A medical crewmember (medical personnel) is an individual with medical training, carried aboard a HAA during flights or flight segments. Crewmembers typically include: flight nurses, paramedics, respiratory specialists, neonatal specialist and other medically-trained specialists. (Refer to § 135.601(b)(2).)

ee. Mountainous. Designated mountainous areas as listed in 14 CFR part 95. (Refer to § 135.601.)

ff. Night Vision Goggles (NVG). A NVG is a Night Vision Imaging System (NVIS) (q.v.) appliance worn by crewmembers that enhances the ability to maintain visual surface reference under low-light flight conditions.

gg. Night Vision Imaging System (NVIS). An approved light amplification appliance enhancing visual sensitivity in low light conditions, combined with specialized lighting systems that are type certificate (TC) approved for the type of helicopter in which it is installed and are compatible with NVGs being used in that helicopter.

hh. Non-Mountainous. Areas other than mountainous areas as listed in part 95. (Refer to § 135.601.)

ii. Operations Control Center (OCC). An OCC is a centralized, dedicated facility staffed by trained HAA Operations Control Specialist(s) (OCS) (see subparagraph 1-6jj. The OCC is described at § 135.618. OCC review includes a wide range of safety-related items detailed in § 135.619(a).

NOTE: OCCs are required for certificate holders authorized to conduct HAA operations with 10 or more HAA-capable helicopters assigned to their OpSpecs, and are strongly encouraged for all operators. (Refer to § 135.619.)

jj. Operations Control Specialist (OCS). An individual within the OCC who provides operational support for the certificate holder's air ambulance operations and is both initially and recurrently trained as specified in § 135.619(d) and (f). An OCS interfaces with the HAA pilot(s) prior to each flight request acceptance.

kk. Operations Specification (OpSpec). Issued by FAA to specify the commercial air operations it has authorized the certificate holder to carry out. OpSpec A021 authorizes HAA service. Before OpSpec A021 can be issued, the operator must meet the regulatory requirements of part 135 subpart L.

ll. Overwater Flight. Operation of a rotorcraft beyond autorotational distance from the shoreline. (See subparagraph 1-6xx, Shoreline.)

mm. Patient. A person under medical treatment. For the purposes of this definition, human transplant organs or tissue are not patients, but are explicitly included under HAA operations, regulations and practices. They are treated in the same manner as people under medical treatment.

nn. Pilot in Command (PIC). The PIC of an aircraft is directly responsible for and is the final authority as to the operation of that aircraft.

oo. Principal Avionics Inspector (PAI). The PAI at the CHDO specifically responsible for aviation safety inspection and oversight of a HAA operator.

pp. Principal Maintenance Inspector (PMI). The PMI at the CHDO specifically responsible for aviation safety inspection and oversight of a HAA operator.

qq. Principal Operations Inspector (POI). The POI at the CHDO specifically responsible for aviation safety inspection and oversight of a HAA operator.

rr. Residual Risk. Residual risk is the safety risk that exists after all controls have been implemented or exhausted and verified (to ensure that the risk acceptance is in accordance with a pre-existing documented risk analysis procedure.)

ss. Response Scene. Unimproved ad hoc LZ sites and other off-airport and off-heliport site locations where HAA flight landings are authorized under the authority of OpSpec A021.

tt. Risk Analysis. A formal methodology for guiding HAA decisionmaking. Its procedures, principles and policies are documented and are the subject of training by HAA operators. They include multiple people with defined roles that have been documented and are the subject of training. As total risk exceeds the operator's pre-determined threshold, approval at higher levels is required. (Refer to §§ 135.615 and 135.617(a)(5).)

uu. Risk Assessment. Risk assessment is a key element of the broader risk analysis. The two terms assessment and analysis should not be used interchangeably. Process documentation should identify risk factors the HAA operator may consider as part of risk assessment. The operator should assign to each risk factor an appropriate numerical value reflecting both the likelihood of occurrence and severity of outcome. Section 135.617 requires HAA operators to have an FAA approved and documented Risk Analysis Program that includes procedures for elevating the final post mitigation risk to a higher management level for approval when the total risk exceeds a predetermined threshold.

vv. Safety Management System (SMS). A SMS is a formal, top-down approach to managing safety risk. It is a system to manage safety, including the necessary organizational structures, accountabilities, policies and procedures. Implementing a SMS can provide useful tools to the HAA operator for complying with the requirements of § 135.617. Additional information and resources on SMS can be found in the current edition of AC 120-92, Safety Management Systems for Aviation Service Providers, and in Chapter 8 and Appendix B of this AC.

ww. Second in Command (SIC).

xx. Shoreline. Land adjacent to the water of an ocean, sea, lake, pond, river or tidal basin that is above the high-water mark at which a rotorcraft could be landed safely. This does not include land areas unsuitable for landing, such as vertical cliffs or land intermittently under water (refer to § 135.168). Additional information is available in 14 CFR part 136, § 136.1, i.e., "suitable for landing area for helicopters."

yy. Standard Operating Procedures (SOP). An established or prescribed method to be followed routinely for the performance of a designated operation or in a designated situation and is used to guide training to meet such contingencies.

zz. Suitable Offshore Heliport Structure. A heliport structure that can support the size and weight of the rotorcraft being operated where a safe landing can be made.

aaa. Supplemental Type Certificate (STC). A TC issued when an applicant has received approval to modify an aircraft from its original design.

bbb. Visual Flight Rules (VFR).

1-7. RELATED SOURCE MATERIAL. The following lists documents that are applicable to HAA operations.

a. ACs (current editions). ACs can be found on the FAA Web site at http://www.faa.gov/regulations_policies/advisory_circulars.

- AC 00-64, Air Medical Resource Management.
- AC 27-1, Certification of Normal Category Rotorcraft.
- AC 27-1B MG 6, Miscellaneous Guidance (MG) for Emergency Medical Service (EMS) Systems Installations.
- AC 29-2, Certification of Transport Category Rotorcraft.
- AC 91-21.1, Use of Portable Electronic Devices Aboard Aircraft.
- AC 91-32, Safety In and Around Helicopters.
- AC 120-27, Aircraft Weight and Balance Control.
- AC 120-49, Certification of Air Carriers.
- AC 120-51, Crew Resource Management Training.
- AC 120-92, Safety Management Systems (SMS).
- AC 120-96, Integration of Operation Control Centers into Helicopter Emergency Medical Services Operations.
- AC 135-5, Maintenance Program Approval for Carry-On Oxygen Equipment for Medical Purposes.
- AC 150/5390-2, Heliport Design.
- AC 150/5230-4, Aircraft Fuel Storage Handling Training and Dispensing on Airports.

b. Handbooks, Manuals, and Pamphlets (current editions). FAA handbooks can be found on the FAA Web site at http://www.faa.gov/regulations_policies/handbooks_manuals.

- FAA Order 8040.4, Safety Risk Management Policy.
- FAA-H-8083-21, Rotorcraft Flying Handbook.
- FAA-H-8261-1, Instrument Procedures Handbook.
- Airman’s Information Manual (AIM).
- DOT/FAA/PM-86/45, Aeronautical Decision Making for Helicopter Pilots.
- DOT/FAA/DS-88/7, Risk Management for Air Ambulance Helicopter Operators.
- FAA FAASTeam Library, Flying in Flat Light and White Out Conditions.
- National EMS Pilots Association (NEMSPA), Preparing a Landing Zone. NEMSPA is located in Layton, UT 84041-9128, telephone (877) 668-0430.

c. Other:

(1) Helicopter Association International (HAI). HAI is located at 1920 Ballenger Avenue, Alexandria, VA 22314-2898, telephone (703) 683-4646. Check their Web site for other documents and links to resources, including their Fly Neighborly Guide.

(2) The National Fire Protection Association (NFPA) is located at 1 Batterymarch Park, Quincy, MA 02169-7471, telephone (617) 770-3000. They have many publications about fire protection. The 400 series may be the most helpful. For example, the current edition of NFPA 418, Standard for Heliports, has fire standards for heliports.

(3) Air Ambulance Guidelines published by both the U.S. Department of Transportation (DOT), National Highway Traffic Administration; and the American Medical Association, Commission on Emergency Medical Services.

(4) The National Association of Air Medical Communications Specialists (NAACS) is located at PO Box 19240, Topeka, KS 66619, telephone (877) 396-2227. Check their Web site for links to resources, including training courses.

(5) Special Airworthiness Information Bulletin (SAIB) SW-10-43, Non-Aviation Transmitters. (Includes, for example, 800 megahertz (MHz) radios used to communicate with hospitals.)

(6) Policy Letter (PL) ASW-2001-01, Certification Guidelines for Compliance to the Requirements for Electro-Magnetic Compatibility (EMC) Testing.

(7) DOT/FAA/AR-99/50, High-Intensity Radiated Fields (HIRF) Risk Analysis.

(8) FAA Technical Standard Order (TSO)-C194, Helicopter Terrain Awareness and Warning System (HTAWS).

(9) International Civil Aviation Organization (ICAO) Doc 9977 AN/489, Manual on Civil Aviation Jet Fuel Supply.

(10) RTCA Inc., DO-160, Environmental Conditions and Test Procedures for Airborne Equipment.

(11) RTCA Inc., DO-178B, Software Considerations in Airborne Systems and Equipment Certification.

(12) RTCA Inc., DO-254, Design Assurance Guidance for Airborne Electronic Hardware.

(13) RTCA Inc., DO-309, Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment.

(14) OpSpecs:

- A005, Exemptions and Deviations.
- A008, Operational Control.
- A010, Aviation Weather Information.
- A021, Helicopter Air Ambulance Operations.
- A050, Helicopter Night Vision Goggle Operations (HNVGO).
- A061, Use of Electronic Flight Bag.
- A096, Actual Passenger and Baggage Weight Program for All Aircraft.
- A097, Small Cabin Aircraft Passenger and Baggage Weight Program.
- D085, Aircraft Listing.

1-8. BACKGROUND. This AC focusses on the requirements and challenges faced by HAA operations and how these can be addressed through application of best practices which, when tailored to local and operational requirements and the appropriate scope and complexity of each organization, provide one way of many possible ways to assure safety and compliance with regulatory requirements within a HAA operation.

a. General. The typical HAA operation provides 24-hour local or regional on-call service from an operational base or multiple operational bases. Each base is assigned one or more helicopters and is staffed by one or more pilots and mechanics. A base may also be staffed by medical crew members (paramedics, EMTs, doctors, and nurses). If not, the helicopter should reposition to a trauma center or other location where medical personnel are available for assignment to support operational requirements.

b. Operational Control. An HAA operator should be organized to ensure the challenges imposed by the need to perform HAA-specific training, operations, equipment installation and maintenance and documentation are adequately addressed. Operational control over the aircraft, pilots and flight operations should remain within the operator’s organization regardless of customer prioritization, inputs, tacit expectations and pressures.

c. HAA-Specific Equipment. HAA-specific equipment (such as HTAWS, Flight Data Monitoring System (FDMS), etc.) and training are required for HAA operations, starting on effective dates provided in the applicable regulations. Such equipment and training has been identified as beneficial for improvements in flight safety and operational efficiency.

d. Maintenance. Helicopters should be maintained and serviced with particular attention to scheduling and accomplishing major inspections and maintenance while recognizing and accommodating customer expectations. Problems are likely to arise if operators defer, then extend, required maintenance to meet operational availability requirements. While the importance of helicopter availability is recognized in the HAA best practices referred to in this AC, HAA operator management, along with a pervasive “safety culture,” should ensure that deferral of unscheduled repairs or replacements are not unduly extended to coincide with previously scheduled preventative maintenance or inspection requirements.

e. OCCs. Regulations require an OCC to be staffed by one or more OCS by those operators with 10 or more HAAs. The FAA strongly encourages similar steps by other operators. Formal Risk Analysis (composed of risk assessment and mitigation processes, not previously required of HAA operations), must be implemented by all HAA operators per § 135.617. Operator risk analysis programs should be well documented and consistently applied to avoid over-extending aircraft or pilot capabilities. Attempting to accomplish HAA operational objectives, in the absence of well thought-out and documented operational risk analysis procedures and training, can result in misplaced priorities, second-order effects, and unintended consequences and could result in poor judgment or decisionmaking.

f. Best Practices. Appropriate HAA industry experience and strong commitment to safe operations has been identified as a best practice of effective management personnel. In particular, effective action to assure flight safety by the director of operations, the chief pilot and the director of maintenance have been seen as essential to the best practices contributing to safe operations. Equally essential are policies and procedures emphasizing professionalism among all employees from the top down.

CHAPTER 2. CERTIFICATION AND HAA-SPECIFIC CONSIDERATIONS

2-1. GENERAL. A helicopter air ambulance (HAA), Title 14 of the Code of Federal Regulations (14 CFR) part 135 operation, as authorized through the issue of Operations Specification (OpSpec) A021, Helicopter Air Ambulance Operations, is unique among other types of part 135 helicopter operations. Organizational challenges are significant. This is reflected in the requirements for such operators under the certification process. Part 135 certificate holders conducting HAA operations are subject to requirements beyond those observed by other certificate holders.

2-2. INITIAL PART 135 CERTIFICATION WITH HAA AUTHORIZATION. Prospective helicopter operators desiring to offer HAA operations as an air carrier in accordance with part 135 should refer to the current edition of Advisory Circular (AC) 120-49, Certification of Air Carriers, for methods and procedures to follow in achieving certification. A Federal Aviation Administration (FAA) Web site with information on the certification process is: http://www.faa.gov/licenses_certificates/airline_certification/

a. Certification Team (CT). The Flight Standards District Office (FSDO) located in the area where the applicant desires to locate its principal business office will assemble a CT. This CT will provide certification process guidance to the prospective certificate holder. It will evaluate the systems, procedures, training, and documentation (manuals, etc.) that the applicant has documented and submitted (or demonstrated) toward earning their air carrier certificate.

b. Additional Information. Further detail about authorization for HAA operations, in addition to achieving part 135 certification, is included in this AC chapter.

2-3. ADDING HAA AUTHORIZATION TO AN EXISTING PART 135 CERTIFICATE. Existing part 135 certificate holders may perform HAA operations after providing training, meeting regulatory requirements, implementing appropriate procedures and installing equipment (described in subsequent chapters of this AC). Following an application for authority to perform HAA operations, supported by demonstrations of capability, the operator may be issued, by the FAA, the appropriate OpSpecs, including A021, Helicopter Air Ambulance Operations. The approving authority for the issuance of these OpSpecs will be the principal inspectors (PI) assigned to that certificate.

2-4. REGULATORY OPERATIONAL CONSIDERATIONS. HAA operators are subject to regulatory operational requirements above those associated with other part 135 operations. These are outlined in Chapter 3 of this AC. In addition, this AC will identify HAA industry best practices applicable to operational issues.

a. Part 135, § 135.603, Pilot Qualifications. Part 135 certificate holders conducting HAA operations are subject to pilot qualifications requirements in addition to those required of such certificate holders not engaged in such operations. Pilots employed in HAA operations must hold a rotary wing (RW) instrument rating or an airline transport pilot (ATP) certificate in accordance with § 135.603. This requirement becomes effective on April 24, 2017.

b. Section 135.609, Local Flying Area(s) (LFA) Familiarity Verifications. An examination of familiarity with a LFA is required to be completed and documented in a

12-month period before a pilot can use the lower weather minimums associated with the LFA. This examination of familiarity with a LFA may be through other means than a flight check. However, a record of all such examinations, regardless of format, must be retained for each pilot and each LFA assigned (refer to § 135.609). In this AC, see paragraph 3-5 for LFA operational considerations, paragraph 4-2 for LFA training implementation details, and paragraph 7-2 for LFA examination documentation requirements.

c. Sections 135.611 and 135.613, Instrument Flight Rules (IFR) Procedure Documentation. It is recommended that part 135 certificate holders conducting HAA IFR operations document procedures associated with point in space (PinS) approaches and associated Obstacle Departure Procedure (ODP). (Refer to §§ 135.611 and 135.613.)

d. Section 135.615, Visual Flight Rules (VFR) Flight Planning Documentation. Procedures for VFR flight planning must be documented by part 135 certificate holders conducting HAA operations in accordance with the provisions of § 135.615.

e. Section 135.617, Preflight Risk Analysis. An FAA-approved preflight risk analysis program must be established by each HAA operator and documented in its operational manual (or other documentation). In accordance with the provisions of § 135.617(d), part 135 certificate holders conducting HAA operations are required to use and retain preflight risk analysis worksheets. Preflight risk analysis worksheets are completed by the pilot and are reviewed and confirmed by the Operations Control Specialists (OCS) in compliance with § 135.617 if applicable. These worksheets are retained for 90 days in compliance with §§ 135.617 and 135.619. The procedure itself is outlined in paragraph 3-4 and Appendix A, which also includes examples of preflight risk analysis worksheets.

2-5. TRAINING CONSIDERATIONS. HAA operators are subject to additional training requirements above those associated with other part 135 operations. These training requirements will be outlined in Chapter 4. In addition, this AC will identify HAA industry best practices applicable to training, including providing examples of curriculum outlines and checklists as appendices.

2-6. EQUIPMENT CONSIDERATIONS. Part 135 certificate holders conducting HAA operations will utilize task-specific equipment associated with medical transport. An applicant should identify, in their initial application, any specialized equipment that may be used in their HAA operations. This equipment should include items required by regulations such as a Helicopter Terrain Awareness and Warning System (HTAWS) and a radio altimeter. By April 23, 2018, helicopters must equip Flight Data Monitoring Systems (FDMS). It may include a Night Vision Imaging System (NVIS) installation and other equipment fitted to bring each helicopter to a desired aeromedical configuration. Helicopters to be used in HAA operations are evaluated by FAA PIs.

2-7. INSPECTION AND MAINTENANCE CONSIDERATIONS. HAA operators should consider inspection and maintenance issues beyond those associated with other part 135 operations. This includes inspecting and maintaining equipment added for HAA operations. This equipment increases maintenance complexity and introduces second-order complications. These complications may include NVIS compatibility, electromagnetic compatibility (EMC) verification, heat shielding, fire resistance, mechanical integrity of mounting, crashworthiness and infection control procedures. Maintenance hours and cost burdens will increase because of the need to remove and replace complex on-board systems, sealed interior panels, etc., when required to access aircraft systems for inspection, maintenance and repair. The operator should factor these considerations into both routine and unscheduled maintenance decisionmaking. For example, it is not acceptable to apply for multiple extensions on deferrals of required maintenance for minimum equipment list (MEL) items solely due to the cost burden associated with gaining access to make repairs. Be on guard against such practices. Standard MEL deferral decisionmaking should be consistently applied.

> **NOTE: Reference materials providing further guidance include: AC 27-1B MG 6, Miscellaneous Guidance (MG) for Emergency Medical Service (EMS) Systems Installations.**

2-8. DOCUMENTATION AND RECORDKEEPING CONSIDERATIONS. All HAA operators are required to document preflight risk analysis and VFR flight planning procedures. In addition to the manual requirements imposed by § 135.21, it is recommended that each certificate holder conducting HAA operations, including single-pilot and basic operators, compile and maintain manuals reflecting the implementation of HAA best practices identified in this AC. Documentation and recordkeeping requirements associated with HAA operations beyond those normally required of part 135 operators are described in Chapter 7 of this AC.

CHAPTER 3. OPERATIONS

3-1. GENERAL. This chapter outlines recommendations regarding the conduct of Title 14 of the Code of Federal Regulations (14 CFR) part 135 helicopter air ambulance (HAA) operations.

3-2. OPERATIONAL CONTROL, FLIGHT LOCATING, AND FLIGHT FOLLOWING DUTIES AND RESPONSIBILITIES. Regardless of the size and complexity of the operation, the operator is responsible for maintaining operational control, accomplishing flight locating and supporting the pilot during preflight planning, risk analysis, and en route by providing information and constructive input which would aid the pilot in effective decisionmaking. Smaller operations may accomplish this through direct communication between the pilot and the management person to whom the authority to provide a flight authorization has been delegated. Larger operations may accomplish the same objective through pilot communication and discussion with a trained Operations Control Specialist (OCS).

a. Operational Control. Only those individuals authorized by name in an operator's operations specification (OpSpec) may exercise operational control. While operational control may be delegated to certain certificate holder personnel, it must never be delegated to customer hospitals or external emergency medical services (EMS) agencies.

b. Duties and Responsibilities. The pilot in command (PIC), by regulation, is the final authority for the operation of any HAA flight. It is an HAA industry best practice that a PIC may not "self-launch." Operators should establish procedures for coordination between the pilot and OCS, or other person authorized to exercise operational control, to evaluate flight risk analyses to ensure risk is mitigated to the extent possible or a flight request is declined due to unacceptable risk. While "three to go, one to say no" is a good practice (with the three being the PIC and two medical crew members, and the one being any one of the three), it is essential that no external pressure "to go" is applied to the pilot during the decisionmaking process.

> **NOTE: A PIC's decision to decline, cancel, divert or terminate a flight overrides any decision by any and all other parties to accept or continue a flight.**

c. Flight Authorization and Flight Locating Procedures. Regardless of whether or not an operator uses an Operations Control Center (OCC), flight authorization and flight locating procedures should be well-considered and thoroughly documented to support training and operations. For those operators with an OCC, the description of the duties and responsibilities of OCSs and an explanation of their duty times in the current edition of Advisory Circular (AC) 120-96, Integration of Operations Control Centers into Helicopter Emergency Medical Services Operations, should amplify the above. In addition, the rule describing OCS training part 135, § 135.619(f) is an excellent guide to the subject matter considerations involved in issuing a flight authorization and with reacting to flight locating adverse outcomes. The certificate holder is required by regulation to use flight locating procedures (refer to § 135.79), unless a Federal Aviation Administration (FAA) flight plan is filed and activated.

d. Flight Following.

(1) Flight Following Recommendations. Flight following is distinguished from flight locating. Flight locating is required for HAA operations unless an FAA flight plan is filed and activated. While § 135.619 requires an OCC to monitor the progress of a flight, for smaller operators (ten or less HAAs), it is a good practice to employ flight following.

(2) Flight Following Connectivity. Flight following should maintain voice communications with helicopter pilots during HAA operations. The operator may wish to consider employing satellite/Global Positioning System (GPS) tracking for flight following tasks as a supplement or substitute for voice radio connectivity.

(3) Flight Following Latency. It is recommended that a position and status report be made, at most, every 15 (in flight) to 45 (on ground) minutes. If communication is lost, the aircraft may be considered missing after failing to provide sequential routine position reports (usually two reports). The longer the time between position reports, the greater the radius of uncertainty of the missing helicopter's location. The operator should also consider employing satellite/GPS tracking for flight following tasks as a substitute for voice radio connectivity.

e. Flight Following and Accident Incident Plan/Post-Accident Incident Plan (AIP/PAIP). Each OCC or other flight following office should have access to the operator's AIP/PAIP. The plan should be reviewed and updated annually or more frequently as needed.

(1) Information in the AIP/PAIP defines and provides direction for emergency response procedures that should be used as a basis for training or for reference in the event of a mishap, accident or other emergency. The AIP/PAIP establishes standard emergency response procedures that OCSs or flight followers will carry out in all cases when an aircraft meets operator-defined criteria of being overdue or has been involved in an incident or accident.

(2) The AIP/PAIP and any other emergency response plans and guides may be formatted in a variety of ways, provided the user (that is, the individual making the initial response to the emergency) can easily determine where to find guidance for a situation and then follow a generic checklist of actions to be taken for that situation. An addendum to the main response plan should be available for every satellite base. Each local addendum should list direct-dial phone numbers for the satellite base manager, local first responder and 911 dispatch organizations, local air traffic control (ATC) and local FAA offices.

f. Communications Personnel and Procedures. Chapter 6 of this AC provides recommendations to assist HAA operators with best practices for implementing OCCs and operational control procedures.

(1) Large HAA operators have developed OCCs to maintain operational control. While there is a regulatory requirement (§ 135.619) for operators with 10 or more HAAs to have OCCs, smaller operators should consider the benefits that best practices have shown can be implemented on a scalable level to meet the needs of smaller operators.

(2) Operators without an OCC, and large operators may find it advantageous to supplement their Operational Control personnel through the addition of Communications

Specialist Staff. If this is the case, the Operator must train and qualify their Communications Specialists to the extent their duties and responsibilities reflect delegated Operational Control tasks. For example, if a Communication Specialist is responsible for performing flight locating duties via radio or other communications process, and to receive and offer the operator flight requests for HAA operations their training should include company policy and procedures for such activity.

(3) A communications specialist may be an employee of the HAA operator, a hospital (i.e., a hospital communications specialist) or a local public safety agency (i.e., a 911 dispatch operator. If communications specialist duties are delegated beyond certificate-holder personnel, such as to a hospital or ambulance dispatch center, those individuals serving in that capacity must be trained by the certificate holder and such training programs must be documented.

(4) The primary function of the communications specialist is to support HAA operations by relaying coordination information and situational awareness information among the flightcrew, hospital, and on-scene personnel and other involved organizations and individuals. Providing and receiving in-flight updates and post-flight debriefs to flightcrews have been identified as part of their recommended functions.

(5) HAA best practices suggest that the responsibilities of communications specialists should include ascertaining, from those requesting HAA services, whether another HAA operator has previously declined to carry out a particular flight and, if so, for what reason. The response received should be conveyed to the pilot performing the Risk Analysis in accordance with § 135.617. The personnel that carry out this function may or may not be the same as those who carry out in-flight connectivity and flight locating functions during HAA operations.

(6) Depending on the size and nature of HAA operations, different communications specialist functions may be split between multiple individuals (who may also carry out other functions) or concentrated in one or more communications specialists.

(7) Communications specialist duties may include flight following. Best practices suggest that an HAA operator's communications system should provide reliable connectivity with HAAs in flight and on the ground, enable flight locating (required by regulation for some operators and recommended for all others) and ensure that medical personnel and pilot(s) can communicate with recipients such as hospitals and ground personnel at a Landing Zone (LZ). Some rural hospitals may not have communications capability other than by phone. Communications specialist personnel may be required to act as an intermediary.

(8) In all cases, when communications specialists perform an OCS duty included in § 135.619(a)(1-4), the communication specialist is subject to training and checking in those subjects that support the duty performed and must be trained in the limit of authority delegated to them.

3-3. VISUAL FLIGHT RULES (VFR)/INSTRUMENT FLIGHT RULES (IFR) FLIGHT PLANNING AND WEATHER MINIMUMS.

a. Flight Planning (refer to §§ 135.613 and 135.615).

(1) HAA VFR flight planning must take into consideration factors including the determination of highest obstacles and minimum cruising altitudes along planned routes as well as contingencies such as deviations due to medical necessity, dynamic weather and changes to the planned flight. The procedures defining these planning methods must be documented. (Refer to § 135.615 for regulatory requirements.)

(2) IFR/VFR Procedures. For operators with IFR authorization, procedures for transitioning from IFR to VFR on approach or from VFR to IFR on departure are required to be documented.

b. Approach Procedures Minimums (refer to §§ 135.609, 135.611 and 135.613).

(1) When executing Point in Space (PinS) Copter approaches that include a "proceed visually" transition, the flight will remain under IFR from the missed approach point (MAP) to a served heliport and the transition must be conducted in accordance with the ceiling and visibility limitations published in the PinS Copter Instrument Approach Procedure (IAP).

(2) When executing PinS Copter approaches that include a "proceed VFR" segment between the MAP and a served heliport, flights must be conducted in accordance with the ceiling and visibility limitations published in § 135.613(a).

(3) When accessing a heliport near an airport served by an IAP, the pilot may execute a published IAP to an airport which is not the intended landing site, and then break off that published approach after visually acquiring the airport served by the approach and then proceed to a landing area other than the airport to which the approach was conducted. The pilot may accomplish this only under VFR weather minimums in accordance with § 135.613(a) or under VFR as appropriate to the class of airspace involved and in accordance with ATC clearances. (The airspace between the protected area surrounding the approach to the airport and the intended landing area located nearby may not be surveyed and obstructions may exist between the airspace protected for the airport served by the IAP and the intended landing site.)

c. Departure Procedures Minimums (refer to §§ 135.609 and 135.613).

(1) HAA Helicopters may depart on an IFR clearance from the surface, at heliports that are not served by weather reporting, providing the heliport is served by a departure procedure (Standard Instrument Departure (SID) or Obstacle Departure Procedure (ODP)) containing ODP and takeoff minimums, and the pilot determines the weather at the departure point meets or exceeds the published takeoff minimums. The flight may depart and proceed visually in accordance with the instructions contained in the DP.

(2) When departing VFR from heliports with the intent of acquiring an IFR clearance at or before reaching a predetermined point (usually the Initial Departure Fix (IDF) not more than 3 nautical miles (NM) from the departure point, the flight must be conducted in accordance with the DP instructions and the ceiling and visibility limitations contained in § 135.613)(a). If the distance between the departure point and the IDF exceeds 3 NM, the flight must be conducted in accordance with the VFR ceiling and visibility minimums for the class of airspace involved. The operator should document procedures for transitioning from IFR to VFR on approach or from VFR to IFR on departure.

(3) If the departure involves a VFR to IFR transition and does not meet the requirements of § 135.613(b)(1), there is no departure procedure, and/or the IDF is more than 3 NM from the point of liftoff, the VFR weather minimums required by the class of airspace apply. If the flight is within Class G, airspace, refer to § 135.609, if within Class B, C, D, or E airspace, refer to § 135.205.

(4) These regulations do not restrict or prohibit “diverse departures" from airports from which IFR departures can be made in accordance with 14 CFR part 97. These are departures from airports with IAPs that have had an obstacle analysis conducted and from which it was determined IFR departures can be performed safely without a published ODP or SID.

(5) An IFR clearance and departure with “proceed visually” text is not considered a VFR maneuver and is not subject to § 135.609 limitations unless the pilot is instructed by ATC to maintain VFR. For this type departure, the weather must meet or exceed either the published “takeoff minimums” contained in the DP, or the restrictions in contained in § 135.613 or in § 135.609, as applicable.

d. Flight Into Locations Without Weather Reporting (refer to § 135.611(a)(3)). In accordance with the provisions of § 135.611(a)(3), the PIC may assess the weather at a departure point where weather reporting is not provided. This is a process where the PIC applies his own professional judgment to determine the weather conditions. The pilot may be assisted by access to enhanced situational awareness provided by the OCC or other aviation or non-aviation weather sources. (See Chapter 6 of this AC and AC 120-96 for more information.)

(1) Based on this weather assessment, the PIC may:

- Takeoff when the observed ceiling and visibility is greater than the weather minimums as published in a departure procedure; or
- Takeoff when a documented departure procedure is not available and when the observed weather is greater than the higher minimum ceiling and visibility limitations required by § 135.609, or for the Class B, D, or E airspace overlying the departure point, as applicable.

(2) The FAA intends to permit HAA flights to enter the National Airspace System (NAS) under IFR when visibilities and ceilings are below VFR minimums, based on the pilot’s weather observations, thus increasing the safety of the flight. This rule permits HAAs to depart heliports with a published IAP and departure procedure with no reported weather under IFR, rather than forcing them to depart under VFR, which in low ceiling and visibility conditions is more hazardous.

e. Weather Minimums (refer to § 135.609). Section 135.609 specifies HAA minimums for Class G airspace. HAA operations use higher ceiling and visibility minimums in uncontrolled airspace in uncontrolled airspace than is required for conventional part 135 operations. Each HAA base may establish one or more local flying areas (LFA) where lower minimums may be used. See paragraph 3-5 of this AC on LFAs.

3-4. PREFLIGHT RISK ANALYSIS (refer to § 135.617). Preflight risk analysis is a key subject of this AC. It is discussed in chapters 3, 6, and Appendix A. This AC provides guidance for implementation of regulatory requirements. Each HAA operator, regardless of size, must design, develop, document and implement an FAA-approved preflight risk analysis process. Only processes that have been documented and have been the subject of training, meet regulatory requirements. (Refer to § 135.617.)

a. Risk Analysis Steps. Risk analysis includes the following steps:

(1) Risk identification. What are the risks and their importance in quantitative terms?

(2) Mitigation. What changes or approaches reduce the effect of risks?

(3) Calculation of Residual Risks. What risk remains after mitigation?

(4) Management Review. Elevation of higher risk assessment to appropriate management levels for concurrence.

b. Risk Analysis. Risk assessment is a key element of risk analysis. Its process documentation should identify risk factors the HAA operator may consider. This assessment should consider not only the primary intended flight operation but also all contingencies that can reasonably be foreseen. The PIC does not have to perform a new risk assessment prior to a change in destinations. As part of risk assessment, these factors are quantified. The operator should assign to each risk factor an appropriate value reflecting both the likelihood of occurrence and severity of outcome. Combining the value associated with each risk factor will yield a total risk value. An example of this is provided in Appendix A.

c. Flight Authorization. Each HAA operator must document procedures for obtaining and documenting approval by management personnel to authorize a flight when a single or cumulative risk exceeds a level predetermined by the operator. If this value exceeds that predetermined level, it will require management approval or preclude operations. After all risks are identified and risk control strategies and their effects are considered, an informed go/no-go decision can be made. The effect of risk assessment on mitigation strategies and restrictions on acceptable risks must be documented.

d. Risk Assessment Quantifies at Least the Following Risk Factors.

(1) Aircraft Capabilities, Flight Route and Landing Site Considerations. This includes performance, fuel required, resulting useful load, environmental factors and their effect on performance with all engines operating and, as applicable, with one engine inoperative as well as obstacles and terrain along the planned route of flight and LZ conditions. In-flight changes to routes or destinations do not necessarily require a full risk analysis, provided these options or contingencies were considered in the original risk analysis of the flight operation that was conducted prior to the flight operation was initiated. The original risk analysis should be updated, considering factors which have changed, such as: fuel required, fatigue, airworthiness, and dynamic weather conditions, etc.

(2) Current and Forecast Weather. This includes ceiling, visibility, precipitation, surface winds, winds aloft, potential for ground fog (especially for off-airport scene response operations), and severe weather such as thunderstorms and icing. These factors should be considered for the departure point, en route, and primary destination and contingency routes/diversion landing facilities.

(3) Human Factors. This includes sources of stress such as health, fatigue, circadian effects, flight difficulty, operational complexity and potentially distracting life events. All these are among the many potential contributors to human failure. Human factors considerations should include information such as pilot experience level and operation-specific hazards that also reflect environmental factors.

(4) Declined HAA Flight Requests. The operator must establish a procedure for determining whether another HAA operator has declined the flight request under consideration and if so, for what reason (weather, maintenance, etc.). If applicable, the reason for the declined flight must be factored into the required risk assessment process, i.e., do not include a declined flight due to a maintenance issue or pilot not available. This could be as simple as asking the requestor whether or not this specific flight request has previously been made and declined and why.

(5) Risk Determined Independent of Patient Condition. It should be assumed that HAA operators and personnel are dedicated to making every flight requested, providing the level of risk is acceptable. Best practices in the industry indicate the medical condition of a patient should not be considered in the risk analysis process and that the PIC should not be briefed on this factor in advance of decisionmaking.

e. Mitigation. Identified risks may be mitigated by changing how a proposed HAA flight is conducted. The operator must develop strategies and procedures for controlling risks imposed by identified hazards. For examples of mitigation, refer to Appendix A.

f. Calculation of Residual Risk. After risk is analyzed and quantified and then mitigated, the degree of residual risk is assessed. Residual risk is the safety risk that exists after all controls have been implemented or exhausted and verified.

g. Elevation of Higher Risk Analysis to Appropriate Management. An HAA operator is required to define risk-based flight authorization limits based upon a quantitative assessment of each specific flight operation. Higher risk assessments are referred to an appropriate manager with operations control authority.

h. Reconsideration of Flight Authorization. Material changes in any of the major risk factors considered in the decisionmaking process should trigger reconsideration of flight authorization. This especially applies to deterioration in weather or other environmental conditions or deterioration of patient condition resulting in an unplanned diversion.

3-5. LFAs (refer to § 135.609).

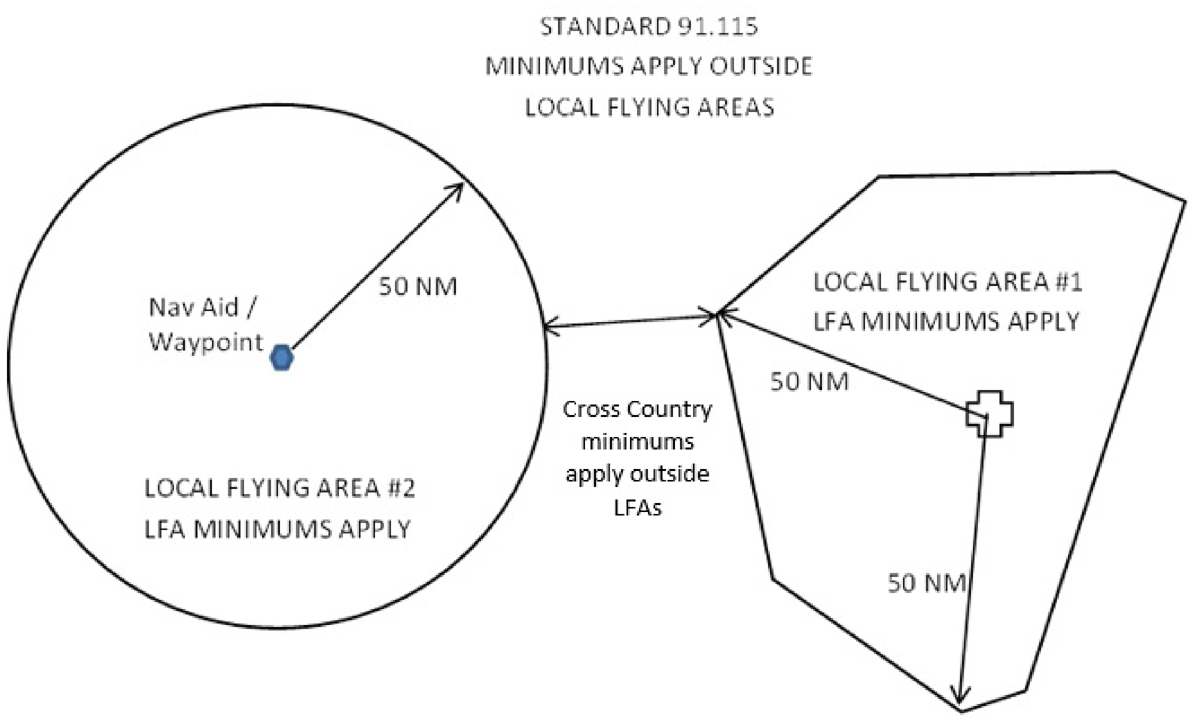
a. Establishing LFAs.

(1) Each HAA base may establish one or more LFA. A LFA is considered a defined or bounded area within which a HAA pilot has demonstrated detailed local knowledge and within which lower Class G weather minimums may be applicable.

(2) A LFA may be symmetrical, such as an area encompassed by a fixed radius from a point designated by the operator or, alternatively, it may be asymmetrical, using landmarks and geographical features to bound the area. In any case, a designated LFA should not exceed 50 NM in any direction from the designated location.

(3) LFA(s) need not be contiguous. There is no requirement that a LFA for a particular base of operations consist of only one defined area. For example, if an operator that conducts HAA operations in a particular metropolitan area, but often transports patients to a regional trauma center outside that area, may choose to develop an additional LFA for assigned pilots to use when operating near the trauma center. While operating in-between LFAs, cross-country minimums would apply.

FIGURE 3-1. EXAMPLE OF LOCAL FLYING AREA(S) AND WHERE CROSS-COUNTRY MINIMUMS APPLY



b. References. References to define a LFA may include:

(1) A specific radius from a point (if easily identified using installed operational avionics).

(2) Bounding natural and constructed references (rivers, shorelines, roads, railroads, etc.).

(3) Governmental boundaries, if easily identified from the air.

(4) By describing an area bounded by natural, constructed or aeronautical reference points (shoreline points, islands, valleys, buildings, airports, very high frequency (VHF) omnidirectional range station (VOR), GPS waypoints, etc.).

(5) Any other reasonable description of an area that may be easily applied by a flightcrew, such as a predetermined route or system of routes.

c. Effects of LFA on Minimum Acceptable Weather Conditions. Establishment of a LFA allows for the use of lower weather minimums as specified in § 135.609. This is only available for use by pilots that have demonstrated LFA familiarity.

d. Demonstration of LFA Familiarity. A pilot must demonstrate a level of familiarity with a LFA by passing an examination given by the certificate holder within the preceding 12 calendar-months prior to using a LFA's local area weather minimums as specified in § 135.609. This examination may be oral or written and may be part of a line check consisted under § 135.299. The manner of the examination must be described in the operator's training program. The grace provisions of § 135.301 apply. This examination should include at least the following:

(1) Terrain features and LFA boundaries.

(2) Prominent obstructions including areas of obstruction.

(3) Minimum safe altitudes in the area.

(4) Weather producers (such as industrial areas, fog-prone areas, etc.).

(5) Areas of poor surface lighting and the effects of seasonal and other changes on surface lighting, as applicable to the area.

(6) Airspace control/air traffic facilities.

(7) Radar and communications coverage, including minimum altitudes for radar service and communications with air traffic facilities and company communications facilities.

(8) Airports/heliports/fuel sources, including night availability; available instrument approaches.

(9) Predominant air traffic flows.

(10) Landmarks and constructed features.

(11) Facility-specific information such as flight locating, dispatch and communications.

(12) Any emergency considerations specific to the area.

NOTE: A record of the examination must be kept in accordance with records retention requirements.

3-6. HAZARDS TO OPERATIONS: IDENTIFICATION AND MITIGATION.

a. Hazard Map. One (or more) hazard maps should be developed. While hazard maps should be developed to cover the entirety of each LFA, such maps may be more extensive than a LFA. The map should be reviewed and updated periodically or as new information becomes available. It should be displayed in a conspicuous location for pilots to review. All potential hazards should be annotated. Power lines, towers and tall structures in the vicinity of designated LZs are particularly important. A system to identify and depict newly-added hazards and to ensure pilots are aware of them should be developed. VFR/IFR transition corridors and preferred routes should appear on hazard maps. Recommended practices include treating the hazard map as a living document, updated by the use of grease pencils or map pins with appropriate notes or captions. Transient hazards (including those created by changing light and visibility or recorded in Notices to Airmen (NOTAM)) should appear on the map with their applicable times.

b. Flight Controls. Leaving the flight controls of a helicopter while rotors are turning is a potentially hazardous situation that may be encountered in HAA operations. While current regulations do not prohibit the pilot from leaving the controls while the helicopter is operating, HAA operators are urged to include procedures for accomplishing this safely in their documented operational procedures and training.

c. Magnetic Resonance Imagery (MRI) Systems. Caution should be used in vicinity of MRI systems. Interference from MRI systems may cause fluctuations in compass accuracy and in instruments for up to 30 minutes and render them unusable. MRI systems may also cause interference with full-authority digital electronic control (FADEC)-equipped aircraft.

3-7. HAA WEIGHT AND BALANCE (W&B) CONSIDERATIONS. Because of the need for specialized equipment, medical personnel and patients to be carried from a wide range of locations and in a wide range of conditions, W&B considerations for HAA operators differ from those of other part 135 operators. Most HAA helicopters have strictly limited payloads due to installed equipment configurations. This AC identifies requirements and best practices considerations.

a. W&B Requirements of HAA Operators. Certificate holders should develop a W&B program as illustrated in OpSpecs A096/A097, using actual weights for crewmembers, medical personnel and carryon medical equipment (not permanently installed on the aircraft), and only relying on solicited or estimated weights for patients, regardless of the size of the helicopter. Certain medical equipment (e.g., isolettes and balloon pumps that are removed and replaced as needed) may not technically be installed but rather should be considered similar to carry-on baggage, be properly secured, and counted toward payload.

b. W&B Programs of HAA Operators. An approved W&B program is required to be documented and listed in the certificate holder's General Operations Manual (GOM), if applicable. It will be approved in the operator's OpSpecs. See guidance for OpSpecs A096/A097 for more details. A W&B control system may include the following:

(1) An index-type W&B program that makes use of actual weights for crew members and equipment and average weights for patients may be established in accordance with the appropriate OpSpec (either A096 or A097) and the current edition of AC 120-27, Aircraft Weight and Balance Control. Company manuals should contain procedures for using, managing and updating W&B data. A loading schedule should be prepared composed of graphs and tables based on pertinent data for use in loading that particular helicopter in a rapid manner for HAA operations.

(2) Best practices in the industry are that operators prepare W&B for multiple configurations of each helicopter in terms of differences in occupants and equipment, especially common configurations (e.g., one or two pilots, one or two medical personnel, one or two patients, large carry-on equipment, balloon pumps, fuel in the most critical center of gravity (CG) locations, training configuration, etc.)

(3) Operators must amend individual helicopter W&B documentation when equipment is removed or replaced. If medical equipment is modified or medical supplies are upgraded, the operator must ensure the resulting changes in weight and location inside the helicopter are reflected in the W&B documentation required by the OpSpecs.

3-8. HELIPORTS/LZs. HAA operators should establish procedures for conducting airborne and ground reconnaissance of all types of heliports/landing zones. This is especially important for off-airport LZs or heliports not used on a routine basis.

a. LZ Criteria. Criteria should be established, documented and included in training programs to assess each heliport/LZ on a continuing basis prior to use. The operator should document criteria for LZ selection. These criteria should include size, obstructions, lighting, surfaces, wires and methods to determine wind direction, etc. A reporting system for unsatisfactory or dangerous conditions and a continuing LZ evaluation program should be part of HAA operations

b. Heliports. When part 135 HAA operations are conducted from established heliports, those heliports should meet the criteria established in the current edition of AC 150/5390-2, Heliport Design, to the maximum extent possible.

c. Approach/Departure. For operations over congested areas, ingress/egress routes to heliports or “scene” locations may have to be modified to adhere to best safety practices. Whenever possible, helicopter operations should include the best practices of “flying neighborly,” as described in the Helicopter Association International (HAI) Fly Neighborly Guide.

d. Ground Security. Best practices suggest that an off-airport or heliport, LZ or “scene” location should be secured against incursions and other hazards by law enforcement or firefighters.

e. LZ Listing. HAA operators should maintain a listing of routinely used off-airport LZs containing pertinent information. This listing should be available to HAA pilots. A system should be established to familiarize pilots with all heliport/LZs serviced by a hospital or certificate holder. A method considered acceptable would be using photographs, drawings and other descriptive means to identify each heliport/LZs with emphasis on timely recording of any obstructions. The site evaluation should include the following:

(1) Identification and/or removal of obstructions;

(2) Assessment of area lighting/transient light conditions;

(3) Awareness of helicopter ingress/egress limitations; and

(4) A reporting system for unsatisfactory or dangerous conditions.

3-9. OPERATIONS UNDER SPECIAL CONDITIONS.

a. Inadvertent Instrument Meteorological Conditions (IIMC).

(1) Operators should develop and document operational procedures for avoiding flight into IIMC along with procedures to be followed after IIMC is encountered. Both of these sets of procedures should include operations in an ATC radar environment as well as IIMC in isolated areas or a non-radar environment.

(2) Avoidance of entry into IIMC should be emphasized in HAA training and operations. A thorough weather briefing, proper analysis of weather (especially that potentially affecting in-flight route changes) and incorporation of adverse weather conditions into risk analysis should help prevent encounters with IIMC. HAA-appropriate training for IIMC flight is discussed in paragraph 4-3 of this AC.

(3) Some best practices for avoiding flight into IIMC include procedures that specify HAA pilots execute a contingency plan whenever speed or course adjustment is required due to deteriorating weather conditions. This contingency plan could be to execute a course reversal to leave the area of deteriorating weather or the execution of a precautionary landing to avoid entering IIMC.

(4) Procedures to be followed by a HAA pilot after entering IIMC should be developed and documented. These procedures should be tailored to each HAA base or operating area. For example, a HAA base that routinely operates near airports with an ATC control facility might establish procedures for contacting ATC and receiving radar vectors to visual meteorological conditions (VMC) or for an instrument approach. A base that operates in areas without local approach control or radar services might pre-designate airports in their service area where IAPs are available. Approach procedure information for those airports could then be kept in the cockpit, readily available should the need arise.

(5) HAA operators may request the use of a discrete transponder code from a local air traffic facility for use when conducting HAA operations in its area of responsibility. This would provide positive identification during an HAA flight.

(6) Operators are also encouraged to meet with local ATC facility personnel to formulate and coordinate instrument meteorological conditions (IMC) "emergency escape plans and procedures” for participating HAA aircraft. These plans and procedures may be established with a letter of agreement (LOA) between an operator and its local air traffic facility.

(7) In the event IMC is inadvertently encountered, weather observations and forecasts assessed during the timely performance of preflight planning and the risk analysis process did not, in the pilot’s judgment, indicate that an IIMC event was likely, and the pilot subsequently performs an FAA accepted IIMC emergency recovery procedure, FAA personnel are discouraged from conducting enforcement against the pilot or the operator.

NOTE: IIMC avoidance and recovery training should in no way be construed as authorizing or condoning actual IMC flights without meeting IFR requirements.

b. Night Operations.

(1) A PIC must meet the requirements of 14 CFR part 61 and should complete the certificate holder’s night training before conducting any night operations. A certificate holder should develop and document procedures for maintaining night proficiency in HAA operations. Pilots must be capable of meeting night recency of flight requirements to fly with or without night vision goggles (NVG). NVG recency of flight experience is defined in part 61, § 61.57(f).

(2) Night landings at unimproved sites, authorized by OpSpec A021, are permitted with adequate and appropriate lighting for the pilot to identify the landing site and surrounding hazards. Such lighting must be compatible with the Night Vision Imaging System (NVIS) if authorized and used.

NOTE: “Adequate” lighting allows a helicopter pilot to conduct a safe approach and landing during conditions of darkness while avoiding terrain and obstacles. The source of this lighting may be on the helicopter or on the surface and includes the possibility of vehicle-mounted lights being used to illuminate a landing site. Pyrotechnic road hazard flares are not recommended for illumination or marking a landing site.

c. Overwater Operations.

(1) Preflight passenger briefings for overwater flight must instruct on use of regulation-compliant life preservers and emergency exits. See the definitions in paragraph 1-6 for autorotational distance, shoreline, or suitable offshore heliport structure. (Refer to §§ 135.117, 135.167, and 135.168.)

(2) Best practices suggest that passengers be briefed anytime there is overwater flight although the regulations address only flights beyond autorotational distance.

d. Flat Light, Whiteout and Brownout. After April 22, 2015, in accordance with the requirements of § 135.293(h), all rotorcraft pilots must be tested on procedures for aircraft handling in flat light, whiteout and brownout conditions, including methods for recognizing and avoiding those conditions. HAA operators are susceptible to all of these conditions due to the nature of off-airport landings and operating in remote environments. These following are not intended to be scientific explanations, but serve as operational definitions suitable for use by HAA operators. These terms should not be used interchangeably.

(1) Flat Light. Flat light is an optical condition, also known as sector or partial whiteout. It is not as severe as whiteout but this condition causes pilots to lose depth-of-field and vertical orientation. Flat light conditions are usually the result of overcast skies over snow or ice fields, inhibiting visual reference. Such conditions can occur anywhere in the world, primarily in snow-covered areas but they can also occur in dust, sand, mud flats or on glassy water. Flat light can completely obscure features of the terrain, creating an inability to distinguish distances and closure rates. As a result of this reflected light, it can give pilots the illusion of ascending or descending when actually flying level. However, with good judgment and proper training and planning, it is possible to safely operate aircraft in flat light conditions.

(2) Self-Induced Whiteout/Brownout. This effect typically occurs when a helicopter takes off or lands on a dusty or snow-covered area. The rotor downwash picks up particles and re-circulates them through the rotor system. The effect can vary in intensity depending upon the amount of light on the surface. This phenomenon can happen on the sunniest, brightest day with good contrast everywhere. However, when it happens, there can be a complete loss of visual clues. If the pilot has not prepared for this immediate loss of visibility, the results can be disastrous.

(3) Some resources that HAA operators have available to assist with training in these conditions include:

- Airman’s Information Manual, paragraph 7-5-13; and
- FAA FAASTeam Library, Flying in Flat Light and White Out Conditions.

e. Operations Involving Multiple Aircraft—General. HAA operator service areas often overlap other HAA operator service areas. Standardized procedures can enhance the safety of operating multiple helicopters at heliports, LZs and hospitals. Communication is critical to successful operations and maintaining orderly separation and coordination between helicopters, ground units and communication centers. HAA operators should establish joint operating procedures and provide them to related agencies.

f. Recommended Multi-Aircraft Landing Zone Procedures. Based on existing industry conventions and material in the AIM, best practices identified include: The first helicopter to arrive on−scene should establish communications with an on-scene ground unit when at least 10 NMs from the LZ to receive a LZ briefing and to provide incident command with the number of helicopters that can be expected. An attempt should be made to contact other helicopters on VHF communications frequency 123.025 megahertz (MHz) to pass on to them pertinent LZ information and the ground unit’s frequency. Subsequent helicopters arriving on-scene should establish communications on 123.025 MHz at least 10 NMs from the LZ. After establishing contact on 123.025 MHz, they should contact the ground unit for additional information. All helicopters should monitor 123.025 MHz at all times.

(1) If an LZ is not established by the ground unit when the first helicopter arrives, then the first helicopter should establish altitude and orbit location requirements for the other arriving helicopters. Recommended altitude separation between helicopters is 500 feet (weather and airspace permitting). Helicopters can orbit on cardinal headings from the scene coordinates.

(2) Upon landing in the LZ, the first helicopter should update the other helicopters on the LZ conditions, i.e., space, hazards and terrain.

(3) Before initiating any helicopter movement to leave the LZ, all operators should attempt to contact other helicopters on 123.025 MHz, and state their position and route of flight intentions for departing the LZ.

g. Recommended Multi-Aircraft Hospital Operations. Many hospitals require landing permission and have established procedures (frequencies to monitor, primary and secondary routes for approaches and departures and orbiting areas if the heliport is occupied). Pilots should always receive a briefing from the appropriate facility (if required, making contact through the use of the HAA operators' communication center, flight following, etc.) before proceeding to the hospital.

(1) In the event of multiple helicopters arriving at a hospital heliport, each arriving helicopter should contact other inbound helicopters on 123.025 MHz and establish intentions.

(2) To facilitate approach times, the PIC of a helicopter occupying a hospital heliport should advise any other operators whether the patient will be off-loaded with the rotor blades turning or stopped, and the approximate time to do so.

(3) Before making any helicopter movement to leave the hospital heliport, all operators should attempt to contact other helicopters on 123.025 MHz and state their position and route of flight intentions for departing the heliport.

3-10. PATIENT/PASSENGER HANDLING/SAFETY.

a. Documentation of Procedures. Restraint of all personnel in flight is required by § 135.117. As in all part 135 passenger-carrying operations, passenger briefing cards are required in HAA operations. Operators are encouraged to document procedures for the proper restraint of all flight personnel and passengers and the proper use of seatbelts and shoulder harnesses during HAA operations. In addition, it is the responsibility of the PIC to insure passengers (such as hysterical or combative patients) who may pose a hazard to the aircraft or occupants are properly restrained before takeoff. Procedures detailing the proper restraint of patients/passengers should be detailed and documented, taking into account local law and applicable regulations.

b. Training in Procedures. A person designated and trained by the operator may conduct the passenger briefing required by § 135.117. If passenger briefing duties are delegated to non-flightcrew member, the procedure must be covered in the operator's operations and training manual or other appropriate documentation.

3-11. BIOHAZARD CONTROL. HAA operators are encouraged to educate pilots, medical crewmembers, and maintenance personnel in mitigating exposure to blood borne pathogens and biohazards. They should observe universal precautions and receive appropriate vaccinations prior to working on or around HAA aircraft. Procedures should be established for each base for HAA and equipment cleaning and the disposal of biohazard materials.

3-12. FLIGHT TIME, DUTY PERIODS, AND REST REQUIREMENTS.

a. Flight Time/Duty Limitations and Rest Requirements. Part 135 subpart F offers multiple ways to comply with this requirement. Each operator needs to maintain records for its personnel and distinctly differentiate their flight time, duty time and rest time.

(1) Section 135.267 is applicable to unscheduled on-demand part 135 flights with one or two pilots.

(2) Most HAA operations are conducted under the provisions of §§ 135.267 and 135.271. The much less commonly used provisions for conducting HAA operations are those in § 135.271. This section was developed specifically for part 135 HAA operations by hospital-based programs. This section is more restrictive than § 135.267. Under the provisions of § 135.271, a flightcrew member may not be assigned any other duties while assigned to HAA flight(s.) A pilot that does not receive the required rest period must be relieved of any flight assignment. A certificate holder operating under § 135.271 should establish a recordkeeping mechanism to show that only bona fide air ambulance flights are conducted during these assignments.

NOTE: Both §§ 135.267 and 135.271 require a comprehensive recordkeeping process.

NOTE: Company training manuals and OpSpecs should specify which of these sections the HAA operator will comply.

b. Pilot/Helicopter Ratio. For 24-hour HAA operations, it is recommended that no fewer than four pilots be assigned per helicopter. An HAA operation with a high operational tempo or those with unusual circumstances may require a higher pilot-to-helicopter ratio. Sufficient staffing levels should be established to promote operational safety standards.

c. Maintenance Personnel Rest. Each HAA operator should establish rest policies for maintenance personnel similar to those for flightcrew. Rest periods should be 10 consecutive hours within the previous 24 hours and at least one 24-hour day for every seven 24-hour days. This requirement should be the same for contractors or vendors performing maintenance.

d. Flightcrew Member Rest Area. An adequate rest area should be provided for flightcrew members assigned HAA duty. This facility is an explicit regulatory requirement for those operators operating in accordance with § 135.271. This area should be at or in close proximity to a hospital or other approved location at which the HAA assignment is performed. A crew rest area should be available on a continuous basis exclusively for flightcrew members away from the general flow of vehicle and pedestrian traffic and should provide a shower, toilet and changing facilities, a bed with sheets, pillow and blankets, and be environmentally controlled for comfort.

3-13. RAPID FUEL AND OXYGEN REPLENISHMENT PROCEDURES. Refer also to the current edition of AC 91-32, Safety in and Around Helicopters.

a. Training and Qualification. The operator must train and qualify all applicable personnel in rapid fuel and oxygen replenishment procedures before conducting such operations. The operator should include the following points in their procedures:

(1) Only turbine engine helicopters fueled with JET A or JET A-l fuels should be refueled while an engine is running.

(2) Oxygen replenishment should not be conducted while refueling operations are underway.

(3) Helicopters being refueled while an engine is running should have all sources of ignition or potential fuel spills located above the fuel inlet port(s) and above the vents or tank openings. Ignition sources may include, but should not be limited to the following:

- Engines,
- Exhausts,
- Auxiliary power units (APU), and
- Combustion-type cabin heater exhausts

(4) Only under the following conditions should operators permit helicopter fuel and oxygen servicing while engines are running:

(a) A company trained and qualified helicopter pilot should be at the aircraft controls during the entire rapid fuel and oxygen servicing process.

(b) Patients should be off-loaded to a safe location before rapid refueling or oxygen replenishment operations. *Where the PIC deems it necessary for patients to remain onboard for safety reasons, all helicopter engine(s) should be shut down and the replenishment conducted with the engine(s) off.*

(c) Passengers should not be loaded or unloaded from the aircraft during rapid replenishment operations.

(d) Only designated personnel, properly trained in rapid replenishment operations, should operate the fuel and oxygen dispensing equipment. Written procedures should include the safe handling of the dispensing equipment.

(e) All doors, windows, and access points allowing entry to the interior of the helicopter that are adjacent to, or in the immediate vicinity of, the fuel inlet ports should be closed and should remain closed during refueling operations.

(f) Before introducing fuel into the helicopter, the helicopter should be bonded to the fuel source to eliminate the potential for static electricity arcing.

(g) Fuel should be dispensed into an open port from approved dead man-type nozzles, with a flow rate not to exceed 10 gallons-per-minute (38 liters-per-minute), or through close-coupled pressure fueling ports. Where fuel is dispensed from fixed piping systems, the hose cabinet should not extend into the rotor space. The operator should provide a curb or other approved barrier to restrict any servicing vehicles from coming closer than within 10 feet (3 meters) of any helicopter rotating components. If an operator cannot provide a curb or approved barrier, servicing vehicles should be kept 20 feet (6 meters) away from any helicopter rotating components and a trained person should direct the approach and departure of the servicing vehicles.

b. Procedure for Evacuation During Aircraft Servicing. A certificate holder's refueling and oxygen replenishment policies and procedures should include any special considerations for the evacuation of passengers (patients). Operators should consider the following requirements when establishing procedures for evacuation of passengers during helicopter servicing:

(1) The certificate holder should establish specific procedures covering emergency evacuation during rapid refueling for each type of aircraft they operate.

(2) If passengers remain onboard an aircraft during fuel or oxygen servicing, there should be enough qualified people trained in emergency evacuation procedures to evacuate the patients.

(3) A clear area for emergency evacuation of the aircraft should be maintained adjacent to not less than one additional exit.

(4) If rapid fuel and oxygen replenishment operations take place with passengers onboard, the certificate holder should notify the Aircraft Rescue and Fire Fighting (ARFF) operation, if available, to assume a stand-by position near the fueling activity with at least one vehicle. This vehicle should be in position before commencing refueling.

(5) Operators should display all no smoking signs in the cabin(s), and the crewmembers should enforce the no smoking rule during rapid refueling and oxygen replenishment.

CHAPTER 4. TRAINING

4-1. GENERAL. This chapter identifies considerations for training for all helicopter air ambulance (HAA) personnel including flightcrew members, medical personnel, Operations Control Specialists (OCS), ground personnel and maintenance personnel. Emphasis is on training beyond the capabilities normally associated with Title 14 of the Code of Federal Regulations (14 CFR) part 135 operations. Most notably, HAA operations include a training program that explicitly requires well-considered and documented risk analysis and human factors issues.

4-2. HAA PILOT-IN-COMMAND (PIC)/SECOND-IN-COMMAND (SIC) GROUND TRAINING. Examples of ground training are provided in Appendix C of this advisory circular (AC). Following are some recommended HAA-specific curriculum items that are suggested by industry best practices:

a. Ground Training Curriculum.

(1) Risk analysis procedures (these are required by regulation and described in paragraph 3-4 and Appendix A of this AC).

(2) Local flying area (LFA) orientations.

(3) Flight planning and weather minimums (described in paragraph 3-3 of this AC).

(4) Flightcrew functions and responsibilities (including Crew Resource Management (CRM) as described in paragraph 4-9 of this AC).

(5) Obstacle recognition and avoidance.

(6) Aircraft systems variations, such as special electrical systems, navigational radios and instrumentation and their performance characteristics.

(7) Handling and securing of special medical equipment such as stretchers, isolettes, balloon pumps and ventilators.

(8) Appropriate restraint of infants, pediatric patients and passengers who may pose a threat to the safety of the aircraft and crew, to include prisoners.

(9) Hospital heliport operations and procedures.

(10) Day and night unimproved landing area (scene) operations.

(11) International operations and programs (if appropriate).

(12) Bloodborne pathogens, biohazard and infection control, including prevention and control of infectious diseases.

(13) Refueling procedures and methods to ensure fuel quality.

(14) Inadvertent instrument meteorological conditions (IIMC), whiteout, brownout and flat light conditions (described in paragraph 3-9 of this AC).

(15) HAA-specific equipment training (i.e., night vision goggles (NVG), Helicopter Terrain Awareness and Warning System (HTAWS), radar altimeter, etc.).

4-3. HAA PIC/SIC FLIGHT TRAINING.

a. Use of Simulators.

(1) Helicopter flight simulation training devices (FSTDs) are rapidly becoming more advanced. Some are now capable of full-motion with realistic visual cockpit displays. A growing number of helicopter FSTDs are approved by the Federal Aviation Administration (FAA).

(2) Training in IIMC, flat light, and other special conditions can be enhanced through the use of simulators. Simulators have the capability to decrease visibility and simulate a variety of situations not possible in flight. Simulators can provide realistic training in sudden onset emergencies such as dual engine failures. It is strongly recommended that, where possible, FSTDs should be included in part 135 training and checking activities.

(3) Inspectors should become thoroughly familiar with the types of simulators and simulator practices employed by their operators.

b. Flight Training Curriculum. At a minimum, the following topics should be included in the HAA flight training curriculum. Examples of flight training and checking practices are provided through the inclusion of training material as Appendix C of this AC.

(1) LFA orientation (day/night). LFA ground (and optional flight) training should familiarize pilots with LFA terrain, airspace, air traffic facilities, weather (including seasonal sun glare, icing, fog and convective weather) and available airports, heliports, Landing Zones (LZ) and their respective approaches.

(2) Operations Control Center (OCC) interface and utilization.

(3) Hospital heliport operations and procedures (day/night and multi-aircraft).

(4) Unimproved LZ (off-airport) operations (day/night and multi-aircraft).

(5) Day and night cross-country flight to include cockpit and exterior lighting and forced landing considerations (including use of a searchlight if installed).

(6) Communications, including air-to-ground and flightcrew/medical crew procedures.

c. IIMC Avoidance and Recovery Procedures. Training and checking should emphasize the recognition of circumstances likely to lead to IIMC encounters and encourage the pilot to abandon continued visual flight rules (VFR) flight into deteriorating conditions. IIMC may occur when visual conditions do not allow for the determination of a usable horizon, such as flat light conditions (discussed in paragraph 3-9 of this AC) and night operations over unlit surfaces in low lighting conditions. These conditions may occur in high ceiling and visibility environments. The result may be a loss of horizontal or surface reference by which the pilot typically controls a helicopter in VFR flight. Without adequate training and checking, these conditions may lead to loss of control that may not be survivable.

(1) All HAA pilots must be trained in basic instrument flying skills to recover from IIMC, including those authorized to conduct instrument flight rules (IFR) operations under part H operations specifications (OpSpecs). Training must also be provided on unplanned transition from an intended VFR flight to emergency IFR operations, which involves a different set of pilot actions, including navigation and operational procedures, interaction with air traffic control (ATC) and CRM.

(2) IIMC training should include identification of a predetermined minimum altitude/airspeed combination which should not be exceeded. If this minimum altitude/airspeed combination cannot be maintained, a diversion to better conditions or a return to the starting base should be the first course of action. Training should emphasize that deteriorating conditions may also dictate a landing short of the destination (even an off-airport precautionary landing) or initiating an emergency transition to IFR as appropriate to the situation. It should be further emphasized that such a decision on the part of the PIC is within the pilot's emergency authority and the pilot will not be subjected to disciplinary action solely based on the transition to IFR or the precautionary diversion or landing.

(3) An oral or written test covering procedures for aircraft handling in flat light, whiteout and brownout conditions, including methods for recognizing and IIMC conditions, is required. (Refer to part 135, § 135.293(a)(9).)

(4) Training and checking for all pilots, whether helicopter instrument rated or not, must include attitude instrument flying, recovery from unusual attitudes and ATC communications. The objective is for non-instrumented rated pilots to demonstrate their ability to be able to recover to visual meteorological conditions (VMC). Pilots should receive training, regardless of their Instrument flying qualifications or lack thereof, so following an IIMC encounter they can maneuver a helicopter from instrument meteorological conditions (IMC) to VMC solely by reference to instruments. Checking of their ability is covered in the flight test required by § 135.293(c).

(5) In the absence of an IFR-certified helicopter, training and checking should include instrument maneuvers appropriate to the installed equipment, the certificate holder's OpSpecs and the operating environment.

(6) For checking, if the aircraft is appropriately equipped and the check is conducted at a location where an instrument landing system (ILS) is operational, an ILS approach should be demonstrated. If unable to conduct an ILS approach, a Global Positioning System (GPS) approach should be demonstrated if the aircraft is equipped with an IFR-approach-capable GPS receiver that is maintained to IFR standards (including a current IFR database) and the check can be conducted where a GPS approach is available. If neither ILS nor GPS procedures can be performed, another type of instrument approach must be performed. Very high frequency (VHF) omnidirectional range station (VOR), automatic direction finder (ADF) and airport surveillance radar (ASR) approaches are options, depending upon available facilities and equipment. Partial panel operations should be considered for inclusion in checks if attitude and gyroscopic heading information are available from single sources. In the case of a helicopter without gyroscopic instruments, the operator should consult with their principal operations inspector (POI) for alternative training and checking methods.

(7) In the event the certificate holder does not have OpSpecs for night or instrument conditions, the aircraft is not equipped with an attitude reference system, a turn indicator or coordinator, or an attitude gyro, and the operating environment is predominantly VFR, the pilot being checked may not be required to demonstrate a VMC recovery from IIMC. Under these circumstances, it is recommended that the pilot be examined verbally in the IIMC recognition and avoidance techniques developed by the operator.

d. Night Training. Many HAA-associated accidents occur at night. Pilot night proficiency is essential for twenty-four hour HAA operations. While not required by regulations, night operations should be emphasized in flight, ground and simulator training.

(1) Night training should be tailored to the certificate holder's specific requirements and capabilities considering the experience level of their pilots, the area of operations, type of aircraft and installed equipment.

(2) Best practices suggest night flight training should include the use of Night Vision Imaging System (NVIS); the appropriate use of HTAWS and radar altimeters. Appropriate use of these technologies will also contribute to pilot proficiency at night, in IIMC and special conditions.

NOTE: This AC is not intended to suggest training or operating a helicopter in actual IMC conditions without a qualified, competent and proficient pilot, a properly equipped helicopter and an IFR clearance. The purpose of the training described here is to provide pilots with an additional margin of safety when conducting HAA operations.

NOTE: Effective April 22, 2017, all HAA pilots must hold a valid helicopter instrument rating or an Airline Transport Pilot Certificate (ATPC) with a category and class rating not limited to VFR. (Refer to § 135.603.)

4-4. MEDICAL PERSONNEL/CREWMEMBER BRIEFING/TRAINING.

a. Required Medical Crewmember Briefing/Training. As stated in § 135.621(a), the pilot in command (PIC) or other flightcrew member must ensure that all medical personnel receive and complete a HAA medical personnel specific safety briefing prior to each HAA operation in which they participate, or, as authorized by § 135.621(b), have completed the certificate holder's approved medical personnel safety training program within the previous 24 months. There is no grace period associated with this 24-calendar-month training period. This training must cover:

- Physiological aspects of flight;
- Patient loading and unloading;

- Safety in and around the helicopter;
- In-flight emergency procedures;
- Emergency landing procedures;
- Emergency evacuation procedures;
- Efficient and safe communications with the pilot; and
- Differences between day and night operations, if appropriate.

b. Recommended Additional Medical Personnel Training. In addition to these required briefing/training subjects, training in the following topics has been identified through industry best practices as fostering crewmember proficiency and safety:

- External power unit (EPU) door and cart;
- Medical equipment – loading and unloading/securing;
- Oxygen system and outlets;
- Audio panel and headsets;
- Lights and vents;
- Cabin cleaning;
- Emergency locator transmitter (ELT);
- Emergency fuel shutoff; and
- Radios –VHF, FM, 800 megahertz (MHz).

4-5. OCS TRAINING. OCCs are staffed during all hours of HAA operations by one or more OCSs, trained to provide a wide range of operational support for the certificate holder's HAA operations. At a minimum, OCSs are required to communicate with pilots, provide weather briefings, monitor flight progress and participate in the preflight risk analysis completed by the pilot (refer to § 135.617). This does not end their involvement in risk analysis, which is a continuous process until the flight is completed. OCSs must be trained in their duties and responsibilities, including duty-time limitations as developed by the certificate holder. By mirroring training requirements of § 135.619(b) into existing staff members and creating standard operating procedures (SOP) scalable to the size of the operation, it is possible for a small operator, with minimal expense, to increase the safety of their HAA operations.

a. HAA OCS Training. Section 135.619(d) establishes the requirement and § 135.619(f) establishes the minimum training for HAA certificate holders operating 10 or more HAAs. Certificate holders operating fewer than 10 HAAs are encouraged to use the same training in all HAA operations.

(1) Preferably, although not required, HAA OCSs should be trained as helicopter pilots and, ideally, be highly experienced HAA pilots.

(2) Before performing the duties of an OCS, each person must satisfactorily complete the certificate holder's FAA-approved OCS initial training program. Initial training must include a minimum of 80 hours of training on the topics required in § 135.619(f).

(3) Each OCS must complete a minimum of 40 hours of recurrent training, every 12 calendar-months after satisfactory completion of initial training.

b. OCS Prior Experience. A certificate holder may reduce the regulatory requirement of 80 hours of initial training provided the individual has certain prior experience. The training may be reduced as appropriate but not less than a minimum of 40 hours. It is recommended that the certificate holder perform a training needs assessment to determine what training requirements (per § 135.619(f)) may not be needed for all for persons who have obtained, prior to beginning initial training, a total of at least 2 years of experience during the last 5 years in any one or combination of the following areas:

- Military aircraft operations as a pilot, flight navigator or meteorologist;
- Air carrier operations as a pilot, flight engineer (FE), certified aircraft dispatcher or meteorologist; or
- Aircraft operations as an air traffic controller or flight service specialist.

c. Training Requirements. OCS training requirements are specified in § 135.619(f). Other requirements, as determined by the Administrator to ensure safe operations, may be added, depending upon each individual HAA operator's circumstances. In addition to required initial and annual training, it is recommended that recurrent training include carrying out periodic emergency procedure drills. Recurrent training and checking must be accomplished before the end of the 12th calendar-month since the last check was accomplished.

d. Testing. OCSs must pass an FAA-approved knowledge and practical test given by the certificate holder on topics required in § 135.619(f). If an OCS fails to satisfactorily complete recurrent training and checking, within this time, the individual may not perform OCS duties until the training and checking is accomplished. There is no provision for a grace period. Requalification of OCS following a lapse may be accomplished by satisfactorily completing the recurrent training and checking. In the event of a test failure, the OCS retest must be proceeded by retraining in the subject areas missed and retesting should cover all subject areas.

NOTE: Effective April 22, 2016, all certificate holders authorized to conduct HAA operations with 10 or more HAA-capable helicopters assigned to the certificate holder's OpSpec must have an OCC. (Refer to § 135.619.)

4-6. COMMUNICATIONS SPECIALISTS TRAINING. Information on communications specialists and their training is provided in the current edition of AC 120-96, Integration of Operation Control Centers into Helicopter Emergency Medical Services Operations. Communication specialists may be employed by the HAA operator, a hospital, and ambulance dispatch center or local law enforcement entities (e.g., local public safety or 911 dispatchers).

a. Training. There are no regulatory qualifications requirements for communication specialists. Employers should provide sufficient aviation-specific training to permit them to perform their intended functions and to know what their limits of authority may be. Communication specialists not employed by the certificate holder, that provide services through either contract or agreement, must be trained in accordance with the certificate holder's approved training program. It is recommended this training would include portions of the OCS training curriculum described above.

b. Third Party Training Providers. Certificate holders may employ outside training resources to provide consistent training to communication specialists, providing the contractor and their training syllabus are approved by the certificate holder.

4-7. GROUND PERSONNEL TRAINING/ORIENTATION. The FAA recommends that HAA operators develop a training program for hospitals, first-responders and law enforcement personnel that includes:

a. LZ Area Evaluation. LZ area evaluation to include size, surface, suitability of terrain, hazard/obstacle identification and the effects of rotor-wash.

b. Use of Visual Cues. The use of visual cues for positioning and parking the helicopter (e.g., standard hand signals and communications).

c. Methods of Lighting. Methods of lighting night landing zones, ground/vehicle lighting considerations, and discipline related to NVG operations.

d. Safety. Personal safety in and around the helicopter, including an overview of FAA rules and safety measures for the specific helicopters that are operated by the certificate holder.

e. Loading/Unloading with Helicopter Shut Down. Loading and unloading with the helicopter shut down.

f. Loading/Unloading with Helicopter Running. Loading and unloading the helicopter with rotors and/or engine running, including the use of a tail rotor guard or lookout.

g. Emergency Landing Procedures. Emergency landing procedures, such as emergency shut-off procedures, securing equipment, etc.

h. Other Emergency Procedures. Emergency procedures for handling fuel leaks, helicopter fires, fire suppression and other situations requiring an emergency response.

i. Helicopter Evacuation Procedures.

j. Other Procedures. Other procedures for day/night operations into and out of an unimproved landing site.

> **NOTE: The Aeronautical Information Manual, chapter 10, 10-2-3 provides information that may be helpful in planning outreach training. Additionally, several industry publications are available to provide information on training for LZ operations.**

4-8. MAINTENANCE PERSONNEL TRAINING.

a. Training. Maintenance personnel participating in HAA operations should receive training to meet specific needs unique to these operations. This includes the mounting and maintenance of medical equipment, non-aviation radios and other communications equipment and the scheduling and performance of maintenance to facilitate the demands of either scheduled or non-scheduled HAA operations. Training of maintenance personnel is required in accordance with § 135.433.

b. Supplemental Training. Maintenance personnel should be trained on servicing and maintaining medical oxygen systems and other equipment as required. Training should include biohazard control and mitigation associated with HAA operations.

NOTE: Recurrent training (and its documentation) is recommended for all maintenance personnel in addition to initial training.

4-9. CRM TRAINING. Flightcrews may experience high stress levels in HAA operations. CRM training is intended to prevent inappropriate actions and decisions during periods of stress. HAA operators should implement CRM training that builds effective integration and coordination during routine flight operations as well as including issues such as the use of medical personnel to supplement flightcrew, as appropriate during emergency operations including IIMC recovery, and non-emergency operations including NVG operations and flight into unimproved LZs, etc. Due consideration should be given to the over-riding medical care priorities that medical personnel serve when training medical personnel in aviation related activities. Refer to the current edition of AC 120-51, Crew Resource Management Training.

4-10. AIR MEDICAL RESOURCE MANAGEMENT (AMRM) TRAINING.

a. General. The purpose of an AMRM training program is to create a shared safety culture, between customer management and HAA operator management cooperatively bringing together HAA operators and medical organizations. Clearly defined and consistently implemented operating philosophies, policies, safety culture, best practices and procedures should be reflected in training to create an understanding of authority and responsibility of all levels of the involved personnel. Refer to the current edition of AC 00-64, Air Medical Resource Management, to identify training issues.

b. Shared Training. Aviation and medical management personnel should collaboratively and explicitly define the safety responsibility and authority of managers and subordinates. Shared AMRM training provides a common language and understanding to enable appropriate safety communication, responsibility and authority, within both HAA operators and medical organizations (and others as appropriate). Ideally, AMRM training should not be limited to the classroom but include engagement with high-level decisionmakers, including medical or hospital management.

4-11. JUDGMENT AND DECISIONMAKING TRAINING. Crewmember judgment is the mental process by which the crewmember recognizes, analyzes, and evaluates information about himself or herself, the helicopter and the external environment. Industry best practices recognize that judgment and decisionmaking can be developed and improved with training. Pamphlet DOT/FAA/PM 86 45, Aeronautical Decision Making for Helicopter Pilots, is a recommended tool to improve aeronautical decision-making (ADM).

a. Topics. Decisionmaking training should include topics such as LFA, refueling locations, terrain, local weather patterns, aircraft characteristics and capabilities and medical equipment. Emphasis in training should be placed on identifying and addressing the types of decisions likely to be required by the specific needs of HAA operations. This includes, for example, training in the decisionmaking process involved when changing weather conditions might dictate a route change or termination of flight.

b. Risk Analysis. Risk analysis is an integral component of the decisionmaking process. It must be trained for, understood and practiced by HAA crewmembers before and during all flight operations.

c. Decisionmaking Training. Emphasizes that the best practices in the industry reflect that the medical condition of the patient should not be a factor in the PIC decision to accept or decline a flight and should not be briefed to the PIC in advance of the decisionmaking process.

d. Management Personnel. Management personnel should participate in the certificate holder's training program. Management personnel should be familiar with the ADM process. Knowledge of appropriate FAA regulations and guidelines related to safe operations is essential. (See Chapter 8.)

e. Human Factors. The operator must effectively address human factors that have the potential to affect HAA operations. (Refer to § 135.330.)

CHAPTER 5. EQUIPMENT

5-1. THE HELICOPTER AIR AMBULANCE (HAA) HELICOPTER. The selection of a suitable HAA helicopter (and its subsequent modification) will include considerations exclusive to the HAA operating environment. An applicant should identify, in their initial application, any specialized flight operations equipment that will be aboard the helicopter(s) used for HAA operations.

a. Weight and Performance of HAAs. An operator should consider the effect of the significant added operating weight associated with even a basic HAA helicopter's mission-specific modifications including equipment such as a Helicopter Terrain Awareness and Warning System (HTAWS), radio altimeter, and Flight Data Monitoring System (FDMS). In addition, weight penalties are associated with an aeromedical interior, medical equipment and supplies, and provision for medical personnel and their personal gear. Equipment such as Night Vision Imaging System (NVIS), satellite communication (SATCOM), position tracking and reporting systems and possibly equipment supporting instrument flight rules (IFR) capability provides additional operational capability but further reduces helicopter payload and performance.

b. Control and Use of HAAs. By regulation (Title 14 of the Code of Federal Regulations (14 CFR) part 135, § 135.25), the certificate holder is required to have control and exclusive use (including maintenance) of at least one aircraft to be used in part 135 service. Helicopters used in HAA operations may be owned or leased by the certificate holder. In the case of leased equipment, the lessor may be the certificate holder's customer (hospital group or community). This common industry practice may introduce operations control complications unless the lease is executed in a manner that transfers operations control unequivocally to the certificate holder. Operators should be on guard against the potential of perceived operations control retention by the lessor. This practice has historically led to undue pressure on the operator during flight risk analysis and flight authorization decisionmaking processes.

5-2. EQUIPMENT REQUIRED BY REGULATION FOR HAA OPERATIONS.

a. Radio Altimeter. A Federal Aviation Administration (FAA)-approved radio altimeter or an FAA-approved device that incorporates a radio altimeter, is required and must be operational unless otherwise authorized in the certificate holder's approved minimum equipment list (MEL). Specifications for radio altimeters under this requirement are in § 135.160. Operators should establish and document procedures to be followed if operations are conducted with an inoperative radio altimeter in accordance with an MEL. Incorporating procedures such as requiring increased ceiling and or visibility and limiting flights where white out, brownout, or encounters with flight light conditions may be possible may mitigate risk. Inoperative equipment should also be addressed as a risk analysis factor as discussed in appendix A of this advisory circular (AC).

> **NOTE: The FAA may authorize deviations for certain helicopters (maximum gross takeoff weight no greater than 2,950 pounds) unable to incorporate a radio altimeter. (Refer to § 135.160.)**

b. HTAWS. An HTAWS that meets the specifications of FAA Technical Standard Order (TSO) C-194 and RTCA DO-309 must be installed and operational in all HAA helicopters. The operator's manuals or other documentation must specify appropriate procedures for the use of this equipment, including the proper flightcrew response to audio and visual warnings. There is a process for operators with HTAWS covered by a deviation under § 21.618 to meet the regulatory requirements of § 135.605. The HTAWS requirement becomes effective on April 24, 2017.

c. FDMS Capable of Recording Flight Performance Data. To meet the requirements of § 135.607, the operator must install an FAA-approved FDMS in each HAA. In this context, "approved FDMS" means only that the installed FDMS be capable of recording "flight performance data" including at minimum: Latitude, Longitude, Barometric Altitude, and Date/time of recording, once per second and have sufficient memory to retain these data over 4 hours of flight time. The FDMS is approved by Supplemental Type Certificate (STC), design review, or field approval, depending upon the complexity of the installation, the interface between the FDMS and other systems installed aboard the aircraft, and that it poses no hazard to other onboard equipment, nor any hazard to occupants. Beyond the minimum parameters, additional parameters recorded by the FDMS are at the discretion of the operator. Retention and use of recorded data is also at the discretion of the Operator. The FDMS requirement becomes effective on April 23, 2018. The FDMS is not to be confused with a flight data recorder (FDR) certified under § 27.1459, though an FDR would be acceptable to meet the FDMS requirement.

(1) The FDMS must operate from the application of electrical power prior to engine start until the removal of electrical power after termination of the flight (refer to § 135.607). The FDMS design should be compliant with Design Assurance Level D (DAL-D) as set out in the latest revisions of both RTCA DO-178 (for software development) and RTCA DO-254 (acceptable airborne electronic hardware development standards). FDMS inspection and maintenance should be conducted in accordance with the manufacturer's instructions for continued airworthiness (ICA). Additional information is in AC 27-1B MG 6, Miscellaneous Guidance (MG) for Emergency Medical Service (EMS) Systems Installations.

(2) The operator determines and maintains the FDMS data stream format and parameter documentation. The operator is responsible for determining:

- Parameters(beyond the minimum direct parameters of latitude, longitude, barometric altitude, and date/time of recording) that are recorded and which are derived from recorded data;
- Latency (how frequently each recorded parameter is recorded);
- Bit resolution of each parameter;
- Operational range of each parameter; and
- Conversion algorithms from digital or analog signal units to engineering units.

(3) Information may be directly recorded or may be deduced from recorded data (e.g., continually updated three dimensional Global Positioning System (GPS) location data may yield ground speed, heading and course being flown and altitude). The FDMS should record digital or analog raw data, images, cockpit voice or ambient audio recordings or any combinations thereof which ideally yield at least the following flight information:

- Location;
- Altitude;
- Heading;
- Speeds (airspeed and groundspeed);
- Pitch, yaw, and roll attitudes and rate of change;
- Engine parameters;
- Main rotor RPM;
- Ambient acoustic data;
- Radio ambient audio; and
- Any other parameter the operator deems necessary (e.g., high definition video recording looking forward including instrument panel and forward cockpit windshield view, intercommunications system (intercom) between pilot and medical crew, communications with air traffic control (ATC), OCS, base operations, first responders at scene, hospital, etc.)

(4) The FDMS should have sufficient non-volatile memory to record flight performance data over the course of an entire flight operation. FDMS data should be retrieved periodically and the resulting information be used for Safety Assurance (SA) programs such as flight operations quality assurance (FOQA) at the discretion of the operator. The recording memory capacity of the FDMS would correlate directly to the maximum data retrieval period.

(5) Though the FDMS is not required to be hardened or crash worthy such as an FDR, it should be able to endure extreme environmental conditions including storage and operational use temperatures, the forces applied during an accident, post-impact water immersion, and to a limited extent, to high heat or fire. Refer to AC 27-1 and RTCA DO-160 (current revisions) for test and analysis options.

d. Additional Equipment Required for HAA Overwater Operations. Except for takeoff and landing, or unless operations specifications (OpSpecs) allow otherwise, overwater operations beyond autorotational distance from the shoreline requires the following special equipment to be aboard the HAA. Refer to the appropriate Title 14 of the Code of Federal Regulations (14 CFR) section. Requirements can be found in §§ 135.168, 135.183 and 136.1.

(1) Approved life preservers, equipped with an approved survivor locator light, must be carried aboard all part 135 helicopters, including HAA, for each occupant. Each occupant must wear a life preserver when the flight operates beyond an autorotational distance from the shoreline. The exception to this requirement is when wearing a life preserver would be inadvisable for medical reasons as determined by medical personnel.

(2) A 406 megahertz (MHz) emergency locator transmitter (ELT), with a 121.5 MHz homing capability and approved batteries must be installed in the HAA. This ELT must meet the TSO and RTCA standards listed in § 135.168(f).

5-3. MEDICAL EQUIPMENT FOR HAA OPERATIONS. Part 135 certificate holders conducting HAA operations will utilize equipment associated with medical transport.

a. HAA Interiors. HAA interiors are typically lined with washable panels, edge sealed to prevent leakage of fluids into interior spaces beneath the subfloor. Interlocking and sealed flame-retardant and moisture-resistant interior panels be designed in accordance with 14 CFR parts 27 or 29 would meet the requirements of an STC.

b. Stretchers (Litters). Stretchers should be designed and FAA-approved for HAA use. Refer to part 27, § 27.561 and part 29, § 29.785 for further information. Restraining devices, including shoulder harnesses, should be available to ensure patient safety.

c. Medical Oxygen Systems. Medical oxygen and nitrous oxide for patient use may be delivered via compressed gas systems consisting of high pressure compressed gas cylinders, regulators, valves, and plumbing; cryogenic liquid oxygen systems consisting of an insulated reservoir tank instead of high pressure compressed gas cylinders and the rest of the downstream equipment mentioned above; and molecular sieve oxygen concentrators. In all cases, the installation must utilize only FAA-approved components installed in accordance with the manufacturer's STC and field approvals as appropriate to the system chosen. Servicing of permanently installed medical oxygen systems should be delegated to appropriately trained flightcrew members or maintenance personnel. Removal, replacement, and securing of portable oxygen systems may be accomplished by appropriately trained medical personnel.

d. Medical Portable Electronic Devices (MPED). MPEDs, such as Automated External Defibrillators (AED), airborne patient medical telemonitoring (APMT) equipment and portable oxygen concentrators (POC), authorized by Special Federal Aviation Regulation (SFAR) 106, should be designed and tested to meet requirements in accordance with the current edition of RTCA/DO 160, section 21, Category M (as referred to in paragraph 1-7 of this AC.) For further information, refer to the current edition of AC 91-21.1, Use of Portable Electronic Devices Aboard Aircraft.

e. Supplemental Lighting System. Standard aircraft lighting may not be sufficient for adequate patient care. Some HAAs may require additional lighting. The cockpit must be shielded from light emitted from the patient area during night operations. Any supplemental lighting must be compatible with an NVIS installation. HAA industry best practices suggest, where possible, installing an emergency lighting system with a self-contained battery pack to allow for continued patient care and emergency egress from the helicopter in the event of a primary electrical failure.

f. Electric Motor-Driven Medical Devices. Medical equipment attached and secured to a mounting inside the HAA should have electric motors thermally protected and isolated against inadvertent overheating to reduce fire hazards. Electrical motors should also be fitted with shielding and filters as necessary to prevent conducted and radiated electromagnetic interference (EMI).

g. Electrical Power Generating Capacity. For each HAA equipped with multiple electrically powered auxiliary systems, an analysis of generating capacity against power consumption should be performed and documented. The operator must be able to meet § 135.159 regulatory requirements.

5-4. RECOMMENDED EQUIPMENT FOR HAA OPERATIONS. Other equipment may also be installed on HAA aircraft such as: a helicopter-approved searchlight, specialized communication equipment for coordination with ground responders, NVIS with STC or manufacturer approved NVIS compatible interior lighting, SATCOM, and aircraft position tracking equipment.

a. Helicopter-Approved Searchlight. Industry best practices are that a HAA should be equipped with a high-powered mounted searchlight manipulated by the pilot, having a minimum traverse of 90 degrees vertical and 180 degrees horizontal and capable of illuminating a landing site. The pilot should be able to fly hands-on with the helicopter flight controls while operating the searchlight.

b. Communications with Hospitals and First Responders. In addition to the radios required for ATC and communication with the Operations Control Center (OCC), a radio capable of air-to-ground communications is recommended to ensure coordination with ground personnel (e.g., hospitals, personnel on the scene, police or fire department).

c. Intercommunications System (intercom). An intercom should be provided for pilots and medical personnel to communicate with each other aboard the helicopter. The intercom should provide for isolation of pilot from crew and crew from pilot, with an over-ride in case of an emergency that either party wishes to advise the other about.

d. Wire Strike Protection System. A wire strike protection system is a recommended safety enhancement modification if it has been type certificated (TC/STC) for installation on the specific make, model, and series (M/M/S) of helicopter.

e. Pyrotechnic Signaling Device(s). Recommended to be aboard in a conspicuously marked location easily accessible to HAA occupants.

5-5. EQUIPMENT INSTALLATION EVALUATION FOR HAA OPERATIONS. Any equipment installed onboard a helicopter should comply with the data in AC-27-1B MG 6 and be installed in accordance with the current edition of AC 43.13-2, Acceptable Methods, Techniques, and Practices—Aircraft Alterations; 14 CFR part 43 and part 135 subpart J.

a. Equipment Installation General Considerations.

(1) Equipment installed in racks should meet the G loading requirements imposed by normal flight and an emergency landing, using approved data provided by the equipment manufacturer. Industry best practices suggest that rack mounting is considered preferable to other mounting approaches, such as attachment to FAA-approved poles or other mounting devices. Medical equipment mounting structures in racks should be installed so that equipment that has been attached to them it may be readily removed to accompany a patient.

(2) Mounting structures attached to the aircraft, regardless of type, should be installed and removed by FAA-authorized personnel. A HAA operator should document instructions for removal and replacement of such equipment. The installation of additional equipment following issuance of a STC or field approval is normally done using instructions and operational supplements. Weight and Balance (W&B) data and ICA should be included. Consider also including such installed equipment in the aircraft MEL. Medical instruments and equipment attached to mounting structures are considered carry-on baggage for W&B purposes. The operator should ensure medical personnel are adequately trained to securely attach equipment to installed mounting structures to prevent hazards in flight.

(3) The requirements of § 135.91(a)(1)(iv), concerning oxygen for medical use by passengers, requires that all installed equipment, including portable devices, be appropriately secured. The structure(s) supporting this equipment should be designed to restrain loads in accordance to FAA certification requirements. (Refer to AC 27-1B MG 6.)

(4) Any cockpit equipment with self-contained illumination that is added to a previously-approved NVIS-compatible cockpit under an STC must be evaluated. Such new cockpit equipment must be approved with respect to NVIS compatibility and appropriate STC or field approval secured. Consult the principal avionics inspector (PAI) and principal maintenance inspector (PMI) for further details.

b. Installation Evaluation.

(1) Each installation should be evaluated at its time of approval to determine if a mechanic is required to perform installation or if other personnel can be trained for its removal or replacement.

(2) The certificate holder must ensure that installation of any additional equipment is compatible with all previously installed and certificated aircraft systems.

(3) Before returning a helicopter to service after the installation of additional equipment, flight tests may have to be accomplished to determine any interference with avionics, navigation, communications or flight and engine control systems. Such flight tests should be accomplished in visual meteorological conditions (VMC). Tests should include all installed equipment and carry-on medical equipment intended to be used for patient monitoring and care during transport. If any incompatibility cannot be solved by appropriate adjustments to newly installed additional equipment or de-conflicted with pre-existing systems, new equipment may not be operated until compatibility issues are resolved. Results of flight tests verifying non-interference and acceptability should be entered into appropriate permanent records for each helicopter.

NOTE: Medical monitors may be affected by the aircraft's electronic equipment. Therefore, at the time of installation and following maintenance, medical personnel should ensure the calibration and operation of such equipment is in accordance with the manufacturer's instructions, operational tolerances and approved data.

NOTE: Patient life support systems, which include litters/stretchers, incubators or isolettes, balloon pumps, etc., not normally included in the type design of the helicopter should be installed in accordance with the applicable part 43 regulations, AC 27-1B MG6, and FAA-approved data.

c. Medical Portable Electronic Devices (MPED). MPEDs that do not exceed electromagnetic emission levels contained in RTCA/DO 160 section 21, Category M, in all modes of operation (i.e., standby, monitor and/or transient operating conditions, as appropriate), may be used on board aircraft without any further testing by the operator. Equipment tested and found to exceed section 21, Category M emission levels are required to be evaluated for EMI and radio frequency interference (RFI) while mounted in the operator's aircraft. All navigation, communication, engine and flight control systems will be operating in the selected aircraft during the evaluation.

d. Medical Oxygen System. Depending upon the type of medical oxygen system installed (including bottles, lines, connectors, gauges, regulators and other system components), the certificate holder will establish an FAA-accepted method, or adopt a manufacturer's approved method, for its servicing and replenishing. If the method of servicing a medical oxygen system requires the disconnection and reconnection of installed fittings, (other than the removal and replacement of a service port cap) a certificated mechanic must perform the servicing. If the method of oxygen system servicing does not require any of the above operations, the service and replenishment procedure must be documented in an appropriate form and be available to the pilot. Each pilot must be trained and checked in the performance of these medical oxygen servicing and replenishment procedures.

e. Electrical Power. All wiring, electrical components and installation procedures should conform to the requirements of parts 27 or 29, as applicable. An electrical load analysis (ELA) should be performed to preclude overload of the helicopter generating system. The system should provide the pilot with a means of rapidly shedding electrical load in an emergency.

f. Motor-Driven Vacuum/Air Pump. Motors and/or pumps should be installed in accordance with appropriate STCs or other FAA-approved information. Any motor-driven device should be installed so as to preclude contact with any flammable fluid, gas or foreign materials that may cause or be susceptible to heat buildup which could lead to fire. Helicopters should be flight-tested with electric motors running to check for interference.

CHAPTER 6. OPERATIONS CONTROL CENTER (OCC)

6-1. GENERAL. This chapter summarizes regulatory requirements, recommendations and best practices regarding the Operations Control Center (OCC). An OCC is required for operators conducting helicopter air ambulance (HAA) operations with 10 or more HAAs and is recommended for other operators. The OCC requirement becomes effective on April 22, 2016. The current edition of Advisory Circular (AC) 120-96, Integration of Operation Control Centers into Helicopter Emergency Medical Services Operations, provides detailed guidance, including recommendations on establishing the physical layout of an OCC. This chapter provides recommendations to assist HAA operators with identifying best practices for implementing OCCs and operations control procedures. It is intended to help encourage and enable operators without a regulatory requirement to establish and operate an OCC to attain their operational benefit.

6-2. CORE CONCEPTS: OCC AND ENHANCED OPERATIONS CONTROL PROCEDURES. There are three primary concepts from AC 120-96 that define an effective OCC and enhanced operations control procedures:

a. Joint Flight Safety Responsibility. The first concept is joint flight safety responsibility for each HAA flight. Joint flight safety responsibility requires that at least one qualified ground staff member, in addition to the PIC, be actively involved in reviewing the PIC risk analysis in accordance with the required risk analysis program (Title 14 of the Code of Federal Regulations (14 CFR) part 135, § 135.617) and be responsible for monitoring factors affecting flight safety before and during the flight. The utilization of qualified Operations Control Specialists (OCS) on the ground also provides additional support and risk monitoring redundancy for pilots in high workload situations.

b. Written Standard Operating Procedures (SOP). The second concept is a requirement for documented SOPs that are used to guide training and standardize operations performance. Standardization of written Operations Control procedures reflects the same concerns that mandate the use of checklists on the flight deck. SOPs are documented so they can be referenced and performed the same way each time. The detail and scope of this documentation should reflect the size and complexity of each HAA operations. SOPs may be accessed either electronically or via hard copy (refer to Operations Specification (OpSpec) A061, Use of Electronic Flight Bag, for in-flight use of electronic documentation), Regardless, written procedures should be readily available, especially in times of high work load situations such as abnormal or emergency operations.

(1) Though industry is moving towards a less paper-dependent environment, a truly paperless environment has yet to be achieved. A key technology (e.g., a local area network (LAN) or workstation) may fail in conjunction with an emergency, or could even be the cause of emergency or abnormal operations. Technology failures may render electronic access to written SOPs unavailable. Therefore, while standard access to written SOPs may be accomplished electronically, these SOPs may not be available, especially in an emergency situation. Hard copy current written versions of all critical SOPs should be maintained and be readily available for use during abnormal or emergency operations.

(2) The requirement for hard copy Operational Control SOPs therefore mandates that the operator also include the Operations Control SOPs in the version and distribution control SOP for managing other required hard copy documents.

(3) Operators should also develop an SOP to provide for a continual internal process to solicit, obtain, and respond to feedback on SOPs and update these SOPs and ensure the value of training based on them. An SOP is needed to provide for a vehicle to continually receive feedback on procedures, respond to and prioritize feedback and accordingly, update procedures, inform staff of changes to procedures, and train staff on new procedures.

c. Leveraging Technology and Communication. The third core concept of OCCs and enhanced operations control procedures is to leverage technology and communication to enhance safety and efficiency. This includes providing an enhanced level of situational awareness to the pilot in command (PIC), OCS, and other individuals.

(1) Flight Operations Support. An OCC is an optimal environment for leveraging technology to support flight operations. An OCC's centralized location can provide economies of scale that make it economically viable to invest in both the information technology (IT) infrastructure and the IT support staff required to support its functions.

(2) Benefits to HAA Operations. An OCC can leverage technology to provide communication and safety benefits to HAA operations. For example, an OCC may be able to acquire weather information for currently non-covered locations. This information may come from a variety of weather feeds available at the OCC, including non-aviation sources such as telephone calls.

(3) Situational Awareness Improvement. As a result of this leveraging of technology, an OCC can contribute to improving the situational awareness of HAA personnel. This includes receiving and filtering information (including weather as in the example above) and providing inputs for or conducting shift-change and preflight briefings.

(4) Provision of Situational Awareness Information. In addition to the regulatory requirements the operator should establish and document procedures to acquire, fuse and provide situational awareness information to the PIC, using the OCC, OCS and other individuals and capabilities as appropriate. This is an example of the use of leveraging technology and communications to reduce risk in HAA operations.

(5) Shift Change Briefing. Operators should have a procedure to ensure the explicit provision by the OCS being relieved, of information on current operational and flight conditions, locations and status of all flights transferred to the relieving OCS, with emphasis placed on hazard updates to the pilots. This may include using conference call or other technology to link personnel at remote sites. This is an example of the use of leveraging technology and communications to reduce risk in HAA operations.

6-3. OCS.

a. OCS Requirements. The OCS is a critical component of the overall concept of emphasizing safe HAA operations. An OCS must be trained for a range of capabilities, as set out in paragraph 4-5 of this AC. The OCS must:

(1) Provide two-way communications with pilots.

(2) Provide pilots with weather briefings, to include current and forecast weather along a planned route of flight.

(3) Monitor progress of each HAA flight.

(4) Ensure pilots have completed all of the required items (as described in § 135.617) on a preflight risk analysis worksheet.

(5) Acknowledge, in writing, specifying date and time, that a preflight risk analysis worksheet has been accurately completed and that, according to their professional judgment, a flight can be conducted safely (as described in § 135.619(a)(iv)).

b. OCS Recommended Capabilities. It is recommended that an OCS:

(1) Participate in adjustments to risk analysis as a continuous process throughout a flight while carrying out regulatory-required flight monitoring responsibilities;

(2) Assist the pilot in mitigating any identified high risk prior to takeoff; and

(3) Secure management approval of a flight authorization if a predetermined level of individual or total risk is exceeded.

6-4. OCC FACILITIES AND CAPABILITIES. AC 120-96 describes possible OCC facilities and capabilities that can be realized by many different structures and physical configurations, depending on operator requirements. There are many possible alternatives, depending on the size and scope of the HAA operator. The OCC provides a physical location where the OCS and any other personnel can access technologies with the overall objective of being able to assist the PIC.

a. Recommended OCC Facilities. The following hardware and software resources should be considered as best practices for developing an OCC. Refer to AC 120-96 for further explanation and details concerning the following issues:

(1) Enabling technologies (to include LANs, Internet access, and digital signature capabilities for form completion).

(2) Aircraft situational displays depicting status of all certificate holder HAA aircraft.

(3) Aviation weather analysis tools (to include textual, graphical and Geographic Information System (GIS)-enabled).

(4) Notice to Airmen (NOTAM) tools (both textual and graphical).

(5) Air traffic flow tools (to include temporary flight restrictions, special use airspace, special areas of operation, military operations airspace, high density and congested airspace, warning areas and weather watch boxes).

(6) Communication tools (to include telephones, email, datalink, radio (aircraft and first responders including Voice over Internet Protocol (VoIP) capabilities), satellite communications (SATCOM) and advanced communication consoles).

(7) Non-aviation situational awareness tools such as the Federal Highway Administration (FHWA) Meteorological Assimilation Data Ingest System (MADIS), Internet capable of accessing weather cams, or television capable of receiving cable news channels.

b. Adapting OCC Facilities and Capabilities to Smaller Operators. Smaller (less than 10 HAAs) operators are not required by regulation to have an OCC staffed by OCSs. However, best practices of such operators have provided examples of the use of similar appropriately scaled methods to achieve the same goal.

c. Voluntary Implementation. If an OCC is not required and the operator chooses to voluntarily implement a similar capability or function, the operator's policies and procedures (and details of training specialists in operations control subject matter) should be established and documented by the operators in their General Operations Manuals (GOM) or other permissible forms of documentation. This documentation system must be accepted by the principal operations inspector (POI). The operator should demonstrate that operational control and PIC responsibility and authority is maintained and safety is not compromised through the duties and responsibilities of the individuals staffing that non-regulatory function.

d. Training Requirements. Operations control training of existing staff members should reflect the training requirements of § 135.619(b). Creating SOPs appropriately reflecting the size and complexity of the operation makes it possible for a small operator to increase the safety of their HAA operations with minimal expense.

CHAPTER 7. MANUALS, DOCUMENTATION, AND RECORDS

7-1. GENERAL. Title 14 of the Code of Federal Regulations (14 CFR) part 135 certificate holders conducting helicopter air ambulance (HAA) operations are subject to generally the same documentation and recordkeeping requirements as are other part 135 certificate holders, with a few additions.

7-2. MANUALS AND DOCUMENTATION. Part 135 certificate holders conducting HAA operations are required to compile and maintain Federal Aviation Administration (FAA)-approved procedures for preflight risk analysis (part 135, § 135.617) and visual flight rules (VFR) flight planning (§ 135.615). The following are subject matter areas which, due to either regulatory requirements or industry best practices, should be included in approved/acceptable documentation in a manual (or other accepted format) that goes beyond those required of other part 135 operations. The list below does not relieve the certificate holder from including other items in their operations manual as required.

a. General Operations Manual (GOM). It is recommended that each single-pilot and basic part 135 certificate holder conducting HAA operations, develop a GOM that covers the subject matter contained in §§ 135.23, 135.615, and 135.617. This manual should be available in each helicopter and at each location where flights are initiated.

b. Accident Incident Plan/Post-Accident Incident Plan (AIP/PAIP). All HAA operators, regardless of size, must establish accident and incident notification procedures, to include the local FAA office, National Transportation Safety Board (NTSB) and FAA certificate-holding district office (CHDO) telephone numbers. This is a requirement shared with other part 135 operations. Due to the nature of the distributed base operation generally conducted by HAA operators, this requirement may be somewhat more complex than a response plan for a single base non-HAA part 135 operation. (Refer to § 135.23(d).)

c. Rapid Refueling Procedures. Refueling with the engine(s) running, rotors turning, and/or passengers on board can be hazardous and must be accomplished in accordance with appropriate documented procedures and by trained personnel.

d. Fuel Quality. Due to the nature of HAA operations, many bases are at locations other than airports. It is recommended that operator-developed documentation define a program for determining and maintaining fuel quality. The operator may choose to procure fuel from commercial fixed base operator sources and/or maintain fuel quality within their own system throughout the chain of custody from receipt (from the distributor) to delivery (into the helicopter). It is recommended that the operator consult International Civil Aviation Organization (ICAO) Doc 9977 AN/489 Manual on Civil Aviation Jet Fuel Supply and the current edition of Advisory Circular (AC) 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports.

e. Procedures for Medical Equipment Installation and Removal. Removal and replacement of medical equipment items may have to be performed on a frequent basis. If the operation is simple, does not require tools, and can be done in accordance with approved data and procedures contained in the operator’s manual, any person trained by the certificate holder may be authorized to remove or replace such equipment. If the operator chooses this option, they must include this training in their FAA-approved training and checking program. The HAA operator must document who is authorized to remove and replace equipment on its helicopters. If personnel other than certified mechanics will be removing or replacing equipment, they must do so in accordance with documented instructions and training provided.

f. Flight Authorization and Flight Locating Procedures and Operations Control Personnel Duties and Responsibilities. These should be well considered and be documented in the operations manual. For those operators with an Operations Control Center (OCC), a description of the duties and responsibilities of Operations Control Specialists (OCS) should appear in documentation (refer to § 135.619(c)). Operators not establishing an OCC should document procedures for comparable functions.

g. Local Flying Area (LFA) Documentation. Procedures for developing LFAs should be documented in accordance with § 135.611(a)(2). If any LFAs are proposed and accepted, a list of LFAs and a description of the examination that is given to pilots by the certificate holder enabling the use of alternative minima in these LFAs must be provided to the principal operations inspector (POI) for acceptance. (Refer to § 135.609 and Operations Specification (OpSpec) A021, Helicopter Air Ambulance Operations.)

h. Instrument Flight Rules (IFR) Operating Procedures. The FAA intends to facilitate use of the IFR system by HAA operations through developing approaches and departures to and from heliports that are not served by weather reporting and in accordance with Instrument Approach Procedures (IAP) and departure procedures Standard Instrument Departures (SID) and Obstacle Departure Procedures (ODP) that are developed specifically to serve these heliports. Certificate holders should document procedures for IFR operations at locations without weather reporting (refer to § 135.611). The operator should document procedures for IFR operations using publicly available published IAPs or per privately developed, FAA approved special instrument procedures, point in space (PinS) approach procedures and SIDs/ODPs.

i. VFR Flight Planning Procedures. VFR flight planning procedures must, by regulation, be documented in accordance with § 135.615(d.) As part of the VFR planning process, operators must document their procedures for determining and documenting the highest obstacles and minimum obstacle clearance altitudes along intended routes of flight (including any contingency routes) prior to departure.

j. FAA-Approved Preflight Risk Analysis Procedures. Risk analysis procedures must be documented in accordance with § 135.617. These procedures are discussed in paragraph 3-4 and Appendix A of this AC.

7-3. RECORDS. Part 135 certificate holders conducting HAA operations are subject to recordkeeping requirements above those required of other part 135 operators not engaged in such operations. Records required by § 135.63 should be kept at an operator’s principal business office or other location(s) approved by the Administrator.

a. Pilot Training Records.

(1) LFA(s) Familiarity Verifications. A record of the 12-month local area demonstration or examination given to each pilot for each LFA assigned. (Refer to § 135.609.)

b. Non-Pilot Training Records. Also, see Chapter 4, Training Program.

(1) Preflight Risk Analysis Worksheets. Preflight risk analysis worksheets completed by pilots and OCS in compliance with § 135.617 are subsequently maintained in compliance with §§ 135.617 and 135.619.

(2) OCS. Training records are kept at least for the duration of that individual's employment and for 90 days thereafter. Training records are required by § 135.619(e) to include a chronological log for each course, including the number of hours and the examination dates and results as well as copies of such examinations. Development of a record of OCS duty times would facilitate tracking.

(3) Maintenance Personnel. A recordkeeping system should be used allowing supplemental training to be verified and tracked.

(4) Medical Personnel. Each HAA operator must maintain a record of training for each medical crewmember that contains the individual's name, the most recent training completion date and a description, copy or reference to training materials used to meet the training requirement. This must be maintained for 24 calendar-months following the individual's completion of training.

c. Administrative Records.

(1) OCS Personnel. OCS personnel are among those employees for whom drug and alcohol testing program records must be maintained in accordance with 14 CFR part 120, §§ 120.105 and 120.215.

(2) Timekeeping. Each operator must maintain flight time and duty records for flightcrews. It is recommended that it do the same for OCS personnel to demonstrate compliance with duty time requirements.

CHAPTER 8. SAFETY

8-1. GENERAL. This chapter is intended to make current and potential operators aware of considerations underlying the safety culture that is central to best practices throughout helicopter air ambulance (HAA) operations. An effective safety program should be developed considering all aspects of the operator's policies and procedures essential to the safe completion of a HAA flight. Best safety culture practices, even where they are not an explicit part of the regulations, facilitate compliance and enhance safety. Examples of ways to foster the safety culture are presented in greater detail in Appendix B of this advisory circular (AC).

8-2. SAFETY CONSIDERATIONS FOR HAA OPERATIONS.

a. Safety Commitment. Commitment to safety should start at the top of an organization. The single most important element of a successful safety program is the commitment of senior management. Safety cannot be dictated; it should be practiced. Managers should lead by example and display a safety-conscious attitude including being involved in safety activities. Operators should conduct regular base safety meetings for all affected base and flight personnel.

b. Safety Management System (SMS). Establishment of an effective SMS helps implement a safety culture to address safety considerations unique to HAA operations. Examples of the use of a SMS are provided in Appendix B of this document.

c. Safety Personnel. The HAA operator should designate a safety officer. This individual should be familiar with each aspect of an HAA operation with particular emphasis on safety requirements unique to helicopters. This individual should plan, organize and disseminate information about the safety program to all involved persons. The safety officer should make an effort to reach out to relevant helicopter information sources and organizations such as the International Helicopter Safety Team (IHST), U.S. Helicopter Safety Team (USHST), and Helicopter Association International (HAI) and carefully review the wide range of fact sheets and toolkits available for applicability to their own operations.

8-3. ROLE OF COMPANY PHILOSOPHY AND EXECUTIVE/SENIOR MANAGEMENT.

a. Management Commitment. The regulatory requirement for some HAA operators to establish an Operations Control Center (OCC) (and the recommendation that those not so required carry out OCC functions) is likely to require the commitment of management to be effective. Many existing communication centers have evolved and operated mostly autonomously since their inception. HAA operators may experience difficulty transitioning from the previously autonomous communication centers as an OCC comes online. Management should plan to overcome these issues through education and communication.

b. Philosophy. In is important that an HAA operator's entire organization embrace and promote a cohesive operational philosophy that provides direction for an OCC (or its functions) and the enhanced operations control procedures described in this AC. The instillation of a company philosophy that enhanced flight operations described in this AC are a team effort. They are not simply a matter of a flightcrew receiving basic flight request information and then it being the flightcrew's responsibility to complete the flight.

8-4. EMERGENCY OPERATIONS. The longer that an OCC and enhanced operations control procedures described in this AC are used, the more the organization relies upon their availability. This may result in increasing impact on the ability of the organization to continue functioning if these are interrupted.

a. Documentation. It is recommended that HAA operators prepare emergency procedures that most effectively leverage resources available to the operator, including the OCC. This will include, but may not be limited to those procedures documented by the applicable Accident Incident Plan/Post-Accident Incident Plan (AIP/PAIP). Such procedures should be prepared to provide guidance on how to carry out HAA operations in emergency or degraded capability situations and to manage the partial or total loss of critical capabilities such as OCC and enhanced operations control functions.

b. Training and Drills. It is recommended that an HAA operator conduct regular refresher training and drills to maintain the organization's ability to follow these procedures. Drills should be conducted annually at minimum; more often is preferred.

APPENDIX A. SAMPLE RISK ANALYSIS TOOLS

A-1. PURPOSE OF THIS APPENDIX. The information in this appendix is provided to assist in developing a risk analysis process. It provides examples of approaches that may be used by a helicopter air ambulance (HAA) operator to assess, mitigate, and manage risk. Additional information on risk analysis management can be found in the current edition of Advisory Circular (AC) 120-92, Safety Management Systems for Aviation Service Providers.

a. Background. Title 14 of the Code of Federal Regulations (14 CFR) part 135, § 135.617 requires preflight risk analysis to be conducted as part of the overall risk analysis and, where applicable, be supported by an operator's Operations Control Center (OCC). These requirements should be implemented within a broader framework of organizational systems, including policies, procedures, training and supervision that have been developed based on assessment of day-to-day HAA operational risks.

b. Risk Assessment. The risk assessment process should produce a quantitative result. The process involves identifying hazards associated with a proposed operation and assessing risks associated with each hazard. After risks are assessed, risk mitigation strategies can be identified, developed and implemented. If mitigations will not reduce risk to an acceptable level, a flight should not be authorized.

c. **Risk Analysis Components.** Risk analysis has two components that are assessed: severity (what is the worst probable outcome) and likelihood (of occurrence). Severity refers to the consequences of an event resulting from the hazard. Likelihood is an estimate of how likely the event is to occur. If the likelihood of an event is estimated to be high, and the consequences potentially severe, the risk analysis would indicate that the flight should not be operated until the identified hazards are eliminated or suitable mitigations have reduced the risk to an acceptable level.

A-2. SEVERITY AND LIKELIHOOD CRITERIA. This appendix provides some examples of one effective tool that has been used by several HAA operators and is intended to be functional for everyday operations without being cumbersome. As throughout the AC, the focus of this appendix is on the results it yields to inform regulatory required actions and it is not intended to prescribe the use of a particular methodology of process. The definitions and design of the final matrix is left to the HAA operator. The definitions of each level of severity and likelihood will be expressed in terms realistic for the individual operational environment and operator's profile. This ensures the relevance of decision tools to the operator's specific needs. An example of severity and likelihood definitions is shown in the table below.

FIGURE A-1. SAMPLE SEVERITY AND LIKELIHOOD CRITERIA

Severity of Consequences			**Likelihood of Occurrence**		
Severity Level	Definition	Value	Likelihood Level	Definition	Value
Catastrophic	Equipment destroyed, multiple deaths	5	Frequent	Likely to occur many times	5
Hazardous	Large reduction in safety margins, physical distress or a workload such that operators cannot be relied upon to perform their tasks accurately or completely. Serious injury or death. Major equipment damage.	4	Occasional	Likely to occur sometimes	4
Major	Significant reduction in safety margins, reduction in the ability of operators to cope with adverse operating conditions as a result of an increase in workload, or as result of conditions impairing their efficiency. Serious incident. Injury to persons.	3	Remote	Unlikely, but possible to occur	3
Minor	Nuisance. Operating limitations. Use of emergency procedures. Minor incident.	2	Improbable	Very unlikely to occur	2
Negligible	Little consequence	1	Extremely Improbable	Almost inconceivable that the event will occur	1

A-3. RISK ACCEPTANCE.

a. Risk Acceptance. In the development of risk analysis criteria, HAA operators are expected to develop risk acceptance procedures, including: acceptance criteria and designation of authority/responsibility for decisionmaking.

b. Acceptability of Risk. The acceptability of risk can be evaluated using a risk matrix such as those illustrated in Figure A-2. Figure A-3 shows areas with an alphanumeric scale and is an example of how risk matrices may be color-coded: unacceptable (red), acceptable with mitigation (yellow) and acceptable (green).

(1) Unacceptable (Red). Where combinations of severity and likelihood cause risk to fall into the red area, the risk would be assessed as unacceptable. A flight should not be authorized under unacceptable conditions until further controls are developed which eliminate the associated hazard or which would control the factors that lead to higher risk likelihood or severity.

(2) Acceptable with Mitigation (Yellow). When the risk analysis falls into the yellow area, risk may be accepted under defined conditions. Risk mitigation may also include consideration of alternate routes/destinations. A decision to initiate an operation should be elevated to a person responsible for Operational Control decisionmaking prior to conducting the flight. For example, landings and takeoffs at high altitude or high density altitude Landing Zones (LZ) present risks resulting from marginal aircraft performance. Risk mitigation could include load reduction or selecting a LZ at a lower altitude where aircraft performance would not be affected as significantly.

(3) Acceptable (Green). Where the assessed risk falls into the green area, it may be accepted without further action and the flight dispatched. The objective should always be to reduce risk to as low as practicable regardless of whether or not the analysis shows that it can be initially accepted.

A-4. SAFETY RISK MATRIX EXAMPLES. The operator should have written policies that define (in numerical terms) acceptable levels of risk, procedures for determining risk acceptability and steps to be taken for a given level of assessed risk, including risk control strategies. § 135.617 requires HAA operators have a documented procedure for elevating the management level required for flight approval when risk exceeds predetermined levels.

FIGURE A-2. SAMPLE "STOP LIGHT" DECISIONMAKING MATRIX

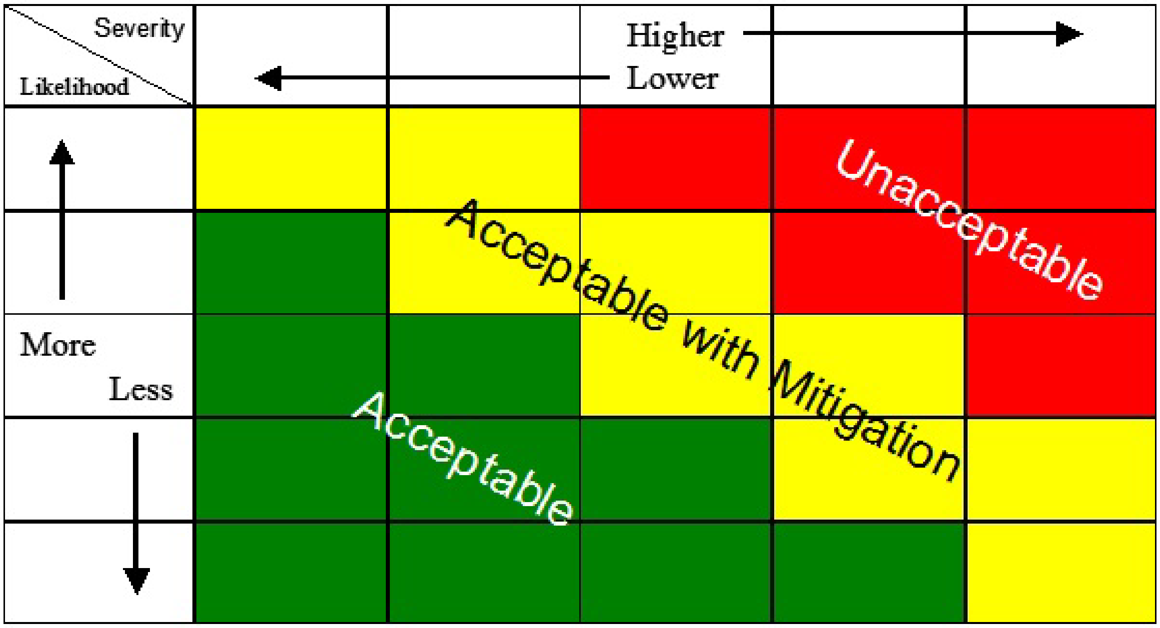


FIGURE A-3. SAMPLE RISK LIKELIHOOD/RISK SEVERITY MATRIX

Risk Likelihood		Risk Severity				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely Improbable	1	1A	1B	1C	1D	1E

NOTE: The direction of higher scales on a matrix to represent the direction of likelihood and severity are at the discretion of the organization.

A-5. RISK ANALYSIS MATRIX EXAMPLE. The definitions and design of a risk analysis matrix is left to the HAA operator. This ensures each of the operator's decision tools is relevant to its specific needs and requirements. An example of a two-sided paper form used by one HAA operator is shown in two figures below. Note that the numbers associated with each option do not represent universal best practices, but rather represent an analysis of their meaning for that specific operator. Not only the value assigned to each factor, but the factors selected, reflect the operator's needs. For example, as in this example, an operator in an inland area would not have to consider quantification of overwater flights, while one operating on an island would have to do so.

FIGURE A-4. SAMPLE RISK ASSESSMENT MATRIX SHOWING QUANTIFICATION OF FACTORS (FIRST PAGE OF A TWO-PAGE FORM)

RISK ASSESSMENT WORKSHEET
"SHORT FORM"

Pilot: ____________ Base: ____________
Date ____________ Mission #: ____________

EXPERIENCE:

HAA EXPERIENCE:	*(Choose all that apply)*	
Less than 1 year	+10 points	
1-3 years	+5 points	
3-5 years	+2 points	
>5 years	0 points	
Homebase:	0 points	
Unfamiliar Area:	+10 points	
SPECIFIC TYPE EXPERIENCE:		
Less than 100 hours	+10 points	
More than 100 hours	0 points	
Unfamiliar Aircraft	+5 points	

WEATHER: *(Choose all that apply)*	DAY:	NIGHT:	
Jagged / Mountainous Terrain	+5 points	+10 points	
Ceiling between 1000' AND 1500' AGL	+3 points	+7 points	
Ceiling less then 1000' AGL	+7 points	+15 points	
Visibility between 3 - 5 miles	+3 points	+5 points	
Visibility less then 3 miles	+7 points	+15 points	
Temperature and Dew Pt spread less than 5	+3 points	+7 points	
Wind in excess of 15 Knots	+3 points	+5 points	
Storms along route of flight	+5 points	+10 points	
MISSION: *(Choose one)*	**DAY:**	**NIGHT:**	
All within local area	0 points	+5 points	
Any or all Cross Country	+5 points	+10 points	
		TOTAL	

If total is less than 35, flight is at your discretion!
For totals 35 or greater, fill out worksheet on reverse
CONSULT FDA ON RISK ASSESSMENTS 35 & ABOVE

FIGURE A-5. SAMPLE RISK ASSESSMENT MATRIX SHOWING QUANTIFICATION OF FACTORS (SECOND PAGE OF A TWO-PAGE FORM)

Risk Assessment Worksheet *"Long Form"*

IF SHORT FORM IS 35 OR GREATER - WORK THIS SHEET.

Do not carry over numbers from other side!!

EVENT	ASSESSMENT VALUES				Score
	0	2	4	6	
Shift	1st 1/2 day shift	2nd 1/2 day shift	1st 1/2 nite shift	2nd 1/2 nite shift	
Time with company	>2 years	>1.5 years	>1 year	< 1 year	
Days on duty	1 to 2	3 to 4	5 to 6	More than 6	
R/W EMS Experience	>2 years	> 1.5 years	> 1 year	< 1 year	
Familiarity with area	> 2 years	1 year to 2 years	6 months to 1year	< 6 month	
Experience in type	> 500 hours	100 - 500 hours	25 - 100 hours	< 25 hours	
Length of longest leg	< 25 nm	25 - 50 nm	50 - 70 nm	> 70 nm	
Pre-mission planning	> 30 min	10 - 30 min	5 - 10 min	< 5 min	
Mission number today	2nd	3rd	4th	1st or >4	
Last min changes	none	minimal	some	major	
Pilots attitude	calm	alert	excited	angry / frustrated	
Personal life factors	Normal	Elevated Stress	Prolonged Stress	Life Changing Event	
Physiological factors	well rest/good diet	good rest/ fair diet	marginal rest/diet	minimum rest/diet	
Time of Day	morning	afternoon	night	dawn / dusk	
Weather	CAVU	VMC	MVMC	MVMC > Imc	
Turbulence	smooth	light chop	moderate	mod to severe	
Wind	calm	5 - 10 knots	10 - 20 knots	>20 knots	
Gust Spread	0	0 - 5 kts	5 - 10 kts	> 10 kts spread	
Precipitation	none	light	moderate	heavy	
Temperature	70 - 40 F	30-40 F or 70/80 F	10-30 F or 80-90 F	< 10 F or > 90 F	
probablity of unforcast wx	none	small	maybe	likely	
Density Altitude	sea leval	3 - 5 K	5 - 8 K	high	
Terrain	flat	rolling	jagged	mountainous	
High obstructions	none	few	occassional	frequent	
Forced landing sites	frequent	some	few	none	
Take off area	Heliport	large open area	somewhat confined	small area	
Landing area	Heliport	large open area	somewhat confined	small area	
Tempo of operations	easy	normal	too slow	too fast	
Fuel on board	1hr more than needed	30-59 more than need	15-29 more than need	minimum	
MEL equipment inop	None/Accessory	Comm	nav lights	instrument	
Loaded weight	operational	light	moderate	max gross	
				TOTAL	

EXERCISE CAUTION !!

< 35	low risk	Pilots Choice
35 - 60	low to mod risk	Exercise Caution
61 - 99	mod to high risk	Exercise Extreme Caution
100 & above	high risk	NO GO

FDA CONSULTATION REQUIRED FOR ALL RISK LEVELS ON LONG FORM

Pilot: ____________________ **Base:** ____________

Date ____________________ **Mission #:** ____________

START WITH OTHER SIDE !!

APPENDIX B. SAFETY MANAGEMENT SYSTEMS (SMS)

B-1. PURPOSE OF THIS APPENDIX. The information in this appendix is provided to give a helicopter air ambulance (HAA) operator information concerning the current state of safety management through an overview of safety management systems (SMS). Additional information and resources on SMS can be found in the current edition of Advisory Circular (AC) 120-92, Safety Management Systems for Aviation Service Providers. The Federal Aviation Administration's (FAA) SMS Program Office (SMSPO) provides tools to assist with implementation of the SMS Voluntary Program (SMSVP). These are intended for use by operators to achieve compliance with the safety assessment requirements of Title 14 of the Code of Federal Regulations (14 CFR) part 135, § 135.617 through implementing a formal SMS within their organization. The SMSPO can be contacted at the following Web link: http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afs/afs900/sms/.

B-2. OVERVIEW. One of the primary goals of an effective SMS is the development of a mature and positive safety culture. Internal and external audits provide assurance that processes are working as designed and continuing to be effective. While it is possible to have a positive safety culture without a formal SMS, a strong safety culture can be fostered by the implementation of an effective SMS. The constant attention, commitment, and visible involvement provided by all levels of management, combined with continuing data analysis, Safety Assurance (SA) activities and daily application of risk analysis and control techniques drive the organization toward safety culture maturity.

a. Confidential Employee Reporting Systems. Are essential components in assuring safety. They provide employee feedback for identifying new hazards and revising procedures.

b. Safety Management is a Learned Skill. Organizations do not simply adopt a software program or a set of posters and buzzwords, attend an hour of slide presentations and instantly install an effective SMS. As with any skill, it takes time, practice, repetition, the appropriate attitudinal approach and good coaching.

c. The Safety Culture Matures as Safety Management Skills are Learned and Practiced. The safety culture becomes second nature across the entire organization as trust builds and the organization functions as a team. The mature safety culture should have the following conditions to flourish.

(1) Openness. The organization encourages and even rewards individuals for providing essential safety-related information which will improve the operation.

(2) Justness. The organization takes a proactive approach toward error disclosure yet demands accountability on the part of employees and management alike. The organization engages in identification of systemic errors through root cause analysis and implements preventative corrective action. It exhibits intolerance of undesirable behavior (i.e., recklessness and willful disregard for established procedures).

(3) Involvement of All Levels of Management. This is demonstrated by:

- Formal risk analysis and resource allocation, as needed to assure mitigation of high consequence, high probability risks;
- Management action beyond rhetoric, actively involved in the decisionmaking processes and participate in safety activities; and
- Strong SA, combined with safety data analysis processes, yielding information, are used to drive risk reduction. An informed organization can take appropriate action to prevent accidents.

(4) Training. This includes training in threat recognition, error management and SMS, SA and Safety Risk Management (SRM) techniques.

(5) Flexibility. The organization uses information effectively to adjust and change in an effort to reduce risk. All aspects of the organization are under constant review and adjustment to meet changing demands.

(6) Learning. The organization learns from its own failures and those of similar operations. The organization uses acquired data to feed analysis processes, which yield information that can be, and is, acted upon to improve safety. Organizational behavior is modified accordingly. Actual practices are based upon accurate and validated information.

d. Accountability. To foster the development of a mature organization with a positive safety culture, an accountable executive must be in place.

(1) The accountable executive is the person who is the final authority over operations, controls, financial and human resources and retains ultimate responsibility for safety performance of the operation.

(2) All of the management staff, at all levels, should convey, enhance and emphasize the organization's safety policy through exemplifying the policy in their daily work and in their one-on-one leadership styles. Decisionmaking should be kept at the lowest level appropriate to the complexity and criticality of the decision. Line managers are the people that own the process. They are in the best position to make appropriate changes. Senior management, including the accountable executive, should monitor actions and provide guidance.

B-3. SAFETY MANAGEMENT SYSTEM (SMS) TOOLS.

a. SMS. The FAA has developed tools for implementing a SMS that are scalable and customizable to operators' size, scope and environment. Two key components of a SMS are SRM and SA. Refer to the current edition of FAA Order 8040.4, Safety Risk Management Policy, for more information. An operator that implements safety management practices using a SMS will have these components integrated into its operations. While current regulations do not require implementation of an SMS, voluntary implementation is encouraged.

b. Risk Analysis. Risk analysis is how an operator provides each pilot-in-command (PIC), Operations Control Specialist (OCS) and others involved in the decisionmaking process with a shared set of documented processes that have been the subject of training to identify conditions (hazards), which if not addressed could foreseeably cause an aircraft accident. This allows an informed process to reduce associated risks by implementing appropriate processes and controls. Risk analyses should also be performed under the following conditions:

(1) Implementation of new systems.

(2) Revision of existing systems.

(3) Development of operational procedures.

(4) Identification of hazards or ineffective risk controls through audits conducted through SA processes.

c. Systems.

(1) In the context of this AC, "systems" are limited to those processes and their associated personnel, facilities, tools, documentation and other resources that are needed to accomplish HAA-related functions.

(2) Every part 135 operator has a number of aviation-related "systems" such as flight operations, maintenance and inspection (frequently called "technical operations"), operational control and dispatch, medical and ground operations. Within these systems, many lower level processes and ancillary systems exist, such as training, fueling, biohazard decontamination, individual station operations and others.

d. Changes to Operations.

(1) Changes to a HAA operators operation could include the addition of new routes, opening or closing of line stations, adding or changing contractual arrangements for services, the addition of new aircraft types or major modifications to existing aircraft, addition of different types of operations such as night vision goggles (NVG) usage or any one of many different types of operations.

(2) Any of these additions or changes would trigger the use of an SRM process to determine if new hazards appear that would require incorporation of mitigations to reduce risk. In many, if not most, cases, those controls will entail revision or addition of procedures and training for personnel engaged in the operation of the systems. For example, if a HAA certificate holder intends to implement NVG operations, they will need to organize their flight operations, maintenance, training and operational control systems to comply with the applicable regulations and guidance to ensure the NVGs are safely integrated into operations. They will also need to develop and document procedures for employees involved in those systems' activities.

(3) In most cases, these procedures will be documented in the service provider's manual system. The baseline for determining acceptable levels of safety for all service providers should be the existing regulatory standards, as applicable. Some mitigations and changes to the operation may require approval or acceptance by the FAA. The SA component provides processes for validation of the organizational processes and effectiveness of risk controls, once they have been implemented as the result of a risk analysis.

APPENDIX C. HAA OPERATOR PILOT TRAINING PROGRAM AND CHECKING EXAMPLES

C-1. GENERAL. This appendix addresses, by providing examples, recommended approaches to the thorough ground and flight training and checking essential in the preparation of a pilot to safely assume the duties of a pilot in command (PIC) of a helicopter air ambulance (HAA). As in the other appendices, these are included as examples rather than being prescribed as an optimal solution. Following are some of the subjects that best practices of HAA operators have indicated should be addressed.

C-2. PILOT GROUND TRAINING – SAMPLE CURRICULUM OUTLINE. The focus of this curriculum is to outline topics specific to HAA operations.

A. Airman:
  1. PIC Responsibility.
  2. PIC Authority.
  3. Flight and Duty Time.

B. General:
  1. Definitions.
  2. Hours of Operation.
  3. Authorized Passengers.
  4. Infection Control.
  5. Cameras.

C. Preflight/Departure:
  1. Visual Flight Rules (VFR) Flight Planning.
  2. Base Flight Planning Documents and Material.
  3. Weather Minimums – General.
  4. Weather Minimums – Area of Operations Considerations.
  5. Minimum Safe Cruising Altitudes (Operations Specification (OpSpec) A021).
  6. Operations in High Wind Conditions.
  7. Wind Requirements.
  8. Local Flying Areas (LFAs).
  9. LFA Pilot Testing/Examination Procedure.
  10. Use of (Night Vision Imaging System (NVIS)) aided Minimums.
  12. Weather.
  13. Turndowns by Other Operators (and identifications of reason).
  14. Routes of Flight - Single-Engine Helicopters.
  15. Instrument Flight Rules (IFR) Operations (HAA-Specific Rules).

D. Operations Control Center (OCC):
  1. Risk Matrix.

E. Refueling:
  1. Engine(s) Off/Rotors Stopped.
  2. Helicopter Rapid Refueling (HRR).

F. Safety Briefing of Passengers/Medical Crew Members.
G. Initial Medical Crewmember Training:
   1. General.
   2. Training Program Contents/Requirements.

H. Crew Resource Management (CRM):
   1. Crew Concept.
   2. Pilot in Command (PIC).
   3. Medical Crew.

I. Flightcrew Member Duties:
   1. Pre-Launch Walk-Around.
   2. Sterile Cockpit.
   3. Engine Start.
   5. Takeoff.
   6. En Route/Cruise.
   7. Before Landing (Prior to 2-Minute Estimated Time of Arrival (ETA)).
   8. Arrival at the Intended Point of Landing.
   9. Crew Callouts.
   10. Aircraft Emergencies.

J. Crew Change:
   1. Crew Change Operational Briefing Subjects.
   2. Safety Precautions.

K. Patient Safety:
   1. Loading and Unloading (engines running/secured).
   2. Children/Infants.

L. Use of Seat Belts and Restraints:
   1. Seat Belts and Shoulder Harnesses.
   2. Infants and Pediatric Patients.
   3. Aircraft Doors.

M. En Route:
   1. Flight Plans and Flight Locating.
   2. Position Reports.
   3. Remote Area Communications.
   4. Obstacles (including Wind Turbine Farms Wake Turbulence).

N. Arrival:
   1. Landing Site Requirements.
   2. Unimproved Landing Sites.

O. Equipment Familiarization (Securing, Storage, Weight and Balance (W&B), Loading):
   1. Stretchers.
   2. Isolettes.
   3. Portable O_2.

4. Balloon Pumps.
5. Ventilators.
6. Miscellaneous Equipment.

P. Emergency Procedures:
1. Emergency Evacuation Duties.
2. Hazardous Material Operations.

Q. Hazardous Patient Transport.

R. Public Relations Events:
1. Crew Duties – PR Events.
2. Landing Zone (LZ) Safety and Security.

C-3. PILOT FLIGHT TRAINING – SAMPLE CURRICULUM OUTLINE.

A. Module 1:
1. Preflight Procedures:
   a. Med Crew Briefing.
   b. Noise Abatement.
   c. Hover/Ground Taxi Operations.
2. Takeoff and Departure Phase:
   a. Normal/Crosswind.
   b. Sidestep.
   c. Maximum Performance.
   d. PC2 (If Applicable).
3. Cruise:
   a. Navigation.
   b. Communication.
   c. Severe Weather Avoidance.
   d. Maintaining Situational Awareness.
   e. Helicopter Terrain Awareness and Warning System (HTAWS).
4. Approach and Landing:
   a. High Reconnaissance.
   b. Low Reconnaissance.
   c. Ground/Hazard Recognition.
   d. Normal/Crosswind.
   e. Sidestep.
   f. Confined Area/Steep Approach.
   g. PC2 (if applicable).
   h. Special Conditions (including Flat Light/Brownout/Whiteout Ops and Multi-Aircraft Situations).
5. Emergency and Abnormal Situations.
6. Post-Flight Procedures:
   a. Crew Debriefing.
   b. Post-Flight Inspection.

c. Cleaning/Decontamination of Aircraft and Equipment (biohazards).
d. Servicing O_2 Systems.

C-4. EXAMPLE OF COMPETENCY-PROFICIENCY CHECK EVALUATION SHEET FOR HAA PIC.

FIGURE C-1. EXAMPLE OF CHECK SHEET FOR PIC (NOTE: THIS EXAMPLE PRE-DATES RULE CHANGES EFFECTIVE 4/22/2015)

AIRMAN COMPETENCY/PROFICIENCY CHECK
HELICOPTER

NAME OF AIRMAN *(Last, First MI)*		LOCATION:		DATE OF CHECK			
		MEDICAL INFO:		TYPE OF CHECK		FLIGHT TIME:	
Certificate Number	Type	Date of Birth:		135.293	-	IFR/Hood	0.0
	-	Date of Exam:		135.297	-	NVG	0.0
		Class:	-	135.299	-	DAY	0.0
Aircraft Type:	-	Position Checked	-	NVG	-	NIGHT	0.0
Aircraft/Simulator ID:		Seat Flown	-	RESULT	-	TOTAL	0.0

FLIGHT MANEUVERS GRADE *(U-UNSATISFACTORY, S-SATISFACTORY, RS-RETRAINED SATISFACTORY)*

		GROUND OPERATIONS	U	S
1	*N+	Equipment Examination (Oral or Written)	-	-
2	*N+	Preflight Inspection	-	-
3	*N+	Start Procedures	-	-
4	*N+	Pre-Takeoff Checks	-	-
		TAKEOFF AND DEPARTURES		
5	*N	Taxiing and Ground Hover	-	-
6	*N	Normal /Crosswind - Takeoff & Landing	-	-
7	*N	With Simulated Power plant Failure (ME Only)	-	-
8	*N	Rapid Deceleration (Quick Stops) - Rejected Takeoff	-	-
		MANEUVERS		
9	*N	Slope Operations	-	-
10	*N	Takeoff - OEI	-	-
11	*N	Landing - OEI	-	-
12	*N	Confined Areas/Pinnacles/EMS Ops.	-	-
13	*N	Autorotation to a Power Recovery (SE Only)	-	-
14	*N	Hovering Autorotation (SE Only)	-	-
15	*N+	System Malfunctions	-	-
16	*N	Anti-Torque System Failure (Oral Only)	-	-
17	*N	Tail Rotor Failure (Oral Only)	-	-
18	*N+	Setting With Power (Oral Only)	-	-
19	*N	Dynamic Rollover (Oral Only)	-	-
20	*N	Low Rotor RPM (Oral Only)	-	-
21	*N	Unusual Attitude Recovery	-	-
22	*N	Inadvertent IMC Procedures (Record approach as appropriate)	-	-
		GENERAL		
23	*N+	Judgment	-	-
24	*N+	Crew Coordination	-	-
25	N	Ground Hazard Recognition	-	-
26	N	Use of External Lights	-	-
27	N	Whiteout/Brownout/Flat Light	-	-
28	*N+	Use of Auto Pilot if Installed	-	-
29	*+	Partial Panel (If no standby instruments)	-	-
		135.293 check substituted for recurrent training per 135.351(C.)	-	
		Aircraft Specific CTS corrected to 100%	-	
		Local Area Knowledge test completed	-	
		Base(s) tested:		
		Name of Check Airman:		
		Signature of Check Airman:		

		INSTRUMENT PROCEDURES			U	S
30	+	Instrument Takeoff			-	-
31	+	Area Departure (Initial Only)			-	-
32	+	Holding (Initial Only)			-	-
33	+	Steep Turns (Initial Only)			-	-
34	+	Area Arrival (Initial Only)			-	-
		PRECISION APPR (ILS/LPV<300')	Airport ID	Appr ID		
35	+	Manual(or OEI #37)			-	-
36	+	Autopilot (Coupled)			-	-
37	+	OEI Manual (ME Only)			-	-
38	+	Landing From ILS			-	-
		GPS/RNAV EQUIPMENT	#1	#2		
39	+	TYPE:	-	-	-	-
		NON PRECISION APPROACHES		Appr ID		
40	+	Manual TYPE:	-		-	-
41	+	Coupled TYPE:	-		-	-
		CIRCLING and MISSED APPROACHES				
42	+	Circling TYPE:	-	-	-	-
43	+	Missed TYPE:	-	-	-	-
44	+	Missed TYPE:	-	-	-	-

AIRMAN COMPETENCY INFORMATION				
Demonstrated Current Knowledge FAR135.293(a) (1,4-8)				-
(2-3)				-
Base Month	-	12 Months	Expires	-
Demonstrated Competency FAR 135.293(b)				
Base Month	-	12 Months	Expires	-
Satisfactory Demonstrated Line Checks FAR 135.299				
		12 Months	Expires	-
Satisfactory Demonstrated IFR Proficiency FAR135.297				
Base Month	-	6 Months	Expires	-
Use of Autopilot 135.297(G)		12 Months	Expires	-
Satisfactory Demonstrated NVG Proficiency				
Base Month	-	12 Months	Expires	-
Check Airman & Instructor Techniques Observed				
Observation	-	24 months	Expires	-
REMARKS				

NOTE: (*) Required for .293 qualification (+) required for .297 qualification (N) required for NVG qualification

Region:		District Office:		FAA Insp. Sign:		Check Airman Performance	-	FAA ONLY