

## U.S. Helicopter Safety Team / Infrastructure Working Group (USHST/IWG)

**DATE:** October 2, 2018

**TO:** Robert Bassey, FAA, Airports Engineering Division, AAS-100  
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**FROM:** U.S. Helicopter Safety Team / Infrastructure Working Group / Heliport Design Guide Ad Hoc Committee

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**RE:** Recommendations for the FAA Heliport Design Guide, FAA AC 150/5390-2C

**PURPOSE:**

Provide a temporary ad hoc committee under the USHST/IWG, which includes relevant lines of business from within the FAA as well as concerned parties from the helicopter and heliport community.

**SCOPE:**

Identify specific and well vetted industry and FAA recommendations for the next revision of the heliport design guide advisory circular AC 150/3390-2C.

**REASON:**

For the purpose of evaluating and making recommendations that will; (1) assist in the harmonization of heliport standards, definitions and terminology across multiple lines of businesses both internally and externally to the FAA; (2) simplify and clarify heliport criteria and standards; (3) reduce cost where possible; (4) enhance safety wherever feasible.

**COMMITTEE MEMBERS:**

A special thank you to all the committee members who contributed to this effort a list of which is attached to the end of this document.

**MEETINGS:**

There was a total of six online conference meetings for this project. Each meeting was proceeded by and followed up by E-mail and phone discussions with minutes of each meeting being recorded.

The following is a list of recommendations generated by the USHST/IWG heliport advisory circular ad hoc committee for consideration by the FAA and the FAA Airports Division.

ITEM	TOPIC	DESCRIPTION & DISCUSSION	JUSTIFICATION
1.	<b>Standardization and alignment of language between the heliport advisory circular and other FAA standards, documents and references, e.g. FSIMS, ATC, AIM, IFR...</b>	<p style="text-align: center;">DISCUSSION:</p> <p>Identify other FAA documents and regulations that need to be considered when developing standardized processes, language, design, and terminology.</p> <p>As an example; while the FAA's Aeronautical Information Manual (AIM) uses the acronyms TLOF and FATO it does not define them, and while it does define the term Helipad in the Pilot/Controller Glossary it does not define the terms Heliport, Helistop, TLOF, FATO, or Safety Area in the glossary. Heliport markings, e.g. the heliport limitation box and the Touchdown/Positioning Circle (TDPC) as well as heliport lighting are also not adequately addressed in the AIM or the Helicopter Flying Handbook, hence these critical items are completely unfamiliar to the average helicopter pilot.</p> <p>Introduce Vertiport language into advisory circular to support VTOL aircraft operations.</p>	<p style="text-align: center;">JUSTIFICATION:</p> <p>Standardized language and terminology between the heliport design guide and the following documents. This would provide a more consistent and unified process for heliport design, implementation, integration, and education to pilots and heliport proponents:</p> <ul style="list-style-type: none"> <li>• Aeronautical Information Manual</li> <li>• FSIMS 8900.1</li> <li>• FAA Order JO 7400.2 / Airspace</li> <li>• FAA Order JO 7110.65 / ATC</li> <li>• FAA-H-8083-21A / Helicopter Flying Handbook</li> <li>• FAA-H-8083-4 / Helicopter Instructor's Handbook</li> </ul> <p>*The above documents should only be considered a partial list as there are multiple opportunities for improving standardization within and between all FAA divisions.</p>
2.	<b>Rearrange the current order and format of the advisory circular to create a more harmonize flow.</b>	<p style="text-align: center;">DISCUSSION:</p> <p>Standardize the presentation of information throughout the advisory circular so that the process begins at the center of heliport site location and works outward in a standardized, systematic and well-defined process from the center point out to the farthest point of a heliports influence.</p>	<p style="text-align: center;">JUSTIFICATION:</p> <p>This will help to enhance clarity and reduce confusion and make some of the more complicated aspects of the advisory circular more comprehensible to the average heliport proponent, hence reducing errors and costly mistakes.</p>

<p><b>3.</b></p>	<p><b>Reduce the length of the advisory circular by reducing the redundancies between chapters.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>As a starting point, identify those areas that are redundant and repetitive in each chapter of the advisory circular. Then identify those areas that are not repetitive that will then require they be discussed separately in a dedicated section of the circular for that type of heliport, e.g. GA vs. Hospital.</p> <p>Consolidate like materials into one section then divide out unique and specific differentials concerning: General Aviation, Transport, and Hospital into shorter annexes or chapters.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Reducing the receptiveness of the current advisory circular will help to clarify those sections that are to be followed at every heliport and better outline those difference that are unique to a particular type of heliport.</p> <p>This will help to enhance clarity and reduce confusion and make some of the more complicated aspects of the advisory circular more comprehensible to the average heliport proponent, hence reducing errors and costly mistakes.</p> <p>This change would also be in line with the 1980 Paperwork Reduction Act.</p>
<p><b>4.</b></p>	<p><b>Address the Heliport Protection Zone</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>New language in the FAA's FSIMS 8900.1, Vol-8, Chp-3, Sec-3, Evaluation and Surveillance of Heliports states,</p> <ul style="list-style-type: none"> <li>• <i>“The heliport protection zone may be an acceptable option in those areas where the proponent has control of the property and wishes to keep that clear. In reality, only a few existing heliports can meet that criteria. Sites in urban areas are normally incompatible with that criteria.”</i></li> </ul> <p>Recommend that this language or a variation of this language be adopted in the heliport design guide.</p> <p>Recommend addition clarification as to it being optional for private facilities such as hospital heliports and private heliports.</p> <p>Recommend providing an alternate means of compliance or standard where possible.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>As stated in the FAA's FSIMS 8900.1 this is a requirement that is 'normally incompatible' with most urban areas.</p> <p>Performance data currently being used is based on DOT/FAA/RD-90/3, Helicopter Physical and Performance Data, published in August of 1991, 27 years ago, which used older helicopters manufactured well prior to the publication date of this document. Significant advancements in aircraft performance have since been achieved which are not reflected in the current advisory circular.</p>

		<p>Recommend reviewing helicopter accident statistics at heliports where the Heliport Protection Zone came into play and made a significant difference in the outcome of the accident for justification of the HPZ.</p> <p>Recommend a new research study be conducted to obtain updated data that would justify a change based on improved performance characteristics from current civil helicopter fleet. The performance data currently being used is from DOT/FAA/RD-90/3, Helicopter Physical and Performance Data, published in August of 1991, 27 years ago, which used older helicopters manufactured well prior to this publication date.</p>	
5.	<p><b>Modify the Extended FATO for Altitude Requirement</b></p>	<p>DISCUSSION:</p> <p>Based on the fact that this standard is in essence a 'Performance Standard', recommend that it be brought in line with the guidance provided in FSIMS 8900.1, Vol-8, Chp-3, Sec-3, Evaluation and Surveillance of Heliports from FAA Standards which states the following:</p> <ul style="list-style-type: none"> <li>• <i>“As AC 150/5390-2 indicates, an extended FATO located on a high-altitude heliport may have a merit for a runway type of heliport environment where a long area of in ground effect (IGE) compatible surface is available. All rooftop heliports essentially need out of ground effect (OGE) performance for safety, hence the extended FATO is not needed if OGE performance helicopters operating within the OGE performance envelope are used.”</i></li> </ul> <p>If it is determined that it is necessary to maintain the provisions of an elongated FATO standard for public use heliports it is recommended that new language be adopted regarding performance standards as an acceptable and equivalent means of compliance for</p>	<p>JUSTIFICATION:</p> <p>This criteria has a potential for creating a negative impact on safety of flight, in that requiring and/or recommending that increased FATO's be incorporated at heliports above 1,000 feet MSL, there is a greater propensity for pilots to attempt operations in underpowered and lower performance aircraft at locations that they should not be operating at. This in turn equates to a higher increased risk exposures due to limited power and performance margins provided by their aircraft in these more challenging environments.</p> <p>From an overall risk mitigation and safety perspective, a better approach for conducting helicopter operations at higher altitudes and/or on rooftop heliports, which more optimally conforms to the FAA's current risk management practices, would be to require pilots to ensure that their aircraft are fully capable of achieving Hover Out of Ground Effect (HOGE) performance for the altitudes</p>

		<p>“Private” heliports. Given that the “Private” heliports, for the most part, are considered “Prior Permission Required” (PPR), as defined by the heliport advisory circular, the FAA provides for and encourages proponents to enact limitations and or restrictions on these heliport as they see fit to enhance safety.</p> <ul style="list-style-type: none"> <li>• <i>“Prior permission required (PPR) heliport. A heliport developed for exclusive use of the owner and persons authorized by the owner and about which the owner and operator ensure all authorized pilots are thoroughly knowledgeable. These features include but are not limited to: approach/departure path characteristics, preferred heading, facility limitations, lighting, obstacles in the area, and size and weight capacity of the facility.”</i></li> </ul> <p>Requiring Hover Out of Ground Effect (HOGE) power performance standards be met for all operations conducted at a “Private” heliport is well within the rights of the owner to mandate. This requirement would then be integrated into all of the pilot briefing material that the owner and operator is responsible for providing to pilots and should then be disseminated directly to all of the appropriate air operators.</p> <p>Given that the extended FATO with altitude standard is a performance-based recommendation, collaboration between FAA standards and airports will need to take place to finalize any new language.</p>	<p>and environmental conditions they would be operating in.</p> <p>Encouraging pilots operating at “Private” heliports to attempt to operate at higher altitudes based on the inclusion of an extended FATO to compensate for their aircrafts lower performance capabilities can increase the overall risk exposer to the operator.</p> <p>In conjunction with this criteria, a “Private” heliport could then institute, per its rights as indicated within the current advisory circular, a performance standard that then must be met to operate at that location.</p>
6.	<p><b>Better define equivalent level of safety in the design guide</b></p>	<p>DISCUSSION:</p> <p>Add and define the terminology ‘Equivalent Level of Safety’ in section-1 of the advisory circular specifically when operational procedures can and are instituted at a heliport where it is not feasible to meet all of the standards and recommendations as outlined in the design guide.</p>	<p>JUSTIFICATION:</p> <p>This will allow for and assist in clarification to both heliport proponents as well as FAA inspectors, specifically for private heliports, when a proponent can and should adopt procedural limitations to ensure that a heliport that for any reason cannot meet all of the</p>

		<p>Recommend the creation of a separate section in chapter one (1) i.e. split out the last paragraph in sections 101 and 105 that spells out the allowance for and acceptance of using an <u>alternate means of compliance</u> when a heliport does not meet a specific criteria.</p> <p>This alternative means of compliance can then be verified and accepted by the FAA inspector signing off on a site-specific operational limitation for which the inspector agrees meets the equivalent level of safety standard.</p> <p>As an example, consider the language found in FSIMS 8900.1, Vol-8, Chp-3, Sec-3, Evaluation and Surveillance of Heliports which states the following:</p> <ul style="list-style-type: none"> <li>• <i>“Heliports that contain enlarged rooftop TLOFs where the entire FATO is not capable of providing an IGE environment are considered operationally safe if the performance of the helicopters-in-use stay within the OGE envelope and do not need the dubious advantage a few feet of TLOF surface may have on IGE performance.”</i></li> </ul>	<p>design standards can still maintain an equivalent level of safety to allow a heliport to exist without an undue burden of cost on the heliport proponent.</p>
7.	<p><b>Introduce VTOL Vertiport language and definitions into the AC.</b></p>	<p>DISCUSSION:</p> <p>While advancements in the Vertical Takeoff and Lift (VTOL) industry is ongoing and may or may not manifest itself into a functioning industry in the near future, it would be prudent to introduce terminology that would encompass the VTOL industry into the current heliport design guide AC.</p> <p>At a minimum, recommend that the heliport design guide reference the language and definitions currently accepted for Vertiports designed to support operations for all “Aircraft with Vertical Takeoff and Lift Capability’s”.</p>	<p>JUSTIFICATION:</p> <p>Help to identify what a heliport is and is not capable of supporting in regard to other “Aircraft with Vertical Takeoff and Lift Capability’s”.</p>

		<p>This would also be a first step in the standardization of terminology between FAA documents to help ensure that the language and terminology used are better aligned for the future.</p> <p>Recommend considering adding an annex to the heliport design guide that discusses Vertiport standards for Aircraft with Vertical Takeoff and Lift Capability's. This may very well only be a brief discussion but could be a starting point for the development of an independent advisory circular that is specific to Vertiport standards.</p> <p>This should also encourage the inclusion of the soon to be fielded tilt rotor aircraft into the current heliport standards as well.</p>	
8.	<p><b>Update advisory circular heliport lighting diagrams.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>Recommend updating heliport diagrams in the design guide that depict lighting to more accurately reflect the required number of lights as specified in the advisory circular in writing.</p> <p>Oftentimes lighting manufactures convince heliport owners and designers to purchase large quantities of lighting which they do not need based on the errors currently found in the illustrations of the heliport design guide.</p> <p>Examples:</p> <p>Figure 2-24 shows 28 lights around a TLOF for which eight (8) lights would have worked. At a cost, in some cases, of upwards of \$800 dollars per light, this represents a savings of upwards of \$16,000.00 for materials which does not include wiring and labor.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>This would reduce the potential overall cost of a heliport, allowing limited funds to be better spent on more appropriate safety enhancements.</p> <p>From an overall safety standpoint, at locations where a large number of unnecessary lighting has been installed, it can overwhelm a pilot's vestibular system hence creating the potential for an optical illusion to occur during a critical phase of flight by creating a dazzle effect.</p> <p>This would also move to bring the heliport design guide in line with the requirements specified in Part-135 for marking and lighting of landing areas.</p>

**Figure 2-24**

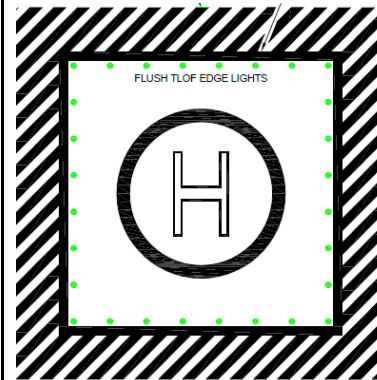
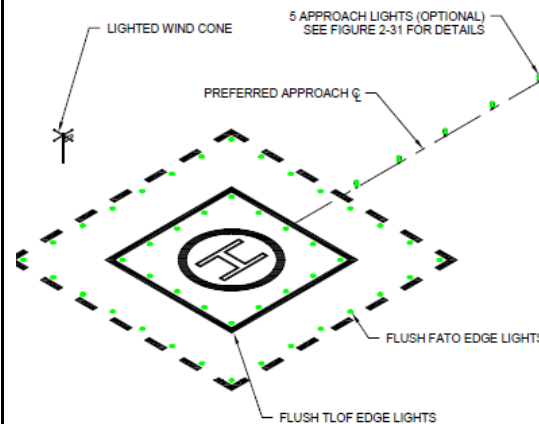


Figure 2-29 shows 44 lights around the TLOF & FATO for which eight (8) lights would work. At a cost, in some cases, of upwards of \$800 dollars per light this represents a potential cost savings of upwards of \$28,800.00 for materials which does not include wiring and labor.

**Figure 2-29**

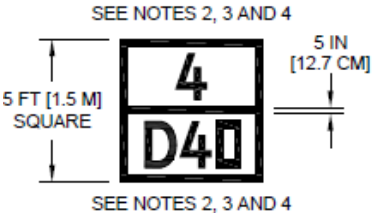


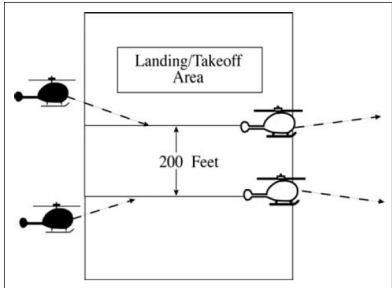


		Also recommend addressing minimal acceptable standards for VFR heliports which have IFR procedures associated with them.	
<b>9.</b>	<b>TLOF dimensional increase for sites without a loadbearing FATO.</b>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>Current language in section (207) b(1) requires increasing the size of the TLOF to the overall length of the design helicopter if the FATO is not loadbearing at an elevated heliport.</p> <p>This is an extremely expensive design standard having at best a very minimal, if any, impact on safety of flight at rooftop heliports from a true performance standpoint.</p> <p>The theory that a larger, solid surface FATO will significantly improve helicopters performance is a double-edged argument. While the statement that a larger solid surface will improve a helicopters "In-Ground-Effect" (IGE) performance may be true to a degree, the fact is that once the helicopter moves off that surface area or attains an altitude of approximately 1/2 the rotor diameter of the helicopter, that improvement is minuscule at best and shortly thereafter disappears all together.</p> <p>Guidance provided in FSIMS 8900.1, Vol-8, Chp-3, Sec-3, Evaluation and Surveillance of Heliports, 8-212 c(5).</p> <ul style="list-style-type: none"> <li>• <i>"Heliports that contain enlarged rooftop TLOFs where the entire FATO is not capable of providing an IGE environment are considered operationally safe if the performance of the helicopters-in-use stay within the OGE envelope and do not need the dubious advantage a few feet of TLOF surface may have on IGE performance."</i></li> </ul>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>The current guidance for increasing the size of the TLOF to the overall length of the design helicopter rather than the standard dimension of the rotor diameter as it applies to elevated heliports is not a true safety enhancement and does not follow accepted helicopter performance standards and helicopter aerodynamics.</p> <p>By removing this increased size requirement, which does not correlate to an increase in overall safety, there would be a significant reduction in the amount of raw material and labor required for an elevated heliport hence reducing its overall cost.</p>

		<p>If a heliport were to be designed to truly take full advantage of the In-Ground-Effect theory pointing to in heliport design guide, one which allows for an airspeed of 16-20 knots to be achieved so as to pass through transitional lift prior to a climb being initiated, i.e. an airspeed over altitude profile, it would need to be about the size of a football field to accomplish this.</p>	
10.	<p><b>Expand and update Chapter-6, Instrument Operations, to better tie in IFR operations to the advisory circular.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>With the recent development of a multitude of IFR ‘Special Procedures’ at VFR heliport throughout the United States it is important to expand the current criteria in the design guide to include these new developments. These facilities are not designated as IFR Heliports, so currently there is a void in information as to applicable standards for VFR heliports with Point In Space (PINS) Procedures.</p> <p>Recommend that the heliport requirements currently in FAA Order 8260.42B be removed and placed in the IFR chapter of heliport design guide. The heliport information, as identified, references an out of date advisory circular (150-5390-2B) and is contrary to Flight Standards guidance material referencing advisory circular material in an order.</p> <p>The current material in the Heliport Design Guide references instrument approaches to the heliport, of which there are zero in the US. However, there are now over a thousand point in space instrument approaches and departures now associated with specific heliports throughout the U.S. It would be appropriate to consolidate all the helicopter guidance in the HDG.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Provide clarity and standardization to a portion of helicopter infrastructure that is currently not being included in the heliport design guide.</p> <p>Enhance safety of IFR operations being conducted throughout the United States.</p> <p>Standardize a new area of IFR operations, e.g. ‘Special Procedures’, in turn encouraging more IFR operations to be conducted.</p>
11.	<p><b>Better define what the IFR standards for a VFR heliport with IFR procedures as well as full IFR heliports should be.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>Survey Standards can be a double-edged sword. In that very stringent and overly exacting standards can then perpetuate a situation where the survey may cost more</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Encourage and expand IFR operations through the development of more instrument procedures to heliports.</p>

		<p>than the actual heliport. That being said there needs to be caution used as to what the standard needs to be.</p> <p>The survey standard will drive who develops the instrument procedure, what minima will be achievable and who will be able to maintain the instrument procedure later.</p> <p>If a proponent would like the FAA to develop and maintain the procedure to the lowest minima, (which in the past for hospitals has been done without charges) additional survey information will be needed, otherwise the instrument procedure may have such high minimums to make the instrument operation impractical if not useless. If the proponent would like to go to one of the nongovernment developers, they can provide an instrument procedure to lower minima, however this will come at a cost.</p> <p>The cost of the survey will depend on what minima the proponent would like to be able to operate to. No, survey, the proponent can get instrument approaches and departures in helicopter VFR minimums. With a visual segment survey, the proponent will be able to achieve a "Proceed Visually" set of minima which often can be hundreds of feet lower minima. If the proponent desires an approach to the heliport, it will likely require a more complex survey to achieve the lowest minimums.</p>	
12.	<p><b>Reevaluate the heliport information box dimensions and layout.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>In the current heliport design guide Fig 2-23 shows a 5 FT square Limitation box. This has been shown to be hard for pilot to read until they are very close to the heliport.</p> <p>Recommend expanding the limitations box to 10 FT square when possible and reduce the dimensions of the</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Provide higher visibility and improved readability at a greater distance regarding a heliports size and weight limitations to pilots prior to landing. Hence enhancing safety.</p>

		<p>information box proportionally as needed for smaller heliports if needed.</p> <p>Fig 2-23</p>  <p>Heliports supporting commercial operations and all rooftop heliports should always be marked with the appropriate information in a limitations box.</p> <p>It would be prudent to check with the FAA test center to see if there is any research regarding this topic.</p>	
<p>13.</p>	<p><b>Include sectored app/dep paths in airspace design options.</b></p>	<p><b>DISCUSSION:</b></p> <p>Recommend including an option along with design criteria for designating a sectored app/dep path, e.g. between 090° to 230° in lieu of a specific app/dep path of 090/180.</p> <p>Currently, some FAA inspectors are creating sectored app/dep zones in lieu of a specific app/dep path but there is no standard that defines how this is to be done.</p> <p>This information will need to be addressed in the FSIMS 8900.1</p> <p>Additionally, given a sectored app/dep zone is utilized a heliport marking should be incorporated that reflects that</p>	<p><b>JUSTIFICATION:</b></p> <p>This would help to standardize and codify a practice currently being used in the field by FAA inspectors.</p> <p>It would also allow heliport proponents the capability to take advantage of this practice when they do have the available airspace to accomplish a sectored app/dep zone.</p>

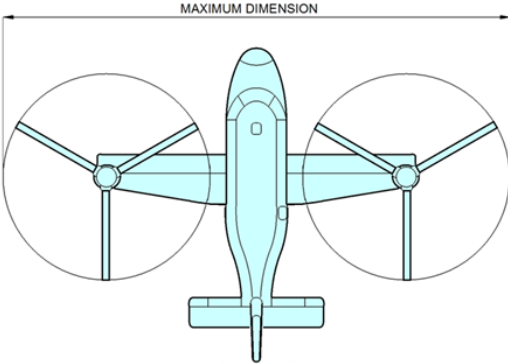
		<p>the heliport has a sectored app/dep path and where it is located.</p>	
<p>14.</p>	<p><b>Define Simultaneous Operations and align the heliport design guide with ATC standards on the matter.</b></p>	<p>DISCUSSION:</p> <p>Recommend realigning the dimensional constraints for simultaneous operations to more accurately reflect those used in ATC standards, e.g. 200 feet between landing and takeoff points in lieu of 200 feet between FATO to FATO edge.</p> <p>Recommend that the heliport design guide define what simultaneous operations are.</p> <p>U.S. DOT/FAA Air Traffic Control Order JO 7110.65W, Dec 10, 2015</p> <ul style="list-style-type: none"> <li>• <i>“3-11-5. SIMULTANEOUS LANDINGS OR TAKEOFFS Authorize helicopters to conduct simultaneous landings or takeoffs if the distance between the landing or takeoff points is at least 200 feet and the courses to be flown do not conflict. Refer to surface markings to determine the 200 foot minimum, or instruct a helicopter to remain at least 200 feet from another helicopter. (See FIG 3-11-6.)”</i></li> </ul> <p style="text-align: center;"><i>FIG 3-11-6</i> Simultaneous Helicopter Landings or Takeoffs</p> 	<p>JUSTIFICATION:</p> <p>Given the volume of traffic being seen at some facilities in the U.S. a clear definition of simultaneous operations is needed.</p> <p>This would define what is acceptable and not acceptable in regard to simultaneous operations at a heliport and what the standards that must be met are to conduct simultaneous operations at a heliport.</p> <p>This would provide clarity and standardization between the heliport design guide and the U.S. DOT/FAA Air Traffic Control Order JO 7110.65W.</p>

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		<ul style="list-style-type: none"> <li>“208 e. FATO/FATO separation. If a heliport has more than one FATO, separate the perimeters of the two FATOs so the respective safety areas do not overlap. This separation assumes simultaneous approach/departure operations will not take place. If the heliport operator intends for the facility to support simultaneous operations, provide a minimum 200-foot (61 m) separation.”</li> </ul>	
15.	<b>Define at what point a heliport that is privately owned but supports commercial for-profit air carrier operations may be required to meet stricter standards.</b>	<p><b>DISCUSSION:</b></p> <p>Define at what point a heliport that is privately owned but supports a high volume of commercial for-profit operations for paying passengers would be required to meet stricter standards based on volume of traffic, passengers and operations.</p> <p>Recommend including a third category that resides between public and private, e.g. private heliport supporting commercial for-profit air carrier operations at a private facility.</p>	<p><b>JUSTIFICATION:</b></p> <p>Assist in assuring heliports in the private sector, where commercial operations are being conducted for hire at a significantly higher volume, maintain a higher standard of compliance and safety.</p>
16.	<b>Safety Net Clarification</b>	<p><b>DISCUSSION:</b></p> <p>Clarify dimensional standards for safety netting at heliports elevated above 30” to remove the current ambiguity between the FAA heliport design guide and current OSHA requirements.</p> <p>Recommend the FAA consult directly with OSHA to help better align each organizations policies on this subject.</p>	<p><b>JUSTIFICATION:</b></p> <p>Better align FAA heliport standards with OSHA regulatory guidance to reduce confusion in the field regarding safety net requirements and standards.</p>
17.	<b>Simplify minimum VFR Safety Area table for marking dimensions.</b>	<p><b>DISCUSSION:</b></p> <p>The current Safety Area table has 5 columns and 6 rows. In the YES blocs there is no FATO NO marked block but</p>	<p><b>JUSTIFICATION:</b></p> <p>Reduce confusion and simplify implementing recommended standards.</p>

		<p>there is a note. A larger number of FATO's are not marked.</p> <p>Recommend that the table be streamlined for ease of use, i.e. have an option for the FATO not to be marked.</p> <p style="text-align: center;"><b>Table 2-1. Minimum VFR Safety Area Width as a Function of General Aviation and PPR Heliport Markings</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">General aviation heliports</td> <td style="text-align: center;"><math>\frac{1}{2}</math> RD but not less than 20 ft (6 m)**</td> <td style="text-align: center;"><math>\frac{1}{2}</math> RD but not less than 30 ft (9 m)**</td> <td style="text-align: center;"><math>\frac{1}{2}</math> D but not less than 20 ft (6 m)</td> <td style="text-align: center;"><math>\frac{1}{2}</math> D but not less than 30 ft (9 m)</td> </tr> <tr> <td style="text-align: center;">PPR heliports</td> <td style="text-align: center;"><math>\frac{1}{2}</math> RD but not less than 10 ft (3 m) **</td> <td style="text-align: center;"><math>\frac{1}{2}</math> RD but not less than 20 ft (6 m)**</td> <td style="text-align: center;"><math>\frac{1}{2}</math> D but not less than 20 ft (6 m)</td> <td style="text-align: center;"><math>\frac{1}{2}</math> D but not less than 30 ft (9 m)</td> </tr> <tr> <td style="text-align: center;">TLOF perimeter marked</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">FATO perimeter marked</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">Standard "H" marking</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">No</td> </tr> </table> <p>D: Overall length of the design helicopter        RD: Rotor diameter of the design helicopter        ** Also applies when the FATO is not marked. Do not mark the FATO if (a) the FATO (or part of the FATO) is a non-load bearing surface and/or (b) the TLOF is elevated above the level of a surrounding load-bearing area.</p>	General aviation heliports	$\frac{1}{2}$ RD but not less than 20 ft (6 m)**	$\frac{1}{2}$ RD but not less than 30 ft (9 m)**	$\frac{1}{2}$ D but not less than 20 ft (6 m)	$\frac{1}{2}$ D but not less than 30 ft (9 m)	PPR heliports	$\frac{1}{2}$ RD but not less than 10 ft (3 m) **	$\frac{1}{2}$ RD but not less than 20 ft (6 m)**	$\frac{1}{2}$ D but not less than 20 ft (6 m)	$\frac{1}{2}$ D but not less than 30 ft (9 m)	TLOF perimeter marked	Yes	Yes	No	No	FATO perimeter marked	Yes	Yes	Yes	Yes	Standard "H" marking	Yes	No	Yes	No	
General aviation heliports	$\frac{1}{2}$ RD but not less than 20 ft (6 m)**	$\frac{1}{2}$ RD but not less than 30 ft (9 m)**	$\frac{1}{2}$ D but not less than 20 ft (6 m)	$\frac{1}{2}$ D but not less than 30 ft (9 m)																								
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FATO perimeter marked	Yes	Yes	Yes	Yes																								
Standard "H" marking	Yes	No	Yes	No																								
<p><b>18.</b></p>	<p><b>Update standards in Chapter 7 for gradients and pavement design</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>Within Chapter 7, the TLOF and FATO have percent listed, whereas the safety area is a slope ratio. Why not standardize them all to percent or slope?</p> <p>Under paragraph 702.c the hospital gradient is somewhat confusing in that it reads; 0.5 to 1 percent and 2 percent. Recommend standardizing with other the rest of the AC to read 0.5 to 2 percent.</p> <p>Comment: In figure 7-1 the Safety Area Slope has the incorrect slope annotated. It reads 1:2 should be 2:1. Recommend standardizing with the rest of the AC.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Standardization of design criteria within AC and makes consistent with NFPA-418 standards.</p>																									
<p><b>19.</b></p>	<p><b>Better define the term EHLF (Emergency Helicopter Landing Facility)</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>Recommend clarifying the inclusion of ground sites into the definition of Emergency Helicopter Landing</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Better align the advisory circular to more accurately reflect the current real-world applications of EHLF's in states such as</p>																									

		<p>Facilities in Appendix A to be standardize with the definition of the EHLF found in section 1.</p> <p>Better define what an EHLF is and is not allowed to support in regard to operations, e.g. “accommodate helicopters engaged in firefighting and/or emergency evacuation operations”, but not routine helicopter operations or EMS operations.</p> <p>Eliminate the requirement for an EHLF to file a 7480. Better align Part-157 with the AC for EHLFs with potential for an exemption process.</p>	<p>California where EHLF’s are exempt, at the state DOT level, from submitting a 7480, having an airspace study, obtaining a 5010 or having a site-specific identifier.</p>
<p><b>20.</b></p>	<p><b>Allow for a nonstandard approach/departure surface for a secondary approach/departure path</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>Allow for nonstandard approach/departure surface angles based on operational requirements to meet helicopter performance standards and fly at an increased app/dep angle. Used to add a secondary app/dep path when only one can meet AC criteria.</p> <p>Provided that the advisory circular allows for locations to have a single approach/departure path which meets the required 8:1 app/dep surface it could be argued that allowing a “Non-Standard” secondary (alternate) approach/departure path with a greater slope than the 8:1 when obstructions are present that cannot be avoided would allow for a safer location with an additional flight path to accommodate for multiple wind conditions.</p> <p>Recommended that in those cases where a location can only support one app/dep path that meets the 8:1 requirement (the primary) allowances be made, on a case by case basis, for the integration of an alternate nonstandard app/dep path, meeting specified criteria. This would also require that this app/dep path would need to have a specific risk mitigation strategy such as a performance criteria or Day VFR only operations limitation.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>This allowance would help promote secondary approach/departure paths at locations that may only be capable of supporting one 8:1 standard app/dep surface. This in turn would allow for operations to be conducted in multiple wind conditions hence providing a safer environment.</p> <p>A primary cause of accidents at heliport has been shown to be pilots attempting to conduct operations at locations with only one approach/departure path. These single app/dep path locations have put pilots into downwind scenario where setting with power has occurred which has perpetuated a helicopter accident to take place.</p> <p>A secondary, performance restricted, approach/departure path would provide for operations to be conducted in additional wind conditions.</p>



		<p>Any change to this would also require a change to Part 77 and the definition of imaginary surfaces.</p>	
<p>21.</p>	<p><b>Address tilt rotor aircraft standards and requirements.</b></p>	<p style="text-align: center;"><u>DISCUSSION:</u></p> <p>The following information is proved from work done with ICAO by Leonardo regarding their 609 tiltrotor. Three areas were primarily reviewed:</p> <ol style="list-style-type: none"> <li>1. D Value           <ul style="list-style-type: none"> <li>• A tiltrotor's maximum dimension (rotor's turning) should be interpreted as its D Value</li> </ul> </li> </ol> <div style="text-align: center;">  </div> <ol style="list-style-type: none"> <li>2. Taxi route widths           <ul style="list-style-type: none"> <li>• A factor of 1.17 should be applied to a tiltrotor's maximum dimension when sizing a taxi route width               <ul style="list-style-type: none"> <li>○ Safety margins for taxi-routes are based upon an assumed average helicopter width/length ratio of 0.83:1 and the limit on operations expressed as the heliport D-Value. As a tilt-rotor</li> </ul> </li> </ul> </li> </ol>	<p style="text-align: center;"><u>JUSTIFICATION:</u></p> <p>Provide guidance to heliport owners and operators as well as those who will be operating tilt rotor aircraft as to what the standards for safe operations at heliports for these type of aircraft constitutes.</p>

		<p>has a width greater than length (i.e. its 'D' and width are the same), the additional factor should be added to the tilt-rotor to achieve the same margin.</p> <p>3. Firefighting</p> <ul style="list-style-type: none"> <li>When equating a tilt-rotor to a heliport category, the maximum dimension of the tiltrotor should be used.</li> </ul> <p>Another definition that could be used besides "Tilt Rotor" is to use the term "Powered Lift" as defined in Part 61.5 and/or helicopter and aircraft with vertical take-off and landing capabilities.</p>	
22.	<b>Add provisions for remotely piloted or non-piloted vehicle being operated at Heliports.</b>	<p>DISCUSSION:</p> <p>Soon to be Drone Ports in operations around the country of which there is a potential for them to be collocated at airports and heliports for combined operations.</p> <p>Define maned and unmanned operations at a heliport.</p>	<p>JUSTIFICATION:</p> <p>Provide guidance as to what is acceptable and what is not acceptable in regard to the intermixing of manned vs. unmanned aircraft at a heliport.</p> <p>Provide for clear standards of what constitutes adequate separation for both ground and air operations between manned and unmanned aircraft.</p>
23.	<b>Add an appendix to the Advisory Circular to explain the heliport process.</b>	<p>DISCUSSION:</p> <p>Develop an appendix with a start to finish how to overview explaining the FAA's heliport processes.</p> <p>Use similar language and chart found in the FSIMS 8900.1 Vol-8, Chp-3, Sect-3: Evaluation and Surveillance of Heliports.</p>	<p>JUSTIFICATION:</p> <p>Currently there is a great deal of confusion amongst individuals and organizations who are attempting to establish a heliport as to what the actual process for doing so is.</p> <p>Clarifying the actual process that the FAA must follow from the point of:</p> <ul style="list-style-type: none"> <li>The submission and acceptance of the FAA Form 7480</li> </ul>

		<p><b>Figure 8-1. Heliport Evaluation Process Flow Chart (Normally Accomplish)</b></p>	<ul style="list-style-type: none"> <li>• Request to conduct and airspace study.</li> <li>• Outcome of the airspace determination letter.</li> <li>• Completing the FAA form 5010</li> <li>• Establishing a heliport with an identifier.</li> </ul> <p>Would go a long way in improving the overall system and enhancing the accuracy of the 5010 database.</p>
<p><b>24.</b></p>	<p><b>Change criteria for marking of hard surface areas outside the TLOF.</b></p>	<p><b>DISCUSSION:</b></p> <p>The current recommended paint scheme for markings of hard surface area outside TLOF is with 1' alternating black and white stripes, as illustrated in Drawing-1.</p> <p>Recommend changing this to black and white stripe diagonals every 10', as illustrated in Drawing-2. This would provide equal visual acuity to pilots without some of the identified issues addressed in the justification block.</p>	<p><b>JUSTIFICATION:</b></p> <p>Issues have been reported by pilots at locations with too many horizontal lines, as illustrated in drawing 1 on the left, regarding optical illusion or a dazzle effect when in close proximity to the site.</p> <p>This change would address the “dazzle effect” related to too many parallel lines in close proximity in and around a flight environment</p>

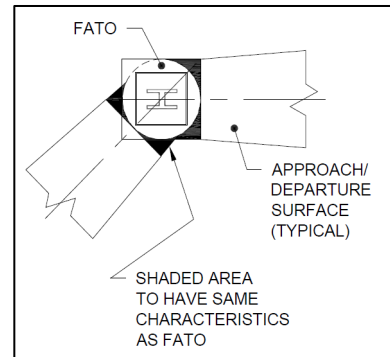
		<p>Drawing-1</p> <p>Drawing-2</p>	<p>which can distort a pilot's perception of the landing and takeoff area, hence overwhelming a pilot's vestibular system and creating the potential for an optical illusion to occur during a critical phase of flight.</p>
<p><b>25.</b></p>	<p><b>Allow for penetrations of the 2:1 transitional</b></p>	<p>DISCUSSION:</p>	<p>JUSTIFICATION:</p>

	<p><b>surfaces on rooftop heliports under specified circumstances.</b></p>	<p>In those cases that a heliport has clear 8:1 approach/departure surfaces without obstruction, allow for a single penetration of the 2:1 transitional surfaces on one side for such things as the elevator penthouse, HVAC system, antenna, building... when applicable and it is deemed not to be a hazard to flight.</p> <p>If a penetration of the 2:1 transitional surfaces is allowed on one side, the obstruction would then need to be appropriately marked and lighted in accordance with the advisory circular.</p> <p>To apply this there will then need to be a standard created for guidance for FAA inspectors to follow.</p>	<p>This allowance would assist proponents in being able to develop heliports that would be capable of supporting more than one approach/departure path and hence provide an environment that could accommodate for multiple wind conditions and create a safer environment for flight operations to be conducted.</p>
<p>26.</p>	<p><b>Define how far apart two or more landing areas have to be before each requires its own 5010, separate location identifier and independent airspace.</b></p>	<p style="text-align: center;">DISCUSSION:</p> <p>In approving instrument operations and approving UAS operations to a location with multiple landing areas has become more challenging in recent months. Getting a Location ID and getting that location into the National Airspace System Resources library can be difficult. It would be desirable to be able to have locations which have multiple landing and takeoff areas that are associated with each other (e.g. a hospital with three helicopter landing areas).</p> <p>An example from the fixed wing community would be an airport such as O'Hare International Airport. While it is only one airport there are 12 different runways associated with it, yet there is only one location ID for the airport. At this airport some runways are miles apart, however, all are within the airport boundaries.</p> <p>Maybe a way to look at how far away the landing areas could be within the heliport boundaries and the helicopter can hover taxi or air taxi between the landing areas. In this instance it may not require specifying a specific distance rather that operations cannot be conducted</p>	<p style="text-align: center;">JUSTIFICATION:</p> <p>Provide for more accurate accountability of those locations conducting operations in close proximity to one another at independent landing and takeoff facilities on the same campus.</p> <p>Provide for a standardized and quantifiable separation distance and criteria that once met requires a separate 5010 and identifier to be published.</p> <p>Provide for the ability of private heliport proponents to identify the independent airspace attached to each of their heliports so that they may better protect it. This is significant in that the FAA cannot and will not protect private heliport airspace.</p> <p>Provides for better Notice to Airman applications where applicable.</p>

		<p>between locations without requiring the helicopter to take off and land.</p> <p>To be evaluated on a case by case basis with the difference in elevation between sites being used as a key consideration.</p> <p>If different airspace is required to support an individual site, then it would need its own 5010.</p> <p>If two different heliports in close proximity are owned by two different entities, then each should have its own 5010 and identifier.</p>	
27.	<p><b>Define the term “Helipad” in the Heliport Design Guide Advisory Circular.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>When talking about helicopter takeoff and landing areas on a heliport most people address the areas as helipads, except in the heliport design guide. In the HDG a heliport is a place for a helicopter to take off and land. But a heliport is also synonymous with airport in some definitions. once again using the example of O’Hare International Airport., you don’t say that there are 12 airports at O’Hare International Airport, there is one airport with 12 runways. Why cannot the same attributes be applied to Heliports, where a Heliport is where helicopters take off and land on helipads, which consist of a Final Approach/Takeoff (FATO) area and a Takeoff Landing area. These would be identified on the 5010 as H with appropriate information attributed to the helipad for that heliport. A heliport could have one helipad or could have multiple helipads. But as long as the helipads were contained within the boundaries of the heliport, and a helicopter could hover or air taxi between the helipads there would be one Heliport, with one heliport LOC ID. It gets cumbersome if a Heliport has two or three helicopter landing areas, under the current HDG principle, a Heliport (the LOC ID named location in the NASR) could</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>Provide clarification as to what the difference is between a heliport, helistop and a helipad and how these terms are defined within other publications.</p> <p>Align with the FAA Aeronautical Information Manual (AIM).</p> <p>Better clarify the defemination of the term ‘Helipad’ so as not to be confusing.</p> <p>Align with the heliport design guide advisory circular with the latest FAA Form 7480-1 (10/17), Notice for Construction, Alteration and Deactivation of Airports, which now utilizes the term “Helipad(s)” in section C(2).</p>

		<p>contain multiple heliports (as in places where a helicopter can take off and land).</p> <p>The term helipad and the term TLOF should be referenced as synonymous and interchangeable terms.</p>	
<p><b>28.</b></p>	<p><b>TLOF, FATO and Safety Area Size and Shape in Relation to 8:1 app/dep surface.</b></p>	<p style="text-align: center;"><b>DISCUSSION:</b></p> <p>REFERENCE: par 407(b) &amp; Fig. 4-6 (also 208(a)(2), Fig. 2-7, 307(a)(3) &amp; Fig. 3-7)</p> <p>STATEMENT OF PROBLEM:</p> <p>Second sentence in 407(b)1 states: “Design the FATO to be circular or rectangular, regardless of the shape of the TLOF.”</p> <p>This would indicate that a round TLOF can have a square FATO and a square TLOF can have a round FATO.</p> <p>Recommend changing the above language to something like:</p> <p><i>“If the TLOF is square design the FATO and Safety area to be square. If the TLOF is round design the FATO and Safety area to be round. Whatever shape is used for the TLOF the distance between the TLOF, FATO and Safety Area perimeters are to be equidistant in all sectors around.”</i></p> <p>Confusion also then becomes if the approach area doesn’t line up with the sides of the TLOF, should we make the FATO wider to accommodate the margin needed between the TLOF and FATO boundaries, or not?</p> <p>The illustrations need to match the text, otherwise it’s impossible to determine what their relationship is supposed to be...and therefore impossible to accurately measure the surrounding obstructions.</p>	<p style="text-align: center;"><b>JUSTIFICATION:</b></p> <p>A more in-depth and clearly stated representation of the heliport’s primary surfaces, e.g. TLOF, FATO and Safety Area, better encompassing the nuances of both square and round sites, will allow for more accurate obstruction evaluations around heliports to occur and will help reduce current confusion.</p> <p>Illustration(s) of the intersection of the 8:1 app/dep path to the FATO when it intersects the FATO at other than a square angle would help clarify airspace questions for obstruction consideration.</p>

**Fig 4-6**



Over the years the above illustration has caused confusion in that it appears to illustrate a circular FATO surrounding a square TLOF.

Currently there is only one location in the advisory circular that illustrates a round heliport, Fig 2-22. All other illustrations are based on a square heliport.

One additional area of confusion on this topic is how this then becomes applied for locations that adopt an elongated FATO for altitude

**RECOMMENDATIONS:**

- Update illustration in Fig 4-6 for clarification. Show a round TLOF with a round FATO and round safety area in one illustration then show a square TLOF with a square FATO and square safety area next to it.
- More clearly illustrate how the 8:1 app/dep surface intersects a FATO when the 8:1 app/dep



		<p>surface does not line up with one of the four flat side of the a FATO, e.g. at a 45-degree angle.</p> <ul style="list-style-type: none"> <li>• Add a round TLOF/FATO/Safety Area relationship chart to Fig4-2</li> <li>• Include illustrations of round heliports in each chapter to include those for lighting.</li> <li>• An additional option would be to consider updating or eliminating the formula for determining the TLOF to FATO separation if there are no adverse effects.</li> </ul>	
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**NOTHING ELSE FOLLOWS**