HELICOPTER SAFETY ADVISORY CONFERENCE
January 21, 2016
Four Points by Sheraton French Quarter
New Orleans, LA

MINUTES

AGENDA January 20 & 21, 2016 (Attachment 1)

SAFETY BRIEFING

- Four Points by Sheraton Head of Security provided the safety briefing.

INTRODUCTION

- Chairman Pat Attaway called the meeting to order at 08:15 and welcomed members and guests.
- Read Antitrust Statement
- Introduction by Attendees

HSAC WORKGROUP COMMITTEE REPORTS

Aerial Observation/ UAS Committee (Attachment 2)

- Steve Bechtol reported they had a guest speaker, Keith Cunningham from the University of Alaska.
- Several members of the UAS group are no longer with their respective companies, due to the current oil price situation.

Technical Committee

- Patrick Robert announced his planned departure from HSAC, and introduced Danny Green, who will be the new Technical Committee chairman.
- The Technical Committee has some new participants at the meeting.
- All operators were encouraged to have a participants on the committee.
- Meeting minutes **(Attachment 3)**
-

Flight Following / ADSB / High Density Helicopter Traffic Areas – Terry Gambill

- Minutes: Meeting minutes are included below. **(Attachment 4)**
- Minutes: The High Density Helicopter Traffic Area group did not meet.

API RP 2L

- Helideck RP Workgroup Agenda (**Attachment 5)**
- HSAC RP 2016-1 **(Attachment 6)**

- HSAC RP 2016-1 Presentation Slides **(Attachment 7)**

HSAC COMMITTEE REPORTS

Treasurer's Report (Attachment 8)

- Joe Gross briefed the group on the HSAC 2015 Financial Status
- The taxes for 2016 have been filed.

Secretary's Report

- Terry Gambill introduced himself as the new HSAC Secretary
- There are four new HSAC workgroups, and HSAC is soliciting participants for those workgroups. Sign-up sheets were made available for those interested in participating. The workgroups are:
  1. HSAC By-Laws Workgroup
  2. Helideck Plates Workgroup
  3. RP Review Workgroup
  4. Communication Site Replacement Platform Workgroup

Vice Chairman's Report

- No report

Safety Committee Report

- Terry Kaufman announced his retirement and departure from HSAC.
- Terry solicited candidates to be the new Safety Committee chairman.

FAA ADS-B Program – Glenn Meier

- Glenn Meier reported on planned installations, and pending platform shutdowns.
- There are 10 known sites that will be going away over the next couple of years.
- Glenn reminded the group that 2020 is getting closer, and mandatory ADS-B equippage will be here.
- Glenn advised the group that Allan Overbey would be having a meeting at 1PM, following lunch, to discuss AWOS locations
- A question was asked about the possibility of the FAA allowing the use of portable ADS-B out. Glenn Meier will ask the question of his superiors.

Fish Spotter Activity – Billy Suckow

- Billy requested helicopters call before beach out on Fish Spotter Frequencies.
- Fish Spotter aircraft operate out of numerous locations from Trent Lott to the Texas-Mexico border.

- Safety Meeting in April 2016, in Patterson
- Billy introduced Rhett Johnson of Daybrook Fisheries. Rhett will be participating in HSAC.

Aviation Spectrum Resources (ASRI) – Mike Hinojosa (Attachment 9)
- Mike briefed the group on the history of ASRI and the Aeronautical Frequency Committee (AFC)
- Mike explained the self-inspection program that is being established for the offshore locations in the Gulf of Mexico.

FAA Security Briefing on Temporary Flight Restrictions – Brian Throop (Attachment 10)
- Brian briefed the group on the history of FAA Security
- There will be a number of Temporary Flight Restrictions for significant events throughout the United States in 2016.
- The FAA expects over 200 Temporary Flight Restrictions for presidential movement in 2016.

Bureau of Safety and Environmental Enforcement (BSEE) Briefing – Steve Rauch
- Steve briefed on a near miss between a BSEE contracted helicopter and another helicopter near Abbeville. The TCAS did not alert. The only information on the other aircraft is that it was blue with a red stripe.

FAA's Compliance Philosophy – Chris Houghton (BTR FSDO) (Attachment 11)
- Chris introduced 3 other BTR FSDO personnel.
- Chris referred to the old statement, "We're here to help you", and said he would rather say it as, "We're here to work with you".
- FSDO will attempt to work through discrepancies without having to use LOI's, though they will still have to be used at times.

2016 Hurricane Season – Colonel Jeff Ragusa 53rd WRS (Attachment 12)

- Colonel Ragusa briefed the group on the history of Hurricane hunting, and how it is done.
- There is an app on Google Earth that allows you to follow their missions.
- The 53rd WRS also flies Winter Storms
- The call-sign for Hurricane Hunter aircraft is always "Teal" followed by a 2-digit number

- Presentation

Awards Presentations

- Rick Sloan presented Patrick Robert an award in recognition of the years he devoted to HSAC, particularly as Technical Committee Chairman
- Pat Attaway presented Terry Kaufman an award in recognition of the years he devoted to HSAC, particularly as Safety Committee Chairman.
- Pat Attaway presented Ron Domingue an award in recognition of the years he devoted to HSAC, particularly as HSAC Secretary.
- Joe Gross presented Mark Fontenot an award in recognition of the years he devoted to HSAC, particularly as HSAC Chairman.

Closing Comments

- Pat Attaway advised the group that HSAC will be revising our workgroup meeting schedule to enable people to increase participation, and to allow people to participate in more than one workgroup.
  1. Workgroups would all still meet on the same day.
  2. Two would meet in the morning, and two would meet after lunch.
  3. The workgroup reports would be made during the General Membership meeting only, rather than being done both days.
  4. The AIC meeting would continue to be held in the first day afternoon.

Next HSAC Meeting will be May 18-19, 2016 – Sheraton North Houston at George Bush Airport; 15700 JFK Blvd.; Houston, Texas 77032 Phone: (281) 442-5100

Submitted by: Terry A. Gambill Date: 3/9/2016
Terry A. Gambill, Secretary

Approved: Pat Attaway Date: 3-9-2016
Pat Attaway, Chairman

HELICOPTER SAFETY ADVISORY CONFERENCE

DATE: January 12, 2016

TO: HSAC Membership

SUBJECT: **HSAC Meeting Wednesday Jan 20th and Thursday Jan 21st 2016**

Attached is the agenda for the January meeting of the Helicopter Safety Advisory Conference (HSAC).

Four Points by Sheraton French Quarter
541 Bourbon Street
New Orleans, LA 70130
(504) 524-7611
http://www.fourpointsfrenchquarter.com/

Jan 20th

06:30 to 07:45	**AgustaWestland Breakfast**	
	Work Groups	
08:00 to 12:00	Aerial Patrol Work Group / UAS	Steve Bechtol
08:00 to 12:00	Technical Work Group	Patrick Robert
08:00 to 12:00	Flight Following / ADSB/ High Density Traffic Area	Terry Gambill / Don Robson
08:00 to 12:00	API RP 2L Work Group Meeting	Terry Duprie
12:00 to 13:15	Lunch (On your own for work groups)	
13:15 to 15:00	**HSAC Work Group Reports**	Pat Attaway
	Aerial Patrol Work Group / UAS Technical Work Group Flight Following / ADS-B API RP 2L Work Group Meeting	
15:00 to 16:30	**AIC Meeting**	Glenn Meier, Alan Overbey Roseanne Albrecht
16:00 to 17:00	**Steering Committee Meeting**	
17:00 to 19:00	**Bell Hospitality Social for all**	

HELICOPTER SAFETY ADVISORY CONFERENCE

Jan 21st

06:30 to 07:45		**Airbus Helicopters, Inc. Breakfast**	
07:45 to 08:15		Registration	
08:15 to 12:00		**Regular HSAC Membership Meeting**	
1.	Introductions and Opening Remarks		Pat Attaway
2.	HSAC – Work Group reports		
	Aerial Patrol / UAS		Steve Bechtol
	Technical Committee		Patrick Robert
	Flight Following / ADS-B		Terry Gambill
			Don Robson
	API RP 2L		Terry Duprie
3.	HSAC Committee Reports		
	• Treasurer's Report		Joe Gross
	• Secretary's Report		Terry Gambill
	• Vice Chairman's Report		Bob Hall
	• Safety		Terry Kaufman
	FAA ADS-B Program		
	• Update		Glenn Meier
4.	Fish Spotter Activity		TBD
5.	ASRI – Self-Inspection Program		Mike Hinojosa
6.	Presidential TFRs		Brian Throop
7.	Steve Rauch (BSEE)		Near Miss
8.	Chris Houghton (BTR FSDO)		FAA's Compliance Philosophy
9.	2016 Hurricane Season		Colonel Jeff Ragusa 53rd WRS
10.	New Business – General Discussion		Pat Attaway

Jan 21st

11. Closing Comments and the next meeting announcements

12:00 to 13:00 **Sikorsky Luncheon for all members**

Flight Safety, Inc. has graciously provided the between meeting refreshments.

2016 MEETING DATES	
May 2016, 18th and 19th	Sheraton North Houston at George Bush
Oct 2016, 19th and 20th	Four Points by Sheraton New Orleans, LA
Jan 2017, 18th and 19th	Lafayette - TBD

HSAC Aerial Observation Committee/UAS Meeting Minutes

Four Points Sheraton, New Orleans, LA, Wednesday, January 20, 2016

8:00-8:15	Introduction – sign in	Steve Bechtol

1. Todd Chase and Bryan Foster are not able to attend due to changes in employment

2. Steve will not be able to make the May meeting

3. Change in locations: May will be in Houston and October will be back in New Orleans

4. Possibility of changing to only 2 AOC Meetings each year and dropping Lafayette from the locations

8:15-8:15 UAS Technical Update

1. Due to Todd and Brian being out, there is no update

8:15-9:30	UAS BVLOS/Pipeline Research and Testing	Keith Cunningham

University of Alaska

1. Keith is a research professor with the U of A
2. UAS Operations from U of A since 2000
3. UAS testing within the rocket range
4. Video on the Nome fuel delivery
5. Video on Prudhoe Bay – BP
6. Fire & Marinized UAS, Methane Sensing,
7. Salmon survey
8. Bridge inspections, Geographic imagery

9:30-9:45 Break

9:45-10:45 Continuation of presentation from Keith Cunningham

1. House model
2. Alyeska project
3. Decision Support System
4. Beyond Line of Sight
5. Open source ground control station
6. Slope Movement

10:45-11:00 Break

11:00-11:15	Safety stats and hours review	Tom Buchner
11:15-11:30	RP Review for AOC	Steve Bechtol

1. HSAC Patrol Captain Minimum Requirements AOC RP – No changes made
2. Number of meetings agreed for AOC may only need 2 per year, but most involved in UAS as well so will attend anyway. Will stick with current format for now.
3. Todd Chase and Aaron will be the meeting coordinator for May in Houston

HSAC Technical Committee Meeting Minutes, January 20, 2016

The meeting was opened with introductions, noting Pat Robert's retirement and my replacing him as committee lead.

The following items were then discussed:

- **Past Business:** We discussed the teams work on the fatigue RP and the benefits it could yield in our Industries future.
- **Pending Business:** We discussed in great detail and depth the safety hazards associated with methane gas flaring and its potential affects as related to the turbine engines used in our aircraft. We discussed our options and responsibilities from the technical side of the issue and concluded that while this is a real and serious concern, it was beyond our realm of authority and expertise and would be better suited to a committee such as the Heli-Deck committee.
- **Current Industry Issues:** Tony Gonzales opened a discussion on what is currently considered a very "hot button issue" in our industry. There are shared concerns over the human factor issues as a result of the current state of the OGP industry and all of the unknowns facing our workforce moving forward.

  It was a very healthy discussion and we had a very diverse team with maintenance, leadership as well as human factors experts at the table and we were able to discuss specific examples, generalized issues as well as immediate practical solutions to these issues.

  I later dedicated my report of these concerns to the HSAC general assembly in an attempt to get all organizations focused on this very real and potentially dangerous issue facing our industry for the foreseeable future.

  Some of the concerns addressed were:

  - Anxiety
  - Depression
  - Lack of attention/Focus
  - Rumor control
  - Family Issues
  - Financial concerns
  - Etc.

HSAC Technical Committee Meeting Minutes, January 20, 2016, cont'd

Attendees: (My apologies on this as the list is incomplete since it does not contain late arrivals and some other attendees)

- DeborahAnn Cavalcante, Aviation Training Academy (ATC)
- Mark Jones, Airbus Helicopters
- Tony Gonzalez, PHI
- John Ellyson, PHI
- Myron Hillers, Westwind Helicopters

Action Items:

- Create a standardized PowerPoint template for committee reports. Danny
- Query our committee members to define the following: Danny
    - Define the Technical Committee's roles and responsibilities. Committee
    - Define the Technical Committee's Vision of Success. Committee
    - Using the above information, determine a structured path forward. Committee
- Review and share the Terms of Reference from other industry Technical committees (i.e. HAI) as guidance to ensure both success and relevance in our committees' endeavors. Danny

HSAC ADS-B/Flight Following Workgroup

Meeting Minutes

January 20, 2016

1. **Safety Briefing**

2. **Welcome and Introduction – Sign-In Sheet Passed – 19 in attendance**

3. **Aeronautical Frequency Committee (AFC)**

   A. **World Radio Conference (WRC-15)**

      (1) **Held November 2-27, 2015 in Geneva, Switzerland**

      (2) **AFC was represented by Aviation Spectrum Resources (ASRI)**

      (3) **Specific details of the conference are confidential at this time, however, we can share that WRC-15 was successful for aviation interests. New allocations were won for new and supporting services, and current spectrum allocations and regulatory protections were successfully defended.**

   B. **World Radio Conference (WRC-19)**

      (1) **Will be held in 2019.**

      (2) **AFC will now begin preparing to face any agenda items for the WRC-19 meeting.**

   C. **Next AFC meeting is March 1-3, 2016 in Albuquerque, NM**

      (1) **AFC members from the helicopter community are urged to try to attend. We need to be there to support the interests of our low altitude communication needs.**

4. **HSAC Frequency Card**

   A. **Some operators indicated they are now scanning the card to pdf, and putting it on Ipads.**

   B. **Someone asked about having the card in pdf format by page. David Robinson is working to get that done.**

   C. **We will stay with the card this year.**

      (1) **Operators are asked to contact David Robinson or Terry Gambill with the number of cards they would like to have.**

5. **Houston ARTCC**

   A. **John Beckman was not able to attend the meeting, due to funding.**

B. John sent a slide presentation showing current and pending outages south of the Galveston area.

C. John requested information concerning the recent changes to drop the “A” from call signs of ADS-B equipped aircraft.

(1) Everyone seemed pleased with the change.

(2) The only question that came up was whether it mattered if the change was made in the transponder or not.

(a) This question will be brought to John, and the answer communicated via email.

6. New Orleans Approach

A. Mike Seaner was unable to attend, due to meetings at MSY on the new terminal building plans.

7. FAA ADS-B

A. Allen Overbey and Glenn Meier briefed on current issues in the ADS-B program. This was an overview of what was covered on Thursday in the AIC Meeting.

B. Glenn Meir requested that a workgroup be formed to look at possible replacement platforms for sites that are shutdown. Volunteers were solicited in the workgroup, and a the General Membership Meeting.

8. High Density Helicopter Traffic Areas

A. This portion of the workgroup did not meet, due to Don Robson not being able to attend.

Helideck RP WG Agenda

Wednesday, January 20, 2016	
6:30 to 7:45	AgustaWestland Breakfast

Wednesday, January 20, 2016	
8:00-8:10	Safety Moment – Pat Attaway
8:10-9:00	Opening Comments – Pat Attaway, Bill Schroeder Farewells and Regrets - Bill Schroeder Minutes – Steve Rauch Presentation – API L1 status and final RP 2016-1 – All
9:00-9:15	Break
9:15-9:45	Con't
9:45-10:15	RP 2016-2 update and review – Richard Landrum
10:15-10:30	Break
10:30-11:30	Con't New Business Close of meeting

Wednesday, January 20, 2016	
13:15-15:00	HSAC WG Report Out – WG LT
17:00-19:00	**Bell Hospitality Social**

Attachment #6

HSAC RP 2016-1

Helideck Design Guidelines

(New Builds)

Recommended Practices (RP) are published under the direction of the Helicopter Safety Advisory Conference (HSAC). RP's are a medium for discussion of aviation operational safety pertinent to the transmission of product, energy exploration and production industry in the United States. RP's are not intended to replace individual engineering or corporate judgment or to replace instruction in company manuals or government regulations. Suggestions for subject matter are cordially invited.

Table of Contents

1 Scope

This document provides a basis for planning and designing new helidecks (including facilities currently without helidecks), commonly called new builds, for all offshore facilities except mobile offshore drilling units (MODUs) and ships which have defined codes/guidance. It includes safety guidelines, design load criteria, helideck size, marking and lighting recommendations, and other design recommendations.

This document does not propose a standard helideck, but recommends basic criteria to be considered in the design of new build helidecks. It is not to be construed as being applicable to existing helidecks as of the date of publication of this document. Criteria for existing helidecks and modification or replacement of helidecks on existing facilities should refer to HSAC RP 2016-2 and other industry guidance.

NOTE - The requirements for mobile offshore drilling units (MODUs) are given in the IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU CODE) and for ships in ICS Guide for Helicopter / Ship Operations

2 Design References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies (including any addenda/errata)

API Recommended Practice 2A-WSD, *Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms*

EI[1] 1529, A*viation Fuelling Hose and Hose Assemblies*

EI 1550, *Handbook on Equipment used for the Maintenance and Delivery of Clean Aviation Fuel*

NFPA[2] 407, 2012 Edition, *Standard for Aircraft Fuel Servicing*

3 Terms, Definitions, and Abbreviations

For the purpose of this document, the following terms and definitions apply.

3.1 Terms and Definitions

3.1.1 D-value

The largest overall dimension of the helicopter when rotor(s) are turning measured from the most forward position of the main rotor tip path plane to the most rearward position of the tail rotor tip path plane or rearward extension of the helicopter structure.

3.1.2 Design helicopter

A composite helicopter used in design of the helideck having the largest set dimensions and the maximum take-off weight/mass (MTOW/MTOM) of the range of helicopters for which the helideck is being designed.

NOTE - The maximum design weight (mass) of the helideck may limit the usable weight (mass) of a helicopter, (See Design Load section 5.2 and Weight (Mass) / Size Limitation Markings section 6.5).

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[1] Energy Institute, 61 New Cavendish Street, London W1G 7AR, UK, www.energyinst.org.

[2] National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471, www.nfpa.org.

3.1.3 Deck integrated firefighting system(s) (DIFFS)
A fire suppression system integrated into the helideck surface structure using pop-up foam/water nozzles

3.1.4 Final approach and take-off area (FATO)
A defined area over which the final phase of the approach maneuver to hover or landing is completed and which the take-off maneuver is commenced.

NOTE -The minimum size of the FATO is 1D.

3.1.5 Ground effect
An improvement in helicopter lift capability that develops whenever the helicopter flies or hovers near the touch down or lift-off area (TLOF).

NOTE - Ground effect results from the cushion of denser air built up between the surface and helicopter by the air displaced downward by the rotor.

3.1.6 Ground effect area
The solid area that provides ground effect.

NOTE - This area can be provided by the touch down or lift-off (TLOF) area plus a safety shelf.

3.1.7 Helicopter
A rotary wing aircraft that depends principally for its support and motion in the air upon the lift generated by one or more power-driven rotors, rotating on substantially vertical axes.

NOTE - This document provides requirements and guidance for the design of a helideck for helicopters with a single main rotor only.

3.1.8 Helideck
An area on a fixed or floating offshore facility designated for the landing and takeoff of helicopters, which includes, as applicable, some or all of the supporting facilities/equipment necessary for helicopter operations, such as personnel/cargo handling, parking, tiedown, fueling, maintenance, etc.

3.1.9 0.83D helideck
A helideck on which the TLOF is of sufficient size to contain a circle of diameter of 0.83D of the largest helicopter that will use the helideck.

3.1.10
1D helideck.
A helideck on which the TLOF is of sufficient size to contain a circle of diameter of 1.0D of the largest helicopter that will use the helideck.

3.1.11 Helideck maximum allowable weight (mass)
A maximum allowed helicopter weight (mass) on the helideck (TLOF) based on dynamic loads incurred during take-off and landings.

3.1.12 Limited obstacle sector (LOS)
An area on the structure side of the helideck in which obstacles are permitted, provided the height of the obstacles above the level of the TLOF is limited.

3.1.13 Limited parking area (LPA)
A parking area of less than 1.0D separated from the TLOF by a parking transition area (PTA) that is designed to accommodate a parked helicopter where restrictions/limitations may apply (i.e. size of helicopter, parking area dimensions, weight (mass) or obstacles).

3.1.14 Metocean
The discipline concerned with the establishment of relevant environmental conditions for the design and operation of offshore structures.

3.1.15 Minimum structure
A structure with one or more of the following attributes:

a) structural framing which provides less reserve strength and redundancy than a typical well braced, three-leg template type platform;

b) free-standing and guyed caisson platforms which consist of one large tubular member supporting one or more wells;

c) well conductor(s) or free-standing caisson(s), which are utilized as structural and/or axial foundation elements by means of attachment using welded, non-welded, or nonconventional welded connections;

d) threaded, pinned, or clamped connections to foundation elements (piles or pile sleeves);

e) braced caissons and other structures where a single element structural system is a major component of the platform, such as a deck supported by a single deck leg or caisson.

3.1.16 Obstacle-free dropdown sector (OFDS)
Obstacle clearance provided below the helideck (TLOF) surface to cover the case of a possible of helicopter descent due to a power unit failure during the final stages of the approach or initial stages of takeoff.

3.1.17 Obstacle-free sector (OFS)
An area free of all obstructions out to a defined distance.

3.1.18 Overall helicopter length (OL)
The distance from the tip of the main rotor blade to the tip of the tail rotor when the rotor blades are aligned along the longitudinal axis of the helicopter.

NOTE - See definition of D-value.

3.1.19 Parking area (PA)
An area, designed to accommodate a parked helicopter, separated from the TLOF by a parking transition area (PTA).

3.1.20 0.83D parking area
A parking area which is of sufficient size to contain a circle diameter of 0.83D of the largest helicopter that it will serve.

3.1.21 1D parking area (PA)
A parking area which is of sufficient size to contain a circle diameter of 1.0D of the largest helicopter that it will serve.

3.1.22 Parking protection area (PPA)
A parking protection area designed to accommodate rotor infringement beyond the combined parking transition area (PTA) and parking area or limited parking area (LPA) that extends beyond the combined PTA and LPA areas.

3.1.23 Parking transition area (PTA)
An area that separates the TLOF and parking area.

3.1.24 Push-in parking area (PIPA)

A restricted parking area separated from the TLOF by a parking transition area (PTA) designed to accommodate only a fully shut down helicopter, which is ground handled to/from the TLOF and to/from the PIPA.

3.1.25 Reference point

The apex/point-of-origin of the obstacle-free sector (OFS) on the FATO edge and the limited obstacle sector (LOS) perimeter

3.1.26 Return period

The average period between occurrences of an event or of a particular value being exceeded

3.1.27 Rotor diameter (RD)

The diameter of a circle made by the rotor blades while rotating.

3.1.28 Safety net

A netting section around the perimeter of the TOLF, and if applicable, the parking area and parking transition area, used to provide fall protection for personnel.

NOTE - Safety nets do not provide ground effect.

3.1.29 Safety shelf

A solid surface capable of providing ground effect around the perimeter of the TLOF and to provide fall protection for personnel.

3.1.30 Touchdown and lift-off area (TLOF)

An area on which a helicopter touchdowns or lifts off.

*NOTE - The minimum size of the TLOF is 0.83*D*: 0.83*D *is approximately 1 RD.*

3.1.31 Touchdown parking circle marking (TDPC)

A yellow circle marking on the parking area used by the pilot for guidance and obstacle clearance information.

3.1.32 Touchdown/positioning marking (TDPM)

A yellow circle marking on the TLOF used by the pilot for guidance and obstacle clearance information while landing, taking off, or maneuvering.

NOTE - The TDPM circle is described as the aiming circle in the previous edition of API 2L.

3.2 Abbreviations

DIFFS - deck-integrated firefighting system

FATO - final approach and take-off area

LOS - limited obstacle sector

LPA - limited parking area

NUI - normally unmanned installation

OFDS - obstacle-free dropdown sector

OFS - obstacle-free sector

PA - parking area

PIPA - push-in parking area

PPA - parking protection area

PTA - parking transition area

RD - rotor diameter

TDPC - touchdown parking circle

TDPM - touchdown/positioning marking

TLOF - touchdown and lift-off area

4 Helideck Planning

4.1 General

4.1.1 This section provides a guide for the design of helidecks. Consideration should be given to the potential design life of the facility/field and possible future requirements, including potential of larger helicopters and/or combinations thereof, increased personnel, facilities upgrades, etc. Initial planning should include all criteria pertaining to the design of the helideck. Valuable assistance during the planning and design phase can be provided by the aviation professionals of the helicopter operators, manufacturers and the oil and gas exploration and production companies.

4.1.2 In planning the helideck, consideration should be given to the helicopter's gross weight (mass), landing load distribution, rotor diameter, overall length, and landing gear configuration of the design helicopter planned to use the helideck.

4.1.3 For extreme cold weather operations, the design of heated helidecks, snow/ice removal and provision of electrical power in the proximity of the helideck to use helicopter ground power units should be considered.

4.2 Design Helicopter Selection

Design criteria presented herein include operational requirements, safety considerations, and environmental aspects that can affect the design of the helideck. The following are considerations for selecting the helicopter for helideck design:

a) distance from onshore staging areas or helicopter bases;

b) proximity to other offshore helidecks, on either satellite structures or adjacent field structures;

c) status as to whether the facility is manned or a normally unmanned installation (NUI) without living quarters;

d) helicopter transportation requirements for the facility;

e) crew change requirements;

f) requirements for night operations, medical evacuation, or other emergency flights;

g) environmental conditions.

On any given day helicopter performance is a function of many factors including the actual all-up weight (mass); ambient temperature; pressure altitude; effective wind speed component; and operating technique. Other factors concerning the physical and airflow characteristics of the helideck and associated or adjacent structures have an impact. These factors will need to be taken into account in the determination of specific and general limitations which may be imposed in order to ensure adequate performance and safe operations. It should also be noted that, following the instance of a helicopter engine failure, it may be necessary for the helicopter to descend below helideck level to gain sufficient speed to safely fly away or to land on the water; in both cases without striking the safety net/shelf or facility obstacles below the TLOF level. In certain circumstances it may be necessary to reduce helicopter operating weight (mass) (fuel or payload) to provide a safe operating area for the helicopter unless the issues above are addressed during the helideck design phase.

4.3 Helideck Design Considerations

4.3.1 Location

Before final location of the helideck is selected, obstruction clearances, personnel safety, and metocean conditions, as well as proximity of the obstacle-free sector relative to flammable materials, hot and cold gas discharges, flare or vent booms, and cooler discharges should be considered. As illustrated in Figure 1, the helideck should be located so that the TLOF and associated flight paths are as far as possible outside the influence of the hot and cold gas discharges, and turbulence effects in prevailing wind conditions.

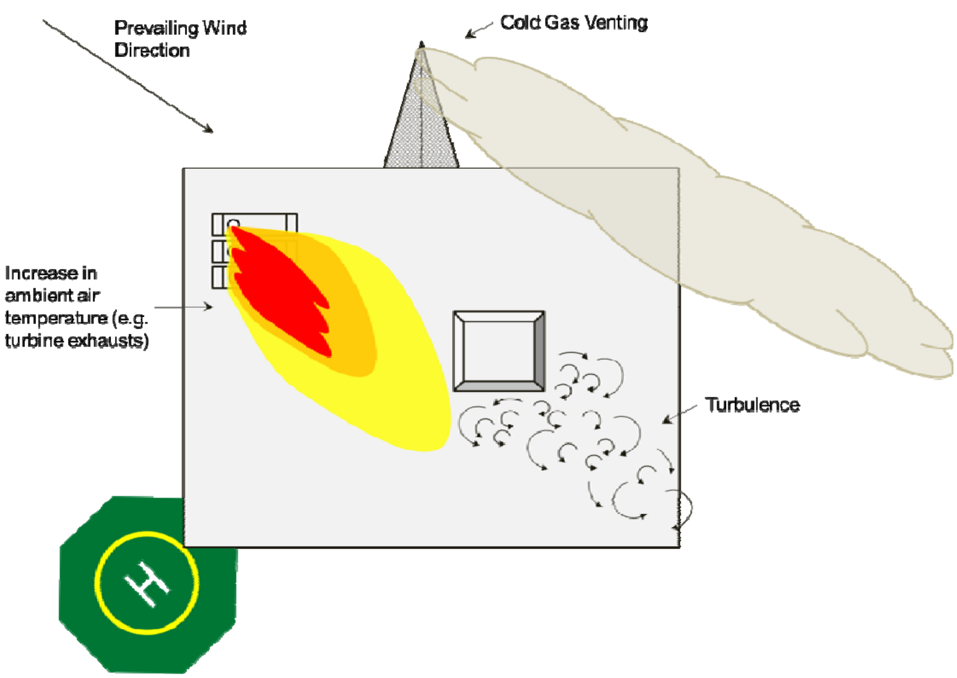

Figure 1 — Helideck Orientation Based on Wind, Direction/Exhaust Discharges

4.3.2 Helideck (FATO, TLOF) Size

4.3.2.1 A helideck should be provided with one final approach and take-off area (FATO) co-located with a touchdown and lift-off area (TLOF). The TLOF may be any shape, but shall be of sufficient size to contain

a) a circle of diameter of not less than 1.0D of the largest helicopter the helideck is intended to serve; or

b) a circle of diameter of not less than 0.83D (see footnote [3]) of the largest helicopter the helideck is intended to serve providing the TLOF is surrounded with a safety shelf. The TLOF together with the safety shelf must provide an area which can accommodate a circle with a diameter of not less than 1.0D. For design loading, see 5.2.

NOTE 1 - The size of the safety shelf or safety net should be at least 5 ft (1.5 m) wide (measured horizontally) around the perimeter: For design loading, see 5.2.7.

NOTE 2 - If the design 1.0D value is more than 58.2 ft (17.9 m) the width of the safety shelf will need to be increased above the minimum of 5 ft (1.5 m) and/or the minimum design size of the TLOF increased so it is larger than 0.83D.

4.3.2.2 Figure 2 shows a square helideck with a 1.0D FATO and 1.0D TLOF and Figure 3 shows a square helideck with a 1.0D FATO and 0.83D TLOF. In the figures, the limited obstacle sector (LOS) is indicated together with the touchdown/position marking, TLOF perimeter marking, and the "H" marking in addition to the FATO and TLOF."

4.3.2.3 The “H” should be co-located with the touchdown/positioning marking (TDPM) with the crossbar of the “H” lying along the bisector of the obstacle-free sector (OFS) (see Figures 2 and 3). If the OFS and the limited obstacle sector (LOS) are swung (by up to 15º) from the norm, the bisector of the OFS need not lie on crossbar of the “H” and the “H” shall also be swung (rotated) by a corresponding amount. The “H” crossbar should remain in the center of the FATO/TLOF and parallel to the bi-sector of the OFS as illustrated in Figure 13. See 4.3.5.1 and Figure 13.

NOTE -The bi-sector is not displayed on all figures in this document.

4.3.2.4 For helidecks that have TLOF of 1.0D or larger, the FATO and the TLOF should be coincidental i.e. be the same size and always occupy the same space. For helidecks that have a TLOF of less than 1.0D, the portion of the FATO outside the TLOF perimeter need not be dynamic load bearing (DLB).

4.3.2.5 The TLOF shall provide ground effect and be dynamic load bearing. The safety shelf on helidecks with a TLOF of less than 1.0D shall also provide ground effect.

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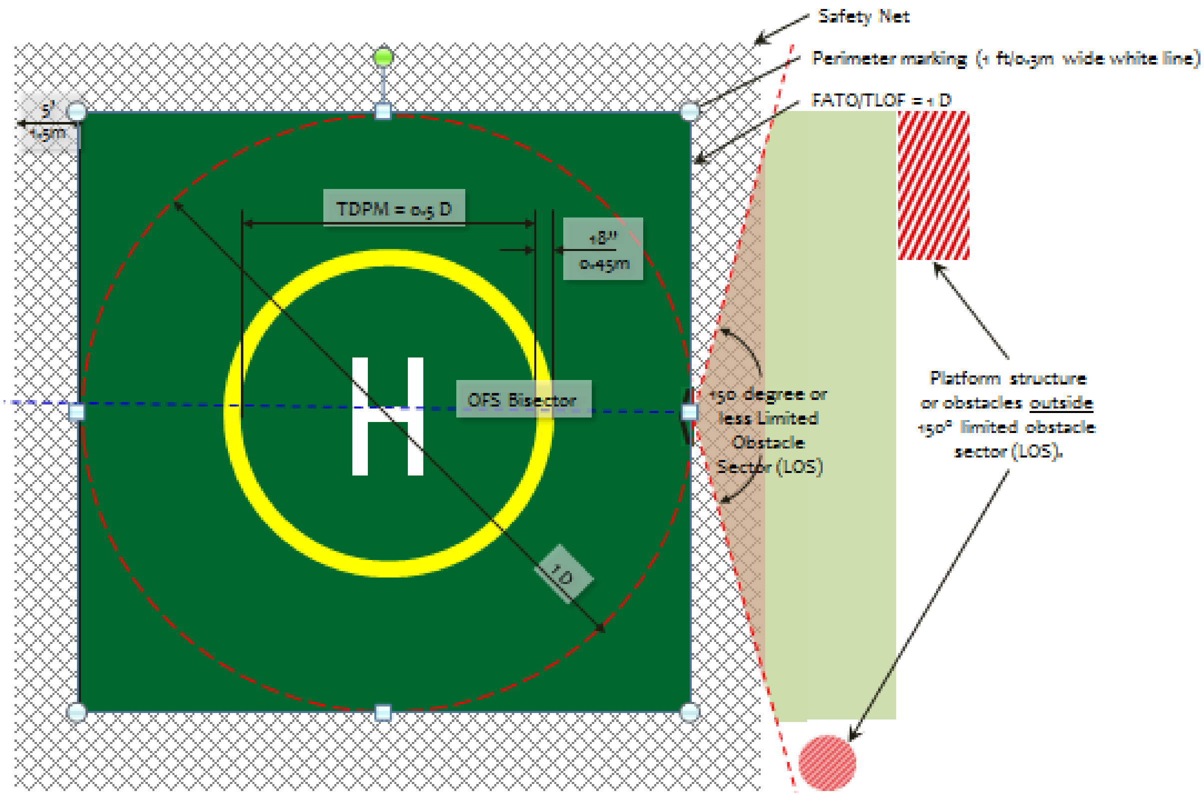
[3] *0.83*D *is approximately 1 rotor diameter (RD).* 1.0D *can be estimated using the relationship 1.0*D *= 1.2 RD and 1 RD using the relationship 1 RD = 0.83*D*.*



NOTE - A safety shelf may be used in place of a safety net

Figure 2 — Square Helideck with 1.0D FATO and 1.0D TLOF

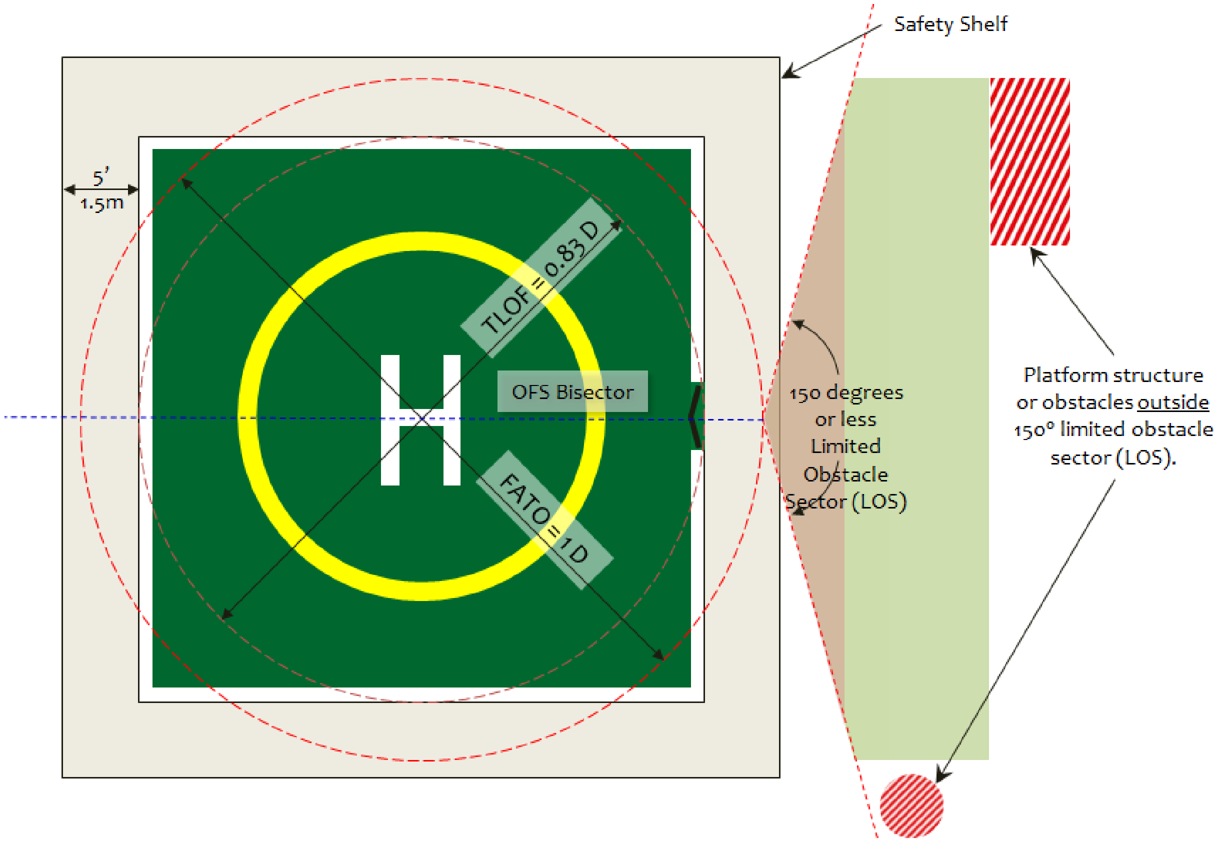


Figure 3 — Square Helideck with 1.0D FATO and 0.83D TLOF

4.3.3 Helideck for a Helicopter Based Offshore

4.3.3.1 If a helideck is being designed to accommodate a helicopter routinely based offshore, it should be large enough to allow a mechanic performing routine maintenance to safely reach all parts of the helicopter. The TLOF should be of sufficient size to contain a circle of diameter of not less than 1.0Dof the largest helicopter the helideck is intended to serve; see Figure 1.

4.3.3.2 A 0.83D square TLOF with the helicopter parked diagonally provides an adequate area to reach all components of the helicopter, in which case proper tie-down points for this configuration should be added (see Figures D.1 and D.2).

4.3.3.3 For cold environments, a hangar for maintenance, sheltering the helicopter from snow, ice, etc adjacent to the helideck in which the helicopter can be towed should be considered. This can be located in the area described for helicopter parking (see 4.3.4).

4.3.4 Parking Area / Parking Transition Area

4.3.4.1 A parking area (PA), connected to the TLOF via a parking transition area (PTA), should be provided when practicable.

4.3.4.2 A PA provides the ability to park one helicopter, which has been shut down, and safely land a second helicopter on the TLOF. The ability to park a helicopter on an offshore installation and to be able to use the helideck for other helicopter operations at the same time provides greater operational flexibility.

4.3.4.3 The PA should be located outside the obstacle-free sector (OFS) and outside the limited obstacle sector (LOS) of the helideck so that a helicopter parked on the PA is outside the LOS height limitations.

4.3.4.4 The PA, if included in the design, may be any shape and should be of sufficient size to contain a circle of diameter of not less than 1.0D of the largest helicopter the parking area is intended to serve as illustrated in Figures 4 and 5 for a 1.0D TLOF and 0.83D TLOF respectively. If a PA of 1.0D cannot be provided due to space or structural limitations, a limited parking area (LPA) or push-in parking area (PIPA) may be provided as outlined in Annex A.

4.3.4.5 A parking protection area (PPA), as indicated in Figures 4 and 5 shall also be provided. The PPA extends beyond the outer perimeter of the PTA and 1.0D circle of the PA by a minimum distance of 0.33D. See Figure 4. The PPA area may contain objects whose presence are essential for the safe operation of the helicopter to a maximum height of 10 in. (25 cm).

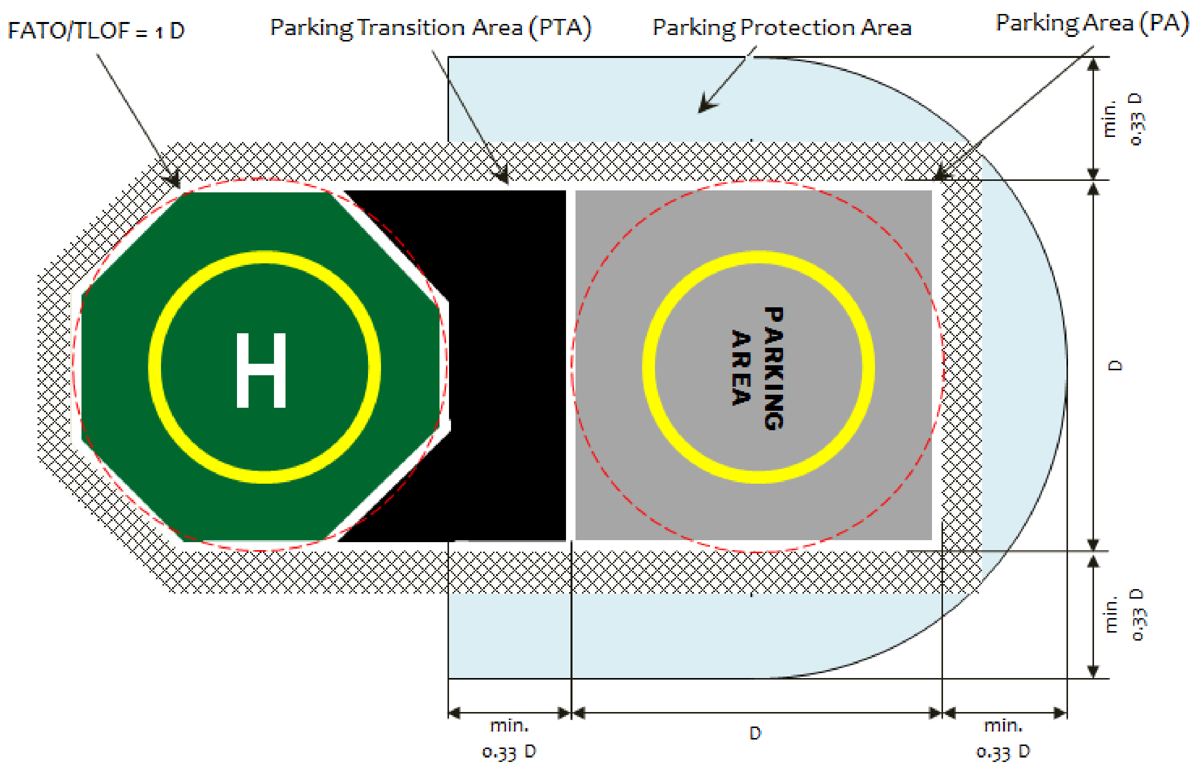


Figure 4 — 1.0D FATO and 1.0D TLOF with a 1.0D Parking Area.

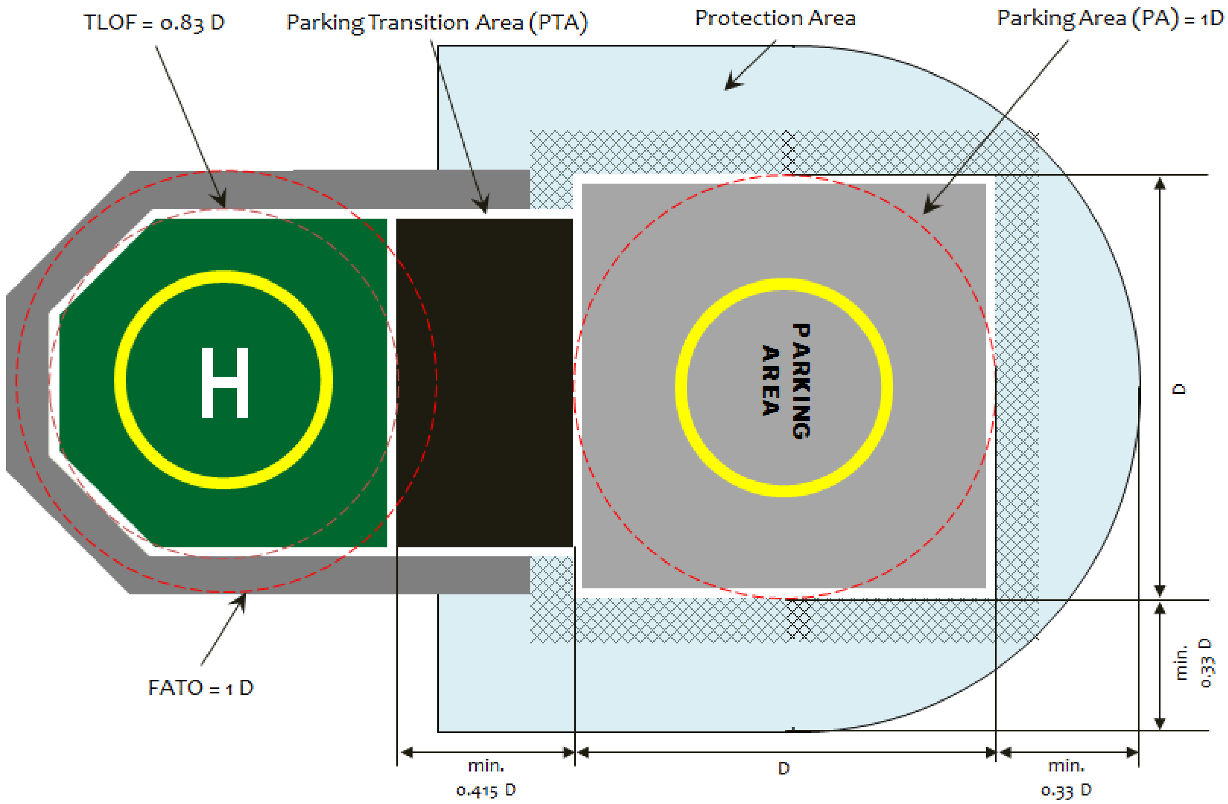


Figure 5 — 1.0D FATO and 0.83D TLOF with a 1.0D Parking Area.

4.3.4.6 If a LPA or PIPA is provided, see Annex A for additional marking guidance.

4.3.4.7 PA and PTA design shall include surface drainage, a skid-resistant surface, and perimeter safety nets/shelves. In addition, the PA should have tie-downs (see 5.8) equivalent to that of the TLOF design.

4.3.4.8 Parking areas should be provided with one or more access points to allow personnel to move to and from the parking area without having to pass through the PTA to the TLOF.

4.3.4.9 A PTA should be provided for the transition of the helicopter to/from the parking area. The PTA divides the helideck TLOF and the PA and provides obstacle clearance between the parked helicopter and a helicopter operating on the helideck TLOF (see Figure 4).

4.3.4.10 The parking area should be separated from the 1.0D FATO of the helideck by a PTA with a minimum width of 0.33D (see Figure 4) and from 0.83D TLOF by a minimum width of 0.415D (see Figure 5). The length (longest dimension) of the PTA should be the same as the maximum width of the TLOF (see Figures 4 and 5)

NOTE - For TLOF sizes less than 1.0D and greater than 0.83D, the TLOF/PA separation will need to be reviewed/calculated in the design phase.

4.3.5 Obstacle Protection Sectors

4.3.5.1 General

4.3.5.1.1 A helideck shall have an obstacle-free sector (OFS), an obstacle-free dropdown sector (OFDS), and a limited obstacle sector (LOS). When objects are required to be located on the TLOF or in the FATO outside the TLOF, they should be limited in height (see 4.3.5.2, 4.3.5.3, and 4.3.5.4) and of a suitable frangible construction when assessed against the undercarriage design of helicopters operating to the helideck.

NOTE - For helidecks mounted on top of a single leg (toad stool configuration) or minimum structures in accordance with API 2A-WSD, with a 360 degree unobstructed access, a LOS is not required.

4.3.5.1.2 Figures 6 and 7 show a plan view and section height requirements for the OFS and the LOS for circular helidecks with a 1.0D FATO with 1.0D TLOF and a 1.0D FATO and 0.83D TLOF respectively.

4.3.5.1.3 Although the extent of the LOS segments are arcs (see Figures 6 and 7), these may be represented as arcs or as straight lines. If the TLOF perimeter has straight lines, the LOS segments should also be straight lines parallel to the TLOF perimeter (see Figures 8 and 9).

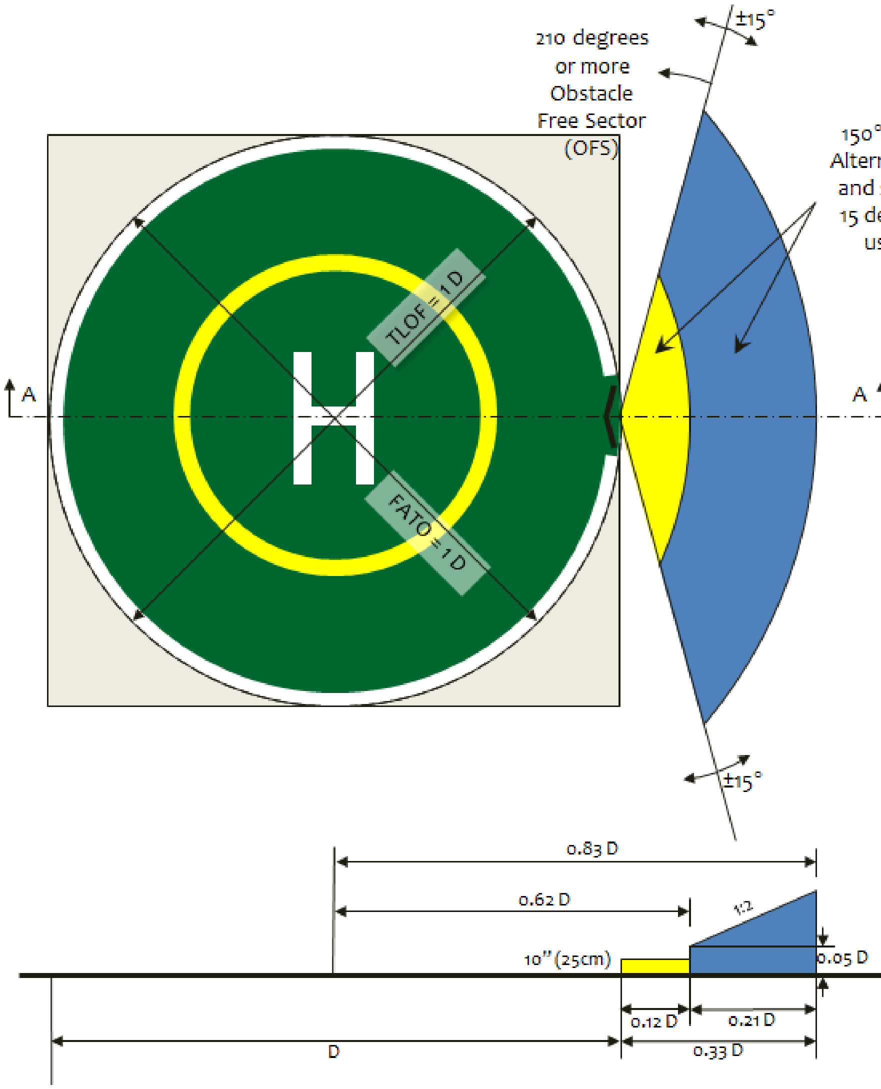


Figure 6 — Obstacle Limitation Sector and Obstacle-free Sector for Helideck with a Circular 1.0D FATO and 1.0D TLOF

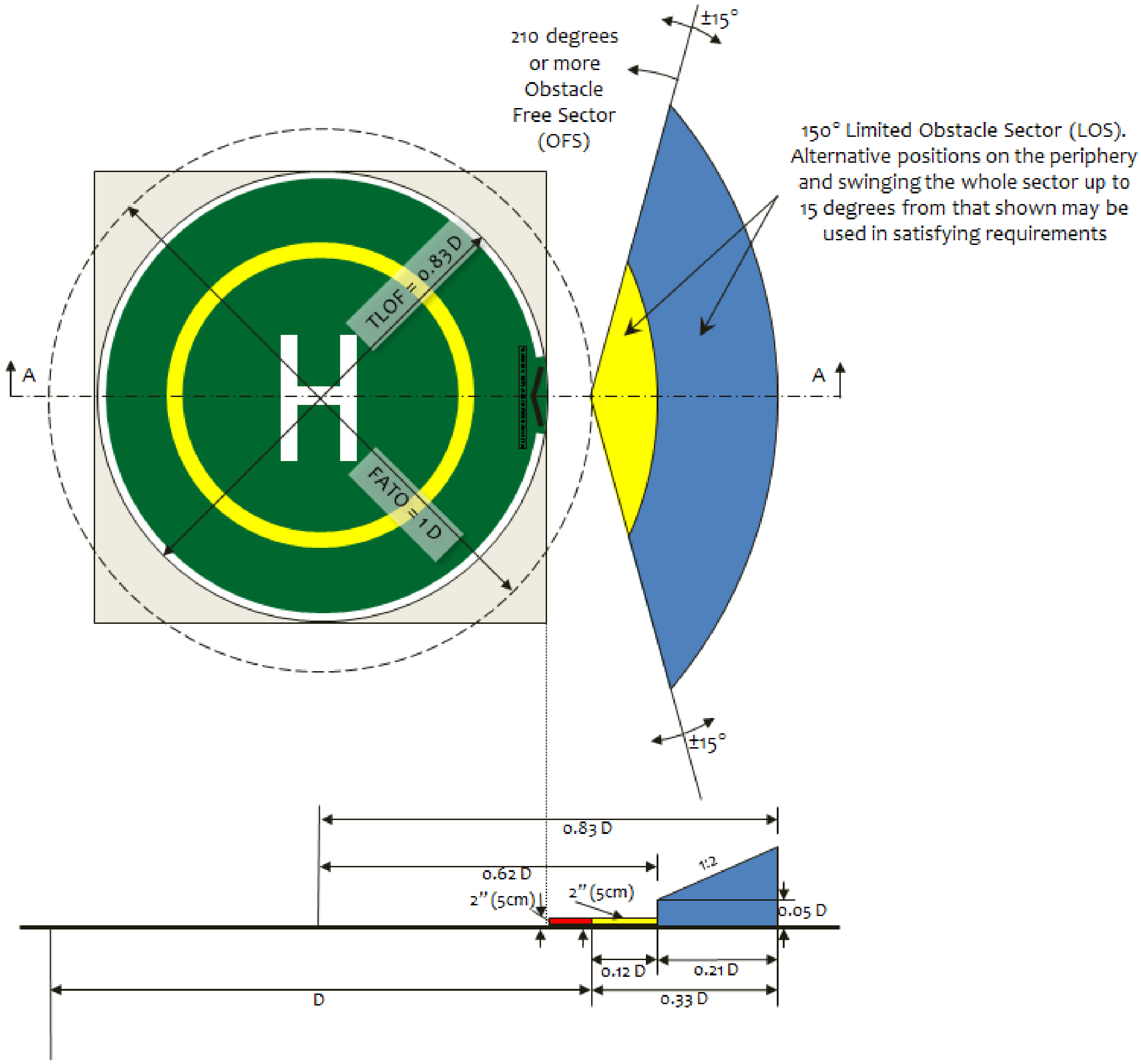


Figure 7 — Obstacle Limitation Sector and Obstacle-free Sector for Helideck with a Circular 1.0D FATO and 0.83D TLOF

4.3.5.1.4 Figures 8 and 9 show the same as in Figures 6 and 7 for an eight-sided/octagonal shaped helideck (TLOF) and Figures 10, 11, and 12 the corresponding plan and elevation requirements.

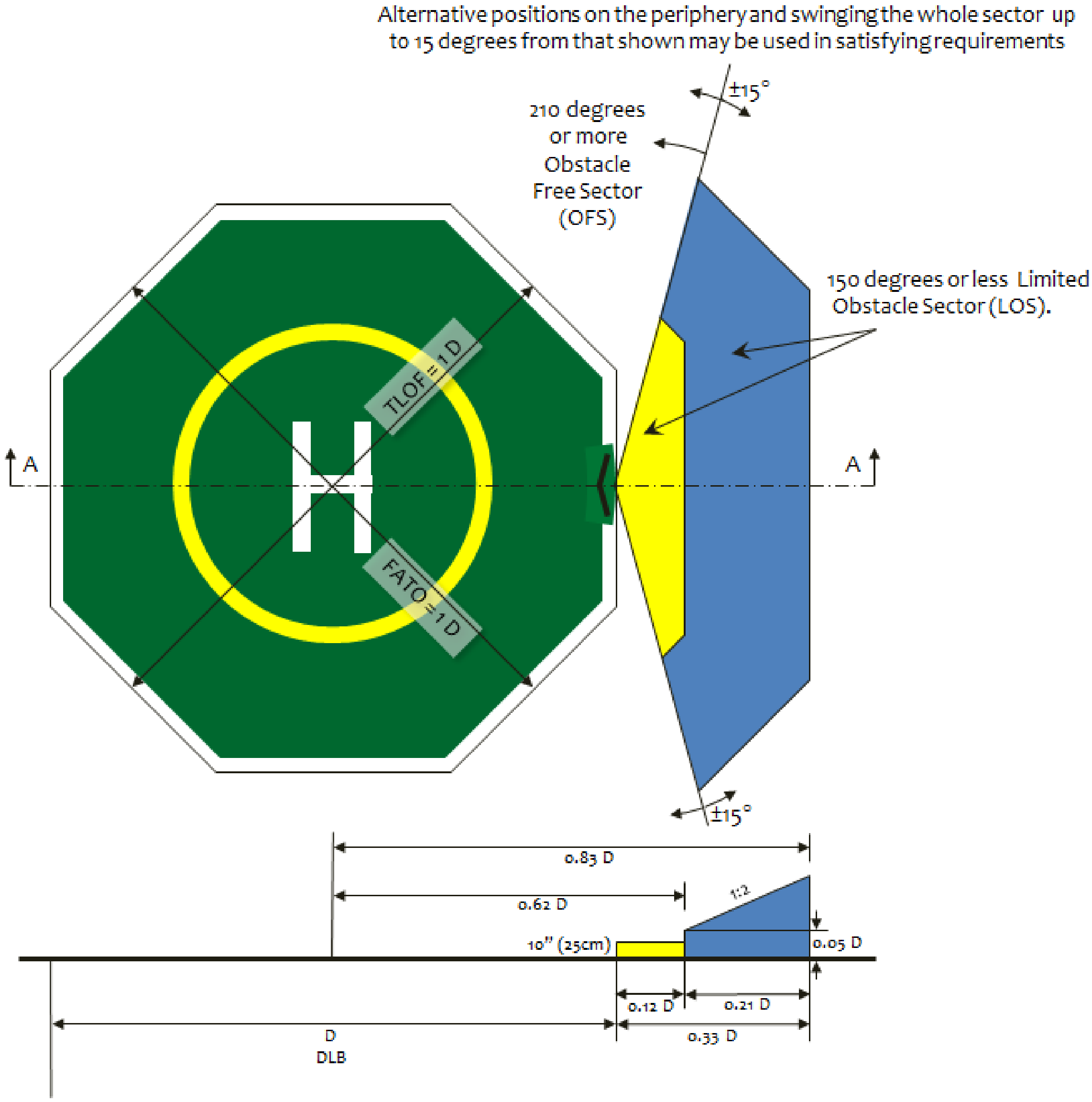
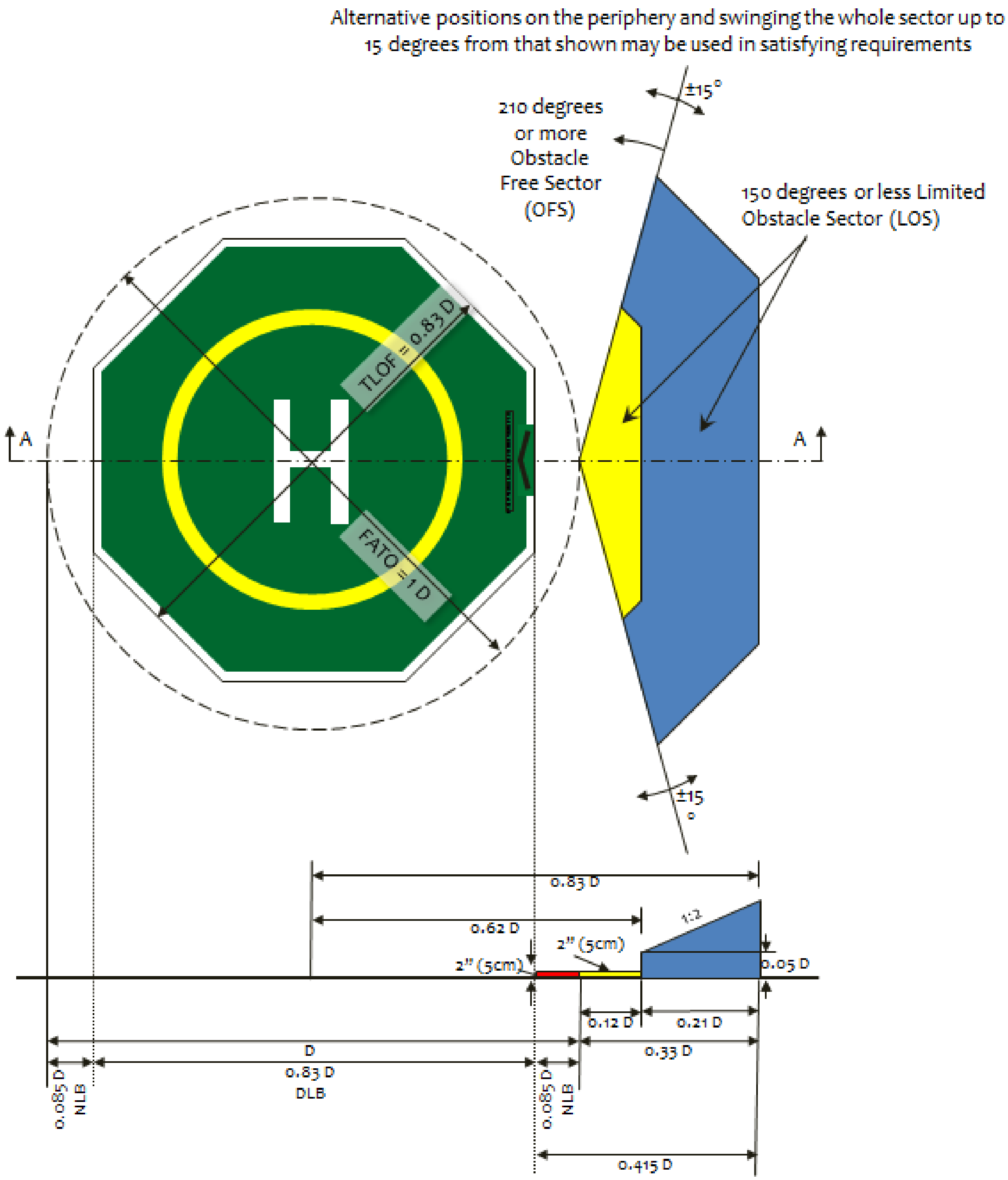


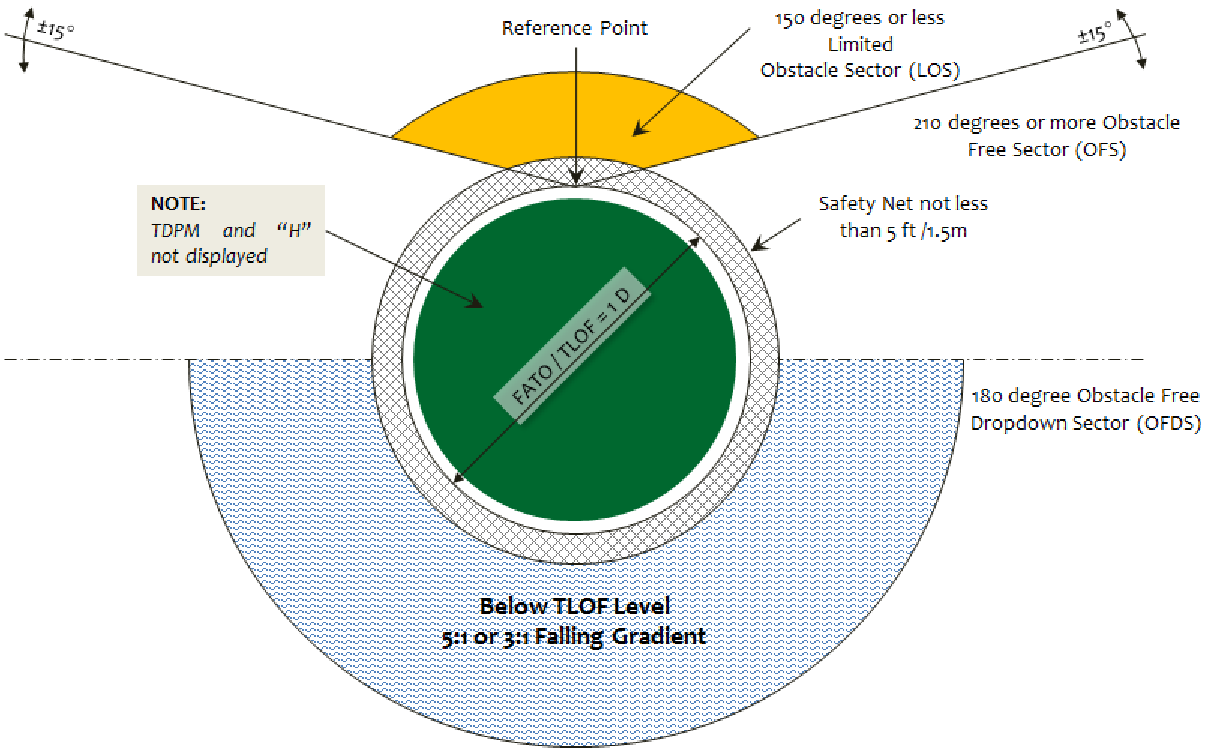
Figure 8 — Obstacle Limitation Sector and Obstacle-free Sector for Helideck with a 1.0D FATO and 1.0D Octagonal TLOF



Legend

NLB = Non-load bearing

Figure 9 — Obstacle Limitation Sector and Obstacle-free Sector for Helideck with a 1.0D FATO and 0.83D Octagonal TLOF



PLAN VIEW

Figure 10 — Obstacle-free Sector, Limited Obstacle Sector and Obstacle-free Dropdown Sector for Helideck with 1.0D TLOF

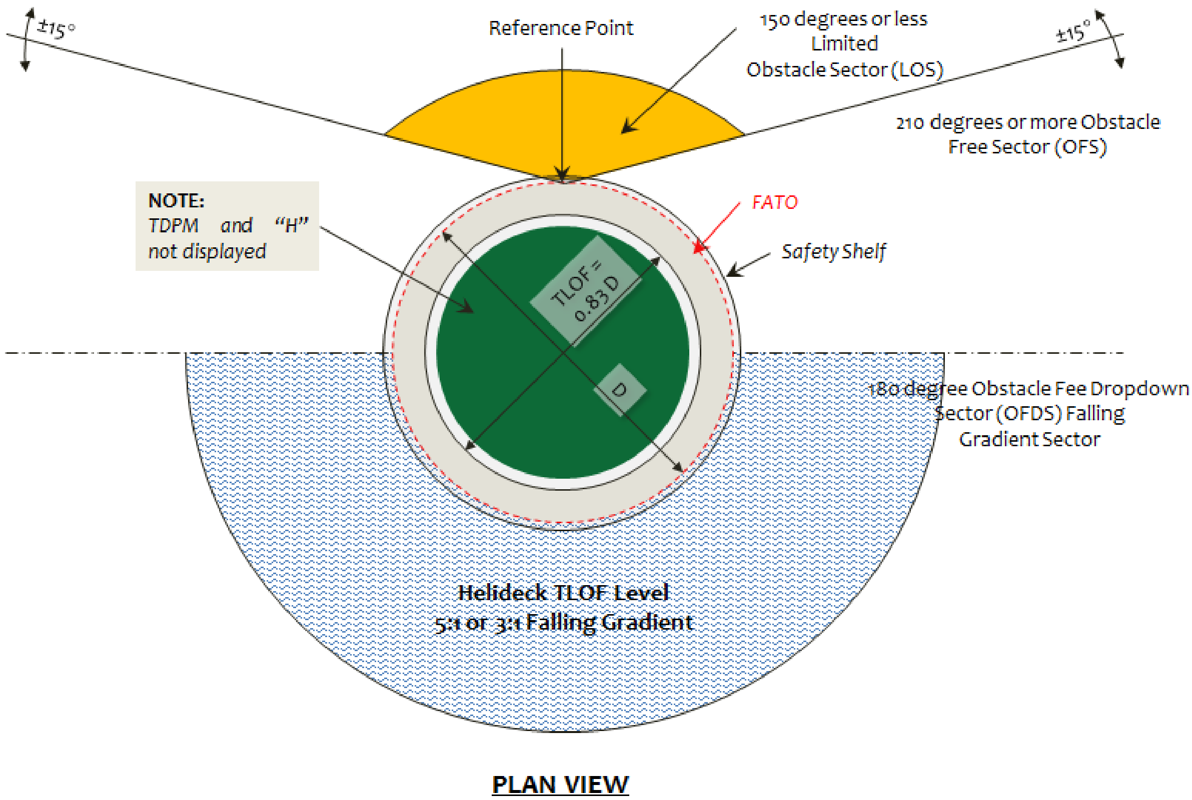
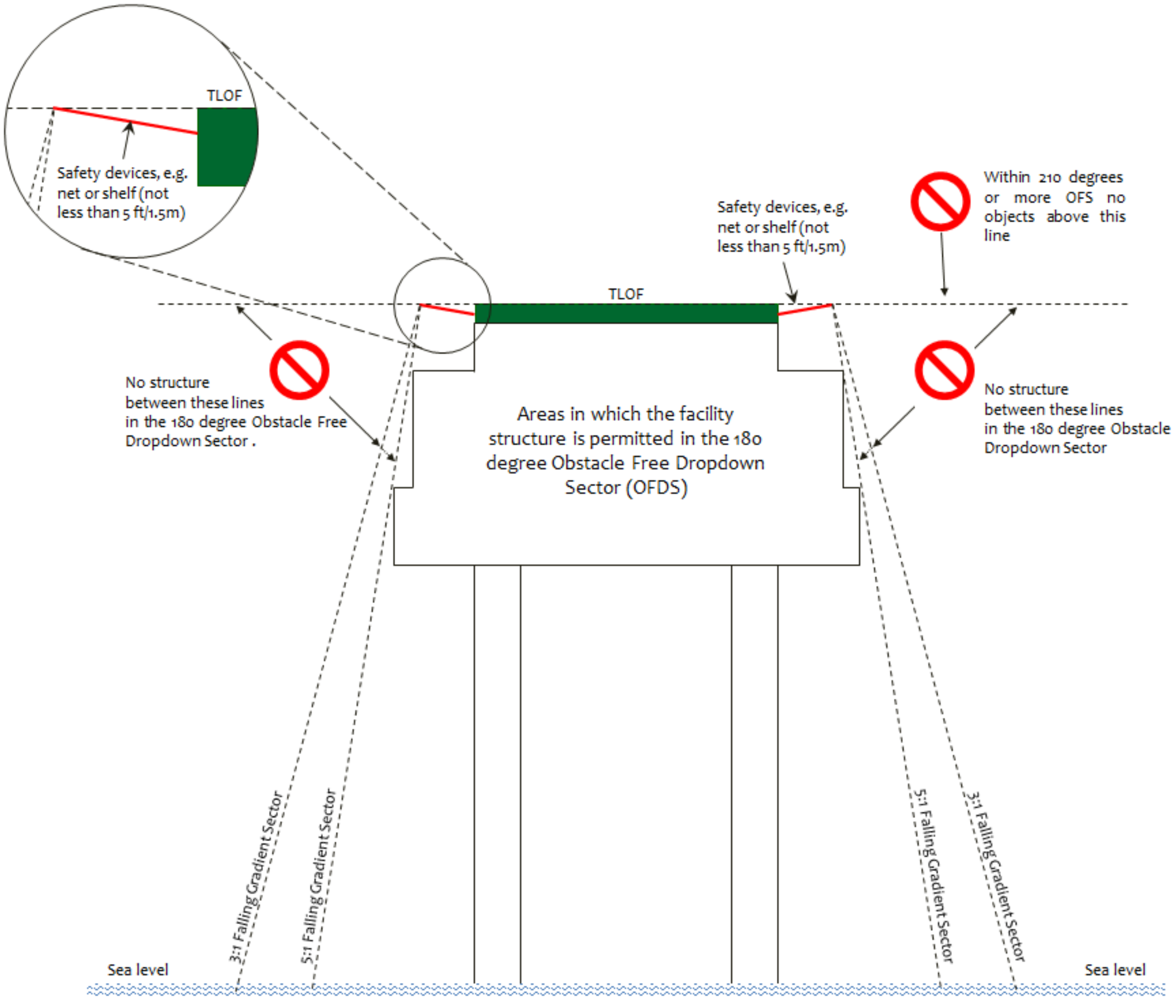


Figure 11 — Obstacle-free Sector, Limited Obstacle Sector and Obstacle-free Dropdown Sector below a Helideck with 0.83D TLOF



NOTE Figures 2 and 3 also show the general plan view characteristics for a square helideck configuration.

Figure 12 — Obstacle-free Sector (OFS) and Obstacle-free Dropdown Sector (OFDS)

4.3.5.2 Obstacle-free Sector (OFS)

4.3.5.2.1 The obstacle-free sector is a surface originating at and extending from the reference point on the perimeter of the FATO. The surface of the obstacle-free sector (OFS) should be a horizontal plane level at the elevation of the helideck (TLOF) surface that subtends an arc of at least 210º from the reference point located on the perimeter of the 1.0D FATO at the intersection with the LOS. The OFS should extend outwards to a distance that will allow for an unobstructed arrival and departure path to/from the helideck for the helicopter(s) it is intended to serve.

NOTE - For helidecks located in heavily congested areas with multiple offshore facilities, it may not be possible because of adjacent facilities to achieve the entire clear departure path throughout the full obstacle-free sector (OFS) with a minimum 210 degrees, in which case operational limitations may need to be applied by helicopter operator in consult with the facility owner. The helideck orientation in relation to adjacent facilities should be considered in the design process.

4.3.5.2.2 The bisector of the OFS should pass through the center of the TLOF and “H”; see Figure 6 through Figure 9.

4.3.5.2.3 The OFS may be swung (rotated) to avoid obstacles above or below the helideck (TLOF) by up to 15 in either direction (a 15° clockwise swing is illustrated in Figure 13), but the LOS shall be maintained at 150º or less (see 4.3.5.3. and 6.6). If the 210º OFS is swung, then the 180º OFDS with a 3:1 or 5:1 falling gradient (see 4.3.5.2) shall also be swung the same amount to align with the swung OFS. This also changes the location of the LOS as shown in Figure 13, but in all cases the chevron will be at the apex of the LOS. If the OFS is swung the "H" shall also be swung by a corresponding amount, and the "H" crossbar should remain parallel to the bi-sector of the OFS as illustrated in Figure 13.

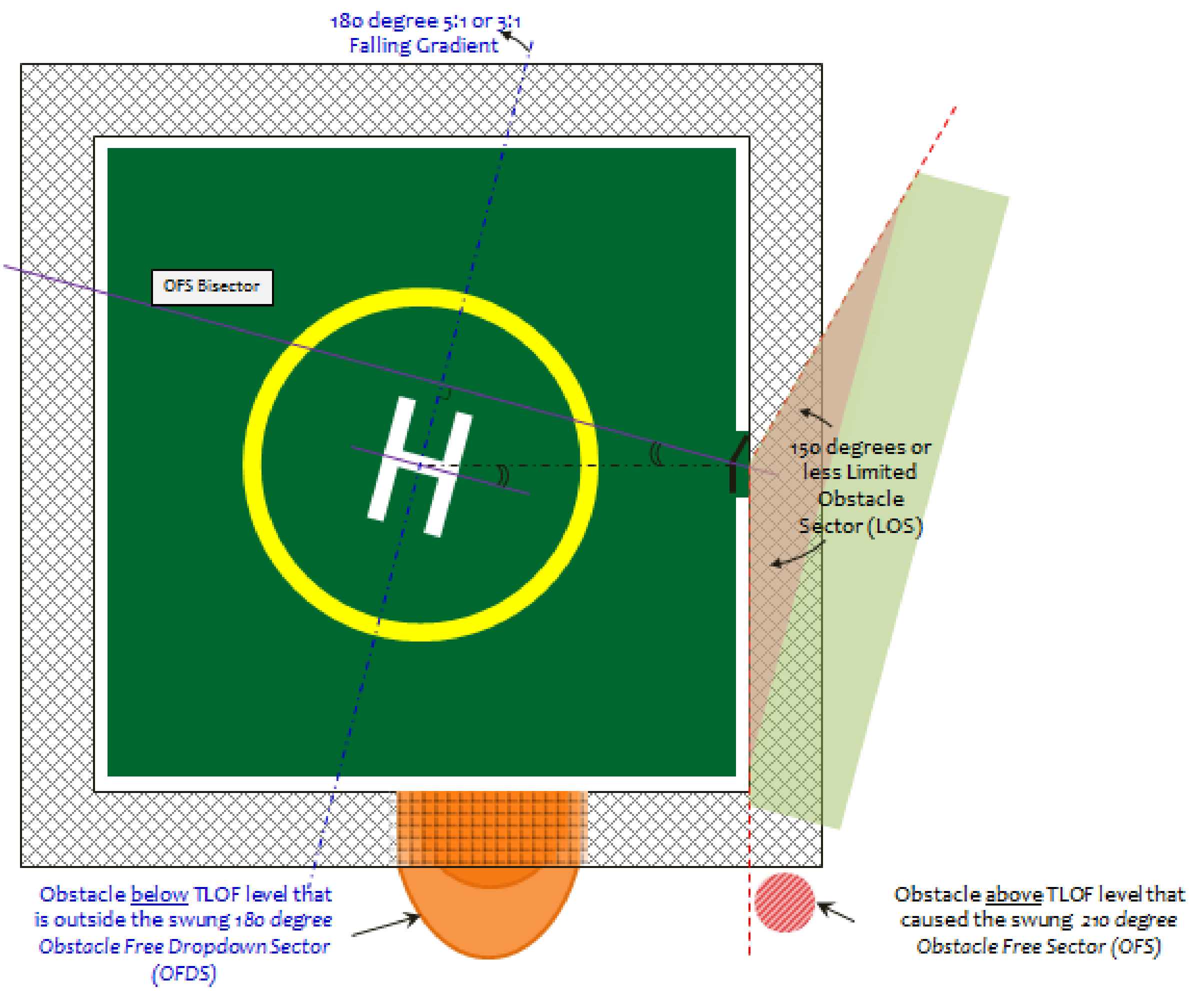


Figure 13 — OFS Sector Swung by 15 Degrees

4.3.5.2.4 There should be no fixed obstacles within the obstacle-free sector (OFS) unless their function requires them to be located as follows:

a) on the TLOF perimeter such as drainage guttering (see 4.6.6), lighting (see 7.1), and firefighting equipment (see 4.6.3. and 4.6.4);

f) just outside the TLOF perimeter i.e. foam monitors (where provided);

g) tie-down points, handrails and other items associated with the TLOF which are incapable of complete retraction or lowering for helicopter operations. When such objects are required to be located within the TLOF the height above the TLOF surface should be limited to 2 in. (5 cm).

4.3.5.2.5 For a helideck with a 1.0D FATO/TLOF or larger, objects which are required to be located outside the FATO/TLOF, such as foam monitors (where provided), lights (see 7.1), etc., the height shall be limited to 6 in. (15 cm).

4.3.5.2.3 For a helideck with a less than 1.0D TLOF, objects which are required to be located just outside the TLOF, such as foam monitors (where provided), lights (see 7.1), etc., the height above the TLOF surface shall be limited to 2 in. (5 cm).

4.3.5.3 Obstacle-free Dropdown Sector

4.3.5.3.1 Below the TLOF level, within the same arc as the OFS, the obstacle-free dropdown sector (OFDS) should extend downward from the outer edge of the safety net or safety shelf at an elevation corresponding to that of the TLOF to the water level; within an arc of not less than 180º with the origin at the center of the TLOF and outwards to a distance that will allow for safe clearance from the obstacles below the helideck; see Figures 10, 11, and 12.

4.3.5.3.2 The obstacle-free dropdown sector (OFDS) should have a falling gradient having a ratio of one unit horizontally to five units vertically (5:1) from the outer edge of the safety net or safety shelf within the 180 degree sector.

4.3.5.3.3 For helidecks designed for the use of only multi-engine helicopters, the horizontal component of the falling gradient within the 180º sector may have a less demanding ratio of one unit horizontally to three units vertically (3:1); see Figure 12.

NOTE 1 - The obstacle-free dropdown sector properties may need adjustment depending upon the performance of the selected helicopter and height of the helideck above the sea. The aircraft manufacturer should be able to provide the necessary technical data and in most cases this is included in the helicopter flight manual.

NOTE 2 - Raising the helideck elevation as high as practicable above the sea level will enhance the capability of the helicopter to safely land or fly away in the event of an engine failure.

4.3.5.4 Limited Obstacle Sector

4.3.5.4.1 The limited obstacle sector (LOS) is a complex sector originating at the reference point, located on the perimeter of the FATO and extending over the arc not covered by the obstacle-free sector within which the height of obstacles above the level of the TLOF are limited. The limited obstacle sector should not subtend an arc greater than 150º. The dimensions and location of the limited obstacle sector should be as indicated in Figure 6 and 8 for a 1.0D FATO with a coincidental 1D TLOF and as in Figure 7 and 9 for a 1D FATO and 0.83D TLOF.

4.3.5.4.2 Figures 6, 7, 8 and 9 show the two segments of the limited obstacle sector (LOS) and how these are measured from the center of the D-circle and the reference point on the D-circle. The first segment extends out to 0.62D from the center of the D-circle or 0.12D from the reference point. The second segment of the LOS is a rising 1:2 slope (1 vertical to 2 horizontal) originating at a height of 0.05D above the TLOF surface and extending out to 0.83D from the center of the D-circle (i.e. a further 0.21D from the edge of the first segment of the LOS or an overall distance of 0.33D from the reference point).

NOTE - If the LOS is made less than 150 degrees, the OFS should be increased by the same amount so that the LOS and OFS angle is 360º. Such a decrease in the LOS will provide a larger clear area for the helicopter to operate. If the LOS angle is reduced, the chevron marking should also be reduced by the same angle.

4.3.5.4.3 For a TLOF of 1.0D or larger, objects within the first segment of the limited obstacle sector should not exceed a height of 10 in. (25 cm) above the TLOF surface. In the second segment the limited obstacle sector surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05D above the level of the TLOF (see Figure 8).

4.3.5.4.4 For a TLOF of 0.83D, objects within the first segment of the limited obstacle sector, objects should not exceed a height of 2 in. (5 cm) above the TLOF surface. In the second segment the limited obstacle surface rises at a rate of one unit vertically for each two units horizontally originating at a height 0.05D above the level of the TLOF (see Figure 9).

NOTE - The height limit of 2 in. (5 cm) above the TLOF surface for objects whose function require them to be located on the TLOF perimeter, applies to the complete area between the TLOF and 1.0D FATO: it also applies to the OFS sector (see 4.3.5.1).

4.4 Orientation

4.4.1 Orientation of the helideck should be determined by reviewing the platform configuration, equipment arrangement, and prevailing wind direction (see 4.3.5.2 for additional details). The helideck should be oriented so the helicopter can takeoff/land into the prevailing winds and any gas discharge booms should be located on the opposite end of the facility or in a location that has the least impact on helicopter operations; see 4.7 and Figure 1.

NOTE - The orientation of the helideck in relation to the main structure(s) of the offshore facility and the direction of the strongest prevailing winds is a critical factor in the ability to operate helicopters safely and efficiently. Every attempt should be made to minimize crosswind and eliminate the need for 'tail wind' approaches/departures. See the Facility Checklist in API 14J for additional guidance.

4.4.2 Topside arrangements, which could potentially have an adverse environmental effect on the helideck area and the helicopter performance/maneuverability, shall be subject to wind flow studies using wind tunnel testing and/or Computational Fluid Dynamics (CFD) analysis to establish the wind environment in which helicopters will be expected to operate if helideck location and the anticipated venting discharges for the facility may present a hazard to flight operations. As a general rule, a limit for the vertical airflow velocity of 5.75 ft/s (1.75 m/s) should not be exceeded.

4.5 Personnel Access and Egress

4.5.1 The location of access and egress stairways for use by personnel using the helideck should be determined from the facility configuration, equipment arrangement, and safety objectives. Two personnel access and egress routes, one primary and one secondary, shall be provided as a minimum. When possible, the personnel access and egress routes should be outside the TLOF. The use of steep stairways or ladders should be limited, where possible, to minimum structures. When practical, the primary route should be provided with a protected passenger waiting area away from any refueling equipment.

4.5.2 One route should be located remotely from the other; limited to emergency use and so marked to prohibit normal passenger flow.

4.5.3 Handrails should not protrude above the height of the TLOF surface; if they cannot be completely retracted or lowered for helicopter operations the height above the TLOF surface should be limited to 2 in. (5 cm) (see 4.3.5.2.4 c)). Alternatively the handrails should fold down or be removable to below the level of the TLOF so they will not be hazards during helicopter operations. A safety net or safety shelf shall be provided to protect personnel from falling overboard during handrail foldup/fold down operations.

NOTE - It may not be possible to provide two access/egress routes for helidecks mounted on top of minimum structures and may have to be limited to one, in which case this should be documented in the helideck's limitation listing facility operational procedures.

4.6 Fire Protection

4.6.1 General

4.6.1.1 A risk assessment shall be completed to determine the level of fire protection necessary to contain a post-crash fire (PCF) in the event of a helicopter crash which in a worst case scenario the largest helicopter using the helideck has rolled onto its side with a full passenger load. The fire protection system should provide adequate time to evacuate all occupants from the helicopter and helideck.

4.6.1.2 When conducting the risk assessment, many parameters should be considered to determine the scope of the fire protection equipment required for each helideck. At a minimum, parameters that should be considered include: whether the platform is fixed or floating, size of helideck, presence of a fueling station, helicopter models that are expected to service the platform including personnel and fuel capacity of such helicopters, whether the platform is manned or unmanned and, typical number of personnel on board a helicopter if the platform is manned.

4.6.1.3 The requirements and fire protection system performance shall, as a minimum, be in accordance with NFPA 418, in particular Chapters 5 and 8, and when fueling systems are provided NFPA 407. Additional Information is available in API 2A-WSD.

NOTE 1 -The principal objective of rescue and firefighting equipment is to save lives. For this reason, the provision of means of dealing with a helicopter accident or incident occurring at or in the immediate vicinity of a helideck assumes primary importance because it is within this area that there are the greatest opportunities for saving lives. This must assume at all times the possibility of, and need for mitigating, a fire which may occur either immediately following a helicopter accident or incident or at any time during operations.

NOTE 2 - The most important factors bearing on effective rescue in a survivable helicopter accident are the training received, the effectiveness of the equipment and the speed with which personnel and equipment designated for rescue and firefighting purposes can respond and the effectiveness of that response.

4.6.2 Firefighting Personnel Access

The two personnel access and egress routes (see 4.5 for further detail) should be designed as access points for fire-fighting/rescue personnel.

NOTE - For NUIs mounted on top of a minimum structure in accordance with API 2A-WSD, it may not be possible to provide two access/egress routes: this should be risk assessed in the design process.

4.6.3 Helideck Surface and Drainage

4.6.3.1 The TLOF surface should be designed with adequate surface drainage arrangements and a free-flowing collection system that will quickly and safely direct any standing water, fuel spillage and/or firefighting media away from the helideck surface to a safe place on the facility and to prevent liquids from spreading to, or spilling onto, accommodation spaces or working spaces.

4.6.3.2 The design shall have

a) a provision for diversion of any fuel that may be spilled due to a helicopter accident, and

b) a provision for containment of any fuel spillage for facilities that have a fuel system.

4.6.3.3 The design should have

a) provision to keep helideck tie-down points (see 5.8 for tie-down point design requirements) from holding liquids,

b) a TLOF surface slope of no more than 2 % to prevent the standing collection of liquids,

c) a drainage system constructed of metal or other materials providing adequate resistance to fire, and

d) a design of the drainage system that precludes blockage by debris and the TLOF surface curbed (if necessary) and sealed so that spillage will only route into the drainage system.

4.6.3.4 The capacity of the drainage system should be sufficient to contain the maximum likely spillage of fuel on the helideck plus fire protection media. The calculation of the amount of spillage to be contained should be based on an analysis of the fuel capacity, typical fuel loads and fuel uplifts of the helicopter types anticipated to use the helideck.

NOTE 1 - Some regulatory authorities may have environmental requirements requiring zero discharge outside the helideck.

NOTE 2 - Consideration may be given to use of passive sub-surface drainage systems that extinguish fires.

NOTE 3 - Designs can be used that capture spilled liquids using a recessed drainage system for safe collection and discharge of water/fuel and passively extinguish any fire.

NOTE 4 - A drainage system diverter valve design to close off the rain water diversion during flight operations and capture any spilled fuel can be used. The valve can be opened when the flight operations are complete.

4.6.4 Key Design Characteristics for Fire Protection at Manned Facilities – Principal Agent Foam

4.6.4.1 A key aspect in the successful design for providing efficient, integrated helideck rescue and fire suppression is a complete understanding of the operational requirements for its use. A helicopter accident, which results in a fuel spillage with wreckage and/or fire and smoke, has the capability to render some of the response equipment unusable or preclude the use of some passenger escape routes.

4.6.4.2 Delivery of firefighting media to the helideck surface at the appropriate application rate as specified in Annex B. The foam system should have a delay of less than 15 seconds using foam that is suitable for use with salt water, measured from the time the system is activated until the start of production of foam at the required application rate. The foam system should be designed to bring a helideck fire under control within 30 seconds measured from the time the system is producing foam at the required application rate. See Annex B for further details on foam firefighting requirements.

4.6.4.3 The foam system should be capable of delivering foam solution to the entire helideck surface.

NOTE 1 -The amounts of water required to support the fire system do not have to be stored on or adjacent to the helideck if there is a suitable adjacent pressurized water main system capable of sustaining the required discharge rate.

NOTE 2 - See 4.3.5.1 and 4.3.5.3 for limitations on height restrictions for any firefighting equipment located on the TLOF perimeter.

4.6.5 Fire Protection Manned Facilities Complementary Dry Chemical and Gaseous Agents

NOTE 1 - While foam is considered the principal medium for dealing with fires involving fuel spillages, the wide variety of fire incidents likely to be encountered during helicopter operations – e.g. engine, avionic bays, transmission areas, hydraulic systems, etc may require the provision of more than one type of complementary agent. Dry powder and gaseous agents are generally considered acceptable for this task. The complementary agents selected should comply with appropriate specifications. Systems should be capable of delivering the agents through equipment which will ensure effective application. Because of prevalent weather conditions, complementary agents can be adversely affected during application and training should take this into account.

NOTE 2 - See 4.3.5.1 and 4.3.5.3 for limitations on height restrictions for any firefighting equipment located on the TLOF perimeter. Ideally, this equipment will be solely located in the LOS.

4.6.5.1 The use of foam compatible dry powder as the primary complementary agent is recommended. The minimum total capacity should be 100 lbs. (45 kg) delivered from extinguishers of not less than 20 lbs (9 kg) each. The dry powder system should have the capacity to deliver the agent anywhere on the landing area and the discharge rate of the agent should be selected for optimum effectiveness of the agent. Containers of sufficient capacity to allow continuous and sufficient application of the agent should be provided. All applicators are to be fitted with a mechanism which allows them to be hand controlled.

4.6.5.2 The use of a gaseous agent (CO_2) in addition to the use of dry powder as the primary complementary agent is recommended and should be provided with a suitable applicator for use on engine fires (long lance). The appropriate minimum quantity delivered from one or two extinguishers is 40 lbs (18 kg).

4.6.5.3 The discharge rate of the agent(s) should be selected for optimum effectiveness of the agent and the extinguishers should be located so that they are readily available at all times. Reserve 100% on-hand stocks of complementary media to allow for replenishment as a result of activation of the system during an incident, or following training or testing, should be provided.

4.6.6 Key Design Characteristics for Fire Protection at Normally Unmanned Installations (NUIs)

4.6.6.1 Consideration should be given to the selection and provision of foam as the principal agent. For an NUI, where helideck rescue and firefighting (RFF) equipment will be unattended during certain helicopter movements, the pressurized discharge of foam through a manually operated fixed monitor system is not recommended. For installations which are at times unattended the effective delivery of foam to the whole of the TLOF area may best be achieved by means of a deck integrated firefighting system (DIFFS). As a minimum, NUIs shall have two (2) 40 lb (18 kg) dry powder fire extinguishers available in close proximity of the helideck (i.e. stairwell landing). See Annex B for additional details.

4.6.6.2 Other combination solutions may also be considered where these can be demonstrated to be effective in dealing with a fuel fire. For example, the selection of a seawater-only DIFFS used in tandem with a passive or self-extinguishing fire-retarding helideck system described previously which demonstrated to be capable of removing significant quantities of unburned fuel from the surface of the helideck in the event of a fuel spill from a ruptured aircraft tank.

4.6.6.3 DIFFS where provided on NUIs should be integrated with platform safety systems such that the pop-up nozzles are activated automatically in the event of an impact of a helicopter on the helideck.

4.6.7 Additional Key Design Considerations

4.6.7.1 Consideration should be given to automated fire protections systems now available that can replace the manned systems; these include a passive fire-retarding helideck system with a recessed drainage system for safe collection and discharge of water/fuel below the deck, ring type systems, automated oscillating fire monitor systems, and deck-integrated firefighting systems (DIFFS) in which nozzles pop-up from the helideck to extinguish a fire.

4.6.7.2 The drainage system can be a totally enclosed system designed to minimize access to oxygen and therefore minimize chances of combustion and fire. Burning liquids, which reach the drainage gutter, extinguishes by itself after very short time due to lack of oxygen.

NOTE 1 - These systems are an integrated part of the load–bearing surface of the aluminum helideck and the inlet openings provide safe drainage of fuel and firewater/foam

NOTE 2 - DIFFS nozzles can present a hazard to skid equipped helicopters, and this should be considered in the risk analysis/design of the fire protection system.

4.6.8 Air Turbulence

4.6.8.1 Helidecks adjacent to or above large raised structures and buildings can experience turbulence in certain wind conditions. Turbulence is also encountered when helidecks are part of a building roof when air is compacted against the building's side and forced over the helideck surface; see Figure 14. See 4.4 and UK CAA Paper 2008/03, for additional guidance.

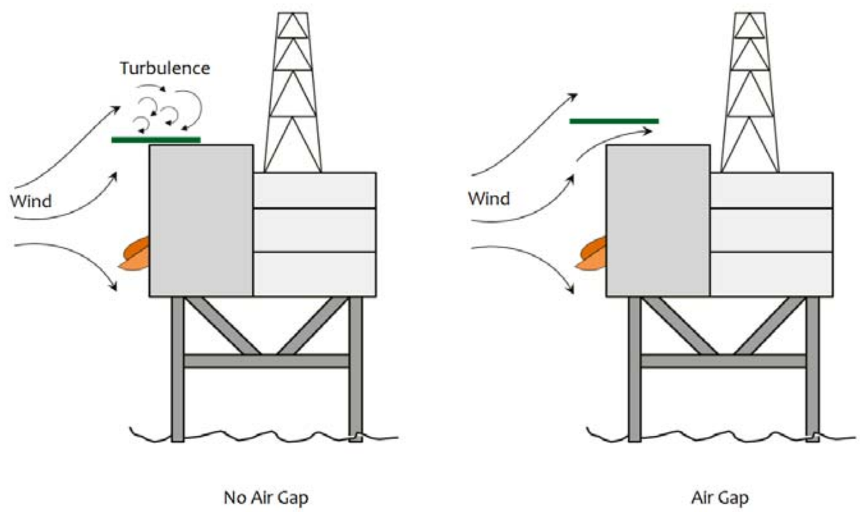


Figure 14 — Turbulence with and without a Helideck Air Gap

4.6.8.2 The following shall be incorporated in the design to reduce turbulence over the TLOF.

a) The helideck should be located as far as practicable from other buildings, derricks, cranes, etc. See API 14J for additional guidance.

b) An unobstructed minimum air gap of 10 ft (3 m) shall be provided between the TLOF and any building roof, so the turbulent air can flow under the TLOF: this will minimize adverse effect to helicopter operations.

c) A helideck shall be designed and arranged to ensure that an unobstructed air-gap is provided which encompasses the full dimensions of the TLOF

NOTE - This unobstructed air gap can include necessary helideck support structure, piping, and other necessary helideck support equipment such as foam tanks, but in no case should the obstructions allowed exceed 70 % of the available air space.

d) A solid safety shelf instead of a safety net can reduce the turbulence problems from adjacent structures located near helidecks. The safety shelf should be at least 5 ft (1.5 m) wide: this will serve to disperse the burble effect of the wind and in addition to provide an increased ground effect area.

4.6.8.3 The helideck design should be subject to an airflow study (see 4.4) if any obstructions other than helideck supporting structure is placed in the air gap or when gas discharges could affect helicopter operations (see 4.8) and it may be necessary to establish, other turbulence mitigating design measures and/or operational limitations under certain wind conditions.

4.6.8.4 Some objects such as supporting structure, foam supply tanks may be installed in the air gap. These obstructions to airflow should be minimized and any deviations should be listed in the helideck's documented limitation listing.

4.7 Hot Air, Raw Gas, and Hydrogen Sulfide (H_2S) Discharge

4.7.1 Raw gas discharges or hot air discharges from compressors and cooling systems adjacent to helidecks may be hazardous to helicopter operations and can drastically affect helicopter performance and appropriate restrictions should be imposed on the use of the helideck where either of the above exists.

4.7.2 Hydrogen sulfide (H_2S) gas discharge in higher concentrations (300 ppm to 500 ppm) can cause loss of consciousness within a few seconds.

4.7.3 When designing helidecks that have been identified to have any of the above conditions that may be hazardous to helicopter operations a visual warning system should be provided to alert pilots of the hazard. See 4.4 for additional guidance on wind tunnel testing and/or computational fluid dynamics and 7.4 for status light guidance.

4.7.4 Sources of discharges should be located as far as practicable away from the helideck, flight path, and oriented so the typical prevailing wind will carry the discharges away from the helideck area.

NOTE - Sniffers (generic term used to describe automated vapor detection devices) or other detection devices (infrared, etc.) may be used to detect these discharges and to automatically activate status lights (see 7.4) when discharges present a hazard to flight operations.

4.8 Helideck Equipment and Material Handling

4.8.1 Lights, refueling equipment, fire extinguishers, wind indicators, and personnel access and egress routes should be located deliberately to avoid becoming an obstruction.

4.8.2 Access to and egress from the TLOF (helideck) for handling material or equipment transported by the helicopter should be addressed. For material handling, steep stairways or ladders should be avoided and inclusion of a crane that can reach the TLOF should be considered but it should meet, when not in use, helideck obstacle clearance requirements.

NOTE - See 4.3.5.1 and 4.3.5.3 for limitations on height restrictions for any equipment, railings, etc. located on the TLOF perimeter. Ideally, equipment will be solely located in the LOS.

5 Design Procedures for Offshore Helidecks

5.1 General

The design procedures are limited to helidecks of steel or aluminum construction located on fixed and floating offshore platforms. However, in no way should the design procedures be construed as a recommendation of steel over other suitable building materials. The helideck design drawings and specifications as well as the fabrication, installation, inspection, and surveys for fixed offshore platforms and floating facilities are defined (as applicable) in API 2A-WSD, API 2FPS, API 2T, and additional regulatory requirements i.e. USCG regulations, ABS Rules for Building and Classing Mobile Offshore Drilling Units and AA ADM-1, as applicable.

Additional guidance and commentary on helideck design procedures are provided in Annex C.

5.2 Helideck Design Load

5.2.1 Dead Weight (Mass)

The dead weight (mass) is the weight (mass) of the complete helideck decking structure including the TLOF, safety shelf and/or safety net, stiffeners, supporting structure, and accessories/appurtenances.

5.2.2 Live Load

5.2.2.1 To allow for personnel and cargo transfer or rotor downwash, the following minimum loading should be used for local and global helideck design live loads:

a) fixed platforms − 40 psf (1.92 kN/m^2);

b) floating platforms − 42 psf (2.01 kN/m^2).

5.2.2.2 The live load is uniformly distributed over the entire helideck area, including the TLOF surface, safety shelves and supporting structure as applicable, and should be equal to or greater than the MTOW load of the helicopter used in the design.

5.2.2.3 Accommodation of loads for temporary equipment placed on an out of service helideck, such as buildings, wireline units, etc. should be considered in the design live loads, as applicable.

5.2.3 Wind Load

5.2.3.1 Storm and operational wind speed should be applied omni-directionally (all directions) in a minimum of 8 directions. Return period, wind speed variation with height and wind load calculation shall be in in accordance with API 2A-WSD.

5.2.3.2 Local considerations for various locations should account for, independent wind storm or squall forces, and shall also be checked independently of the storm wave with its associated wind.

5.2.3.3 Operational wind loading should be determined based on the projected areas of the helideck and helicopter silhouette, including helicopters on landing and parking areas and the projected area of the framing.

5.2.4 Helicopter Landing Load Considerations

5.2.4.1 General

The TLOF, stiffeners, and supporting structure should be designed to withstand the helicopter landing dynamic loads encountered during a heavy landing after a power failure. Helicopter parameters, as listed in Table 1, shall be obtained from the manufacturer for any helicopter considered in the helideck design.

5.2.4.2 Contact Area

The maximum contact area per landing gear, used to design deck plate bending and shear, should conform to values obtained from the helicopter manufacturer.

5.2.4.3 Load Distribution

The load distribution per landing gear in terms of percentage of maximum takeoff weight (mass) should be obtained from the helicopter manufacturer.

5.2.4.4 Design Landing Load

5.2.4.4.1 For the purpose of design, use the load distribution as determined in 5.2.4.3. The loads imposed on the structure should be applied over the contact areas for the undercarriage or wheels.

5.2.4.4.2 The design landing load is equal to 1.5 times (150 %) of the maximum takeoff weight (mass) of the design helicopter and is distributed as determined in 5.2.4.3. This loading equates to the dynamic load at impact on touchdown that is based on a heavy landing with a rate of descent of 6 ft/s (1.8 m/s) i.e., the serviceability limit state of the undercarriage.

5.2.4.4.3 When specific dynamic loading distribution data is not available it should be assumed that 75 % of the weight (mass) of the design helicopter is applied equally through the two contact areas of the main undercarriage (normally the two rear wheel assemblies) of a wheel-equipped helicopter. For a skid equipped helicopter 75 % of the weight (mass) of the design helicopter is applied equally through the two aft skid contact areas of the helicopter.

5.2.4.4.4 When designing the helideck plate for the design-landing load, beam theory, large deflection theory (membrane concept), or other accepted design practice may be used as long as the stresses are within the allowable stress limits and do not cause permanent deformation.

5.2.5 Parking Area Load Considerations

Loads for the parking area should be developed in accordance with 5.2.4, except: the dynamic impact factor, from 5.2.4.4 should be 1.0 of the maximum takeoff weight (mass) of the helicopter.

If the loading information is not available it should be assumed that 40 % of the static loads are applied equally through each of the two contact areas of the main undercarriage (normally the two rear wheel assemblies) of a wheel-equipped helicopter and 20 % through the other wheel(s) or skid contact areas.

5.2.6 Dynamic Loads

There are potentially additional dynamic loads imposed on the platform due to platform response or reaction to impact that may be caused by waves, wind, earthquake or machinery. The dynamic amplification factor shall be determined for the associated wave load and for the wind load defined in 5.2.3.

5.2.7 Safety Net/Safety Shelf Loads

Safety nets or safety shelves should be designed to support dead loads plus the live loading as shown in section 5.2.2. It shall also be designed to support dead loads plus a minimum concentrated load of 300 lbs. (136 kg/1.33 kN) at any point.

5.2.8 Tie-down Points Loads

The tie-down points should be designed to secure the design helicopter to the helideck (TLOF) during the maximum anticipated environmental condition, as determined by the platform and helicopter operators. See 5.8 for TLOF surface tie-down point configurations and additional tie-down information.

5.3 Design Load Conditions

The helideck should be designed, as a minimum, for the combinations of design loads in Table 1.

Table 1 — Helideck Design Loads Combinations

Load Type	HSAC RP 16-XX Section	Load Cases for Helideck Design					TLOF Design	Parking Area	
		1	2	3	4	5		A	B
Dead[a]	5.2.1	X	X	X	X	X	Use helideck design case and applicable allowable stress modifier that produces the most conservative stress check ratios	X	X
Live (global helideck)[a]	5.2.2	X		X					
Wind (storm)	5.2.3		X						
Wind (operational)	5.2.3			X		X			X
Landing[a]	5.2.4				X	X			
Parking area load[a]	5.2.5							X	X

NOTE 1 See C.5.3 for explanation of load cases.

NOTE 2 Table does not cover all possible load combinations but is intended to indicate the minimum to adequately design the helideck.

[a] Include dynamic amplification factors as required.

5.4 Installation

Loads experienced during helideck construction and installation, including the static and dynamic forces that occur during lifting, loadout, and transportation, should be considered in accordance with API 2A-WSD, API 2FPS, or API 2T as applicable and API 2MET.

5.5 Material

All structural materials should conform (as applicable) to API 2A-WSD, API 2FPS, API 2TOP, API 2T or AA ADM-1.

5.6 Helideck (TLOF) Surface

The helideck (TLOF) surface should be of solid or perforated construction (such as helidecks with built in sub-surface fire protection) so that a ground cushion is created by the rotor downwash. All materials, coverings, or coatings used should provide a non-skid surface. The minimum average surface friction coefficient of 0.65 should be achieved across the area inside the TDPM, outside the TDPM and on the paint markings themselves.

Extruded section or grid construction aluminum (or other similar material) surfaces may provide adequate resistance to sliding, but they should be coated with a non-slip material unless friction properties have been confirmed by measurement. It is important that adequate friction exists in all directions and in worst case conditions, i.e. when the deck is wet. Over-painting friction surfaces on such designs with other than non-slip material will likely compromise the surface friction.

5.7 Safety Nets and Safety Shelves

The helideck should be fitted with a safety net or safety shelf for protection of personnel at least 5 ft (1.5 m) wide (measured horizontally) around the perimeter, except at stairwells the safety net or safety shelf should extend completely around the opening. The safety net or safety shelf need not extend around stairways oriented perpendicular to the helideck perimeter. The safety net or safety shelf should produce an outward and upward inclined surface a minimum of 3º beginning below the helideck (TLOF). The outer edge should not protrude above the helideck (TLOF).

Safety shelves shall be provided in lieu of safety nets for helidecks with (TLOF) sizes less than 1.0D. See 5.2.7 for surface loading requirements for safety nets and safety shelves.

5.8 Tie-down Points

5.8.1 Typical tie-down configurations for a helideck are shown in Figure 15. The number of tie-down point circles on the figure should be used relative to the *D* size of the TLOF. A smaller D TLOF will require fewer tie-down circles. During the design, the tie-down configuration should be configured for the full range of helicopters that may use the helideck. The tie-down points should be to secure the helicopter to the center area of the TLOF. Similar tie-down point arrangements will be required in a parking area.

5.8.2 Tie-down points should be recessed, have provision to allow liquids to drain and be closed to seal the helideck during helicopter operations, and have adequate side wall clearances to allow straps to be attached. See 5.2.8 for tie-down load design, and 4.6.2 for drainage requirements. The maximum diameter or thickness of the tie-down bar attachment point should be 1.0 in. (2.5 m).

5.8.3 Specifically for a 0.83D square or rectangular TLOFs less than 1.0*D* eight tie-down points should be considered if the helicopters may need to be parked or reoriented for maintenance purposes, etc.; see Annex D, Figure D.1 and Figure D.2.

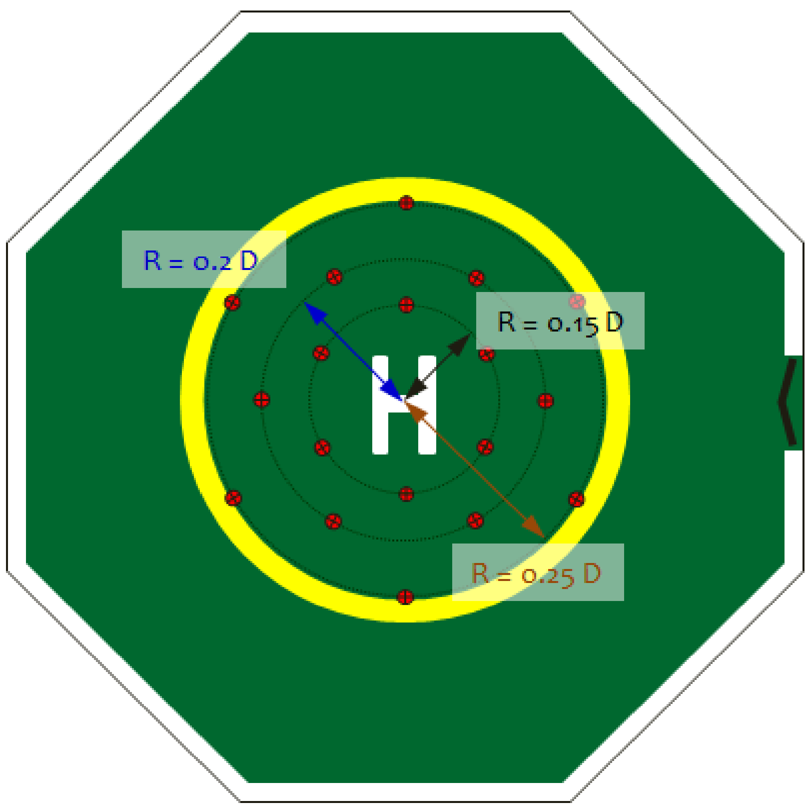


Figure 15 — Tie-down Locations

6 Helideck Markings

6.1 General

TLOF perimeter, touchdown/positioning and other markings for normal helicopter operations should be provided. The conspicuity of the white or yellow lines can be improved by outlining it, on one or both sides, in black or some other contrasting color. Any contrasting color can be used except when a specific color is defined; however, red is reserved for markings of the weight/size box, the “EXIT” and “No Nose” marking as well as general obstruction markings.

6.2 TLOF Perimeter Marking

A 12 in. (30 cm) wide solid white line should be used to mark the boundary of the TLOF.

6.3 Touchdown/Positioning Circle Marking

The touchdown/positioning circle (TDPM circle) is the aiming point for a normal touchdown (landing) so located that when the pilot’s seat is over the marking, the whole of the undercarriage will be within the TLOF and all parts of the helicopter will be clear of any obstacles by a safe margin. The TDPM also provides the same protection (clearance) when maneuvering/turning on the TLOF. The relationship of the TDPM to the LOS when a helicopter is occupying the TLOF is shown in Figures 16 and 17 for a 1D TLOF and 0.83D TLOF respectively.

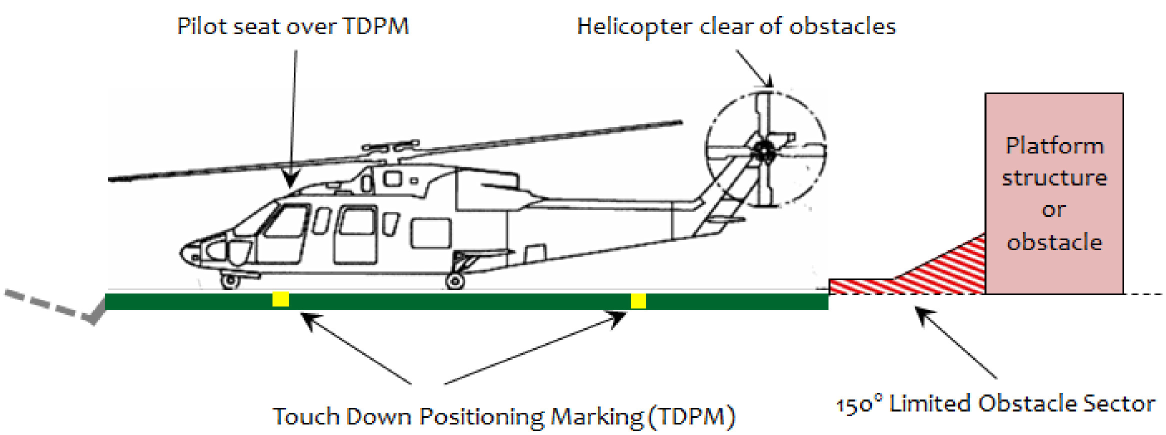


Figure 16 — Relationship of the TDPM to LOS for a 1.0D TLOF

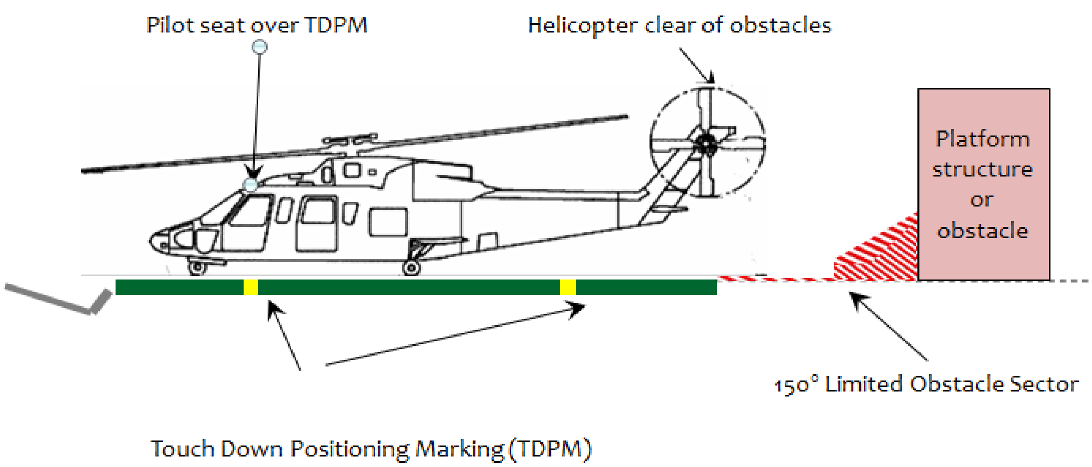


Figure 17 — Relationship of the TDPM to LOS for a 0.83D TLOF

The TDPM circle marking should be located in the center of the TLOF. The TDPM circle is a yellow circle with an inner diameter of 0.5D (i.e. radius of 0.25D) and a line width 18 in. (0.45 m). The TDPM circle is illustrated on Figures 2 through 9 and Figure 18. The conspicuity of the yellow TDPM circle may be enhanced by outlining the marking with a thin black line (typically 6 in. [15 cm]): this is particularly important if the TLOF surface is not a dark green.

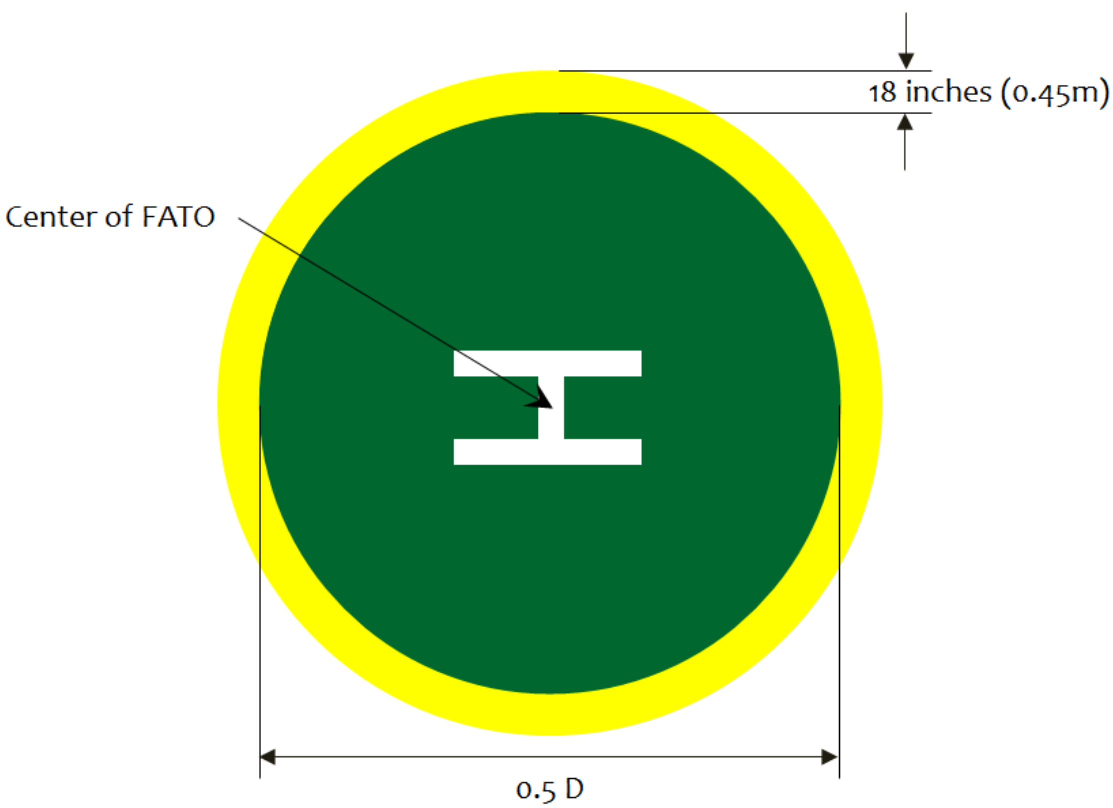


Figure 18 — TDPM and "H" Marking

6.4 “H” Marking

The “H” marking (international identification symbol) should be marked in the center of the TLOF. Since the TDPC is located in center of the TLOF (see 6.3), the “H” should be centered in the middle of the touchdown/positioning circle (TDPM circle).

The marking consists of the letter “H”, 10 ft high × 6 ft wide (3 m × 1.8 m) painted white. The width of the

legs and the cross bar of the “H” should be 16 in (40 cm) as shown in Figure 19. The “H” may be outlined with a 6 in. (15 cm) wide line of a contrasting color to enhance conspicuity.

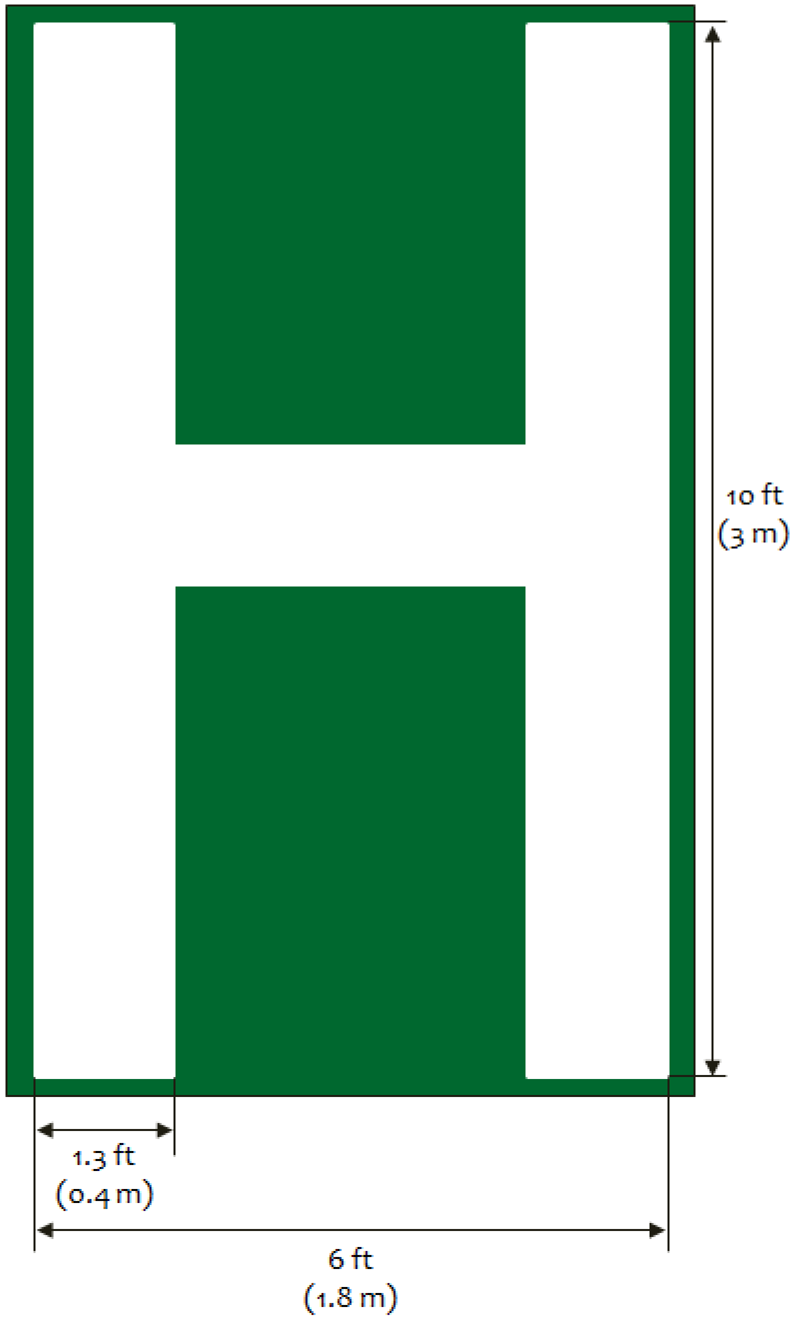


Figure 19 — Helideck "H" Marking

The "H" should be marked co-located with the TDPM circle with the crossbar of the "H" lying along the bisector of the obstacle-free sector as shown in Figures 2 through 9.

Where the OFS is swung in accordance with 4.3.5.1, the positioning of the TDPC and "H" should comply with the swing criteria and positioning as specified in 4.3.5.2.3. The "H" crossbar should be orientated so that the bar is parallel to the bisector of the swung sector. See Figure 13 and 4.3.5.1 and 4.3.5.3 for additional detail.

6.5 Weight (Mass) and Size Limitation Markings

6.5.1 Textual Marking Font Requirements for Helidecks

6.5.1.1 Helideck textual markings require maximum legibility while minimizing the area being occupied by the lettering and numbers on the helideck and should be in contrasting color to the background color. All textual markings on helidecks should use the Clearview Hwy 5-W as the standard font type. However, where horizontal spacing has to be reduced in order to keep helideck markings from overlapping, the horizontal width restricted variant Clearview Hwy 5-W(R) may be used. Details and diagrams regarding the Clearview Hwy 5-W and 5-W(R) font type are provided in Annex E.

NOTE The letters and numbers in the Annex E charts are based on upper case letter height of 4 in. (10 cm) and should be scaled (adjusted) to the height defined in this document for the various markings.

6.5.1.2 Since a helideck is limited to helicopters of a certain gross weight (mass) and "D" size, the TLOF should be marked to indicate the design weight (mass) and D-value limitations. The actual size of the TLOF, which provides useful information to the pilots using the helideck, should also be marked.

6.5.1.3 The size of a non-rectangular (i.e. square, octagonal, hexagonal, pentagonal, or circular) TLOF should be indicated by a single number representing the diameter of the largest circle which can be contained within the TLOF. Dimensions of rectangular TLOFs should be indicated by the length (L) times the width (W) where L is measured from the TLOF edge marked with the chevron to the opposite TLOF edge and W is measured between the TLOF edges perpendicular to the L measurement as shown in Figure 20. These dimensions should not include the safety net or solid safety shelf.

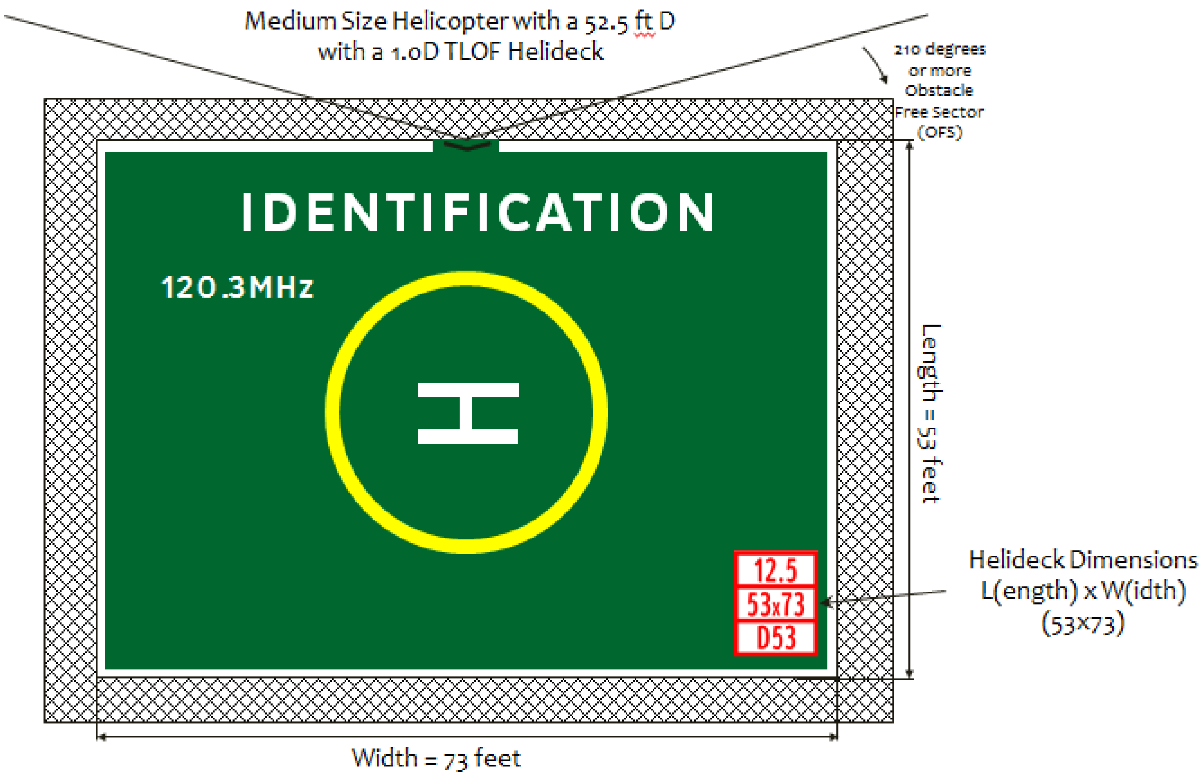


Figure 20 — Size and Weight Markings for 1.0D 52.5 ft Medium Helicopter Rectangular Helideck in U.S. Customary Units

6.5.2 U.S. Customary Units

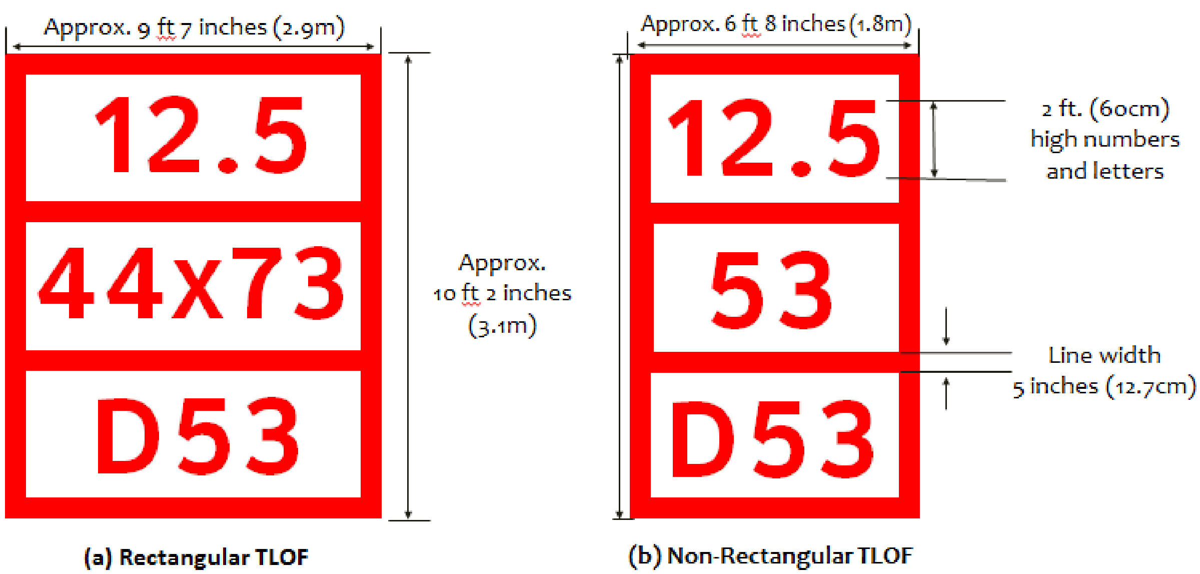
6.5.2.1 SI unit equivalents should only be used for marking the weight (mass) limit or size limitation in locations where SI units are used (see 6.5.3).

6.5.2.2 The recommended method of designating the helideck (TLOF) limitations is to indicate the maximum design load and the design D-value, together with the actual TLOF size (see 6.5.1), in a three-tiered box as shown in Figure 21.

6.5.2.3 The maximum design load of the helideck should be indicated in terms of 1000 lbs by a two or three digit number with one decimal point rounded down to the nearest 100 pounds i.e., 15,675 lbs. should be marked as "15.6". Below this design weight (mass) the actual TLOF size should be indicated with the dimension rounded down to the nearest one foot and below this the allowable helicopter size in terms of the "D" dimension rounded up to the nearest one foot should be marked with a letter "D" in front of the D-value.

NOTE - A helideck with a 15,000 lb. design load should be marked as "15.0" and not "15"

6.5.2.4 The box and numerals should be of such size as to be readily discernible by the pilot of the approaching helicopter in sufficient time to affect a go-around if necessary. To achieve this, the design load and D size limitations and the actual TLOF size rounded down to the nearest foot should be marked in a box, outlined in red, in red numerals on a white background as shown in Figure 21. The height of the numbers and letters should be 2 ft (0.6 m) with the line width of the box and the minimum separation between the numbers/letters and the frame of box, approximately 5 in. (12 cm). For smaller helidecks (less than 40 ft [12 m]) where space may be limited, the height of the figures may be reduced to 18 in. (45 cm). The width of the box will depend on the actual numbers since although the height is defined the width varies depending on the actual number.

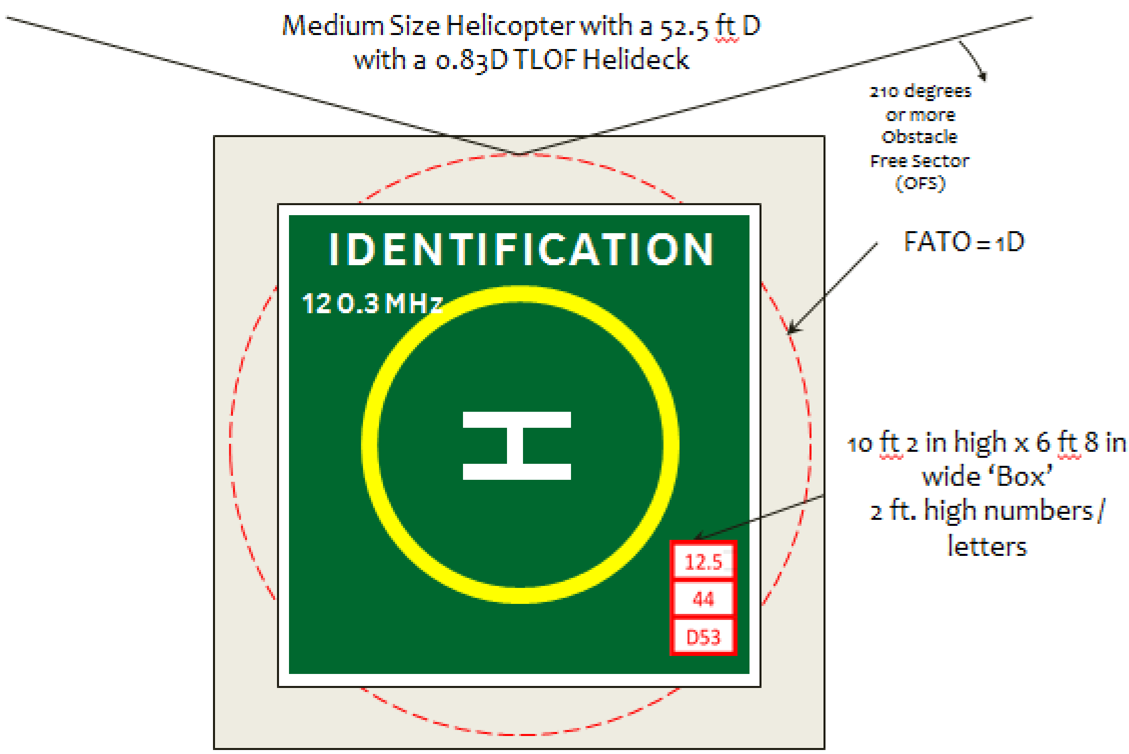


NOTE - Dimensions illustrated refer to 0.83D TLOF designed for a 52.t ft diameter medium helicopter.

Figure 21 — Helideck Size and Weight Markings in U.S. Customary Units

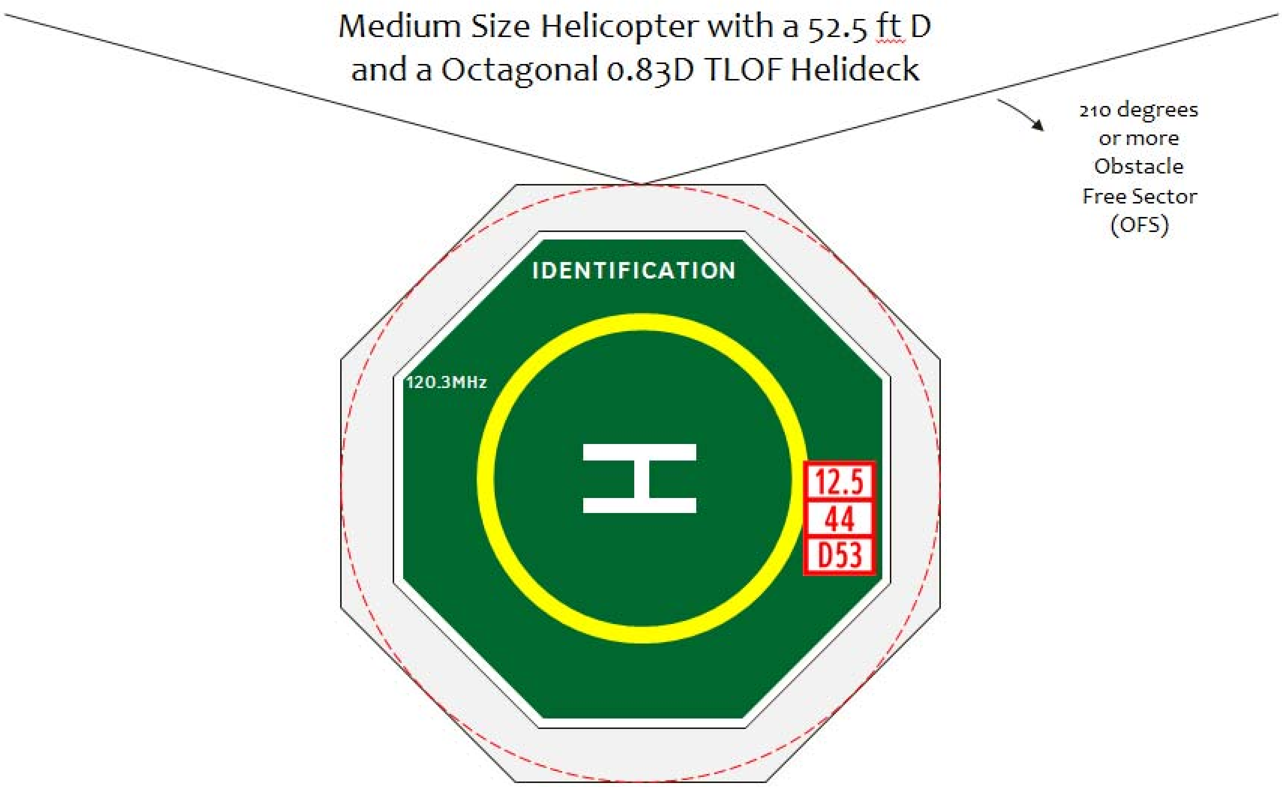
The weight/size limitation and the actual TLOF size box marking should be visible from the principal direction of approach and oriented in the same direction as the helideck name. It is recommended that on a square or rectangular helidecks the box should be located on right-hand side relative to the principal direction of approach (when facing the helideck) as illustrated in Figure 22. For circular, hexagonal and similar shapes the box should be located on right-hand side of the TLOF and if feasible outside the TDPM, when viewed from the preferred approach direction as shown in Figure 23.

NOTE - On a small TLOF the size/weight box may overlap the TDPM.



NOTE - Chevron markings not depicted.

Figure 22 — Size and Weight Markings for a 0.83D Square Helideck in U.S. Customary Units



NOTE - Chevron markings not depicted

Figure 23 — Size and Weight Markings for Medium Helicopter 0.83D Octagonal Helideck in U.S. Customary Units

6.5.3 SI Units

6.5.3.1 U.S. Customary unit equivalents should not be used for marking the mass (weight) limit or size limitation in locations where SI units are used.

6.5.3.2 The recommended method of designating the helideck limitations is to indicate the maximum design load of the helideck in terms of 1000 kg (tonnes) by a two or three digit number with one decimal point rounded down to the nearest 100 kg followed by the letter “t” i.e. 7250 kg should be marked as 7.2 t. The maximum design load marking should be marked in white, located on the upper left-hand section of TLOF and so arranged as to be readable from the preferred final approach direction.

NOTE - A helideck with a 12,000 kg design load should be marked as 12.0t and not 12t as shown in Figure 24.

6.5.3.3 The allowable helicopter size in terms of the D dimension rounded to the nearest one metre with 0.5 rounded down. The D dimension should be marked on the perimeter of the TLOF so it can be seen from the preferred approach direction. The D-value marking should be white with a contrasting background.

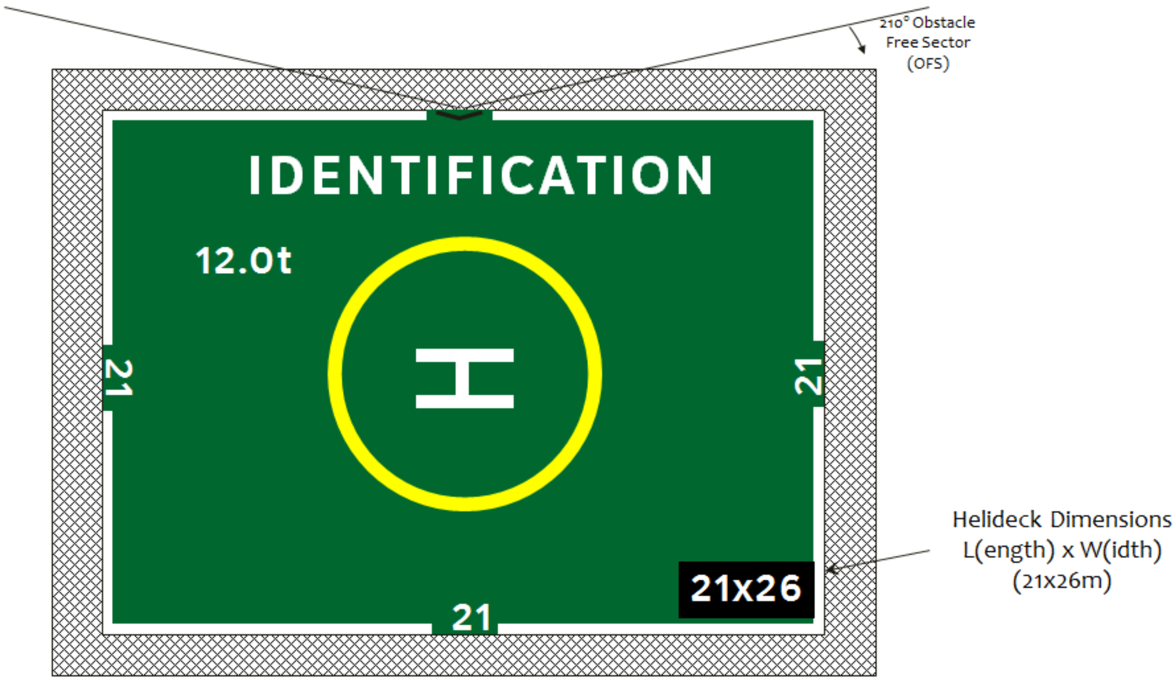


Figure 24 — Size/Weight Markings for SI Units

6.5.3.3 The mass limit should be marked in white numerals (followed by a letter "t") on the TLOF surface or a contrasting background in the upper left hand area as shown in Figure 24.

6.5.3.4 The actual TLOF size dimensions, rounded to the nearest one metre with 0.5 rounded down, should be marked on the TLOF surface, outlined in white with white numerals on a black background: the marking should be located in the bottom right hand corner as shown in Figure 24.

6.5.3.5 For each marking, the height of the numbers/letter should be 0.6 m (2 ft). For smaller helidecks where space may be limited, the height of the figures may be reduced to 45 cm (18 in.).

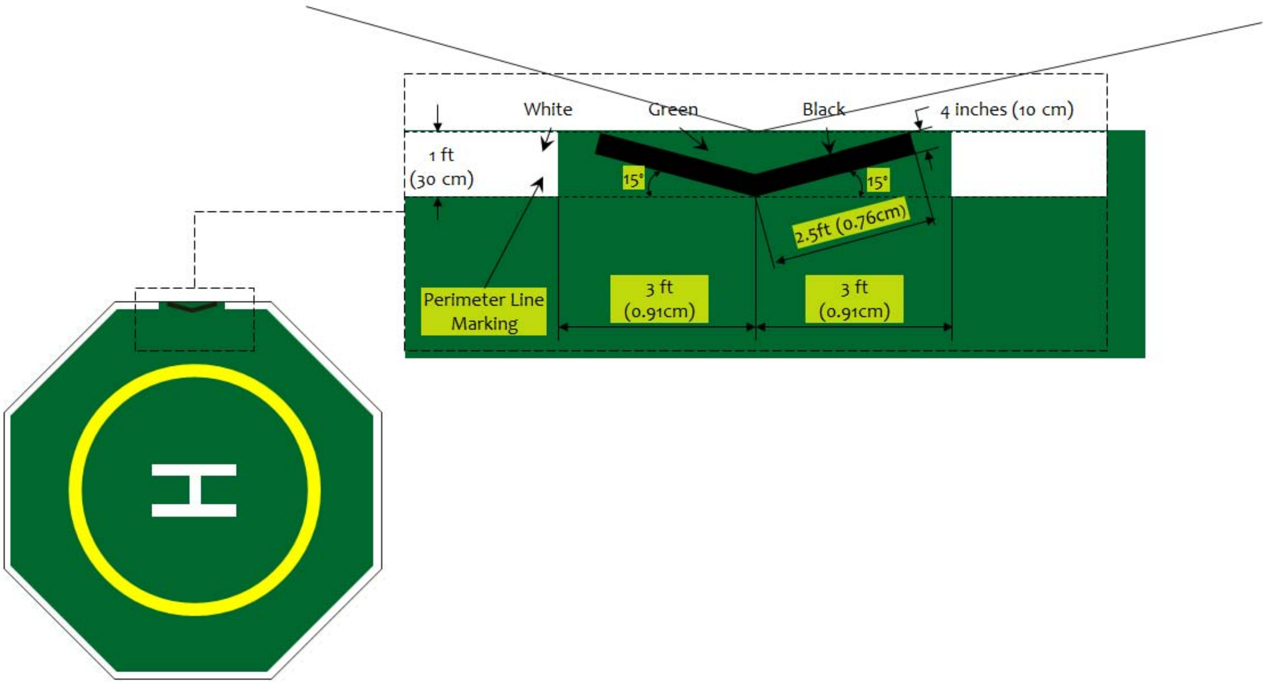
6.5.3.6 The design load marking, actual TLOF size and D-value marking in white may be enhanced, if required to improve conspicuity**,** by overlaying the white marking on a black painted background.

6.6 Helideck Obstacle-free Sector (Chevron) Marking

6.6.1 A helideck obstacle-free sector (OFS) marking, a chevron, should be located on the FATO perimeter: unless the TLOF is the same size as the FATO this will not be on the perimeter of the TLOF. The marking should indicate the reference point/point origin of the obstacle-free sector and the directions of the limits of the sector. Each leg of the chevron should be a minimum of 2.5 ft (0.76 m) long and 4 in (10 cm) wide, forming an angle that indicates the direction of the limits of the sector. See Figure 25. The chevron should be marked in black color on the FATO surface, or a contrasting background, as shown in Figure 25.

6.6.2 Where there is no room to place the chevron on the edge of the FATO or the FATO edge is non-load bearing (i.e. not a solid surface), the chevron marking, but not the reference point/point of origin, may be displaced towards the FATO center: the distance displaced should be indicated as shown in Figure 26 for a TLOF less than 1.0*D*. The marking should be a black box (thin black line) around the black wording

“WARNING DISPLACED CHEVRON X ft (X m)” where X is the displaced distance. On helidecks where there are no obstacles for 360º, no chevron is required.



NOTE 1 - Placing the chevron marking on the FATO perimeter line will actually displace the apex of the chevron approximately 1 foot from the outer edge of the FATO perimeter where the reference point of the OFS and LOS actually begins. Thus the actual placement of allowable obstacles begins at the LOS reference and not at the apex of the chevron as depicted on the actual LOS chevron marking.

NOTE 2 - The actual OFS reference point/point of origin will in most cases be located on the safety shelf (see Figures 3, 17 and 18)

Figure 25 – Standard Chevron Marking

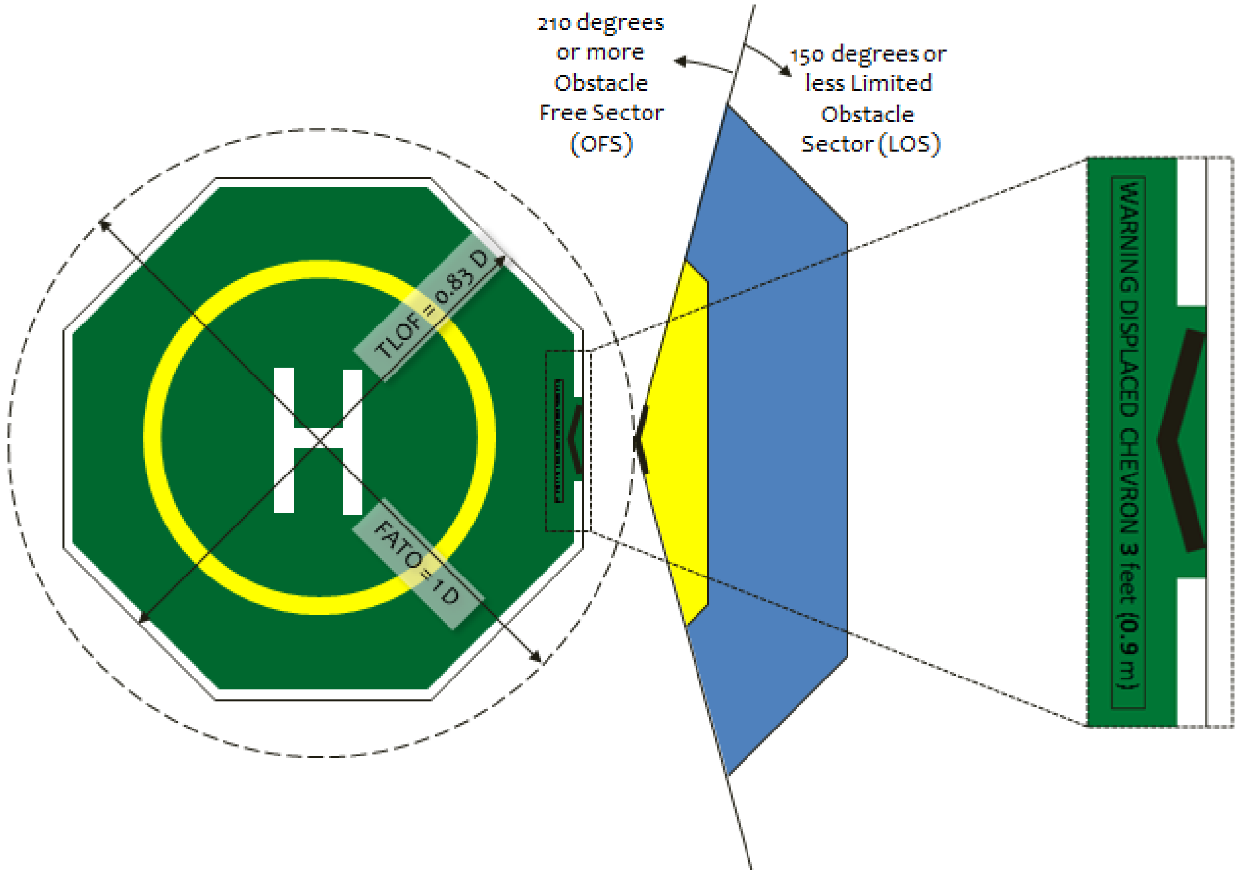


Figure 26 – Displaced Chevron Marking

6.7 Parking Area and Parking Transition Area Markings.

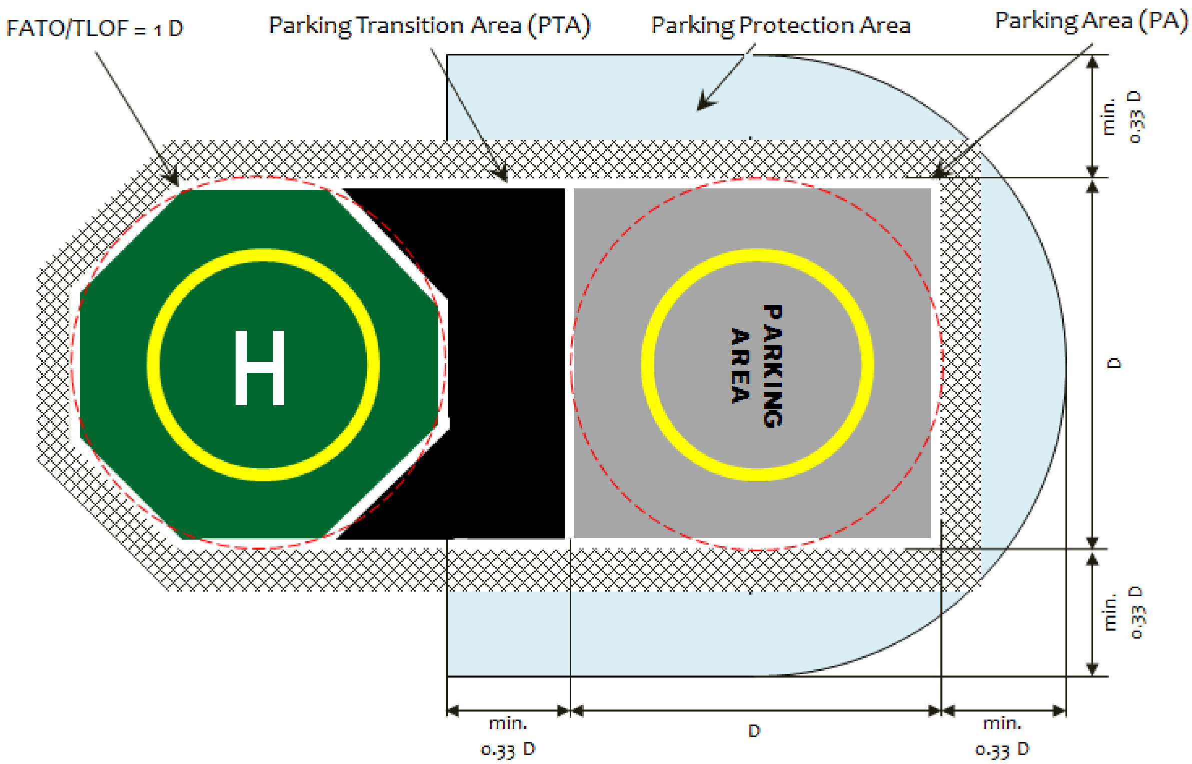
6.7.1 The parking area (PA) should be clearly distinguished from the TLOF surface and surface markings by the use of light gray color on the PA surface. The perimeter of the PA should be marked with a 12 in. (30 cm) wide solid white line.

6.7.2 The parking transition area (PTA) surface should be painted in a black color, starting from the perimeter line of the TLOF to the PA perimeter line. The perimeter of the PTA not in contact with the TLOF perimeter, or not in contact with the PA, should be marked with a 18 in (45 cm) wide solid white line.

NOTE 1 - If a limited parking area (LPA) or push-in parking area (PIPA) is provided, see Annex A for additional marking guidance.

NOTE 2 - For hover transition areas, other methods of movement via ground taxi, push in, etc. are also allowed.

6.7.3 A yellow touchdown parking circle (TDPC) marking should be marked on PA to provide proper obstacle clearance when the pilot's seat is over the TDPC. The TDPC should have an inner diameter of 0.5D, line width of 18 in. (45 cm), and the center of the TDPC should be located 0.5D from the PA perimeter nearest to the TLOF as illustrated in Figure 24. In the center of the TDPC, the words "Parking Area" should be marked in black as indicated in Figure 27.



NOTE - The TLOF weight (mass)/size markings and Chevron not shown on the figure.

Figure 27 — Parking Area and Transition Area Markings for 1D FATO, 1D TLOF and 1*D* PA

6.7.4 If there are any restrictions to the method of movement from the TLOF to the PA, any other PA restrictions, or if the PA is not designed as previously described, refer to Annex A for further guidance.

6.7.5 For a helideck with a 1.0D TLOF or a 0.83D TLOF and a 1.0D PA, no weight (mass) and size markings are necessary for the PTA.

6.8 Prohibited Landing Sector Markings

On a helideck where the number of personnel access points is limited, a “No Nose” prohibited landing heading sector marking may be used to avoid placing the tail rotor in close proximity to the stairs, etc.

The sector of the TDPM circle, opposite from the personnel access points should be bordered in the color red, with the words “No Nose” clearly marked in red, on a white background as shown in Figure 28. When positioning over the TDPM, helicopters should be maneuvered so as to keep the aircraft nose clear of the “No Nose” marked sector of the TDPM at all times. The minimum prohibited ‘No Nose” marking should be 30º.

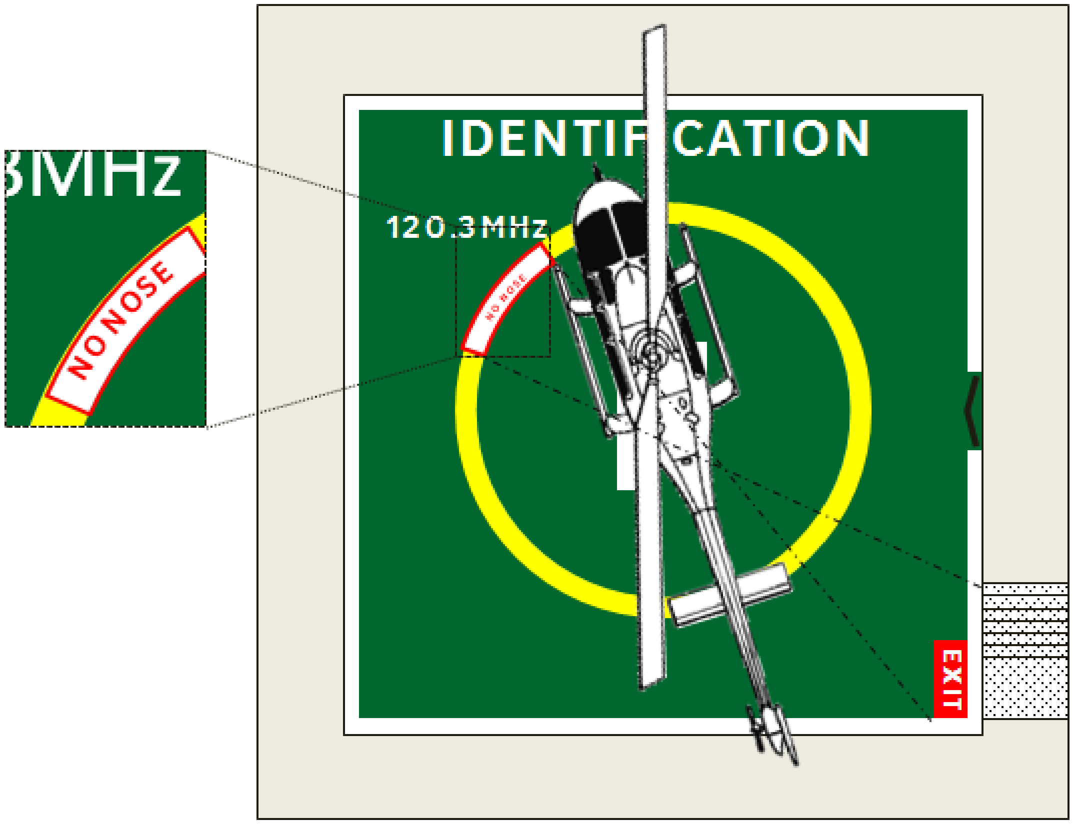


Figure 28 – "No Nose" Marking

6.9 Helideck Name and Radio Frequency Markings

The TLOF should be marked with the offshore block name (identification) and radio frequency number. The facility identification (name) should be marked on the TLOF surface between the perimeter of the TLOF and the TDPM in letters and/or numbers of not less than 3 ft (1.0 m) high and in a color (normally white) which contrasts with the helideck surface. The radio frequency should be marked in the upper left in numbers and letters of 2 ft (0.6 m) and the same color as the identification marking as shown in Figures 20, 23, and 28. These markings should be located so they can be seen from the preferred approach direction

6.10 TLOF Surface Colors

The surface bounded by the TLOF perimeter shall be of a dark color, preferably dark green, with a non-skid coating. Where the surface coating may have a degrading effect on friction qualities or is not practical since the surface incorporates for example a fire protection system, it may be necessary to leave the helideck surface untreated. Aluminum helidecks are a natural light grey color and may present painting difficulties. In such cases, the conspicuity of the markings shall be enhanced by outlining the TLOF perimeter markings and other markings with a contrasting color or overlaying white or yellow markings on a black background.

6.11 Exit markings

To provide direction to passengers and an indication of the location of the opening on helidecks with stairwells, the area should be highlighted by the word "EXIT". All helideck exits that provide normal egress (stairways) will have the egress points and should be highlighted by a red box on the perimeter line as shown in Figures 29 and 30. This box should be 4 ft (1.2 m) wide by 2 ft (0.6 m) high with 1 ft (30 cm) high lettering.

Exits that provide egress by ladder shall be marked as “EMERGENCY EXIT.” The emergency exit marking shall be identified by a red box on the perimeter line as shown in Figure 26 and 27. This box should be 4 ft (1.2 m) wide by 2 ft (0.6m) high with the word EMERGENCY above the word EXIT with 6 in. (15 cm) high lettering.

6.12 Walkway markings

For manned facilities, a walkway marking is optional. For NUIs, a walkway/direction marking to the exit, see Figure 30, should be painted on the helideck surface, although it should be noted that this may present a hazard for single egress decks if the pilot is forced by wind direction to land with the tail rotor close to this marked walkway. The walkway markings 3 ft (1.0 m) wide shall start 1 ft (30m) from the touchdown/positioning (TDPM) marking and it should be marked in a color that contrasts with the surface, such as white. Yellow should not be used.

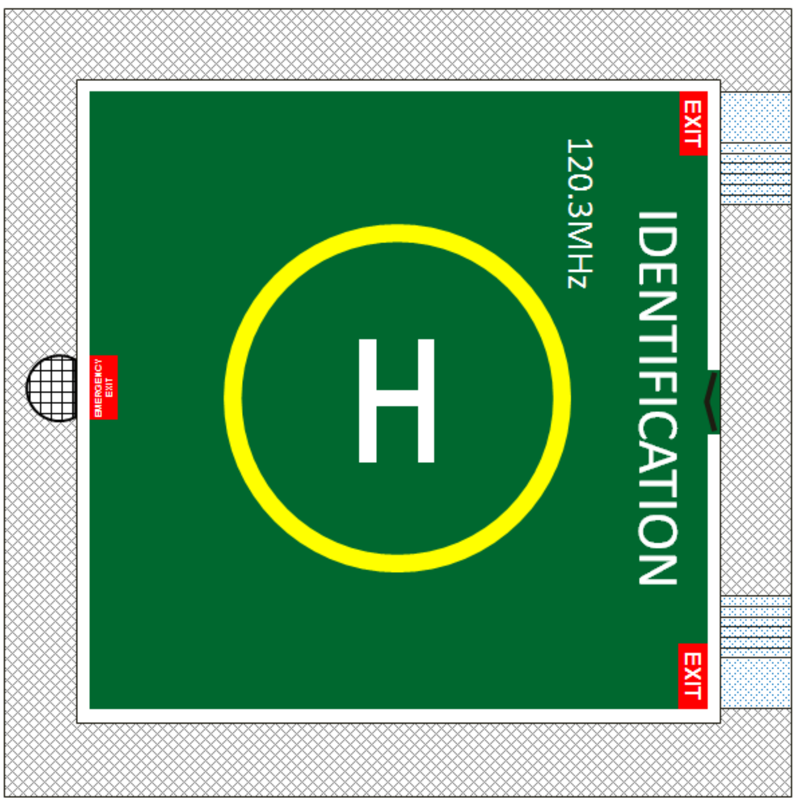


Figure 29 – Manned Facility Exit Marking

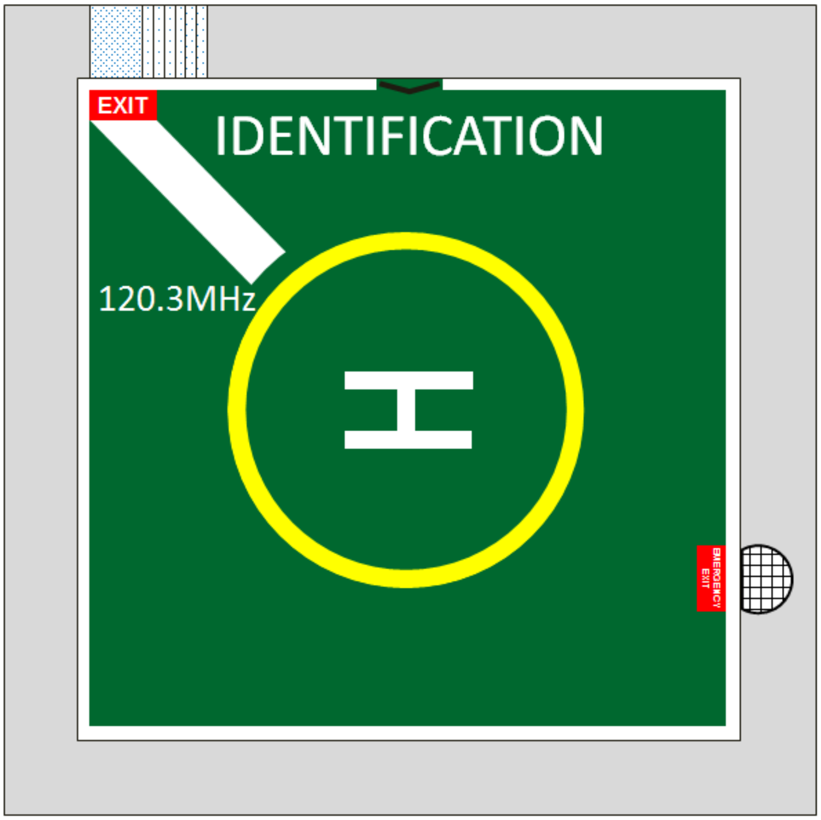


Figure 30 – Un-manned Exit Facility Marking

7 Lighting

7.1 General

7.1.1 Lights shall be installed on manned facilities.

7.1.2 New technology lighting such as strip LEDs for the TLOF perimeter or TDPC should be considered as these become more available, reliability is proven, and they meet the equivalent lighting specifications for existing lighting systems.

7.1.3 Specifications for perimeter lights for the TLOF, parking area, and parking transition area, are given in Annex F.

7.2 TLOF Perimeter Lighting

7.2.1 Perimeter lights shall be used to delineate the TLOF. Aviation green omni-directional lights shall be used. Alternatives to omni-directional such as strip lights may be considered with appropriate national authority approvals.

7.2.2 The omni-directional perimeter lights should have an intensity and intensity distribution (beam spread) corresponding to the values defined in FAA Engineering Brief No. 87. See Annex F for additional information on perimeter lighting.

NOTE - The FAA Engineering Brief No. 87 applies to heliports but the intensity and intensity distribution (beam spread) requirements are equally applicable to helidecks.

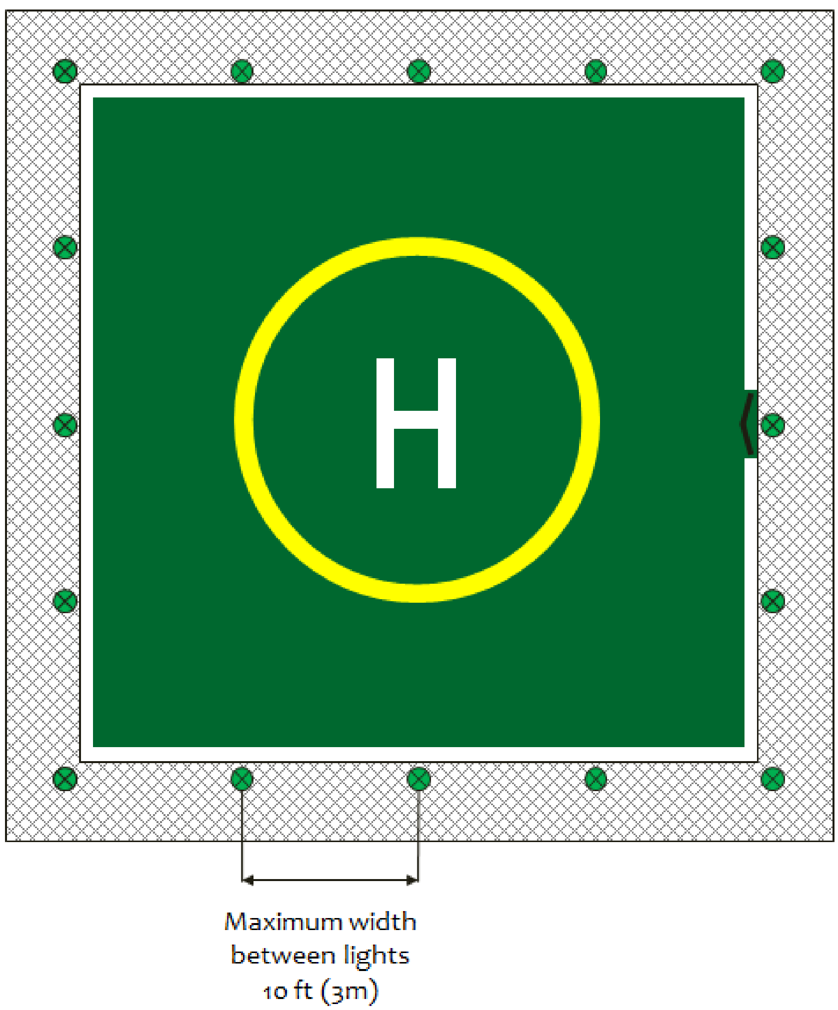
7.2.3 The perimeter lights shall be uniformly spaced at intervals of not more than 10 ft. (3.0 m).

7.2.4 For square or rectangular shaped TLOFs there should be a minimum number of four lights on each side including one light at each the corner as shown in Figure 31. For circular TLOFs, there should be a minimum of eight lights. For hexagonal or octagonal shaped TLOFs, there should be at least one light at each corner and one in the middle of the 'straight section' as shown in Figure 32.

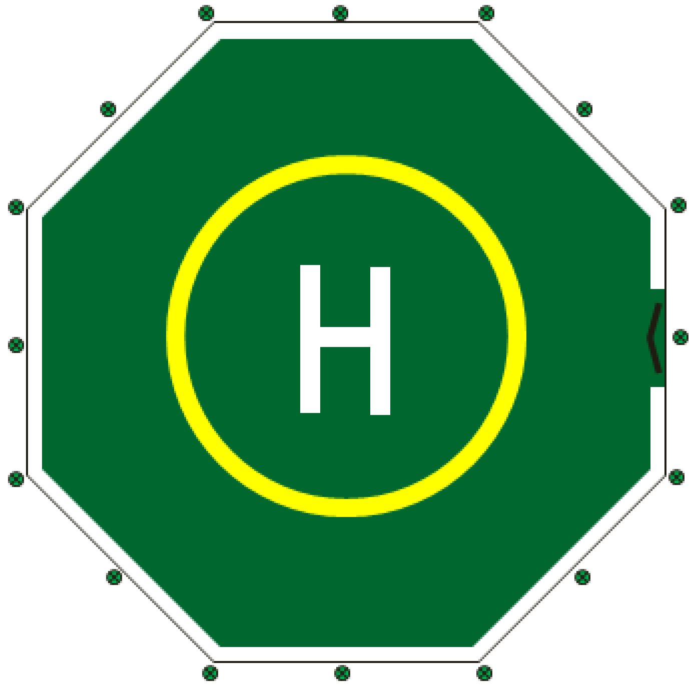
7.2.5 Perimeter lights should be outboard and adjacent to the TLOF edge, or in-set within 12 in. (30 cm) of the TLOF edge (i.e. on the TLOF perimeter marking), and should not protrude more than 2 in. (5 cm) above the elevation of the TLOF surface. They should be guarded with frangible lenses, preferably plastic (no metal guards), have no exposed wiring, and be located so as not to be an obstruction. Any inboard lighting should be flush mounted.

NOTE 1 - All lighting components and fitment should meet safety regulations relevant to a helideck environment as prescribed in API 500 or API 505 for lighting requirements, and as a minimum be rated for Class 1, Division 2.

NOTE 2 - If night vision goggle (NVG) approaches are anticipated the lights shall be NVG compatible.



Figures 31 — Lighting Square Helideck



NOTE - Safety net/shelf not depicted.

Figure 32 — Lighting Octagonal Helideck

7.3 Parking Area and Parking Transition Area Lights

The TLOF perimeter lights, see 7.1, should be used for the parking area perimeter and parking t6ransition area, but the color of the lights shall be aviation blue. The blue lights on the inboard section of the parking transition area and parking area shall be flush mounted as shown in Figure 330.

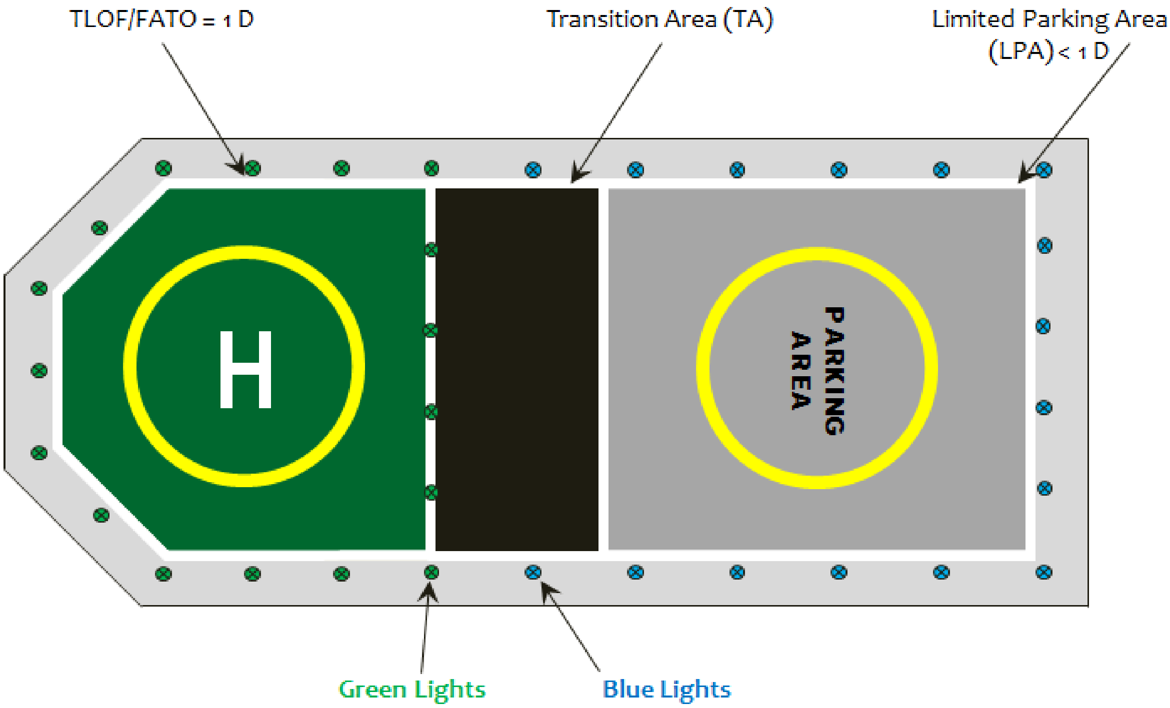


Figure 33 – Parking Area Lighting

NOTE - FAA Engineering Brief No. 87 only refers to 'aviation green lights': the intensity and intensity distribution (beam spread) is equally applicable to aviation blue lights.

7.4 Status Light(s)

7.4.1 The intent of the status light(s) is to indicate an unsafe landing area. Red status light(s) shall be provided for all manned facilities. When the status light is off, the helideck is cleared for flight operations and the illumination of a status light indicates the helideck is closed to helicopter operations.

7.4.2 The status light(s) should be located near the primary personnel access and egress stairway to the helideck and be visible to the pilot of an approaching aircraft. When this location does not ensure approaching pilot visibility, include the outboard corners of the TLOF. The light(s) should not exceed 2 in. (5 cm) above the level of the TLOF surface unless located in the limited obstacle sector and not exceeding the obstacle height limitations in that sector. The status light should be visible from all approach directions, i.e. 360° in azimuth.

7.4.3 A rotating beacon or flashing status light shall be operating during conditions hazardous to helicopter operation as listed in section 4.8. (hot air, raw gas, H_2S, etc.) and shall be automatically triggered and remain on until the hazard is cleared. Additionally, the light shall be left on and flashing in the manual mode at all other times until the helideck is cleared for helicopter operations. Examples of these hazardous situations include but are not limited to the following: facility not prepared to accept helicopter operations, crane operations, helideck not cleared as green, wind conditions exceed helicopter limitations, etc.).

7.4.4 The effective intensity of the status light should be a minimum of 700 cd between 2° and 10° above the horizontal and at least 176 cd at all other angles of elevation. Back-up lights should be provided in the event of failure of the primary status light(s). The flashing status light(s) should have a minimum flash rate of 60 flashes per minute, and where multiple lights are installed the lights should be synchronized to increase visual cueing for flight crews.

NOTE - Where one light / automated activation system can be technically designed to perform all the functions required, one status light can be used.

7.5 Lighting of Obstructions

7.5.1 Elevated obstructions that are not obvious should be marked with omni-directional red lights of at least 10 cd. Where the highest point on the platform exceeds the elevation of the TLOF by more than 50 ft (15 m), an omni-directional red light should be fitted at that position, with additional lights fitted at 35 ft (10 m) intervals extending to the elevation of the TLOF.

7.5.2 Specifications for obstruction lights are given in FAA Specification for Obstruction Lighting Equipment, FAA Advisory Circular 150/5345-43G.

NOTE - At a helideck used at night with obstacles on which it is not possible or practicable to display obstacle lights, the obstacles should be floodlighted.

7.6 Uninterrupted Power Supply

7.6.1 Arrangements should be made so that there is no loss of critical (specified) lighting due to loss of the primary power system on the facility.

NOTE - A critical lighting analysis should require at least 50 % of perimeter lighting and 100% of the access and egress routes, obstruction, status and windsock lights will remain operational.

7.6.2 This lighting may be supplied from the emergency power bus power so that power to the lighting is maintained, and be provided from an uninterrupted power supply (UPS) sufficient to power the specified lighting for the period required for the emergency generator/bus to assume the load after the loss of primary power.

7.6.3 In the event that the facility is not equipped with an emergency generator/bus as noted above, the specified lighting should be connected to a UPS capable of powering the lighting for a period of at least 18 hours.

8 Fueling Stations

8.1 General

Helicopter fueling stations and equipment should be located to avoid obstructing any personnel access or egress route serving the TLOF (helicopter flight deck) and should not infringe required obstacle-free surfaces.

Piping for fuel systems should be stainless steel with welded connections. All tanks, sumps, and filtration unit shall have low point drains for the removal of contaminants.

8.2 Fuel Tanks

Helicopter fuel storage tanks shall be installed as far as practicable from the TLOF area, accommodation spaces, escape routes embarkation stations and sources of vapor ignition. Marine portable fuel stowage tanks must meet the requirements 46 CFR Part 64 and each marine portable fuel stowage tank must have a means to contain fuel spills or leaks. All steel tanks should be lined with an approved epoxy liner unless the tanks are constructed of stainless steel and the tank design should incorporate a floating suction.

8.3 Fuel Transfer Equipment

8.3.1 All fuel delivery systems, including portable systems, should be fitted with water blocking (ie a system designed to stop fuel flow from the fuel delivery when water contamination is present in the filtration shall meet the requirements of EI 1550 both into and out of the storage tank.

8.3.2 Each nozzle must be a dead man type resulting in the stopping of fuel flow when released. Each hose shall have a storage reel meeting the requirements of EI 1529. A Static bonding cable, which attaches to the aircraft and the fueling nozzle, shall be provided.

8.3.3 Each electric fuel transfer pump must have a control with a fuel transfer pump operation indicator light at the pump. There must be a fuel pump shut off at each of the helideck access routes. Each tank, pump unit, filter, each hose reel must have a means to contain fuel spills or leaks

8.3.4 All components of the fuel system should be electrically bonded. Each hose shall meet the requirements of NFPA 407, Chapter 3.

8.4 Marking of Fuel Systems

Required markings should be applied during system manufacture as prescribed in IP 1542.

9 Weather Reporting Equipment

9.1 Wind Sock

9.1.1 An offshore facility shall be equipped with at least one wind sock to provide a visual indication of the wind conditions prevailing over the facility during helicopter operations. The location of the primary wind direction indicator should be in an undisturbed air-stream avoiding any effects caused by nearby structures, and unaffected by rotor downwash from the helicopter. The location of the wind sock should not compromise the established obstacle protected surfaces.

9.1.2 The wind sock should be easy visible to the pilot on the approach (at a height of at least 600 ft (200 m), in the hover and whilst touched down on the surface of the TLOF, and prior to take-off. Where these operational objectives cannot be fully achieved by the use of a single windsock, consideration should be given to locating a second windsock in the vicinity of the helideck, which could also be used to indicate a specific difference between the local wind over the TLOF and the free stream wind at the installation (which the pilot will reference for an approach).

9.1.3 A wind sock made of fabric of orange color and should be illuminated internally or by external lights where night flights are anticipated. This windsock lighting should not be a glare hazard to pilots. A wind sock should be a truncated cone made of lightweight (mass) fabric and should have the following minimum dimensions: length 4 ft (1.2 m), diameter (larger end) 14 in. (0.3 m) and diameter (smaller end) 8 in. (0.15 m).

9.2 Weather Measuring Equipment

9.2.1 In addition to the wind sock outlined in 9.1, a manned facility designed for visual flight rule and day only operations should be minimally equipped with a weather station with the following:

a) wind speed, direction and gust spread;

b) temperature;

c) barometric pressure;

d) a means to provide cloud ceiling height and visibility which may be estimated visually or by using measurement equipment;

e) the ability to report sea state which may be estimated visually or by using wave measurement equipment.

9.2.2 For facilities where instrument flight rules (IFR) or night operations are to be conducted, the weather station must provide all the items in ‘a’ above and the dew point.

NOTE - For instrument operations, the weather systems must be certified, calibrated, and maintained as required by the manufacturer or authority and automated systems preferred.

9.2.3 Where an existing manned facility is in close proximity to the planned new manned facility (‘close’ as determined by regulatory authority) it may deemed that the new facility does not have to provide the above equipment, provided those existing facilities which are equipped can share their information routinely to the new facilities. For these new facilities, a manual means of verifying and updating the visual elements of an observation, i.e. cloud amount and height of base, visibility and present weather, may be used.

9.2.4 Additional guidance relating to the provision of meteorological information from offshore facilities is contained in ICAO Annex 3.

9.3 Floating Facilities Additional Weather Reporting Equipment and Systems

9.3.1 Floating installations experience dynamic motions due to wave action which can present a potential hazard to helicopter operations. Operational limitations are therefore set by the helicopter operators which are promulgated in the facility’s helideck operations manual when the helideck is commissioned and incorporated in the helicopter operator’s operations manuals.

9.3.2 Floating helidecks will have limitations established regarding the movement of the helideck in pitch and roll, helideck inclination, significant heave rate (SHR) and facility heading (if applicable) and this information will be recorded by the vessel’s helideck monitoring or motion system (HMS) and be available as part of the overall facility offshore weather reporting system.

9.3.3 The accelerometers for such measurements should be located as close to helideck level and centerline as possible to provide accurate readings. The accelerometer readings may be processed by sophisticated software that can produce accurate helideck level measurements of pitch, roll and heave (PRH) regardless of the accelerometer location.

9.3.4 Pitch and roll reports to helicopters should include values, in degrees, about both axes for the true vertical datum (i.e. relative to the true horizon) and be expressed in relation to the vessel’s heading. Roll should be expressed in terms of “left” and “right” in degrees; pitch should be expressed in terms of ‘up’ and ‘down’ in feet or meters (as applicable); helideck inclination is the angle measured in degrees between the absolute horizon and the plane of the helideck. SHR, being twice the root mean square (RMS) heave rate measured over a 20-minute period, should be reported in meters or feet (as applicable) per second. Values of pitch and roll, helideck inclination and SHR should be reported to one decimal place.

10 Emergency Response Equipment

Equipment should be immediately available in a weather proof container to respond to a helicopter mishap on the helideck at a manned facility.

11 Communications Equipment

All manned offshore facilities should have an Aviation VHF radio capable of communicating with the pilots during any flight operation.

Annex A

Guidance for Helideck Limited Parking Areas and Push-in Parking Areas

A.1 General

If a parking area of 1.0D cannot be provided due to space or structural limitations, a limited parking area (LPA) or push-in parking area (PIPA) outlined in this Annex may be provided. Like the parking area discussed in 4.3.4, the limited parking area or push-in area should be located outside the obstacle-free sector (OFS) and outside the limited obstacle sector (LOS) of the helideck so that a helicopter parked on the LPA or PIPA is outside the LOS height limitations as shown in Figure A.1

A.2 Limited Parking Area

A.2.1 An LPA may be provided when a 1.0D parking area (see 4.3.4) cannot be provided because one or more of the following conditions exists:

a) an infringement of the 0.33D protection area surrounding the D-circle of the parking area is present;

c) a weight (mass) limitation exists for helicopters allowed onto the LPA due to structural constraints;

d) the dimensions of the LPA are insufficient to accommodate the helicopter type allowed onto the TLOF.

A.2.2 The minimum LPA should be of sufficient size to contain a circle of diameter of not less than 0.83*D* of the largest helicopter the parking area is intended to serve, surrounded by a 0.33D protection area. Infringements of the 0.33D additional protection area are allowed if be adequately marked and written documentation and procedures are made available to air operators to identify obstruction(s) or limitation(s).

A.2.3 A helideck layout with a 1.0D TLOF and adjacent 0.83D parking area[4] with an obstacle clearance area of 1.0D and a 0.33D protection area is shown in Figure A1. The TDPC on the PA may be offset to a maximum distance of 0.33D provided the 0.33D clearance is still guaranteed and no part of the helicopter undercarriage is closer than 3 ft (0.9 m) from the LPA deck edge (see Figure A.1 for offset diagram example and figures A.10, A.11 and A.12 for depiction of the undercarriage 3 ft helideck edge clearance requirement).

A.2.4 The LPA area may contain objects whose presence is essential for the safe operation of the helicopter with a maximum height of 2 in. (5 cm).

A.2.5 An LPA may be down-sized to accommodate a helicopter with a lesser D-value then associated with the TLOF in order to achieve the 1.0D obstacle clearance area and 0.33D protection area for the smaller helicopter. In this case, the D-value of the LPA shall be marked in the PTA together with the weight (mass) limit and the LPA dimension(s), if applicable (see 6.7).

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[4] 0.83D = Approximately 1.0 RD

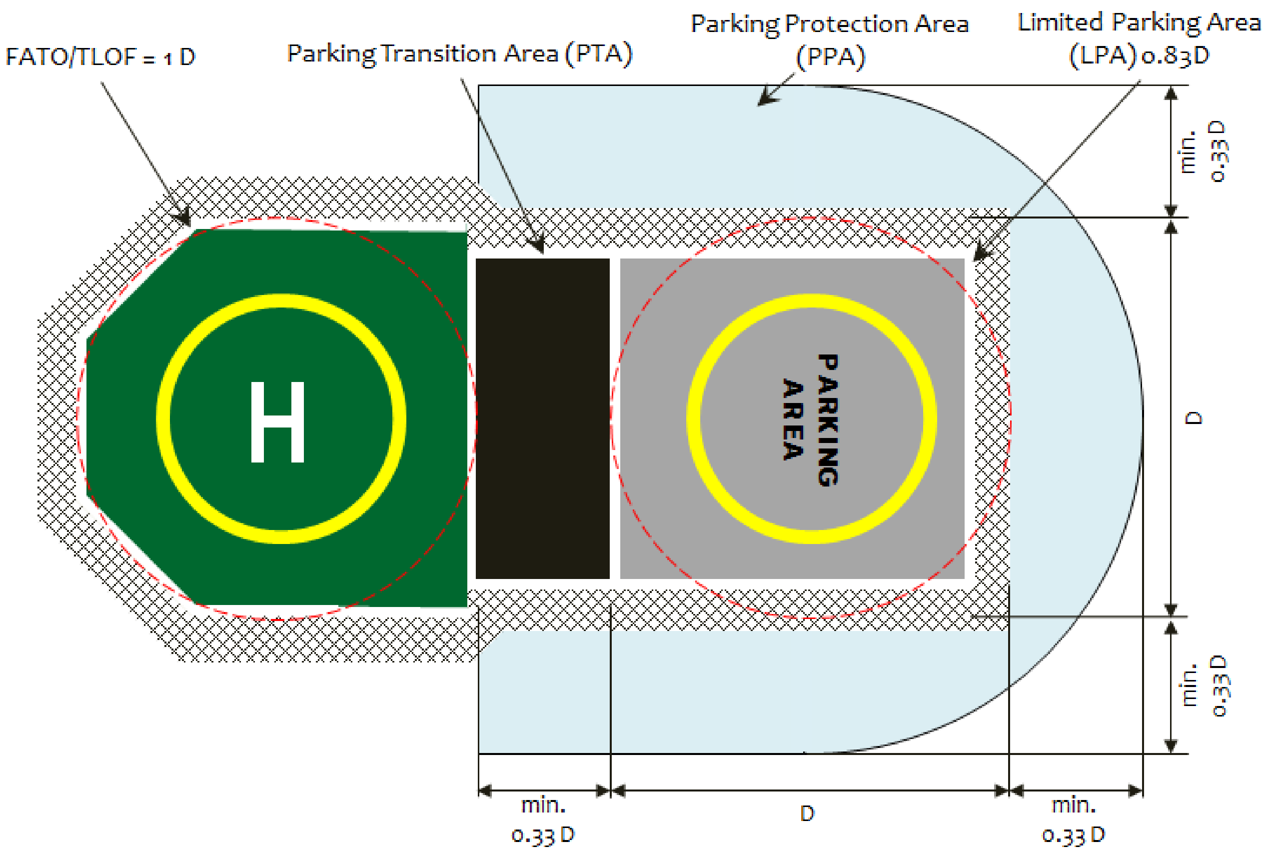


Figure A.1 — 1D FATO, 1D TLOF, and Limited Parking Area of 0.83D

A.2.6 The PTA is an area between the TLOF and the LPA/PIPA used to transition the helicopter to/from the parking area by hover, ground taxi, or ground handling. The PTA divides the TLOF and LPA/PIPA in order to provide a minimum of 0.33D clearance between the parked helicopter and the TLOF perimeter. The PTA surface should be painted in a black color, starting from the perimeter line of the TLOF to the LPA/PIPA perimeter line. The minimum distance from the 1.0D circle to the LPA/PIPA should be 0.33D. Thus, the parking area should be separated from a 1.0D TLOF by a parking transition area (PTA) with a minimum width of 0.33D (see Figure A.1) and from a 0.83D TLOF by a minimum width of 0.415D.

A.2.7 Restrictions on the method of transition and any parking area restrictions should be marked on the PTA (see Figure A.14).

A.2.8 PTAs and PAs shall be surrounded with a safety net or shelf.

NOTE 1 - During normal operations no part of either a helicopter tied down or operating on the helideck should intrude into the PTA except during transition to and from the LPA/PIPA.

NOTE 2 - On Figures A.1 through A.13 and Figure A.16 the dark areas surrounding the TLOF, PTA's and PA's are the required safety net or shelves, although this is not shown in the text on the individual figures.

A.3 Touchdown Parking Circle Marking

A touchdown parking circle (TDPC) should be marked on LPA to provide proper obstacle clearance when the pilot's seat is over the yellow portion of the TDPC. The TDPC should have an inner diameter of 0.5D, line width of 18 in. (45 cm), and the center of the TDPC should be located 0.5D from the LPA perimeter nearest to the TLOF.

A.4 Parking Area Markings

A.4.1 General

As indicated in A.4.2 and A.4.3 there are two parking circle markings that may be added to the TDPC to provide clearances for obstacles that may be adjacent to the parking area.

A.4.2 Parking Circle Orientation Marking

A.4.2.1 The parking circle orientation marking (PCOM) should be a white colored marking on the yellow TDPC as shown in Figure A.2.

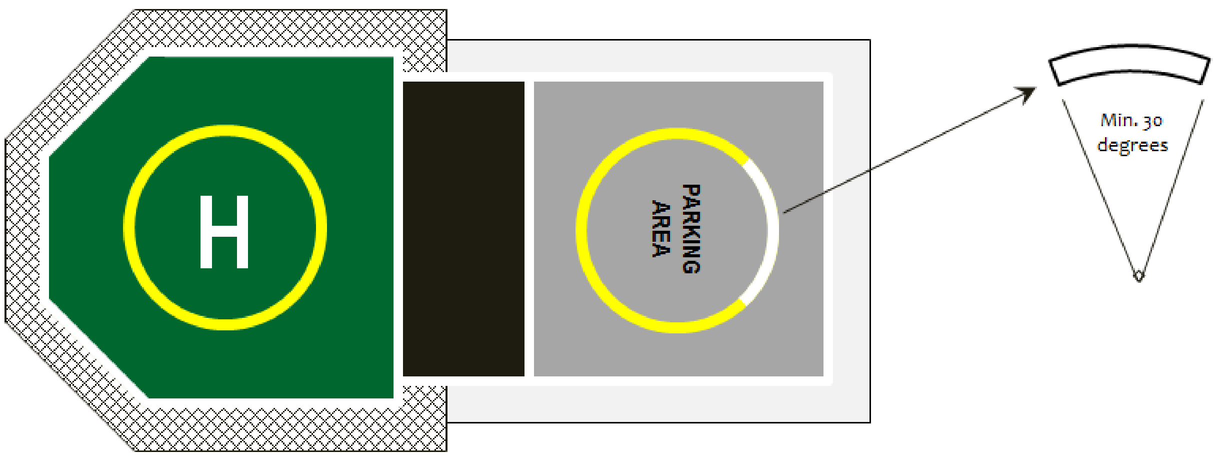


Figure A.2 — Touchdown Parking Circle and Parking Circle Orientation Marking

A.4.2.2 A parking orientation restriction due to an infringement of a clearance area should be marked with a parking circle orientation marking (PCOM). The PCOM is located on the TDPC and provides visual cues to the flight crew that the helicopter needs to be oriented in specific directions before helicopter shutdown (see Figures A.3 and A.4).

NOTE A PCOM is only required if there is an infringement of the 0.33*D* protection area

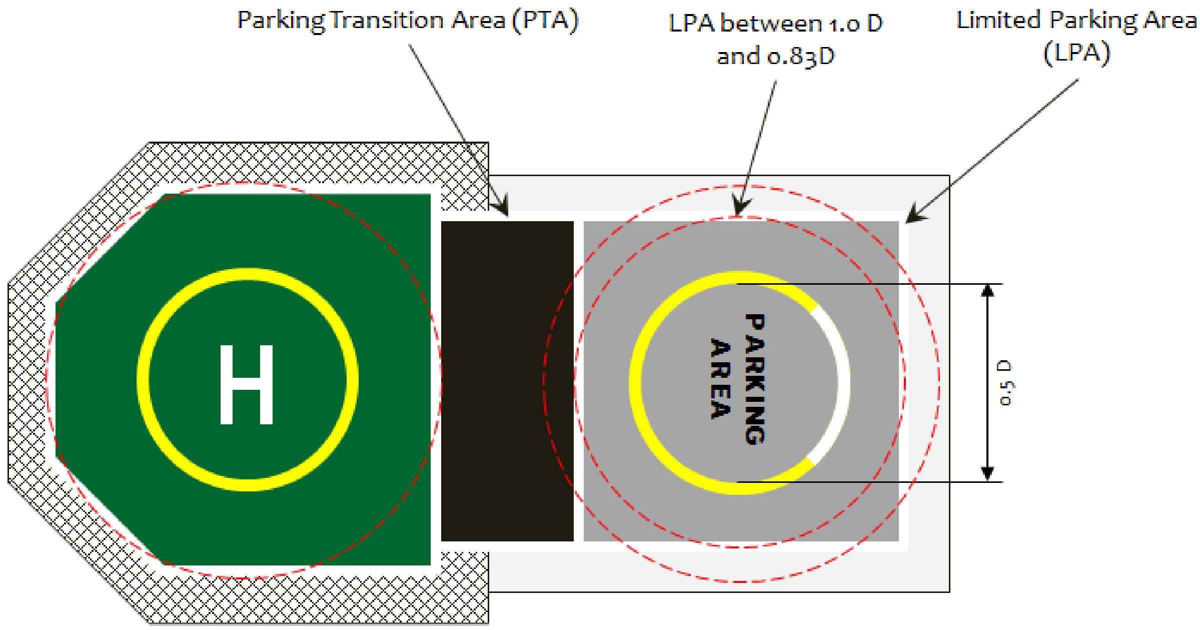


Figure A.3 — Limited Parking Area of 0.83*D* with Parking Circle Orientation Marking

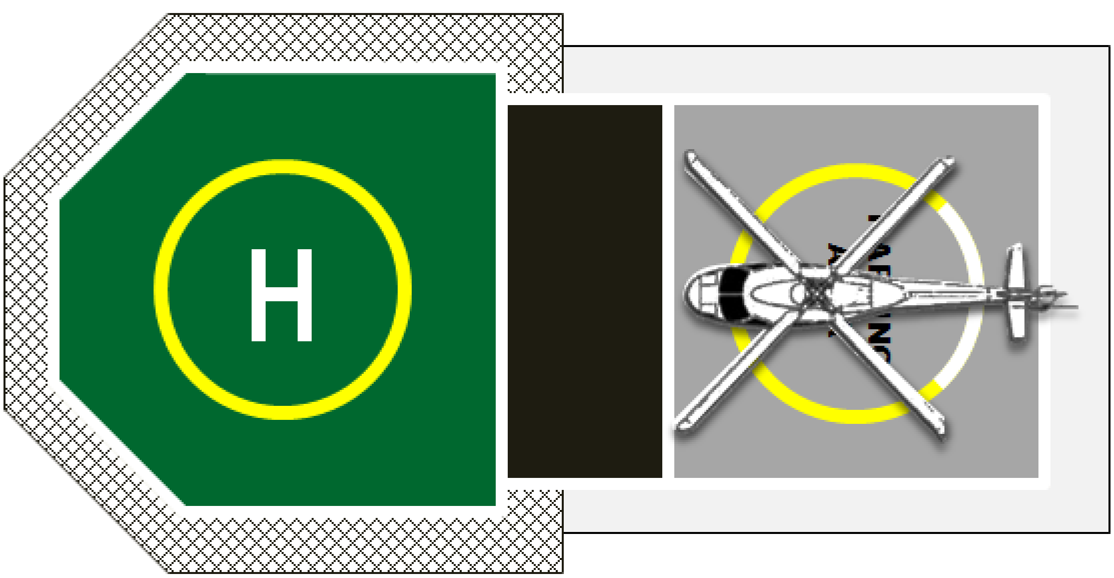


Figure A.4 — Helicopter Parked using Parking Circle Orientation Marking after Maneuvering via Hover Taxi

A.4.2.3 The nose of the helicopter shall be located over the yellow portion of the circle during or while shutdown as shown in Figure A.4.

A.4.2.4 Maneuvering in the LPA using hover or ground taxi is acceptable. The nose of the helicopter should be located over the yellow portion of the TDPC circle when shutdown i.e. the nose of the helicopter should not be located over the white portion of the PCOM circle during or while shutdown. A PCOM marking may be used to avoid the tail rotor being positioned in the vicinity of an exit or emergency exit.

A.4.2.5 The size of the PCOM will depend on the size of the obstacle to be avoided but when used. It is recommended the minimum (angular) size should be 30º.

NOTE - The PCOM provides visual cues to the flight crew that the helicopter needs to be re-oriented before the helicopter is shutdown.

A.4.2.6 Figure A.4 shows a helideck layout with adjacent 0.83D parking area, 1.0D obstacle clearance and 0.33D protection area. The PCOM provides orientation information that prevents a helicopter's tail rotor from being positioned in the parking transition area and infringing on the 0.33D protection area from the TLOF which would limit the use of the TLOF.

A.4.3 No Nose Marking

A.4.3.1 A No Nose marking can be used to avoid the tail rotor being positioned in the vicinity of an exit or emergency exit (see 6.11) or if an obstacle is very near to or infringes the 0.33D protection area.

A.4.3.2 A No Nose marking provides visual cues that the helicopter's nose should not be parked or maneuvered in particular direction. Figures A.5 through A.9 show a helicopter maneuvering and parking orientation restriction, to avoid infringement of the transition area by use of the PCOM marking and use of the No Nose marking to avoid a tail rotor hazard.

A.4.3.3 A No Nose marking should be on a white background with a red border and the words "No Nose" located on the TDPC as shown in Figure A.5, Figure A.6 and Figure A.7. The No Nose marking section on a TDPC should be a minimum of 30º but may be expanded depending on the size of the obstacle. One or multiple obstacles may be covered by this sector.

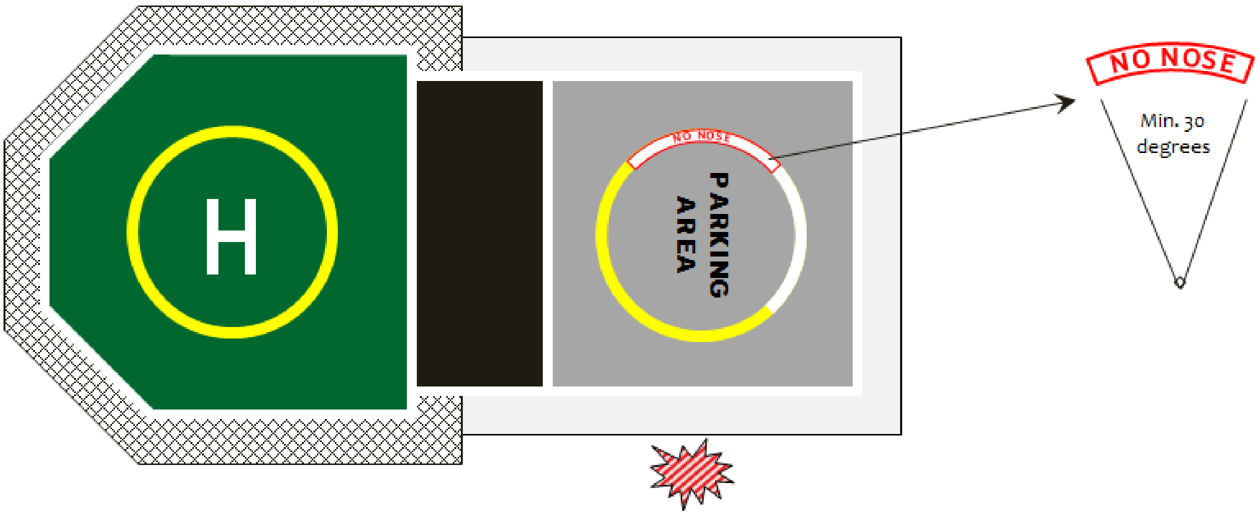


Figure A.5 — No Nose and Parking Circle Orientation Marking

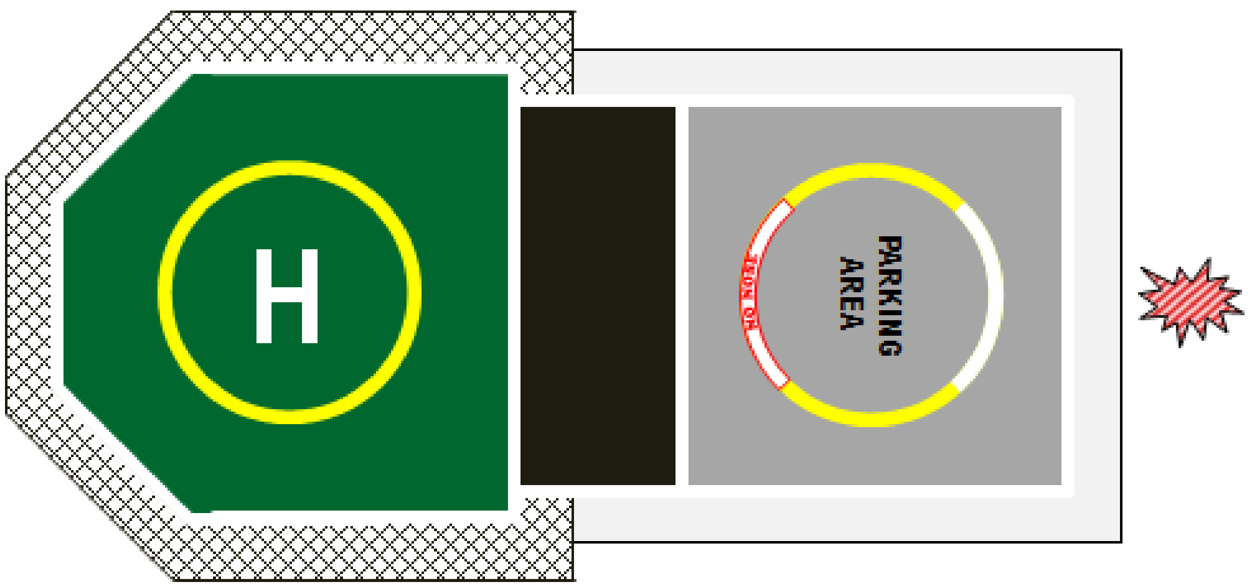


Figure A.6 —"No Nose" Marking and PCOM on TDPC Marking

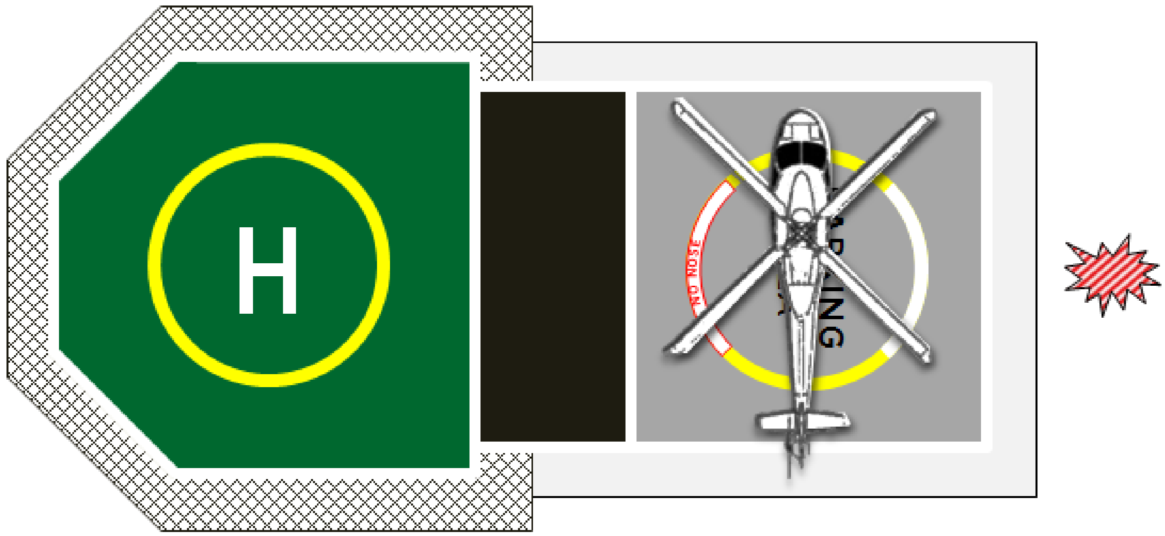


Figure A.7 — No Nose Marking and PCOM on TDPC Marking

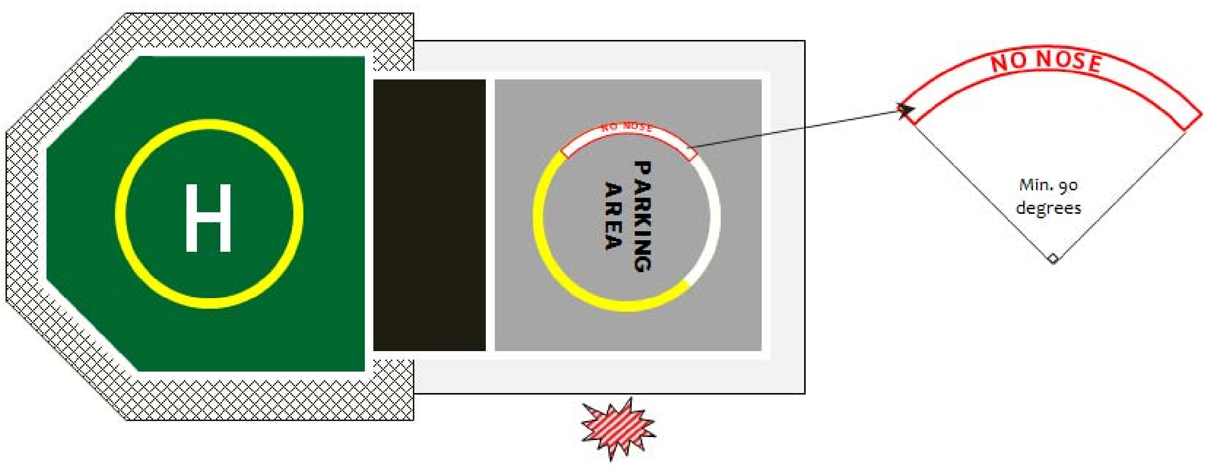


Figure A.8 — No Nose Marking and PCOM on TDPC Marking

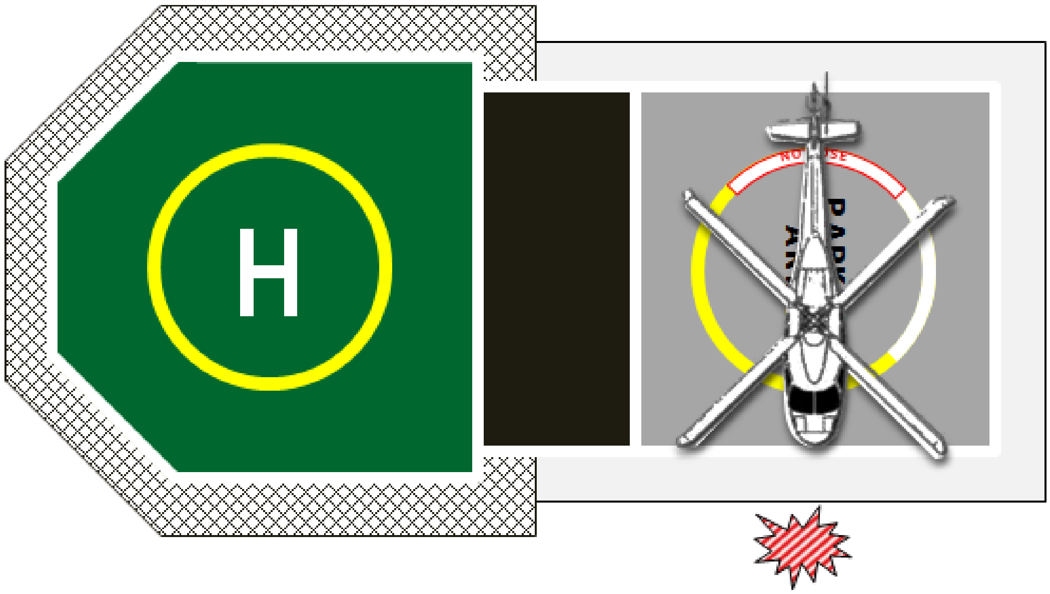


Figure A.9 — No Nose Marking and PCOM on TDPC Marking

A.4.3.4 The size of the ‘No Nose’ marking will depend on the size of the area or obstacle to be avoided by the tail rotor/tail boom. It is recommended the minimum (angular) size should be 30º.

A.4.3.5 The sector of the TDPC, opposite from the obstacle area to be should be bordered in red, with the words “No Nose” clearly marked in red, on a white background as shown above. When positioning over the TDPC, helicopters should be maneuvered so as to keep the aircraft nose clear of the “No Nose” marked sector of the TDPC at all times.

A.4.4 Limited Parking Area and Push-in Parking Area Markings

A.4.4.1 General

Information on the markings required on the parking transition area (PTA) for a limited parking area (LPA) and push-in parking area (PIPA) are given in Figure A.13. The “PARKING AREA” marking should be 24 in. (60 cm) high letters black in color. The words shall be stacked and centered within the touchdown parking circle (TDPC) as illustrated in Figures A.3, A.4, etc.

A PIPA will not have a parking circle and the lettering will be a minimum of 12 in. (30 cm) high letters white in color with a 4 in. (10 cm) brush stroke and a 1.5 in. (4 cm) black outline stating “PUSH-IN AREA”. The words shall be stacked as illustrated in Figure A.10.

A.4.4.2 Push-in Parking Area

The push-in parking area (PIPA) should be a minimum area that will provide un-obstructed clearance for a helicopter (rotors when not turning) to be ground handled to and from the TLOF and the PIPA.

The ability of maintenance personnel to access the helicopter, i.e. work stands, ladders, tools and equipment should be considered when determining the overall size of the push-in parking area. Illustrations of possible push-in parking areas (PIPAs) are shown in Figures A10 to A12.

A 3 ft (0.9 m) wide, solid white edge (buffer) line shall be painted along all three free sides of a push-in parking area and sides of the parking transition area (PTA) to aid ground handlers in safely moving the aircraft. Keeping the landing gear (under carriage) at least 3 ft (0.9 m) inside of the edge of the PIPA. See Figures A10 to A12.

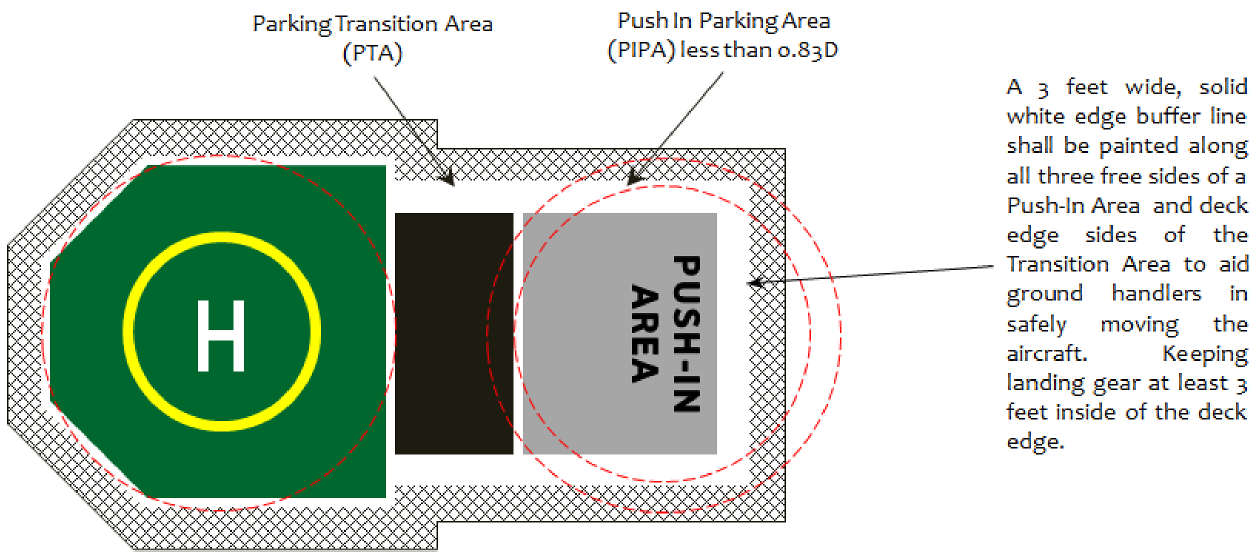


Figure A.10 — Push-In Parking Area

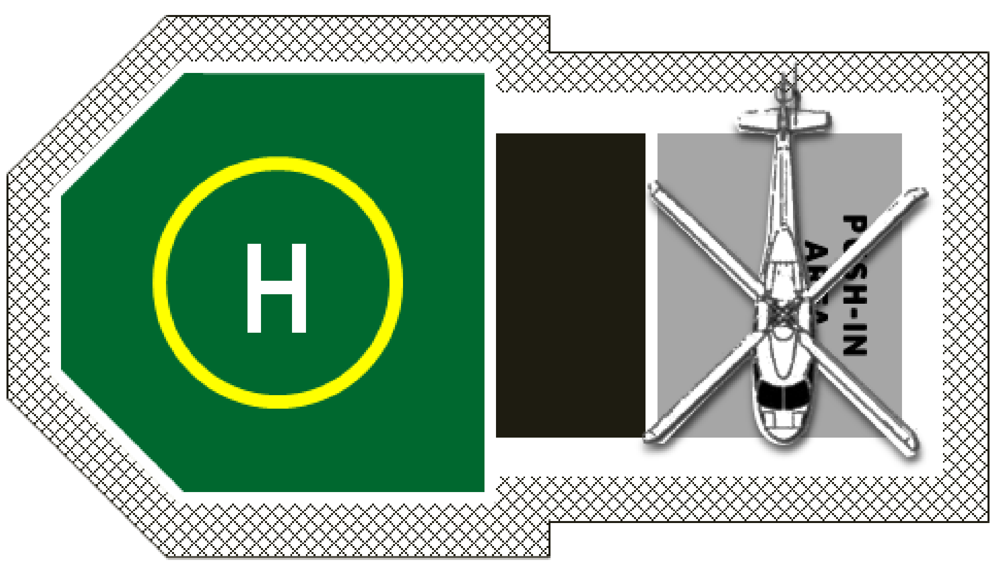


Figure A.11 — Push-In Parking Area

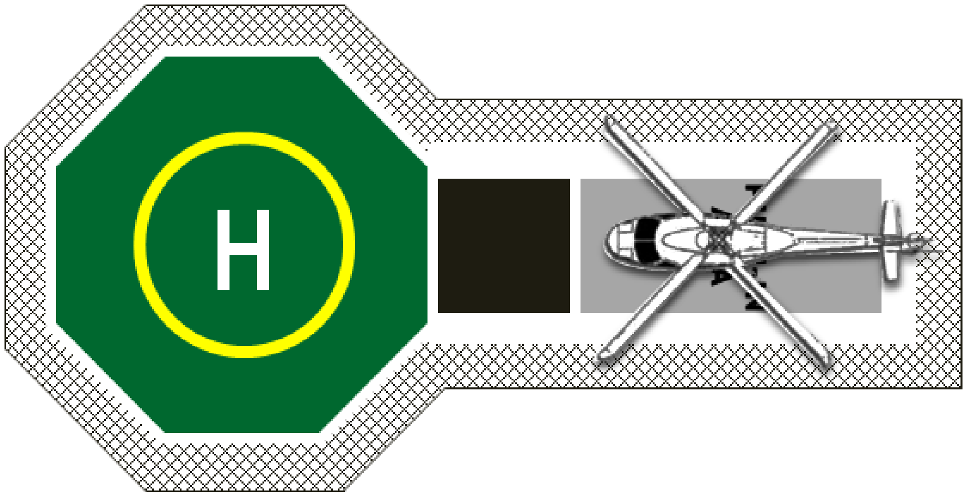


Figure A.12 — Push-In Parking Area

A.4.5 Parking Transition Area Markings

A.4.5.1 One of the following directives should be used to identify the allowed method of transition into the LPA/PIPA. “Push-in Only”, “No Hover Taxi” or “No Ground Taxi”, should be marked on the PTA as shown in Figure A.13. The applicable directive should be marked in text in a white color in the center of the PTA 12” from the TLOF perimeter line with letters 18 in. (0.45 m) high white letters located on a black background as shown in Figure A1.3.

NOTE - If the parking area can accommodate the same size helicopter as allowed on the TLOF without limitations, no markings are necessary

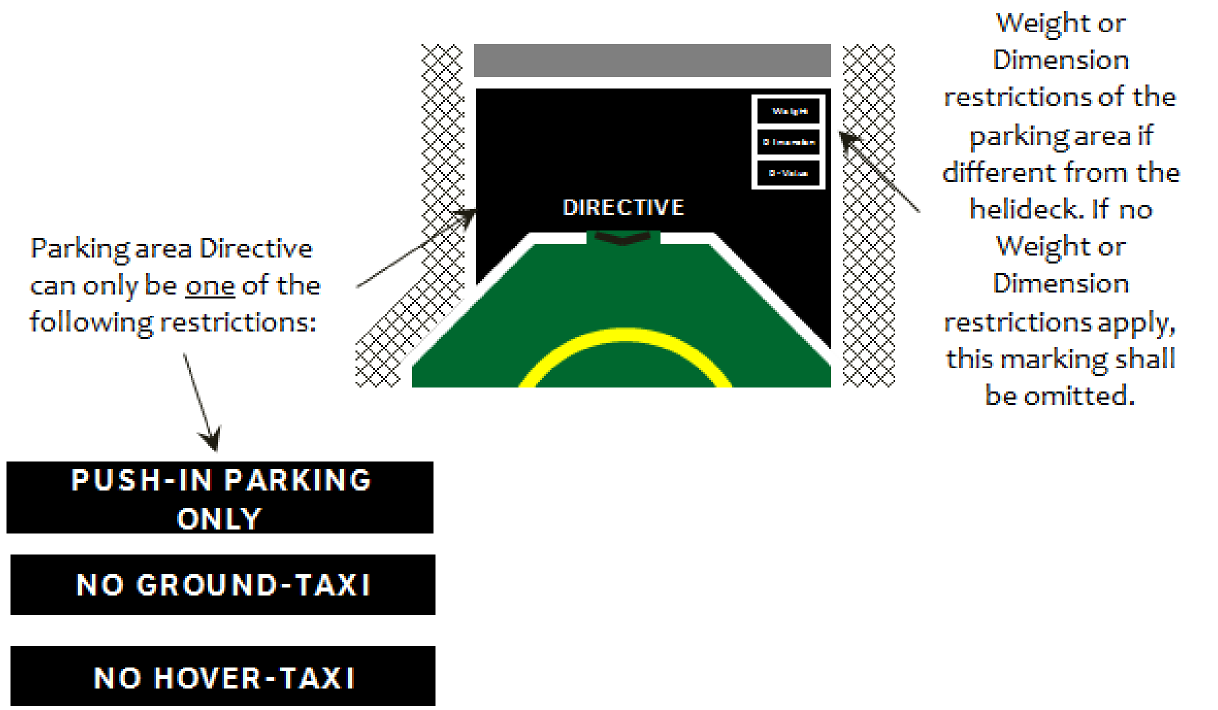


Figure A.13 — Parking Transition Area Markings

A.4.5.2 A limited parking area can be down-sized to accommodate a helicopter with a lesser D-value than then associated with the TLOF (see A.1). In this case, the 'D-value' of the LPA should be marked on the PTA together with, if applicable, the weight (mass) limit and the LPA dimension(s). All three values should be marked in a parking area limitations box, has shown in Figures A.14 and A.15 for imperial units and metric units respectively. The limitations box should be marked on the right hand side of the PTA at a distance of 12 in. (30 cm) from the TLOF perimeter line as shown in Figures A.13 with 18-inch high white letters on a black background with a 4-inch white border located as shown in Figures A.14 and A.15. This serves as a visual warning to the flight crew that is about to transition a helicopter from the TLOF into the LPA.

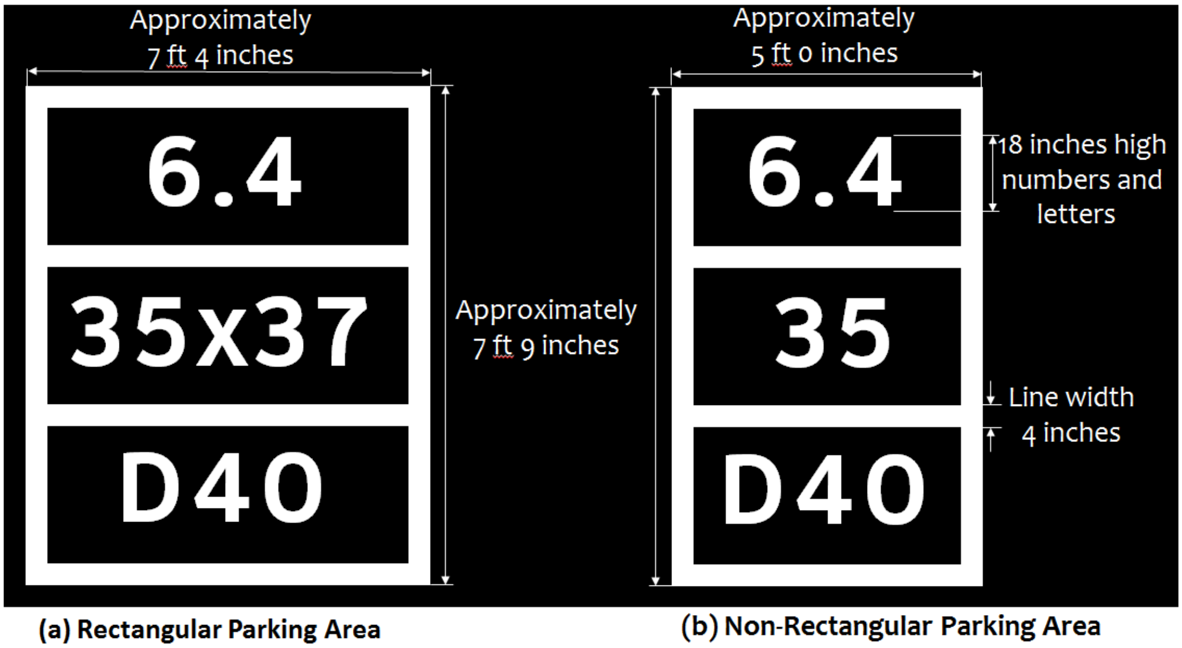


Figure A.14 — Parking Area Size/Weight Markings (U.S. Customary Units)

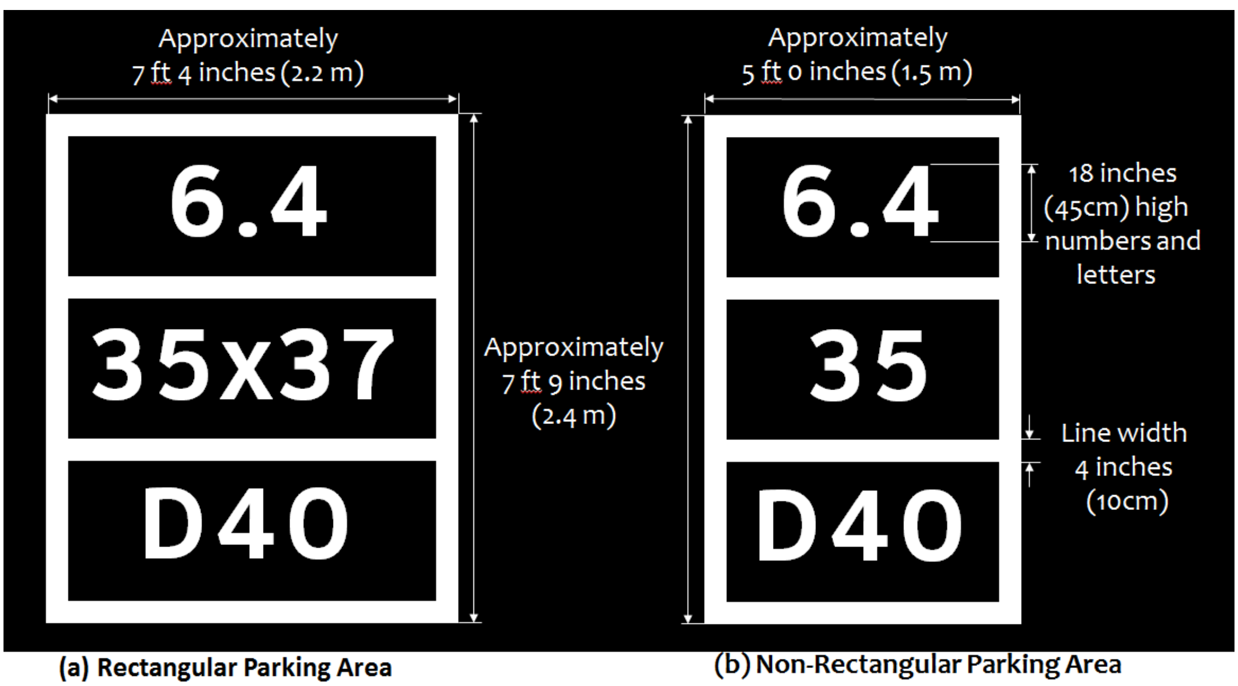


Figure A.15 — Metric Parking Area Size/Weight Markings

A.5 Lighting of Parking Transition Areas with Limited Parking Areas and Push-in Parking Areas

A.5.1 See 7.2 for lighting of a LPA with hover and/or ground taxi.

A.5.2 For PIPA-only areas, the area shall be lit with floodlighting as shown in Figure A.16.

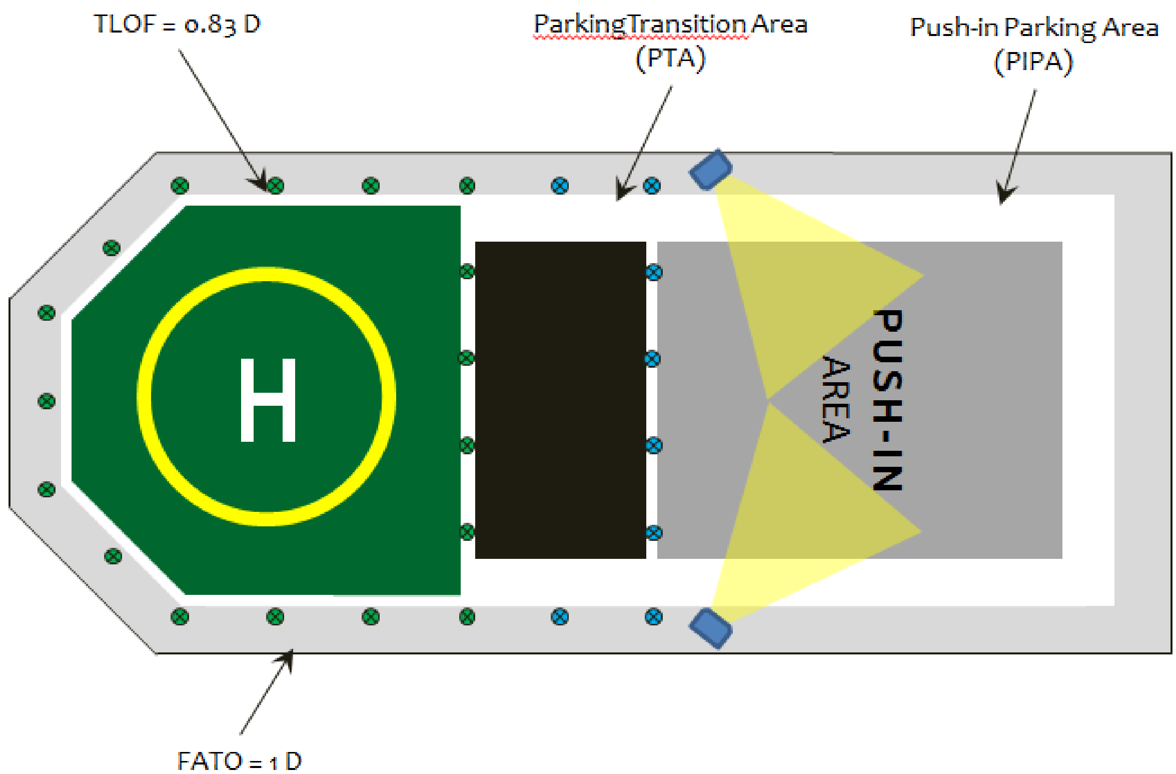


Figure A.16 — Push-in Parking Area Lighting

Annex B

Firefighting Foam Systems

B.1 Siting of Systems

B.1.1 Foam-making equipment should be of adequate performance and be suitably located to ensure an effective application of foam to any part of the landing area irrespective of the wind strength/direction or accident location when all components of the system are operating in accordance with the manufacturer's technical specifications for the equipment.

B.1.2 For a fixed monitor system (FMS), consideration should also be given to the loss of a downwind foam monitor either due to limiting weather conditions or a crash situation occurring. The design specification for an FMS should ensure remaining monitors are capable of delivering finished foam to the landing area at or above the minimum application rate (see B.2). For areas of the helideck or its appendages which, for any reason, may be otherwise inaccessible to an FMS, it is necessary to provide additional hand-controlled foam branches.

B.1.3 Consideration should be given to the effects of the weather on static equipment. All equipment forming part of the facility should be designed to withstand protracted exposure to the elements or be protected from them. Where protection is the chosen option, it should not prevent the equipment being brought into use quickly and effectively. The effects of condensation on stored equipment should be considered.

B.1.4 It is essential that all equipment should be ready for immediate use on, or in the immediate vicinity of, the helideck whenever helicopter operations are being conducted. All equipment should be located at points having immediate access to the landing area and the location of the storage facilities should be clearly indicated. The design placement/layout of all such equipment shall take into consideration the additional space needed to maintain and service equipment.

B.2 Foam Quantities and General Information on Application Rates

B.2.1 The minimum capacity of the foam production system will depend on the D-value of the helideck, the foam application rate, discharge rates of installed equipment and the expected duration of application. It is important to ensure that the capacity of the main helideck fire pump is sufficient to guarantee that finished foam can be applied at the appropriate induction ratio and application rate and for the minimum duration to the whole of the landing area when all helideck monitors are being discharged simultaneously. The foam storage containers and tanks must be correctly labeled.

B.2.2 The application rate is dependent on the types of foam concentrate in use and the types of foam application equipment selected. For fires involving aviation kerosene (jet fuel), ICAO has produced a performance test which assesses and categorizes the foam concentrate. A minimum of five minutes' discharge capability is required.

B.2.3 Most foam concentrate manufacturers will be able to provide the performance of their concentrate against this test. The decision regarding selection of the foam concentrate and type should take into account the design characteristics of the foam system and that mixing of different concentrates in the same tank, i.e. different either in make or strength is not acceptable and there are many different strengths of concentrate available.

B.3 Calculation of Application Rate

Given the remote location of helidecks the overall capacity of the foam system should exceed that necessary for initial extinction of any fire. Foam concentrates compatible with seawater and meeting at least Performance Level B are used. Level B foams should be applied at a minimum application rate of 6.0 L/m^2/min.

The formula for calculating the application rate is as follows.

$$\text{Application rate} = 6.0 \times \pi \times r^2$$

An example calculation for a D-value 22.2 m helideck is as follows.

$$\text{Application rate} = 6.0 \times \pi \times (11.1)^2 = 2{,}322 \text{ L/min}$$

B.4 Calculation of Minimum Operational Stocks

Using the 22.2 meter example as shown in B.4, a 1 % foam solution discharged over five minutes at the minimum application rate will require 2,322 × 1 % × 5 = 116 L of foam concentrate. A 3 % foam solution discharged over five minutes at the minimum application rate will require 2,322 × 3% × 5 = 348 L of foam concentrate.

B.5 Foam Aspiration:

Low expansion foam concentrates can generally be applied in either aspirated or unaspirated form. It should be recognized that while unaspirated foam may provide a quick knockdown of any fuel fire, aspiration, i.e. induction of air into the foam solution by monitor or by hand-controlled foam branch (see below), gives enhanced protection after extinguishment.

NOTE - Wherever non-aspirated foam equipment is selected during design, additional equipment capable of producing aspirated foam for post-fire security/control should be provided.

B.6 Hose Lines and Hand Controlled Monitors:

B.6.1 Not all fires are capable of being accessed by FMS and on some occasions the use of monitors may endanger passengers. Therefore, in addition to FMS, there should be the ability to deploy at least two deliveries with hand-controlled foam branch pipes for the application of aspirated foam at a minimum rate of 225 liters/min through each hose line.

B.6.2 A single hose line, capable of delivering aspirated foam at a minimum application rate of 225 L/min, may be acceptable where it is demonstrated that the hose line is of sufficient length, and the hydrant system of sufficient operating pressure, to ensure the effective application of foam to any part of the landing area irrespective of wind strength or direction.

B.6.3 The hose line(s) provided should be capable of being fitted with a branch pipe capable of applying water in the form of a jet or spray pattern for cooling, or for specific firefighting tactics.

B.7 Deck Integrated Firefighting System

B.7.1 General

B.7.1.1 As an effective alternative to an FMS, facility owners are strongly encouraged to consider the provision of a deck integrated firefighting system (DIFFS). These systems typically consist of a series of pop-up nozzles, with both a horizontal and vertical component, designed to provide an effective spray distribution of foam to the whole of the landing area and protection for the helicopter for a range of weather conditions.

NOTE - DIFFS may pose a roll-over or skid damage hazard to skid equipped helicopters, and the skids may also damage the DIFFS nozzles and this should be considered in the fire protection design risk assessment.

B.7.1.2 Where a DIFFS capable of delivering foam and/or seawater in a spray pattern to the whole of the landing area is selected in lieu of an FMS, the provision of additional hand-controlled foam branch pipes may not be necessary to address any residual fire situation. Instead any residual fire may be tackled with the use of hand-held extinguishers.

B.7.1.3 A DIFFS should be capable of supplying performance level B or level C foam solution to bring under control a fire associated with a crashed helicopter within the time constraints stated in paragraph 4.6.3 of the 2L1 base document achieving an average (theoretical) application rate over the entire landing area (based on the D-circle) of 6.0 liters per square meter per minute for level B foams or 3.75 liters per square meter per minute for level C foams, for a duration which at least meets the minimum requirements stated in paragraph D 2.

B.7.1.4 The overall design of a DIFFS should incorporate a method of fire detection and be configured to avoid spurious activation. It should be capable of manual over-ride by the personnel transported to the facility and from the “mother” installation or from an onshore control room.

B.7.1.5 Similar to a DIFFS provided for manned installation, a DIFFS provided on an NUI needs to consider the eventuality that one or more nozzles may be rendered ineffective by a helicopter crash. The basic performance assumptions stated in this document should also apply for a DIFFS located on an NUI.

B.7.2 Deck Integrated Firefighting System Nozzles

B.7.2.1 The precise number and layout of pop-up nozzles will be dependent on the specific helideck design, particularly the dimensions of the critical area.

B.7.2.2 Nozzles should not be located adjacent to helideck egress points as this may hamper quick access to the helideck by trained rescue crews and/or impede occupants of the helicopter escaping to a safe place beyond the helideck. The number and layout of nozzles should be sufficient to provide an effective spray distribution of foam over the entire landing area with a suitable overlap of the horizontal element of the spray pattern from each nozzle assuming calm wind conditions.

B.7.2.3 In meeting the objective for the average (theoretical) application rate specified in B.7.1.3 for Performance Level B or C foams that there may be some areas of the helideck, particularly where the spray patterns of nozzles significantly overlap, where the average (theoretical) application rate is exceeded in practice. Conversely for other areas of the helideck the application rate in practice may fall below the average (theoretical) application rate specified in B.7.1.3. This is acceptable provided that the actual application rate achieved for any portion of the landing area does not fall below two-thirds of the rates specified in B.7.1.3for the critical area calculation.

NOTE - Where a DIFFS is used in tandem with a passive fire-retarding system demonstrated to be capable of removing significant quantities of unburned fuel from the surface of the helideck in the event of a fuel spill from a ruptured aircraft tank, it is permitted to select a seawater-only DIFFS to deal with any residual fuel burn. A seawater-only DIFFS should meet the same application rate and duration as specified for a Performance Level B foam DIFFS in B.7.1.3.

B.7.2.4 Where an FMS is provided (see B.1.2), the performance specification for a DIFFS needs to consider the likelihood that one or more of the popup nozzles may be rendered ineffective by the impact of a helicopter on the helideck. Any local damage to the helideck, nozzles and distribution system caused by a helicopter crash should not unduly hinder the system's ability to deal effectively with a fire situation. The DIFFS supplier should be able to verify that the system remains fit for purpose, in being able to bring a helideck fire associated with a crashed helicopter under control within 30 seconds measured from the time the system is producing foam at the required application rate for a range of weather conditions (see 4.6.3).

B.8 Foam Equipment Induction Settings and Testing.

B.8.1 Induction equipment ensures that water and foam concentrate are mixed in the correct proportions and the settings of adjustable inductors, if installed, should correspond with strength of concentrate in use.

B.8.2 All parts of the foam production system, including the finished foam from the nozzle, should be tested by a competent person prior to commissioning and the tests should assess the performance of the system against original design expectations while ensuring compliance with any relevant pollution regulations. The documented results of these tests should be supplied to the facility owner.

Annex C

Additional Guidance on Design Procedures for Section 5

NOTE - This annex includes additional guidance on Section 5 of this document. The section numbers correspond to the numbering in the referenced section.

C.5.2.2 Live Load

Areas of the helideck that have loading that exceeds that of the global helideck and global topsides loading (such as fueling stations, firefighting stations, etc.) should be accounted for in the helideck design.

Local and global helideck design live loads: the 40 psf (1.92 kN/m^2) design loads for fixed platforms has been carried-over from previous versions of 2L. The 42 psf (2.01 kN/m^2) for floating platforms is based on the ABS MODU Rules, 2012, Part 3, Chapter 2, Section 2/3.3.1 (3-2-2/3.3.1)

Global topsides/platform design live loads were developed to account for general loading that may be placed on the helidecks during the design life of the structure and are to be 25 % of the global helideck design live loads.

C.5.2.3 Wind Load

Site-specific operational and storm wind loads are preferred; however, API 2MET wind loading may be used if site-specific loading is not available.

The wind area of the helideck framing should be used to determine the extreme storm wind loading on the helideck. For operational load cases, the projected area of the helicopter(s) should be included with that of the framing to determine the wind loading on the helideck.

C.5.2.4 Helicopter Landing Load Considerations

A lateral inertial load of 0.5 times the helicopter weight (mass) should be considered in the local helideck design.

C.5.3 Design Load Conditions

Table 1 is not an exhaustive list of load cases but is provided to indicate the minimum load combinations that should be considered in designing the helideck and the helideck loads applied to the global analysis of the platform. A general description of the load combinations is as follows.

a) General loading with dead loads and rotor downwash/generic global helideck live loads

b) General helideck loading on the global platform analysis. Includes dead load, the global platform live loading, storm wind, and applicable platform motions (minimum 8 directions)

c) This case also applies as an overall case to check the effects of storm winds on the helideck. A one-third allowable stress modifier is used in this case

d) Operational wind case with dead loads and the rotor downwash / generic global helideck live loads and applicable platform motions (minimum 8 directions)

e) Landing loads without wind, but with dead loads and applicable platform motions (minimum 8 directions)

f) Landing loads with operational wind, but with dead loads and applicable platform motions (minimum 8 directions)

TLOF – design the TLOF to one of the cases in Table 1 (1 - 5, A, or B) that produces the most conservative stress ratios (WSD) or most conservative design (LRFD)

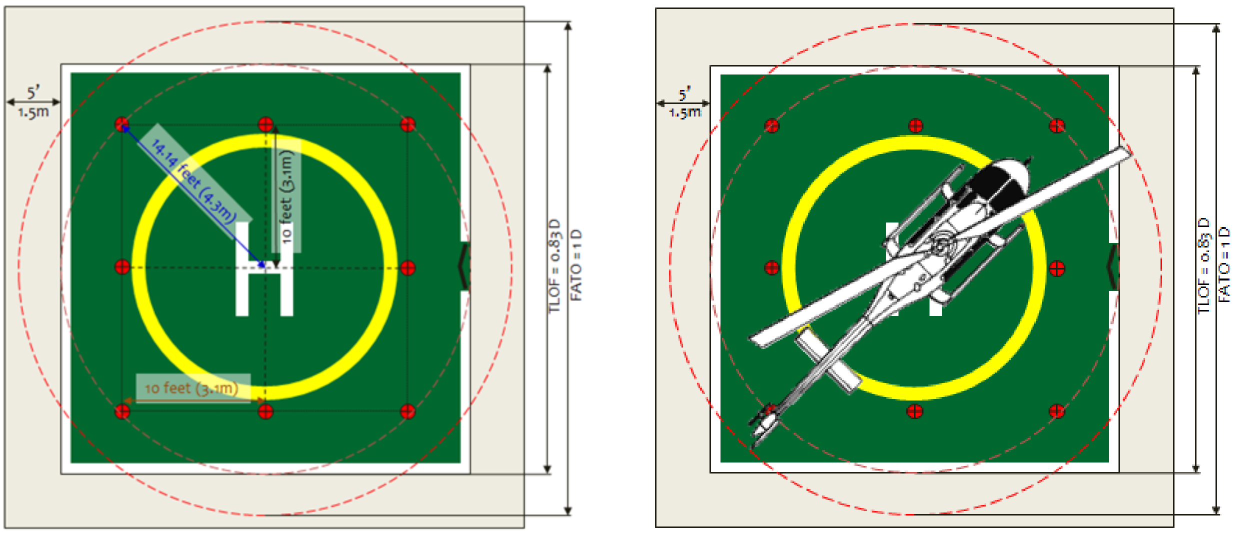
Parking Area A – Landing loads without wind, but with dead loads, helicopter in parking area, and applicable platform motions (minimum eight directions)

Parking Area B – Landing loads with operational wind, but with dead loads, helicopter in parking area, and applicable platform motions (minimum eight directions)

Annex D

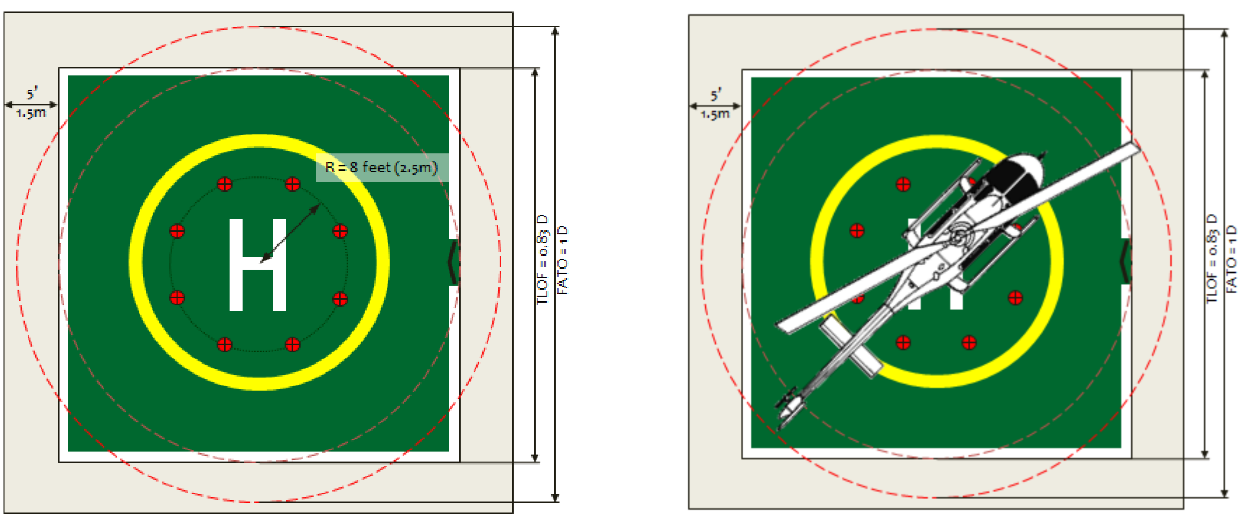
Additional Helideck Tie-down Arrangements

Figures D.1 through D.3 depict additional tie-down arrangements.



a) b)

Figure D.1 — Tie-downs for an Offshore-based Helicopter with 0.83D TLOF



a) b)

Figure D.2 — Tie-downs for an Offshore-based Helicopter with 0.83D TLOF

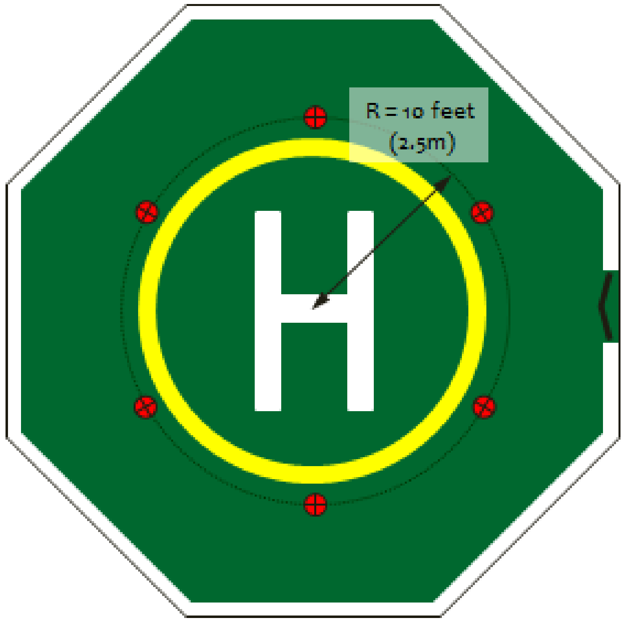


Figure D.3 — Tie-downs for 1.0D TLOF Less Than 40 ft Diameter

Annex E

Helideck Text Fonts

All textual markings on helidecks should use the Clearview Hwy 5-W(R) font type. The Clearview Hwy 5-W variant should be used as the standard font type; however where horizontal spacing has to be reduced in order to keep helideck markings from overlapping, the horizontal width restricted variant Clearview Hwy 5-W(R) may be used. Details regarding the Clearview Hwy 5-W(R) and Clearview Hwy 5-W font types are shown in Table E.1, Table E.2 and Figure E.1.

Table E.1 — Clearview Hwy 5-W(R) Font Spacing Chart

Dimensions in inches

Character	Left	Width	Right	Character	Left	Width	Right	Character	Left	Width	Right
A	0.24	3.76	0.24	a	0.40	2.96	0.40	1	0.28	1.80	0.68
B	0.68	3.04	0.48	b	0.64	2.88	0.48	2	0.36	2.76	0.52
C	0.52	3.28	0.32	c	0.48	2.72	0.28	3	0.32	2.80	0.52
D	0.68	3.24	0.52	d	0.48	2.92	0.64	4	0.36	3.16	0.40
E	0.68	2.56	0.44	e	0.48	2.96	0.48	5	0.48	2.76	0.52
F	0.68	2.44	0.40	f	0.32	1.92	0.28	6	0.52	2.92	0.48
G	0.52	3.48	0.52	g	0.48	2.92	0.64	7	0.28	2.84	0.28
H	0.80	3.08	0.80	h	0.64	2.76	0.64	8	0.52	2.92	0.52
I	0.68	0.80	0.68	i	0.56	0.92	0.56	9	0.48	2.92	0.52
J	0.20	2.24	0.68	j	-0.24	1.76	0.56	0	0.56	3.28	0.56
K	0.68	3.12	0.24	k	0.64	2.84	0.16	&	0.52	3.44	0.28
L	0.68	2.36	0.36	l	0.64	1.28	0.32	!	0.60	1.0	0.60
M	0.68	3.68	0.68	m	0.64	4.52	0.64	"	0.44	2.16	0.44
N	0.68	3.32	0.68	n	0.64	2.76	0.64	#	0.44	3.44	0.44
O	0.52	3.72	0.52	o	0.48	3.08	0.48	$	0.36	2.72	0.36
P	0.68	2.92	0.36	p	0.64	2.92	0.48	¢	0.48	2.60	0.28
Q	0.52	3.72	0.52	q	0.48	3.20	0.36	/	0.32	2.88	0.32
R	0.68	3.00	0.48	r	0.64	1.84	0.28	*	0.48	1.92	0.48
S	0.36	2.88	0.40	s	0.28	2.56	0.40	.	0.44	1.00	0.44
T	0.28	2.88	0.28	t	0.24	1.96	0.36	,	0.40	1.08	0.40
U	0.68	3.12	0.68	u	0.64	2.72	0.64	:	0.44	1.00	0.44
V	0.24	3.40	0.24	v	0.16	3.04	0.16	(	0.48	1.08	0.48
W	0.28	5.32	0.28	w	0.20	4.64	0.20	)	0.48	1.08	0.48
X	0.20	3.44	0.20	x	0.12	3.08	0.12	-	0.60	1.56	0.60
Y	0.16	3.52	0.16	y	0.16	3.12	0.16	@	0.52	4.04	0.52
Z	0.40	2.88	0.40	z	0.36	2.44	0.36	=	0.60	2.40	0.60
								+	0.48	2.68	0.48
								?	0.44	2.56	0.44

Table E.2 — Clearview Hwy 5-W Font Spacing Chart

Dimensions in inches

Character	Left	Width	Right	Character	Left	Width	Right	Character	Left	Width	Right
A	0.36	3.76	0.36	a	0.52	2.96	0.52	1	0.40	1.80	0.80
B	0.80	3.04	0.60	b	0.76	2.88	0.60	2	0.48	2.76	0.64
C	0.64	3.28	0.44	c	0.60	2.72	0.40	3	0.44	2.80	0.64
D	0.80	3.24	0.64	d	0.60	2.92	0.76	4	0.48	3.16	0.52
E	0.80	2.56	0.56	e	0.60	2.96	0.60	5	0.60	2.76	0.64
F	0.80	2.44	0.52	f	0.44	1.92	0.40	6	0.64	2.92	0.60
G	0.64	3.48	0.64	g	0.60	2.92	0.76	7	0.40	2.84	0.40
H	0.80	3.08	0.80	h	0.76	2.76	0.76	8	0.64	2.92	0.64
I	0.80	0.80	0.80	i	0.68	0.92	0.68	9	0.60	2.92	0.64
J	0.32	2.24	0.80	j	-0.12	1.76	0.68	0	0.68	3.28	0.68
K	0.80	3.12	0.36	k	0.76	2.84	0.28	&	0.64	3.44	0.40
L	0.80	2.36	0.48	l	0.76	1.28	0.44	!	0.72	1.00	0.72
M	0.80	3.68	0.80	m	0.76	4.52	0.76	"	0.56	2.16	0.56
N	0.80	3.32	0.80	n	0.76	2.76	0.76	#	0.56	3.44	0.56
O	0.64	3.72	0.64	o	0.60	3.08	0.60	$	0.48	2.72	0.48
P	0.80	2.92	0.48	p	0.76	2.92	0.60	¢	0.60	2.60	0.40
Q	0.64	3.72	0.64	q	0.60	3.20	0.48	/	0.44	2.88	0.44
R	0.80	3.00	0.60	r	0.76	1.84	0.40	*	0.60	1.92	0.60
S	0.48	2.88	0.52	s	0.44	2.56	0.52	.	0.56	1.00	0.56
T	0.40	2.88	0.40	t	0.36	1.96	0.44	,	0.52	1.08	0.52
U	0.80	3.12	0.80	u	0.76	2.72	0.76	:	0.56	1.00	0.56
V	0.36	3.40	0.36	v	0.28	3.04	0.28	(	0.60	1.08	0.60
W	0.40	5.32	0.40	w	0.32	4.64	0.32	)	0.60	1.08	0.60
X	0.32	3.44	0.32	x	0.24	3.08	0.24	-	0.80	1.56	0.80
Y	0.28	3.52	0.28	y	0.28	3.12	0.28	@	0.64	4.04	0.64
Z	0.52	2.88	0.52	z	0.48	2.44	0.48	=	0.72	2.40	0.72
								+	0.60	2.68	0.60
								?	0.56	2.56	0.56

Figure E.1 — Clearview 5-W and 5-W(R) Font Characters

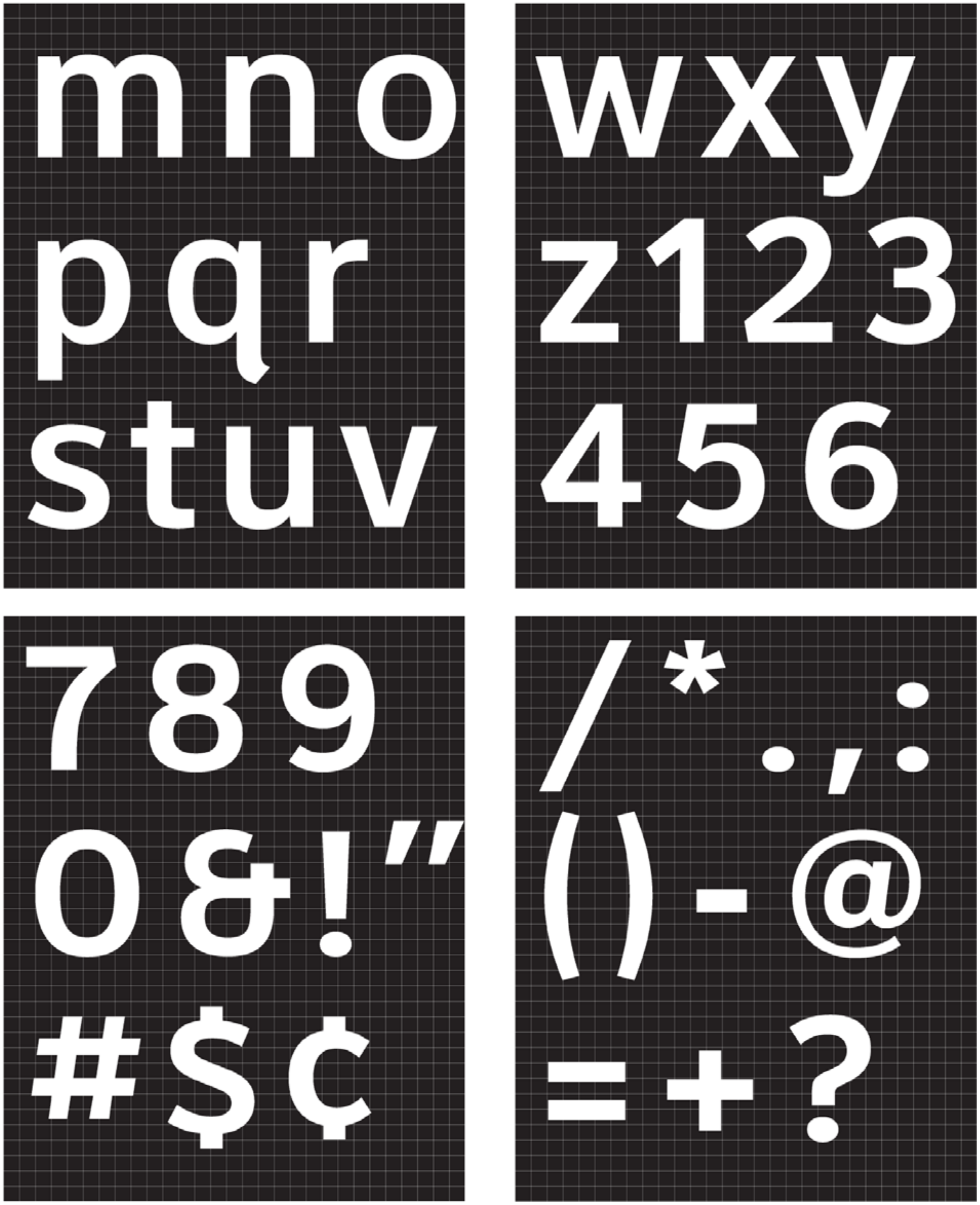


Figure E.1 (cont.) — Clearview 5-W and 5-W(R) Font Characters

Annex F

Perimeter Light Requirements

F.1 General

The intensity and intensity distribution (beam spread) requirements in this document are based FAA Engineering Brief No. 87 that gives recommendation for heliports. The intensity and intensity distribution (beam spread) requirements are considered to be equally applicable to helidecks.

F.2 Light Intensity

The minimum light intensity, as a function of the elevation, is given in Table F.1 and Figure F.1: these values should apply for a full 360º azimuth.

Table C.1 — Light Intensity

Elevation	Minimum Intensity cd	Minimum Average Intensity cd
0° to 15°	10	15
16° to 90°	5	—

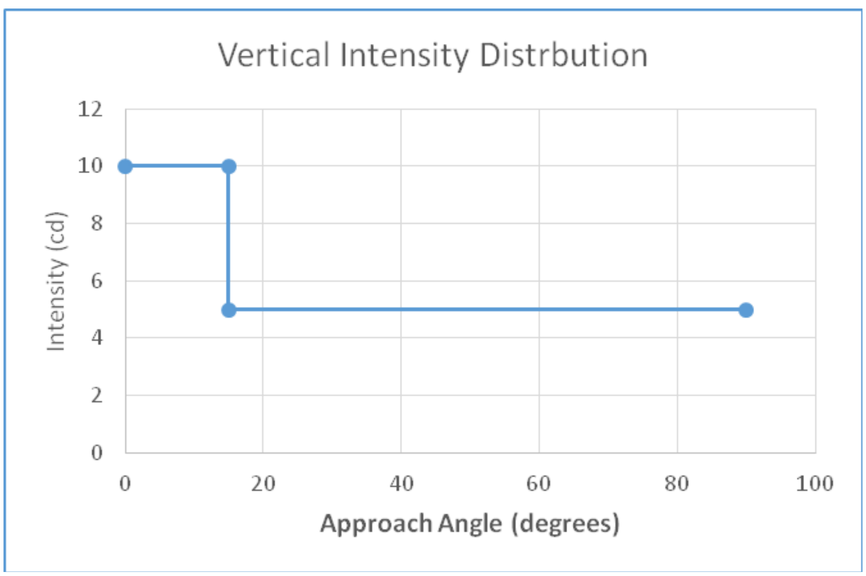


Figure C.1 — Vertical Intensity Distribution

F.3 Color

Perimeter light fixtures that use light emitting diodes (LEDs) must meet the chromaticity requirements for aviation green (TLOF perimeter) and aviation blue (parking area and PTA) requirements in accordance with FAA Engineering Brief No.67. When using incandescent lights the color requirements are defined in SAE AS 25050.

All lighting components and fitments should meet safety regulations relevant to a helideck environment such as explosion proofing and flammability and, as a minimum, be rated Class 1, Division 2 (see 7.2.5, Note 1).

Bibliography

[1] API Recommended Practice 2FPS, *Planning, Designing, and Constructing Floating Production Systems*

[2] API Recommended Practice 2MET, *Derivation of Metocean Design and Operating Conditions*

[3] API Recommended Practice 2TOP,

[4] API Recommended Practice 2T, *Planning, Designing and Constructing Tension Leg Platforms*

[5] API Recommended Practice 14J, *Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities*

[6] API Recommended Practice 500, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2*

[7] API Recommended Practice 505, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1 and Zone 2*

[8] EI 1542, *Identification Markings for Dedicated Fuel Manufacturing and Distribution Facilities, Airport Storage and Mobile Fueling Equipment*

[9] ABS[5] *Rules for Building and Classing Mobile Offshore Drilling Units*

[10] AA[6] ADM-1, *Aluminum Design Manual*

[11] FAA[7] Advisory Circular 150/5390-1B, *Federal Aviation Administration Heliport Design Guide*

[12] FAA Advisory Circular 150/5345-43G, *Specification for Obstruction Lighting Equipment*

[13] FAA Engineering Brief No. 67, *Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures*

[14] FAA Engineering Brief No. 87, *Heliport Perimeter Light for Visual Meteorological Conditions*

[15] ICAO[8] Annex 3 to the Convention on International Civil Aviation (all parts), *Meteorological Information for International Air Navigation*

[16] LDOT[9] *Offshore Heliport Design Guide*

[17] SAE AS 25050, *Colors, Aeronautical Lights and Lighting Equipment, General Requirements*

[5] American Bureau of Shipping,

[6] Aluminum Association,

[7] U.S. Federal Aviation Administration,

[8] International Civil Aviation Organization,

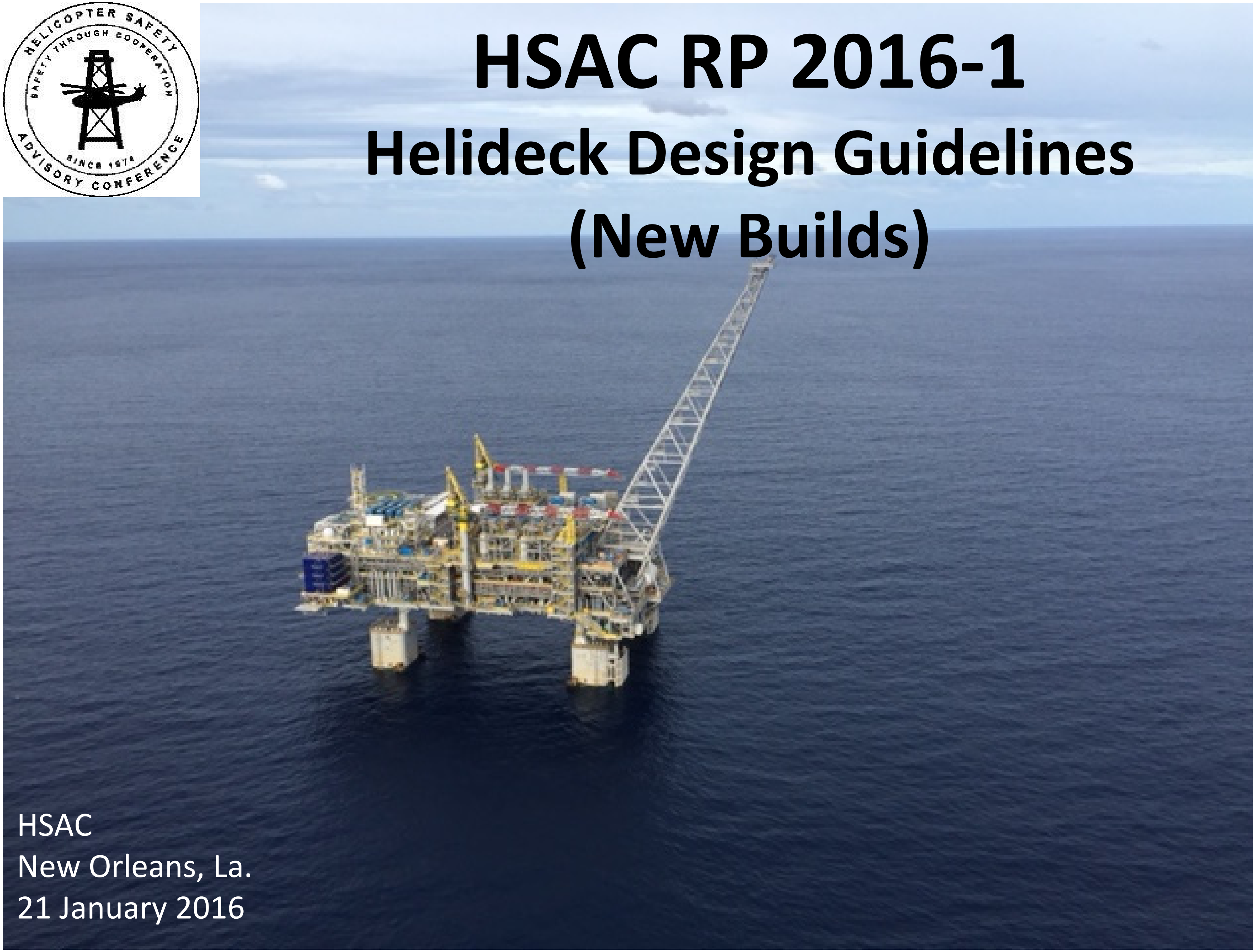
[9] Louisiana Department of Transportation,

[18] UK CAA Paper 2008/03 *Helideck Design Considerations – Environmental Effects*

Attachment #7

HSAC RP 2016-1

Helideck Design Guidelines (New Builds)



HSAC
New Orleans, La.
21 January 2016

API RP-L1 Status

- **Helicopter Safety Advisory Conference (HSAC)**

  Sponsored American Petroleum Institute (API)

  Helideck Recommend Practices Rewrite Work Group

  was formed in November 2012 with Bob Williams (ExxonMobil) as Chair.

- The WG submitted the final document to API for review and formatting in September 2015.
- The document was reviewed and sent to the membership for balloting in October, with a response date of 11 December 2015 (6 weeks).
- Some API members asked for an extension. One was granted by API LT with a new due date of 25 January 2016 (12 weeks).

HSAC WG's (plan forward)

- **API had requested that HSAC take the lead in updating the documents.** The HSAC LT has decided that the document will become a HSAC RP first, and then submitted to API for their review.
- **HSAC** will approach other groups to either sanction or endorse the RP's, i.e. HAI, OGP, HeliOffshore.

HSAC WG's (plan forward)

- **HSAC RP 2016-1- Helideck Design Guidelines (New Builds) -** Completed January 2016
- **HSAC RP 2016-2- Assessment, Upgrades, Modification, Replacement and Marking of Existing and Temporary Helidecks-** WG is in place and Richard Landrum is the lead and LT Cooper leads the Sub-group.

In Progress

- **HSAC RP 2016-3- Inspection, Maintenance and Management of Offshore Helidecks-** Align the RP with current industry best practices. Bill Schroeder (Chevron) and Pat Bosman (Shell) are co-chairs.

Pending

HSAC RP’s

- Create an Archived folder on the HSAC website with reference that the RP has been updated or superseded.

Examples: RP 2013-1 updated and embedded in RP 2016-1

RP 2008-1 revision RP 2008-1r1

- Several HSAC RP’s will be updated and embedded in RP 2016-3.

Examples:

94-1 HELICOPTER RAPID REFUELING PROCEDURES (HRR)

93-2 OFFSHORE HELIDECKS / LANDING COMMUNICATIONS

92-5 CLOSED HELIDECKS/HELIPORTS , HELIDECK/HELIPORT OPERATIONAL HAZARD WARNING(S)/PROCEDURE(S)

HSAC RP 2016-1
(Highlights)

Deck Integrated Fire Fighting System

Highlights

Largely aligned with existing FAA and International requirements for markings, lighting, and Fire Protection.- LOS, OFS, and dropdown protected areas are well defined, as well as the size of all markings.

Minimum Deck size–Helidecks for Helicopters under 7000Lbs. are designed to Rotor Diameter (RD) with solid shelving. Larger Helicopters will be sized to accommodate a helicopter to one diameter.

TDPM/Aiming Circle– Reduced size to 18 inches from 36 inches, aligns with the FAA Advisory Circular.

Helideck Fonts- All Names and numbers on the helideck will be identified by using a common font that has been adopted by the USDOT and TC for highways. Parking area - RP 2013-1 has been embedded into RP 2016-1.

Parking area - RP 2013-1 has been embedded into RP 2016-1.

HSAC RP 2008-1 (revision)

1: Background

The aim of the study reported in this Note was to develop a Touchdown Position Marking (TDPM) for helidecks with a TLOF of 0.62D i.e. a TLOF of sufficient size to contain a circle of 0.62D of the largest helicopter that will use the helideck. It is proposed that this marking should apply to all helidecks with a TLOF between 0.62D and 0.82D.1

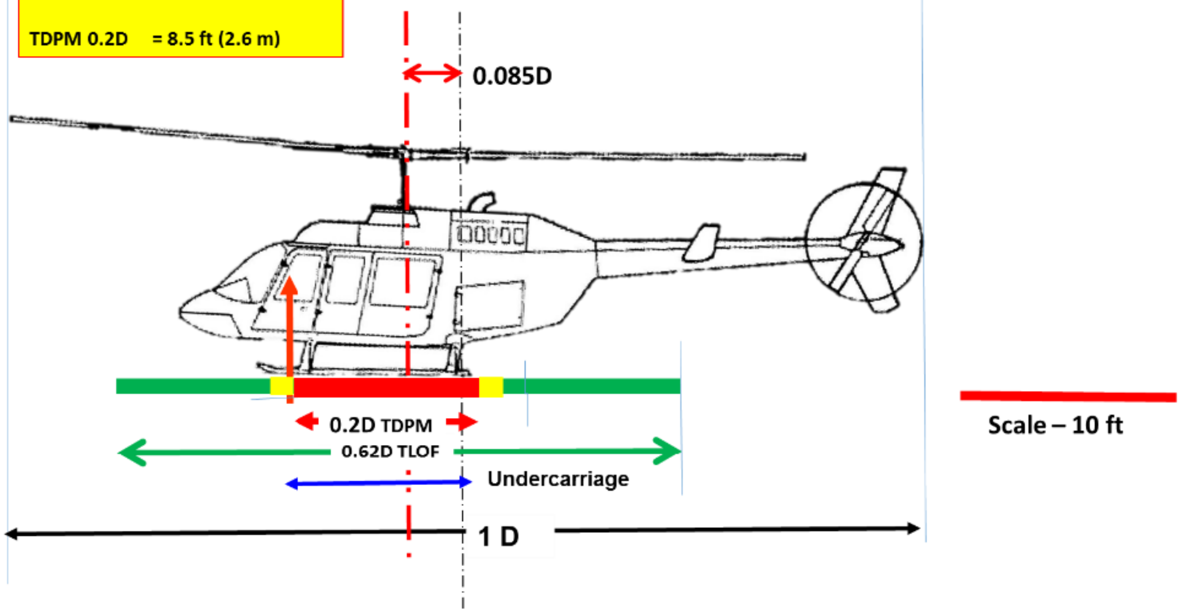
For helidecks with a TLOF of less than 0.62D it is proposed that any TDPM should be developed on an individual basis by accessing the requirements associated with the helicopters planned to be used on such a helideck.

HSAC RP 2008-1 (revision)

The structure owners, with operator agreement wanted a more manageable TDPM for the smaller helidecks.

D	= 42.5 ft	[12.9 m]
RD	= 37.0 ft	[13.4 m]
0.83D	= 35.2 ft	[10.7 m]
0.62D	= 26.3 ft	[8.0 m]
1/3 RD	= 12.3 ft	(3.8 m)
TDPM 0.2D	= 8.5 ft	(2.6 m)

Bell 206 L4 – D = 42.5 ft (12.9 m)
1D FATO/0.62D TLOF



Undercarriage locations for the Bell 206 L4 with 0.2D TDPM

HSAC RP 2016-2

Assessment, Upgrades, Modification, Replacement and Marking of Existing and Temporary

HSAC Contributors – 2015

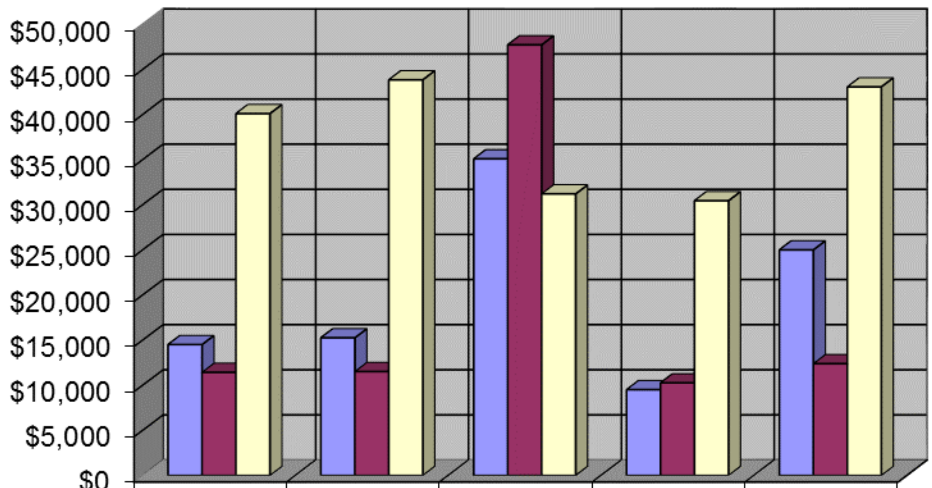
Anadarko Petroleum Corporation	$1,000
Blue Sky Innovations, Inc.	$1,000
Bristow US LLC	$1,000
Cenergy International Services, LLC (ACH)	$1,000
Chevron North America E&P	$2,000
Construction Helicopters (ACH)	$1,000
Dart Aerospace Ltd.	$1,000
Energy Transfer	$500
Eni US Operating Company (ACH)	$1,000
ExxonMobil	$1,000
Genesys Aerosystems	$1,000
Island Operating Company, Inc.	$500
Mayeux Flying Services, Inc.	$2,000
Metro Aviation, Inc.	$1,000
Oceaneering International, Inc.	$1,000
Panther Helicopters, Inc.	$1,000
PHI, Inc.	$1,000
Shell E&P (USA)	$5,000
TransCanada Pipelines Limited	$1,000
Westwind Helicopters, Inc.	$1,000
Total:	**$25,000**

2015 HSAC Bank Account Activity
1 January – 31 December

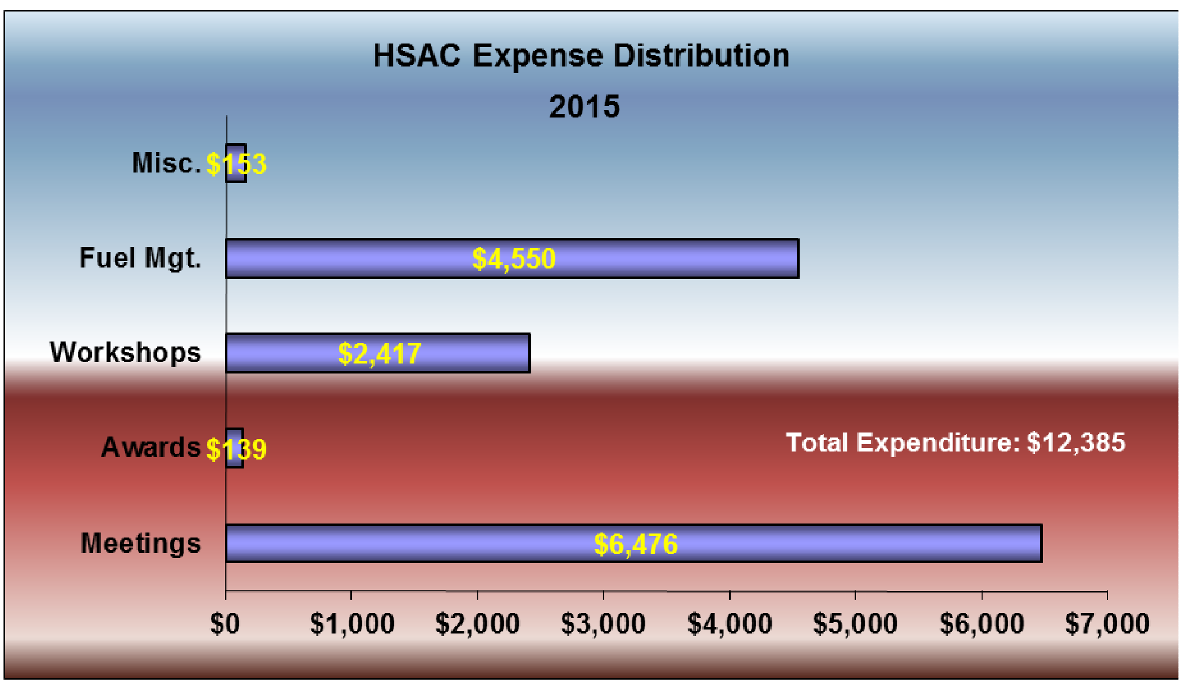
Opening Year Balance	**$ 30,440.02**
Contributions	**$ 25,000.00**
Expenditures	**$ 12,385.03**
To Date Balance	**$ 43,054.99**
Net Difference	**$ 12,614.97**

2015 Summary
1 January – 31 December

HSAC Contributions vs. Expenses



	2011	2012	2013	2014	2015 YTD
Contributions	$14,500	$15,250	$35,083	$9,500	$25,000
Expenses	$11,423	$11,508	$47,724	$10,260	$12,385
Balance	$40,098	$43,840	$31,200	$30,440	$43,055



IRS Tax Status

2014 Taxes – Filed and Accepted

Urban Institute

e-Postcard
file your electronic IRS Form 990-N

Home | Support | Links | Log Out

Check Filing Status

HELICOPTER SAFETY ADVISORY CONFERENCE
76-0189780
2015 IRS Form 990-N (e-Postcard)
1/1/2015 - 12/31/2015

Links

Control Panel

View e-Postcard Image

View Form 990-N (e-Postcard)

Current Status: Accepted

Congratulations, the IRS accepted your Form 990-N (e-Postcard).

Next Step: Your next e-Postcard will be due after 12/31/2016.

Delivery Status

No.	Filing	Delivery	Status	Postmark
1	Form 990-N	E-file	Accepted on 1/9/2016	1/9/2016 2:13:05 PM

Questions or problems regarding this web site should be directed to Tech Support
Concerned about your privacy? Please view our privacy policy.
This website is best viewed with Microsoft Internet Explorer 6.0+ or Mozilla Firefox with a screen resolution of 1024 X 768.
Last modified: December 31, 2015.

Helicopter Safety Advisory Conference
HSAC

ASRI Ground Station Inspection Program

January 2016, New Orleans, La.

An Introduction to Aviation Spectrum Resources, Inc.

Michael Hinojosa
ASRI Operations Manager

ASRI Overview

- ASRI's History
- The Company Today
- VHF Services
- Aeronautical Frequency Committee
- SELCAL

The History of ASRI

- ARINC was established in 1929 as a Frequency Manager and Communications Company for the Aviation Industry.
  - ASRI was spun off as separate company 1 Jan 2006
  - Maintained US airline control over frequencies
- Licensee for the Aeronautical Operational Control (AOC) frequencies in CONUS
  - 128.825-132.000 and 136.500-136.975 MHz
- Sponsors the Aeronautical Frequency Committee (AFC)
  - Represents the interests of the US aviation industry domestically and internationally
- Worldwide SELCAL registrar for ICAO

ASRI Today

- ASRI owned and managed by the US commercial aviation industry
  - Industry-wide support from stockholders across major US airlines and manufacturers
  - Board of directors comprised of DAL, AA, UA and USA
- Directed to promote and protect civil aviation's spectrum operations
  - Promote the spectrum requirements of commercial aviation in domestic and international forums
  - Defend commercial aviation's existing use of spectrum, particularly HF and VHF aeronautical enroute services.
  - Coordinate and respond to FAA communications and navigation initiatives
  - Provide technical assessment and responses to FCC and NTIA rulemakings, applications, and other proceedings affecting civil aviation use of radio spectrum
- Independent representation of US commercial aviation interests
  - Recognized Operating Agency membership of the ITU
  - Takes into account ICAO and US national positions

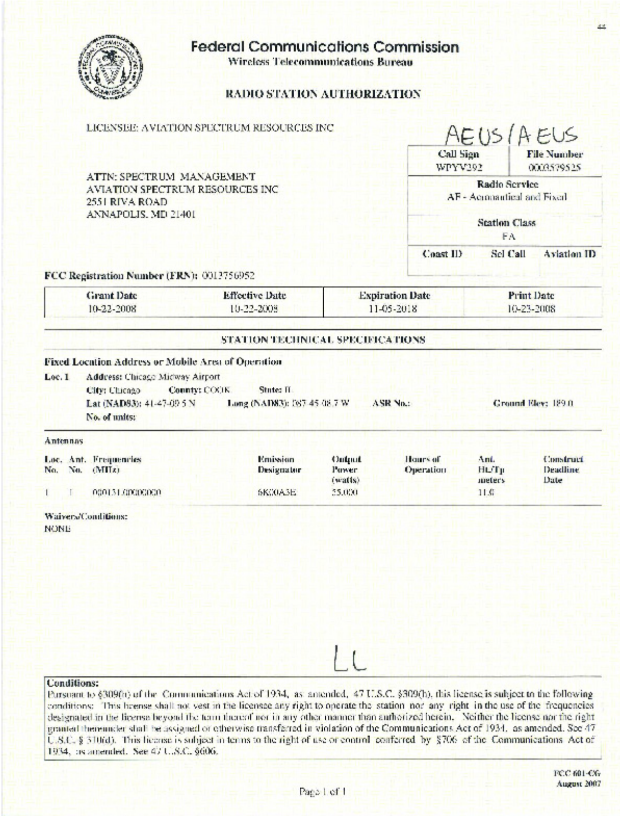
ASRI Aviation Spectrum Resources, Inc.

ASRI VHF Services

- Licensee for US AOC spectrum in 128.825-132.000 and 136.500-136.975 MHz
  - CFR 47 and CFR 14 regulations
- Current customers
  - Airlines
  - Helicopter Operators
  - FBO’s
  - Corporate aviation
  - DSPs
    - ARINC
    - SITA

Frequency Assignment Process

- Frequency requested via ASRI website
  - Service contract
  - Frequency coordinated with existing assignments and AFC policy
  - License request sent to FCC
    - Temporary authority can be issued immediately if required
  - Standard 10yr license issued
- Regular station inspections
  - Confirm compliance with the FCC and AFC license conditions



44

Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: AVIATION SPECTRUM RESOURCES INC

AEUS / AEUS

Call Sign	File Number
WPYV292	0003579525

Radio Service
AF - Aeronautical and Fixed

Station Class
FA

Coast ID	Sel Call	Aviation ID

ATTN: SPECTRUM MANAGEMENT
AVIATION SPECTRUM RESOURCES INC
2551 RIVA ROAD
ANNAPOLIS, MD 21401

FCC Registration Number (FRN): 0012756952

Grant Date	Effective Date	Expiration Date	Print Date
10-22-2008	10-22-2008	11-05-2018	10-23-2008

STATION TECHNICAL SPECIFICATIONS

Fixed Location Address or Mobile Area of Operation
Loc. 1 **Address:** Chicago Midway Airport
City: Chicago **County:** COOK **State:** IL
Lat (NAD83): 41-47-09.5 N **Long (NAD83):** 087-45-08.7 W **ASR No.:** **Ground Elev:** 189.0
No. of units:

Antennas

Loc. No.	Ant. No.	Frequencies (MHz)	Emission Designator	Output Power (watts)	Hours of Operation	Ant. Ht./Tp meters	Construct Deadline Date
1	1	000131.00000000	6K00A3E	55.000		11.6	

Waivers/Conditions:
NONE

LL

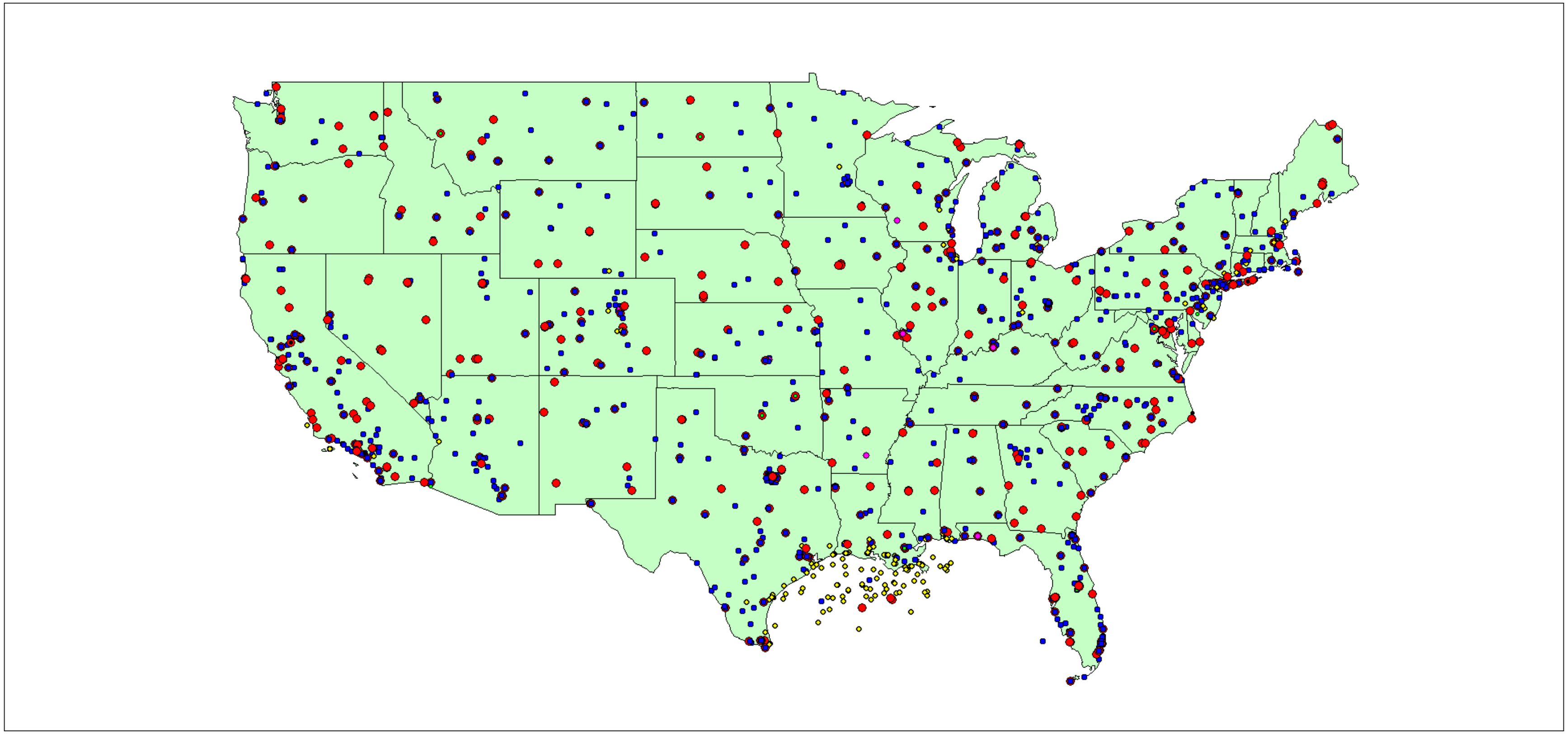
Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

FCC 601-CG
August 2007

Page 1 of 1

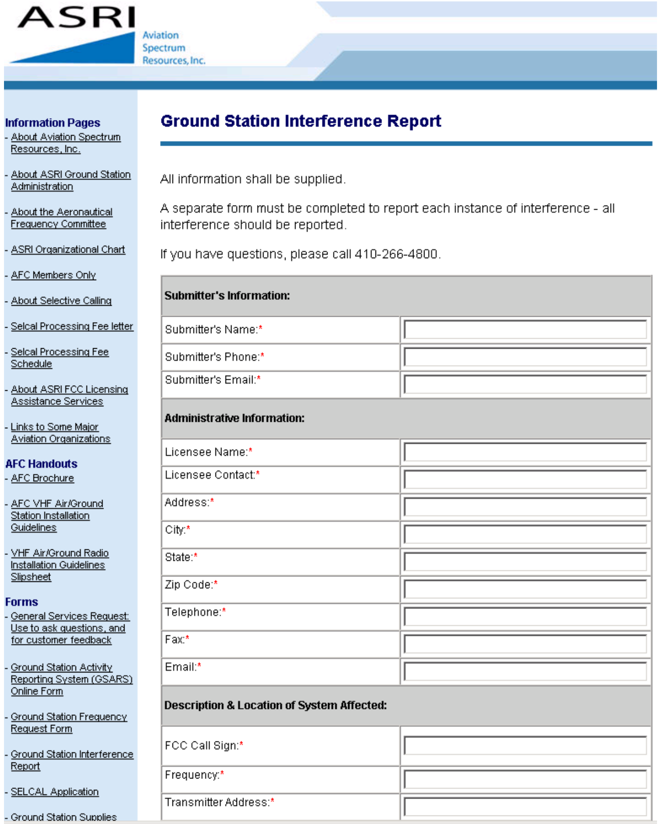
ASRI
Aviation Spectrum Resources, Inc.

ASRI LICENSED STATIONS CONUS



Interference resolution

- Formal report by customer through ASRI website
  - ASRI provides initial technical support
  - Technician dispatched if unable to resolve remotely


ASRI Aviation Spectrum Resources, Inc.

Information Pages
- About Aviation Spectrum Resources, Inc.
- About ASRI Ground Station Administration
- About the Aeronautical Frequency Committee
- ASRI Organizational Chart
- AFC Members Only
- About Selective Calling
- Selcal Processing Fee letter
- Selcal Processing Fee Schedule
- About ASRI FCC Licensing Assistance Services
- Links to Some Major Aviation Organizations

AFC Handouts
- AFC Brochure
- AFC VHF Air/Ground Station Installation Guidelines
- VHF Air/Ground Radio Installation Guidelines Slipsheet

Forms
- General Services Request: Use to ask questions, and for customer feedback
- Ground Station Activity Reporting System (GSARS) Online Form
- Ground Station Frequency Request Form
- Ground Station Interference Report
- SELCAL Application
- Ground Station Supplies

Ground Station Interference Report

All information shall be supplied.

A separate form must be completed to report each instance of interference - all interference should be reported.

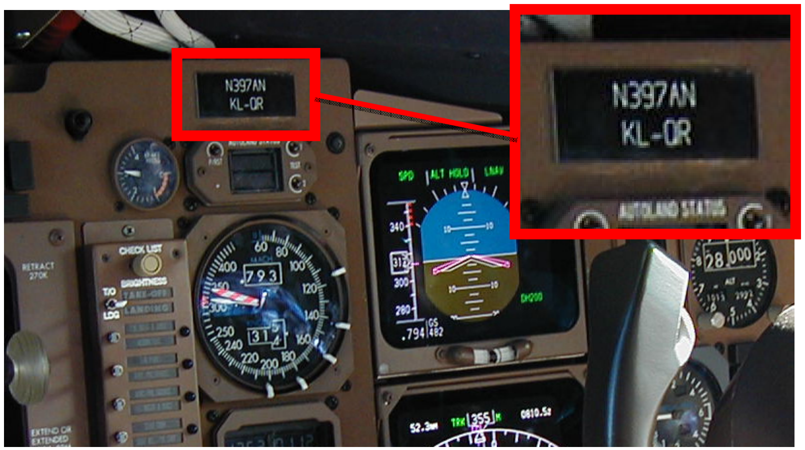
If you have questions, please call 410-266-4800.

Submitter's Information:	
Submitter's Name:*	
Submitter's Phone:*	
Submitter's Email:*	
Administrative Information:	
Licensee Name:*	
Licensee Contact:*	
Address:*	
City:*	
State:*	
Zip Code:*	
Telephone:*	
Fax:*	
Email:*	
Description & Location of System Affected:	
FCC Call Sign:*	
Frequency:*	
Transmitter Address:*	

Aeronautical Frequency Committee

- ASRI sponsors the commercial aviation industry committee
  - Membership composed of airlines and representatives of various aviation user groups
  - FAA and IATA attend as observers to provide advice
  - Meets three times a year for regular coordination
- Develops US aviation industry policy related to allocation, assignment and use of radio frequency spectrum for ASRI
  - Discussion and policy development for aviation communication issues across all aviation sectors
    - Special focus on VHF management
    - Agreed industry policy recorded in the AFC Manual
  - Supports and endorses ASRI's work in domestic and international regulatory forums (FCC, ICAO, ITU)

SELCAL



- Selective Calling (SELCAL) system permits selective calling of individual aircraft over a shared channel
- ASRI is the official ICAO sponsored SELCAL Registrar for all aircraft worldwide
- Primarily HF usages for oceanic routes
  – Regular VHF use in China
- Shortage of available codes for assignment
  – ASRI is sponsoring ICAO work to expand number of available codes
  – Currently initiating RTCA and AEEC work to create new standard
  – ICAO have agreed a Sept 2016 implementation

ASRI Summary

- Represents US commercial airlines views on spectrum management
  - AFC guides and provides industry-wide endorsement of ASRI’s work
- Involved in multiple international and national aviation committees
  - Independent membership of ITU for aviation focused approach

Ground Station Inspections for oil platforms

- Each year ASRI conducts about 1,000 ground station inspections of ASRI licensed stations to Confirm compliance with the FCC and AFC license conditions.
- Ground Station Inspections verify:
  - Location of radio
  - Operational Frequency
  - Radio equipment
  - Station Representative
- Due to oil platforms access inspections are difficult.
- ASRI would like to have inspections done while other activities are being carried out, maintenance or other inspections.

Station Requirements Summary

The following items should be checked as an inspection guide:

1. Is the Station License posted prominently at the primary control point?
2. Is Station access properly controlled?
3. Are Restricted Area signs properly posted?
4. Is there a current copy of *ASRI Aeronautical Ground Station Manual* available at the Station?
5. Is the transmitter approved by the Federal Communications Commission (FCC)?
6. Is the transmitter output power within authorized limits shown on the station license?
7. Is the Station operating on the authorized frequency/frequencies?
8. Is the operating frequency prominently posted on the transmitter?

Station Requirements Summary (Continued)

9. Ensure the Station's records up to date, record any changes in:

   a. Company name and/or address

   b. Station location (moves from licensed location)

   c. Closures

   d. Additions

   e. Station representative changes (to include Phone, FAX, and Email changes)

   f. Station POC changes (to include Phone, FAX, and Email changes)

   g. Number of transmitters

Attachment #10

Federal Aviation Administration

System Operations Security

HSAC New Orleans

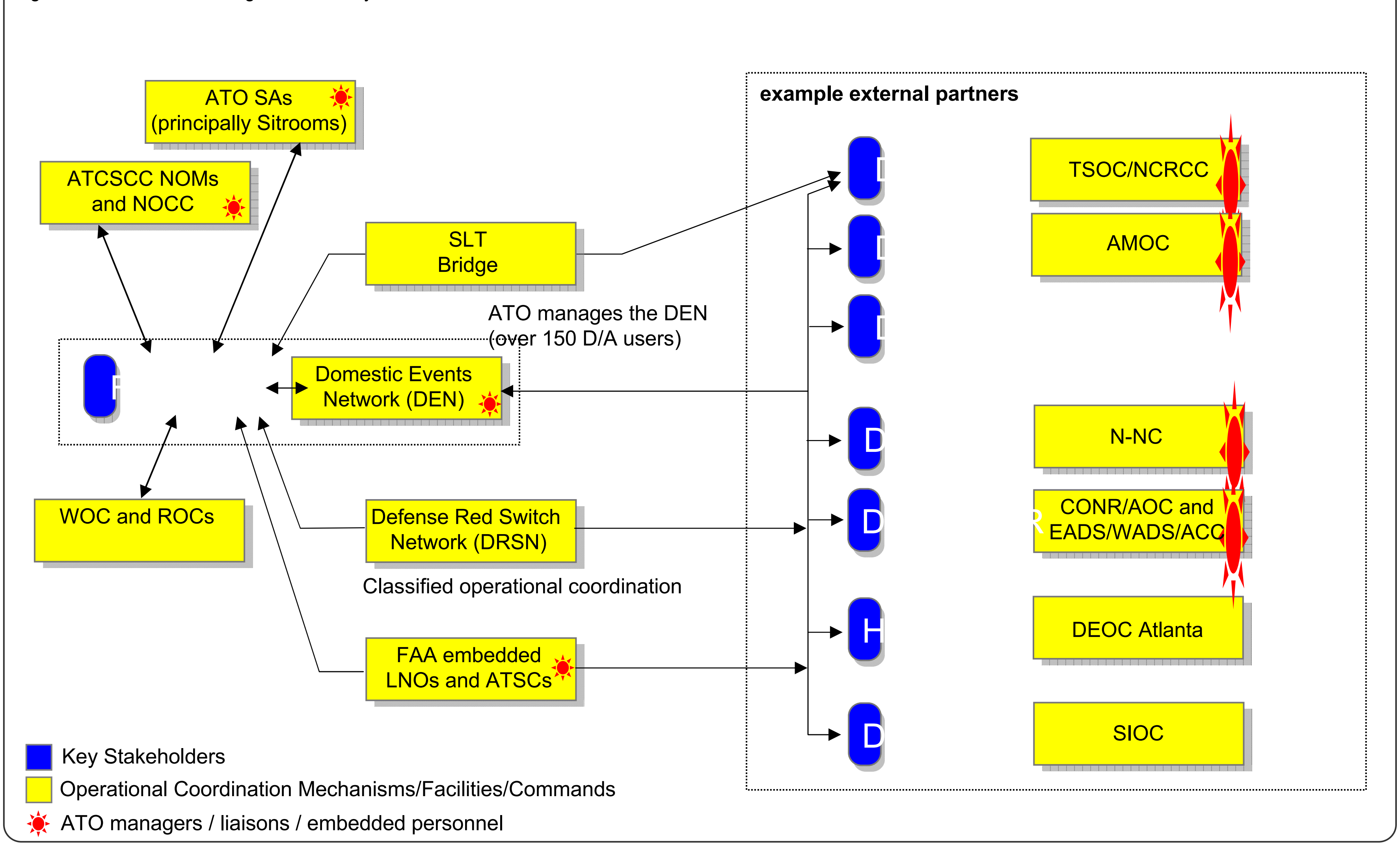
Jan 20-21, 2016

System Operations Security

- Protect the flying public and all components of the National Airspace System from criminal and national security threats
- Manage the FAA's operational response during real world security events
- Mitigate the impact of real world events on non participating/non involved operations
- Balance the right to access America's airspace against national security/defense and law enforcement operations
- Manage the ATO's disaster/crisis response operations

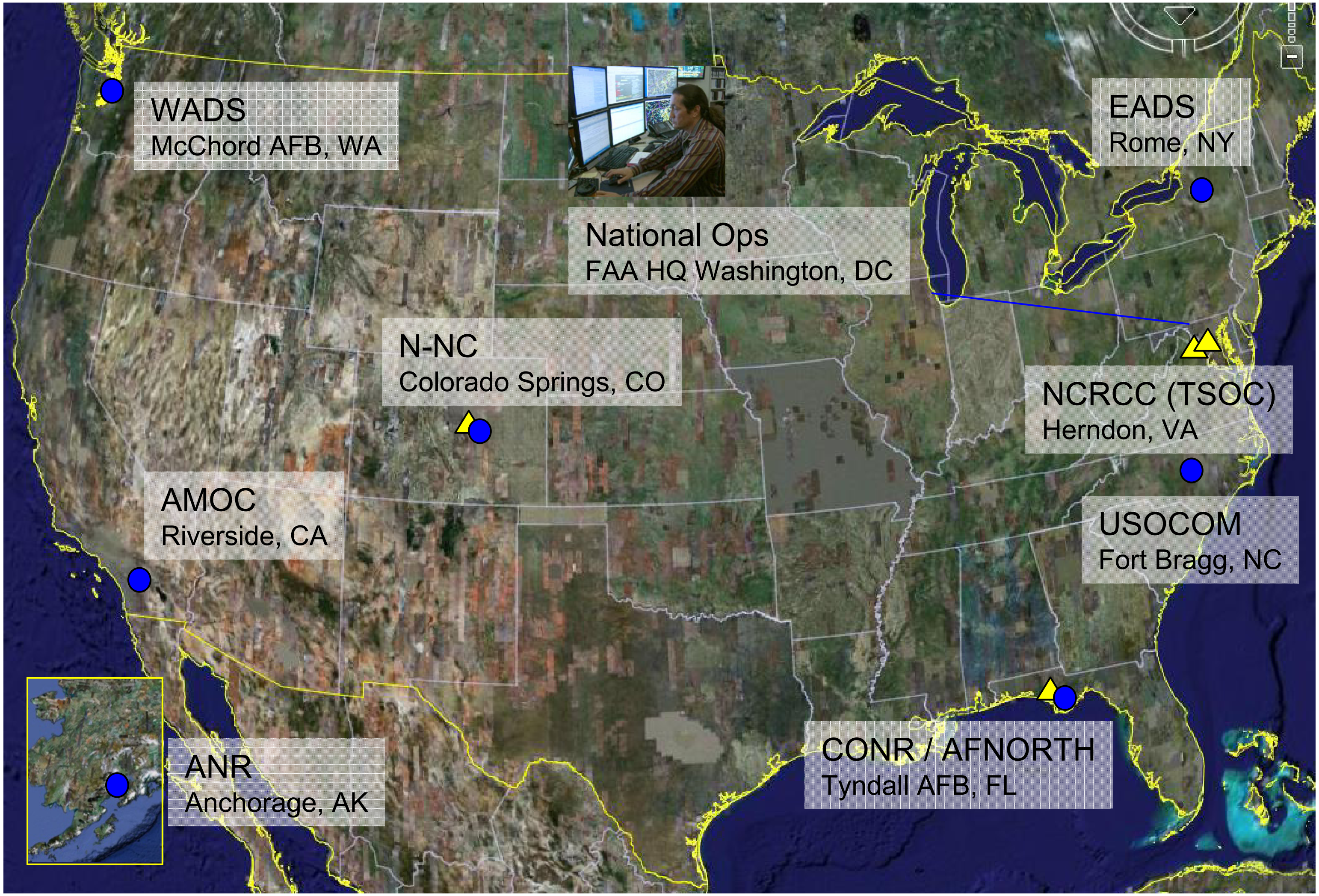
Standing Interagency Connections

Figure 7. Outline of Standing ATO Security Structure



LNOs and ATSC Teams

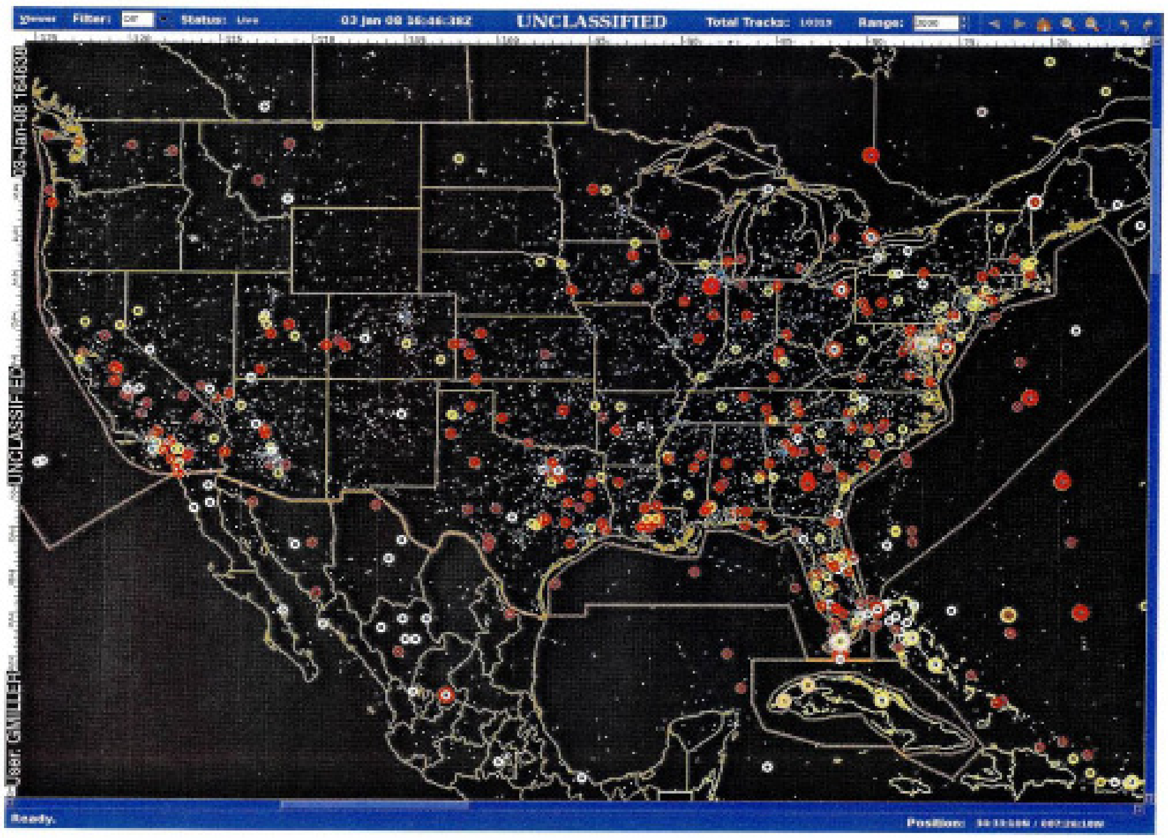
Figure 8. ATSC Locations



Constant Monitoring and Interdiction

- The FAA uses its ATM capabilities to actively monitor the NAS and its approaches, identifying and facilitating responses to potential threats while mitigating impacts.

Figure 10. ADAPT Screenshot and Select Features



- Automatic Detection and Processing Terminal (ADAPT):
  - Automation supported detection of anomalies
  - Integration of FAA and multiple interagency databases and data layers
  - Decision support tools such as Flow Evaluation Area (FEA) like functionality

2016 Significant Airspace Events

- SOTUA   DC   Jan 12   NSSE
- Super Bowl 50 Santa Clara, CA Feb 7 SEAR1
- ASEAN Palm Springs Feb 16-17   VIP TFR
- Global Nuclear Summit   DC Mar 31-Apr 1 NSSE
- RNC Cleveland July 18-21 NSSE
- DNC Philadelphia July 25-28 NSSE
- Martha's Vineyard   late August   10-14 days VIP
- Hawaii VIP visit   Christmas time   10-14 (???) VIP
- Approximately 5000 sporting events TFRs

Impact on HSAC members

- **Operations inside the inner ring are prohibited without LFA approval**
- **Operations in outer ring…Squawk, talk, flight plan.**

If one of these events, or any event, will impact your ability to operate, contact our office immediately so we can attempt to accommodate your ops…Time is everything!

UAS Operations Or Issues

- **Point of contact for UAS issues/questions:**
  - Jim Williams, Manager
  - FAA UAS Integration Office, Flight Standards
  - 202-267-8306
  - James.H.Williams@FAA.gov

Any questions?

POC

Brian Throop

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Attachment #11

Flight Standards Service Compliance Philosophy

FLM Briefing

Federal Aviation Administration

Objectives

- Know the Flight Standards Service Compliance Philosophy
- Identify and Discuss Compliance Actions
- Ability to Document Compliance Actions and Follow-up
- Ability to Apply the Compliance Philosophy

Overview

- Compliance Philosophy (CP) Differences
- CP Guidance
- Compliance Action Documentation

Compliance Philosophy Differences

Old Philosophy

- Informal Action
- Administrative Action
- Legal Enforcement Action

New Philosophy

- Compliance Action
- Administrative Action
- Legal Enforcement Action

Compliance Philosophy Differences

Old Philosophy

•Informal Action

- Low risk event outcome determination with on-the-spot corrective action

New Philosophy

•Compliance Action

- Event outcome not a determining factor
- Determination made on persons behavior and level of cooperation
- Corrected through root cause analysis and on-the spot correction, counseling, training, improvement to procedures, improvement to training programs, etc.

Compliance Philosophy Differences

Old Philosophy

- **Enforcement Decision Process no longer used to determine action**

New Philosophy

- **Compliance Action Decision Process**
  - Determine if the person is willing and able to comply with safety standards
  - Does not involve intentional, reckless, or criminal behavior

Compliance Philosophy Differences

Old Philosophy

- Informal Action documented in PTRS using one activity code
- Administrative Action and Legal Enforcement Action documented in EIS and PTRS using the appropriate activity code

New Philosophy

- Compliance Action documented in PTRS using PTRS activity code for the type of corrective action
- Administrative Action and Legal Enforcement documented the same as old philosophy

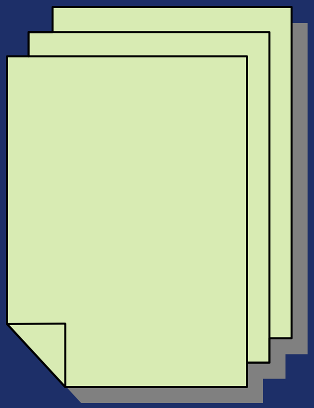
Guidance

- Order 2150.3B, Change 9
- Notice 8900.323 Compliance Philosophy
- Draft 8900.1, Vol. 14
- Notice 8900.325 Remedial Training

Federal Aviation Administration Compliance Philosophy

Order 2150.3B

- Change 9, Section 5



Notice 8900.323 C.P.

- **Notice will be replaced by new 8900.1 guidance**
- **Willing and Able**
- **Stop non-compliance now and in the future**
- **When enforcement is taken**
  - Must be able to answer why that action was needed

Draft 8900.1, Vol. 14

- **Also Revision to Volume 10**
  - Revision to Volume 3
- **Compliance Philosophy guidance takes precedence over older guidance**
  - Exceptions are ASAP, VDRP or other MOUs, etc.
- **Older guidance will be revised**

Notice 8900.325 R.T.

- Will be (when revised) 8900.1, Vol. 15, Chapt. 6

Which of the following are compliance Actions?

A. Remedial training

B. On the spot correction

C. Letter from the certificate holder identifying corrective action and dates that action will be taken.

D. All of the above

Review

- Compliance Philosophy (CP) Differences
- CP Guidance
- Compliance Action Documentation

Objectives

- Know the Flight Standards Service Compliance Philosophy
- Identify and Discuss Compliance Actions
- Ability to Apply the Compliance Philosophy

Questions?

U.S. AIR FORCE

53rd Weather Reconnaissance Squadron
"The Hurricane Hunters"

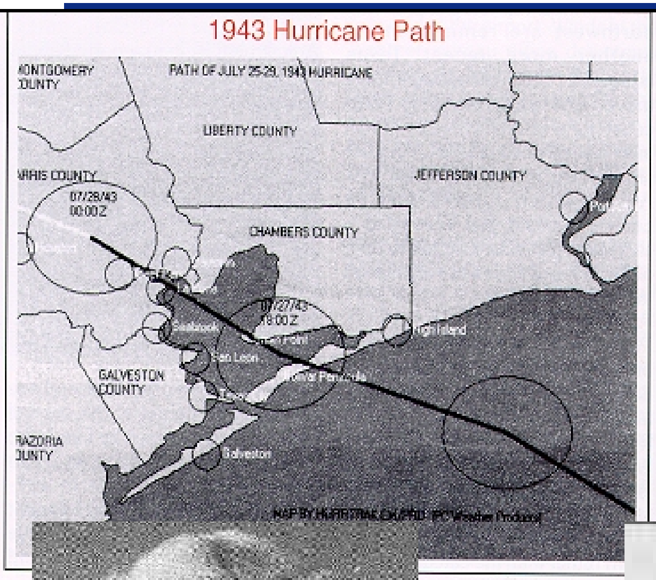
2016 Mission Brief

HURRICANE HUNTERS

Lt Col Jeff Ragusa – Evaluator Pilot
And Former Wing Chief of Safety

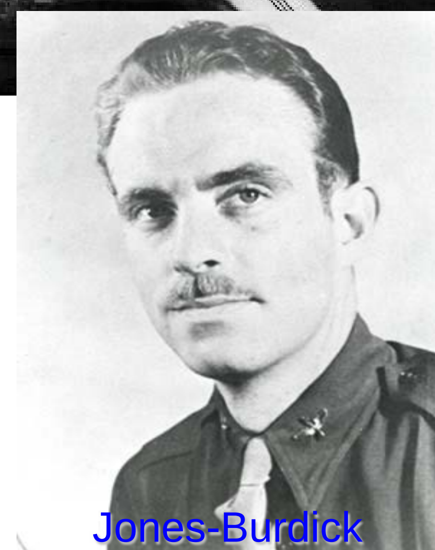
On a Wing and a “Dare”

Pilot Joe Duckworth, Nav Ralph O’Hair, and Wx Ofcr William Jones-Burdick Bryan TX, Jul ‘43




Duckworth


O’Hair


Jones-Burdick

U.S. AIR FORCE

WC-130J

WC-130J “Herk” and T-6 “Texan”

Personnel: 5 Person Crew

Pilot, Copilot, Navigator

ARWO, DSO/Loadmaster

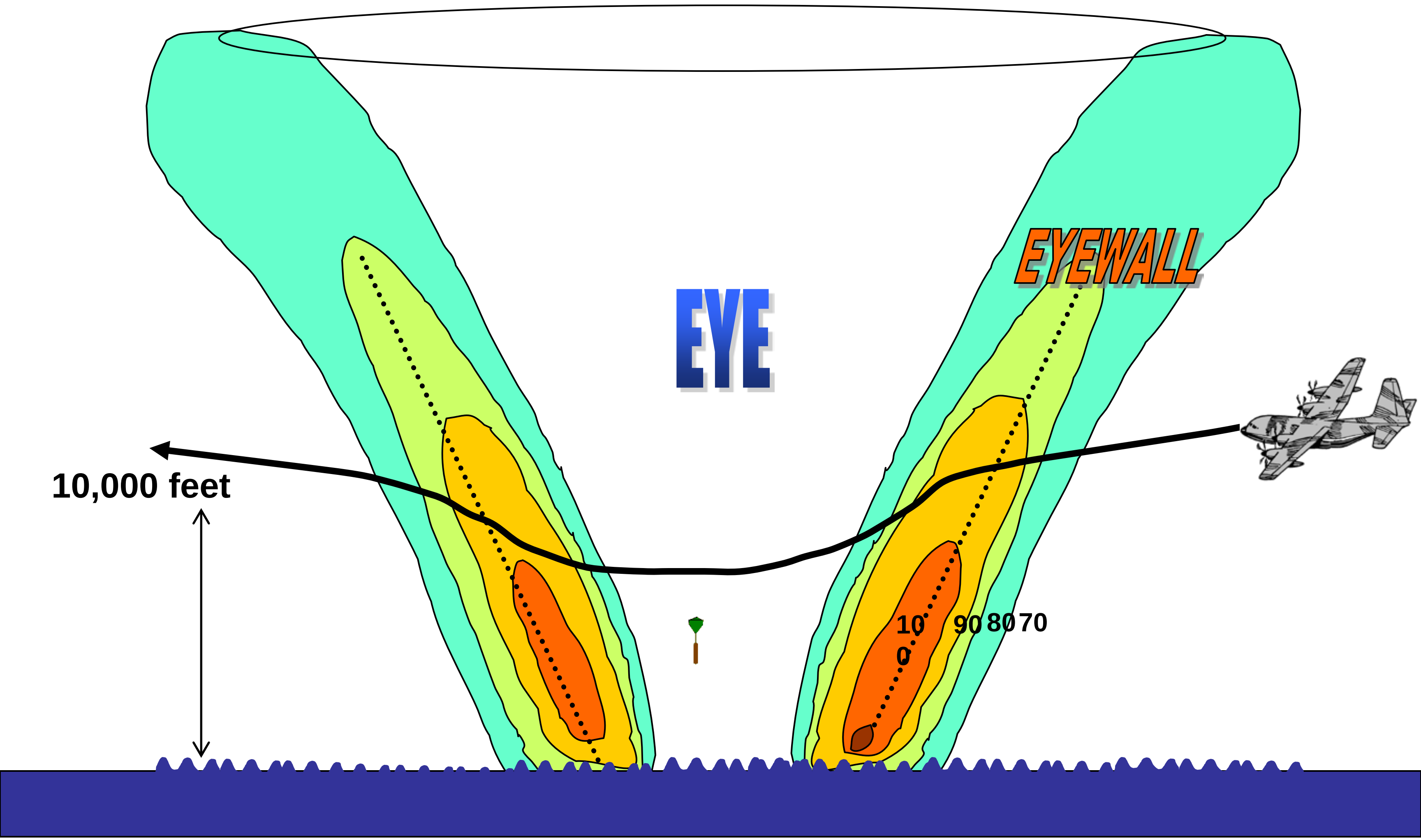
10 Full Time ART crews
10 Traditional Reserve crews

Area of Responsibility

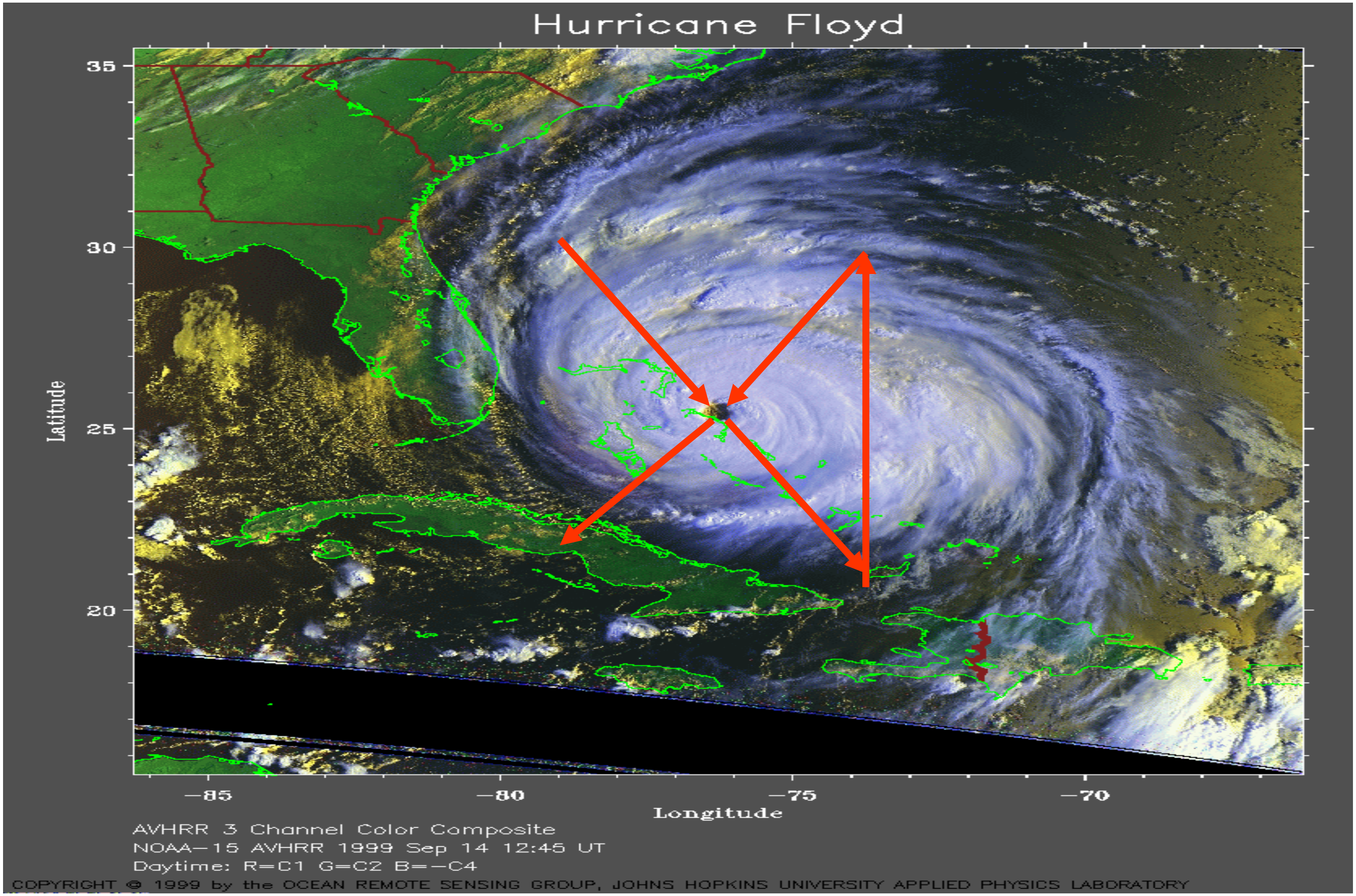
Mid-Atlantic (55W) – Int'l Dateline

U.S. AIR FORCE

Dropsonde Releases

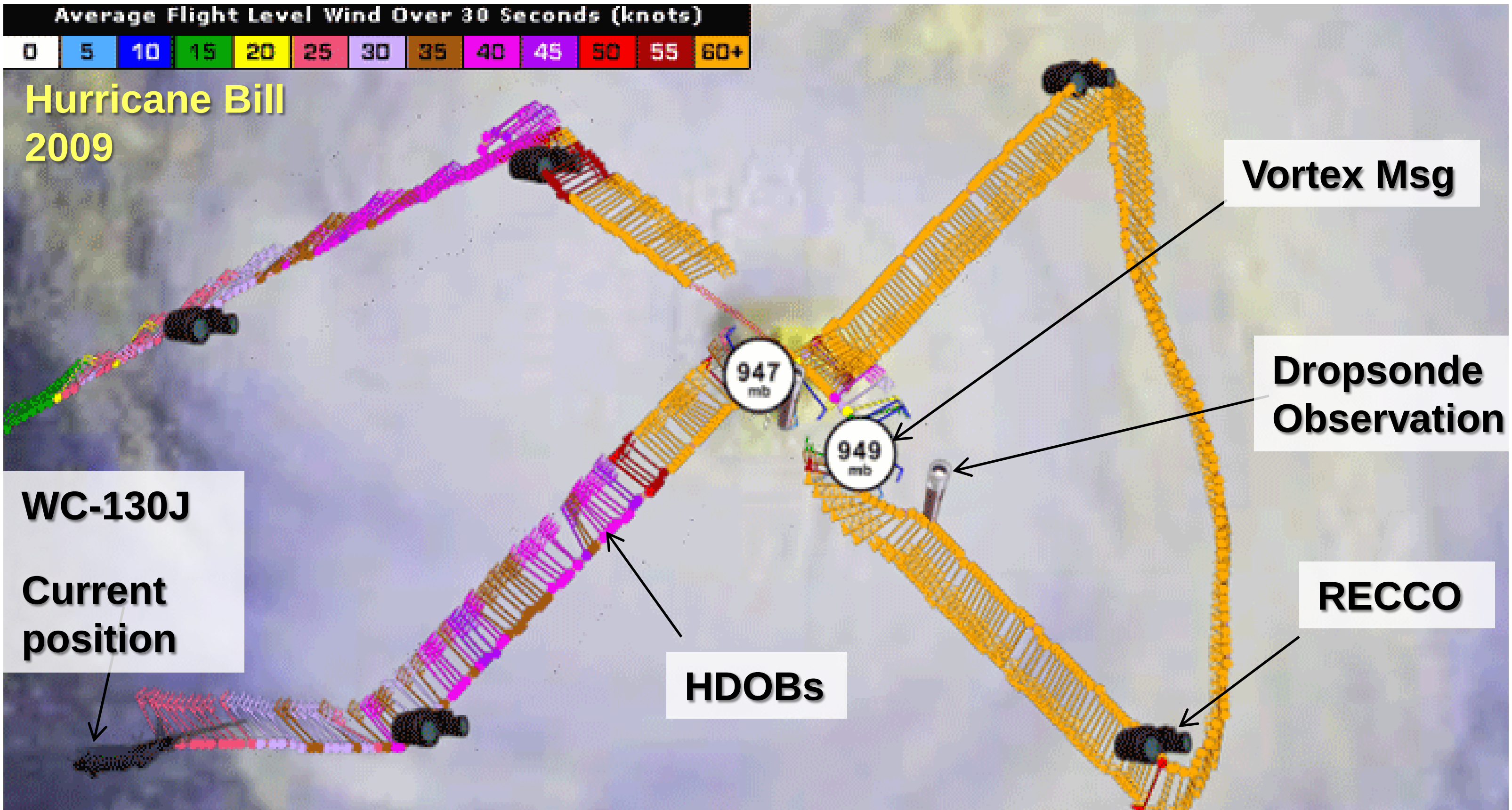


Storm Flight Pattern



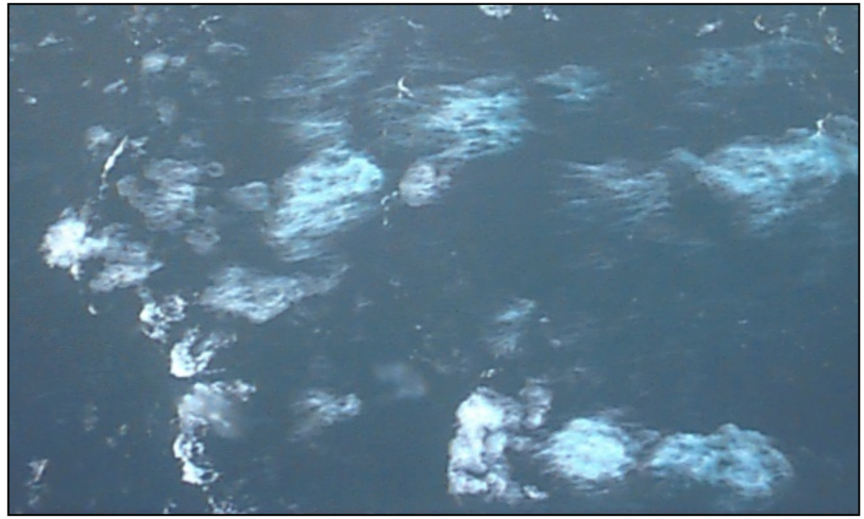
Google Earth Flight Following

U.S. AIR FORCE



- Plots aircraft position and data every 30 sec via HDOBs
- Plots manual observations (RECCOs, Drops, Vortex)

Low-Level Mission: Birth of a Storm



500’ to 1500’ above water – Use sea state to determine rotation

2016 Atlantic Names

Alex
Bonnie
Colin
Danielle
Earl
Fiona
Gaston
Hermine
Ian
Julia
Karl
Lisa
Matthew
Nicole
Otto
Paula
Richard
Shary
Tobias
Virginie
Walter

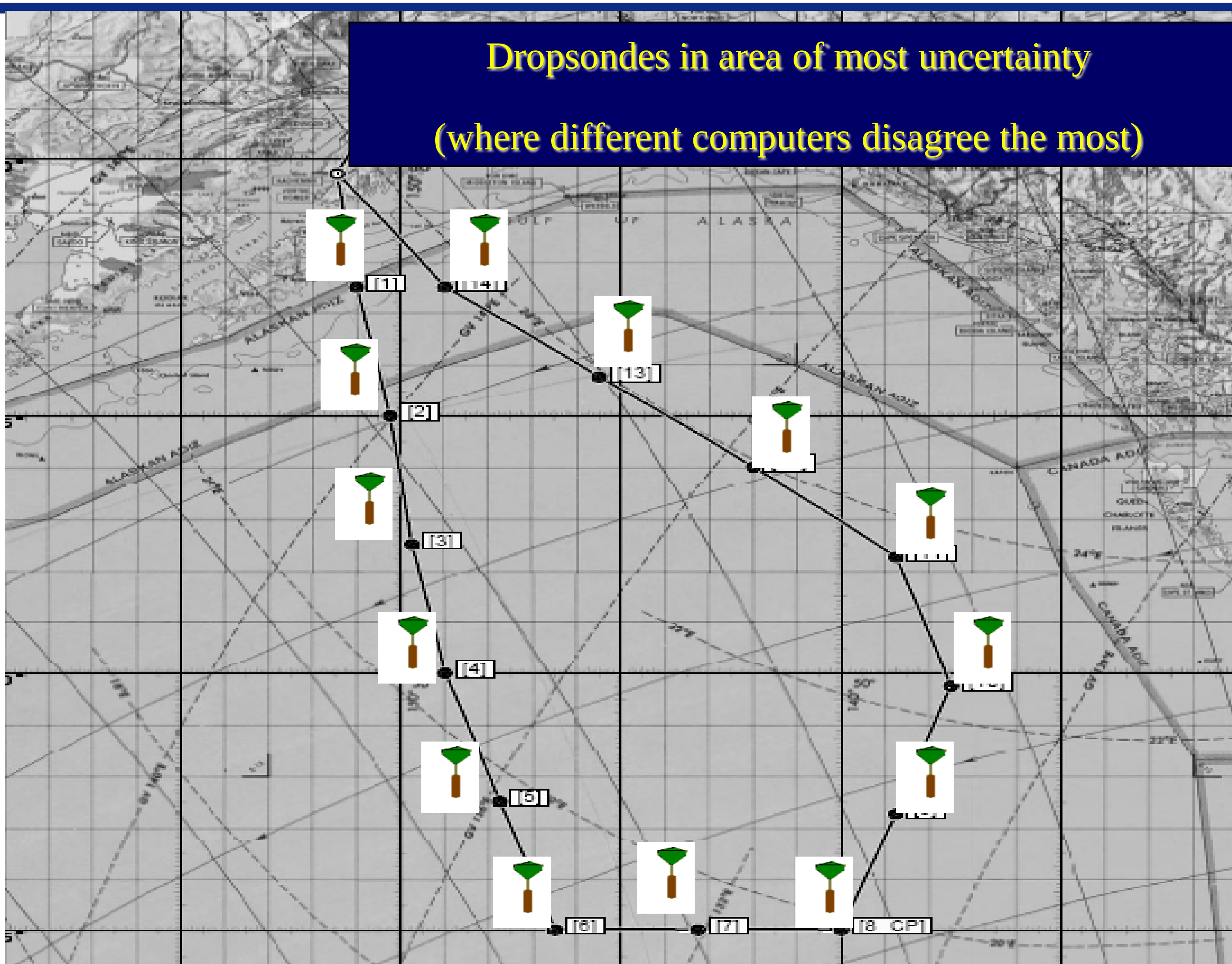
National Winter Storm Operations Plan

"to reduce uncertainty in 24-96 hour forecasts for specific weather events associated with potentially large societal impact over the CONUS and Alaska."

December - April

U.S. AIR FORCE

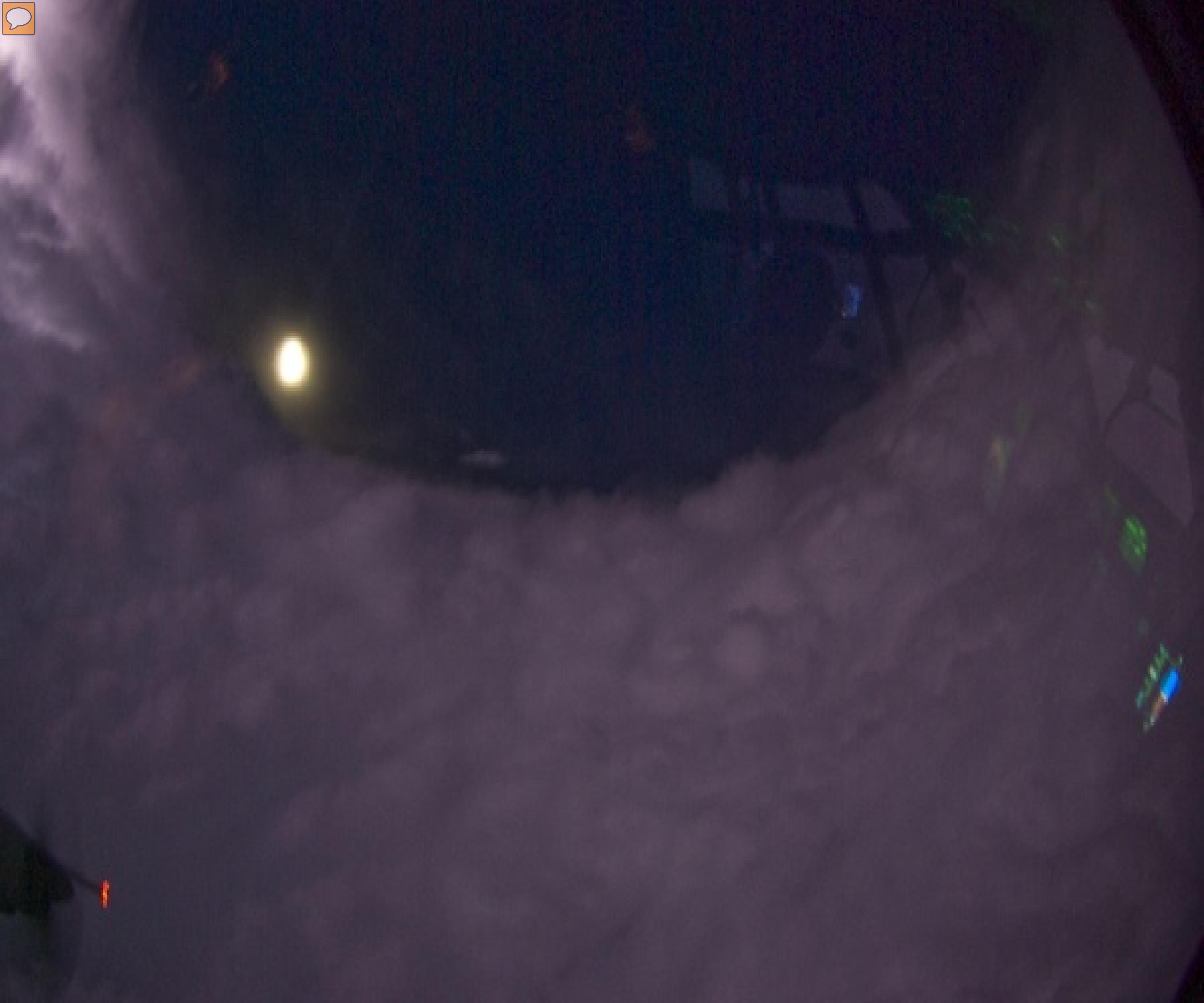
"Targeted Obs"

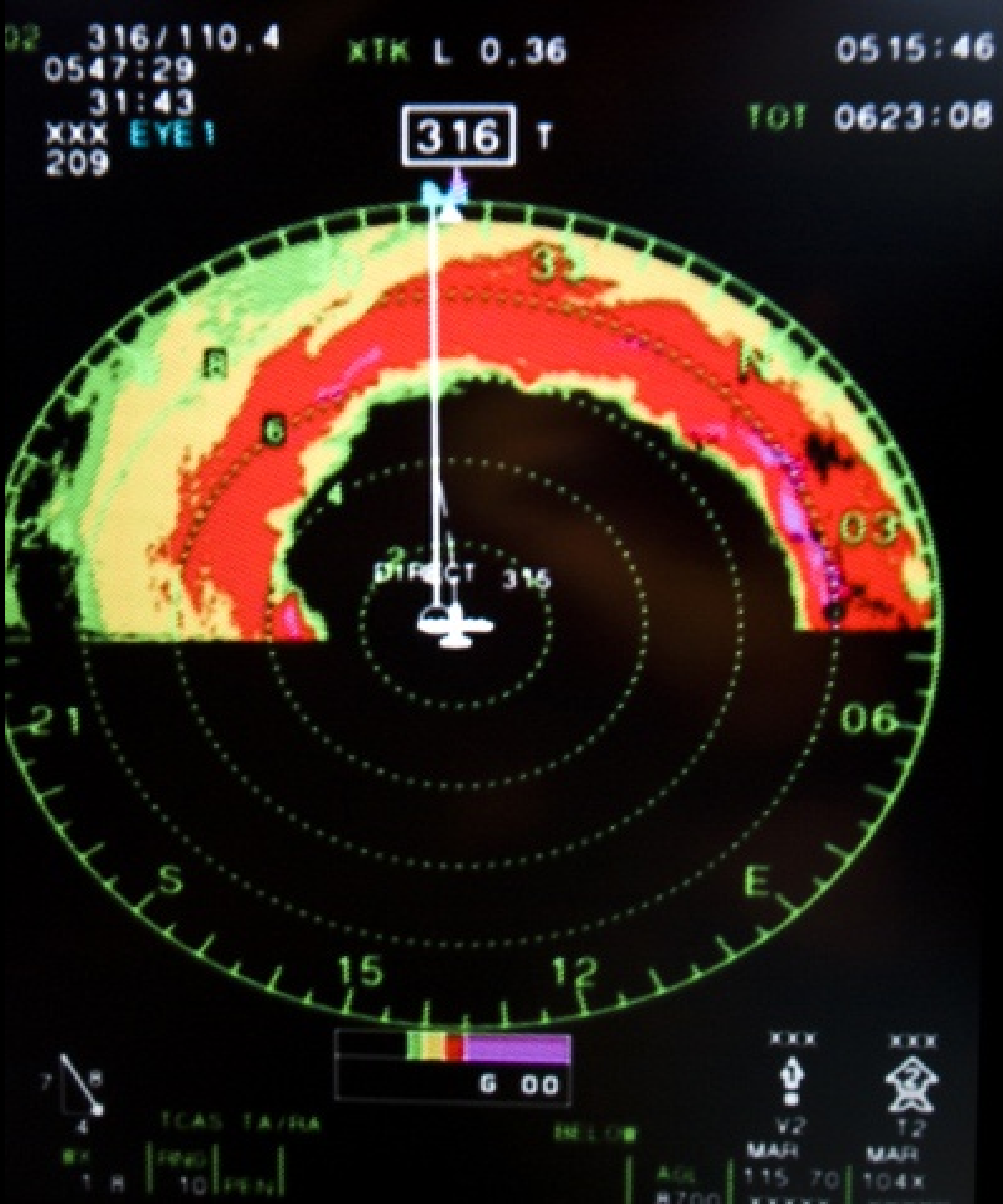


U.S. AIR FORCE

When we aren't hunting hurricanes

We have combat trained Pilots and loadmasters. This is me while deployed for Operations Iraqi Freedom and Enduring Freedom.




316/110.4
0547:29
31:43
XXX EYE 1
209
XTK L 0.36
316 T
0515:46
TOT 0623:08
DIRECT 316
21
06
S
E
15
12
G 00
TCAS TA/RA

Airspace Issues

From our Aircrew In-flight Guide:

- Beware of fish spotters between the months of April–October at or below 2000' AGL. When departing Rwy 21, broadcast intentions on VHF 130.65.

- OFF-SHORE DRILLING PLATFORMS
  Based on the information provided by the Shell Oil Company the tallest structures in the Gulf of Mexico are operated by Shell. Most structures are less then 300 feet MSL but the following list contains most of the highest structures:

STRUCTURE NAME	*LAT/LONG*	*HEIGHT (MSL)*
AUGER	N27-32.6 W092-26.6	515
MARS	N28-10.1 W089-13.2	350
RAM POWELL	N29-04.2 W088-06.2	350
BULLWINKLE	N27-53.1 W090-54.2	350

- *NOTE The U.S. Gulf Coast VFR Aeronautical Chart, commonly referred to as the "oil rig map", contains the printed statement "MAXIMUM ELEVATION FIGURES ARE BELIEVED NOT TO EXCEED 400 FEET." Obviously this statement is incorrect (reference pt AUGER), and crews should CHUM their charts IAW directives.*

Airspace Issues

From our Aircrew In-flight Guide (Cont'd):

- From our Ingress Checklists:
  TACTICAL PLOTs – "Set" (for Oil Rigs over 300') N
  RADIOS– "Set" (for Oil Rigs/Choppers) PM

- Petroleum Helicopters (PHI)
  800-235-2452
  337-235-2452
  F1357

- Air Logistics Helicopters (Air Log)
  800-365-6771
  318-365-6771
  F6152

Airspace Issues

From our Published Guidance:

- ***WARNING: Due to the high concentration of offshore oil drilling platforms and high density helicopter*** **traffic, crews flying low level investigative or fix missions tasked to operate within 60NM of the US coastline, beginning at 88°00'w longitude and extending westward to 97°30'w longitude, will not fly below FL048.**

- ***Exception: At the aircraft commander's discretion, these missions may be flown below FL048*** **providing day VMC can be maintained. Exercise extreme vigilance for helicopter and seaplane traffic. It is highly encouraged to make periodic "in the blind" broadcasts on common helicopter, fish spotter and guard frequencies to announce aircraft position, altitude and direction of flight.**

Airspace Issues

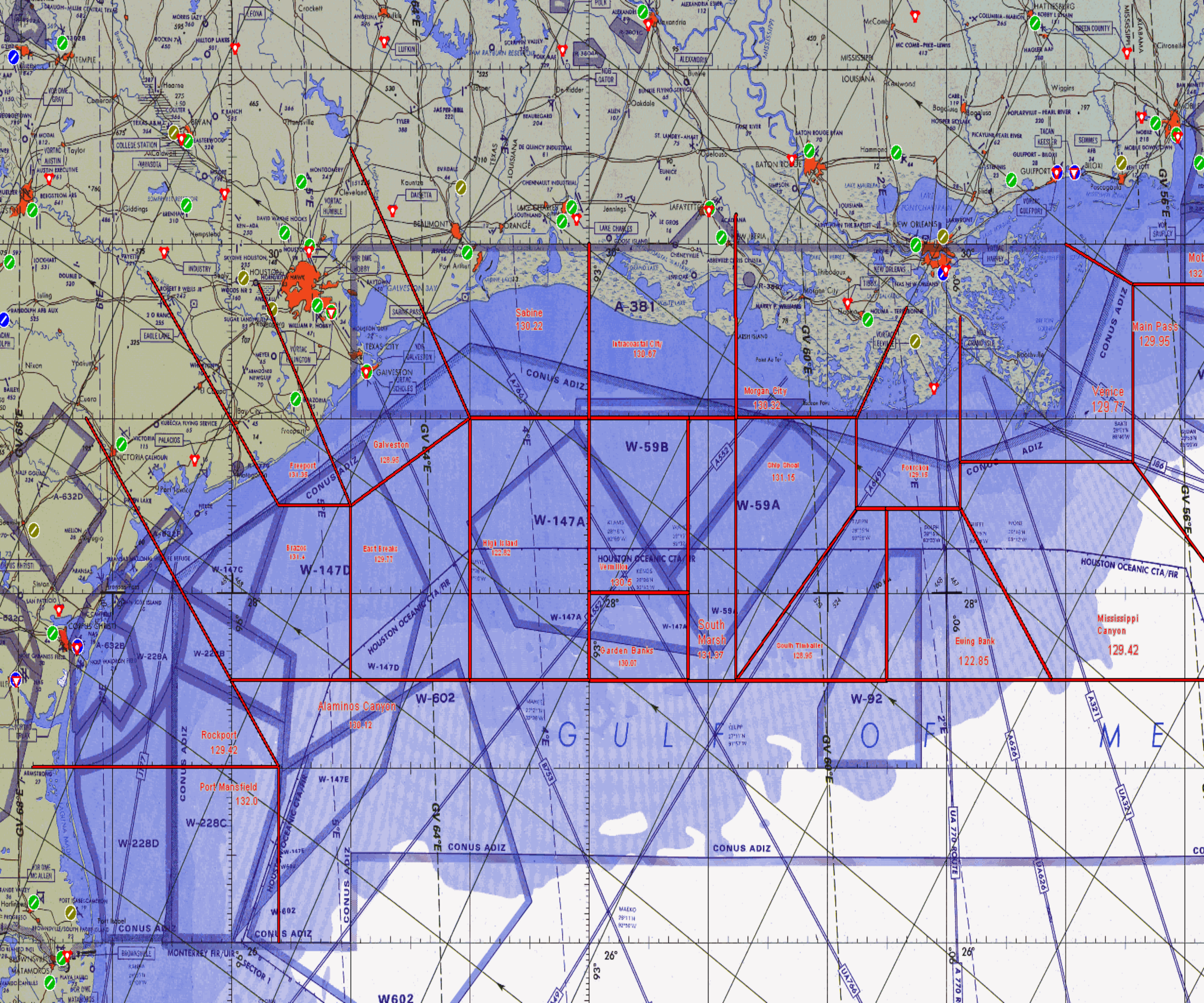
From the National Hurricane Operations Plan (NHOP):

Release of Dropsondes:

- When ATC has radar contact with the aircraft, they will notify the aircrew of any known traffic below them that might be affected.
- The aircraft commander is solely responsible for release of the instrument after clearing the area by all means available.
- During NHOP missions, commencing five (5) minutes prior to release from FL190 or higher, the aircrew will broadcast in the blind on radio frequencies 121.5 MHZ and 243.0 MHZ to advise any traffic in the area of the impending drop.

Operations in Uncontrolled Airspace (Class F and G):

- ATC is not authorized to assign altitudes in, nor provide separation between aircraft in uncontrolled airspace. While in uncontrolled airspace, aircrews will advise ATC of their planned altitudes and the Aircraft Commander is the IFR clearance authority. In addition, aircrews are responsible for maintaining their own separation from the surface of the sea, obstacles, and oil platforms while operating below the Minimum IFR Altitude (MIA).



Sabine
130.22
Intracoastal City
130.67
Morgan City
130.32
Venice
129.77
Main Pass
129.95
Freeport
131.35
Galveston
128.95
Chip Shoal
131.15
Fourchon
129.15
Brazos
East Breaks
129.77
High Island
122.82
Vermilion
130.5
South Marsh
131.37
Garden Banks
130.07
South Timbalier
128.95
Ewing Bank
122.85
Mississippi Canyon
129.42
Alaminos Canyon
130.12
Rockport
129.42
Port Mansfield
132.0
A-381
W-59B
W-59A
W-147A
W-147D
W-602
W-92
W-228C
W-228D
CONUS ADIZ
HOUSTON OCEANIC CTA/FIR
G U L F O F M E

U.S. AIR FORCE

Questions