



# RISK ANALYSES AND CRITICAL SAFETY MANAGEMENT OF CERTIFIED, PREPARED AND UNPREPARED HELICOPTER EMERGENCY MEDICAL SERVICE (HEMS) LANDING SITES

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Australia



## AERIAL WORK VERSUS AIR TRANSPORT AOC (Air Operators Certificate) LICENCE

HEMS Operations in Australia currently conducted under Aerial Work

### ***Aerial work CAR 206(a)***

An aircraft operation in which an aircraft is used for specialised services such as air ambulance, agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement

### ***Air Operator Certificate (AOC)***

A certificate authorising an operator to carry out specified commercial air transport operations.

*Much higher level of control*

## **HEMS HELICOPTER LANDING SITES**

### **DEVELOPMENTAL OVERVIEW 2011 - 2013**

#### **Historically**

- **Controls were developed and applied by individual service providers (Aerial Work Category)**
- **Limited oversight by the Regulator**
- **Night VMC operations in single engine aircraft with single crew**
- **Limited assessment and control over landing site selection**

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**A risk assessment meeting held in Brisbane on the 3rd August 2011 involving Surat Basin Oil & Gas, Aeromedical and Service Provider personnel established a new safety baseline for HEMS Helicopter Landing Site operations.**

**The significant outcome of this meeting was that all HEMS operations would be conducted as a minimum to the level of Commercial Operations, hence eliminating Aerial Work Category practices.**

**The new Standard introduced, defined minimum requirements for Helicopter Landing Site design and control and collective acceptance of this safety enhancement, introduced for the first time documented controls, in accordance with global standards.**

# CURRENT LEGISLATION AND GUIDELINES

## INTERNATIONAL

**I.C.A.O. ANNEX 14 VOL II**  
**(Australia is a signatory to the International Civil Aviation Organisation)**

## AUSTRALIAN

### **1.CAAP 92-2(2)**

Draft Guidelines (May 2013) for the establishment of on-shore Helicopter Landing Sites (HLS)

### **2. DOCUMENT NPRM 1304OS – July 2013**

Regulation of Aeroplane and Helicopter 'Ambulance Function' flights as Air Transport Operations

## **Overview**

Civil Aviation Advisory Publication (CAAP) 92-2(2), the sole Draft legislative reference, **provides guidance but does not mandate minimum Standards.**

The new CASR Part 139 (Aerodromes) does not address Heliports or Helidecks.

**Document NPRM 1304OS – July 2013 Pending**

**I.C.A.O. Annex 14 Vol II is the design Standard for HLS operations.**



## **NOTICE OF PROPOSED RULE MAKING**

**Regulation of aeroplane and helicopter  
'ambulance function' flights as Air  
Transport operations**

Issued for public consultation by  
CASA's Standards Division

Document NPRM 13040S – July 2013  
Project Number: OS 01/11

### **KEY CHANGES**

- Hold an AT AOC in accordance with Part 119 of CASR
- Demonstrate compliance with the additional requirements contained in the applicable AT operational rule set (i.e. Part 121, 133 or 135 of CASR)
- Rotorcraft Performance Class 3 operations would not be authorised for MT night flights
- Fatigue risk management of AT operations through the implementation of Civil Aviation Order (CAO) 48.1
- Formal Safety Management System
- GPS Flight Following (Industry feedback)
- Night Vision Goggles (Industry feedback)

# Hems Risk Management Component Parts

Medical	Client	Aircraft Service Provider	Helicopter Landing Site
<ul style="list-style-type: none"><li>➤ Accident Site Management</li><li>➤ Aircraft Transport</li><li>➤ Hospital Acceptance</li></ul>	<ul style="list-style-type: none"><li>➤ Contractual</li><li>➤ Quality Assurance</li></ul>	Aerial Work or AOC/Commercial Operations - pending	<b>Developing processes, largely uncontrolled</b>

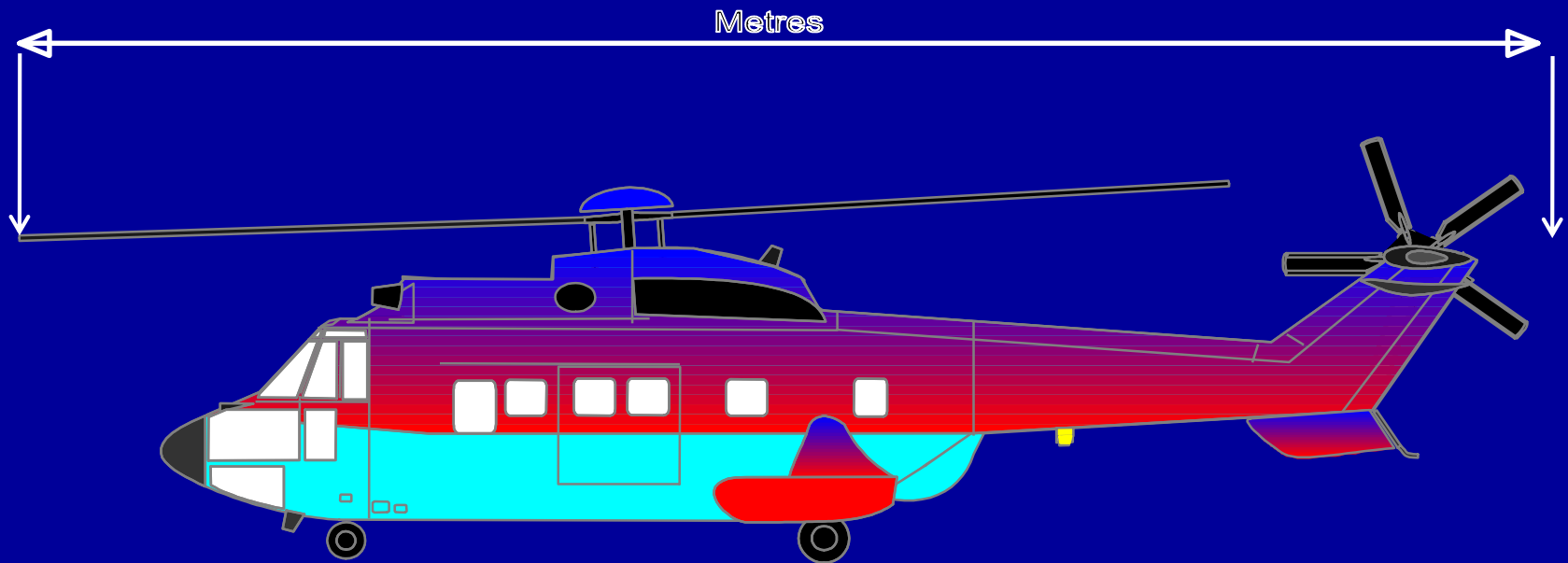
# Certified HLS

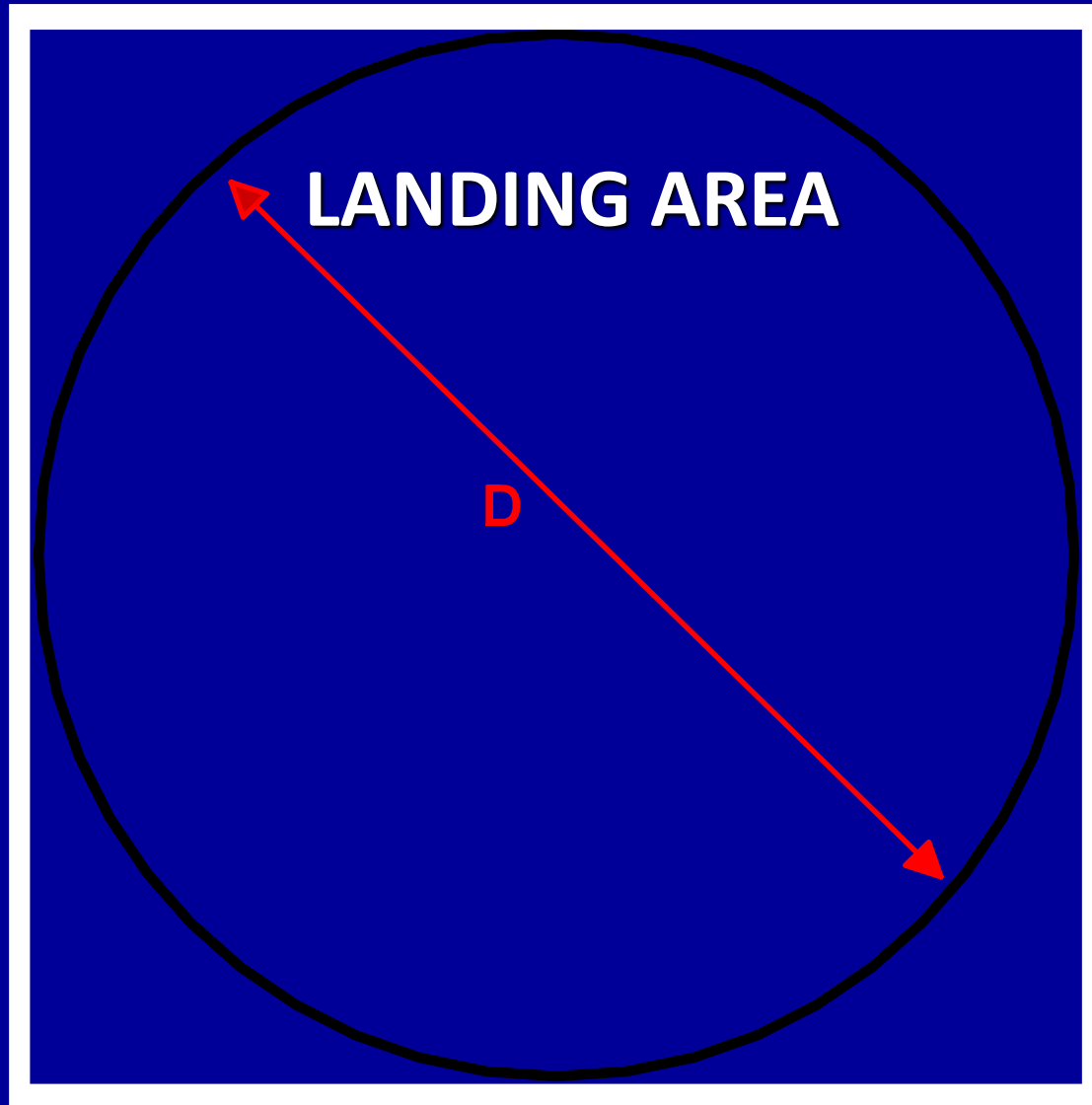


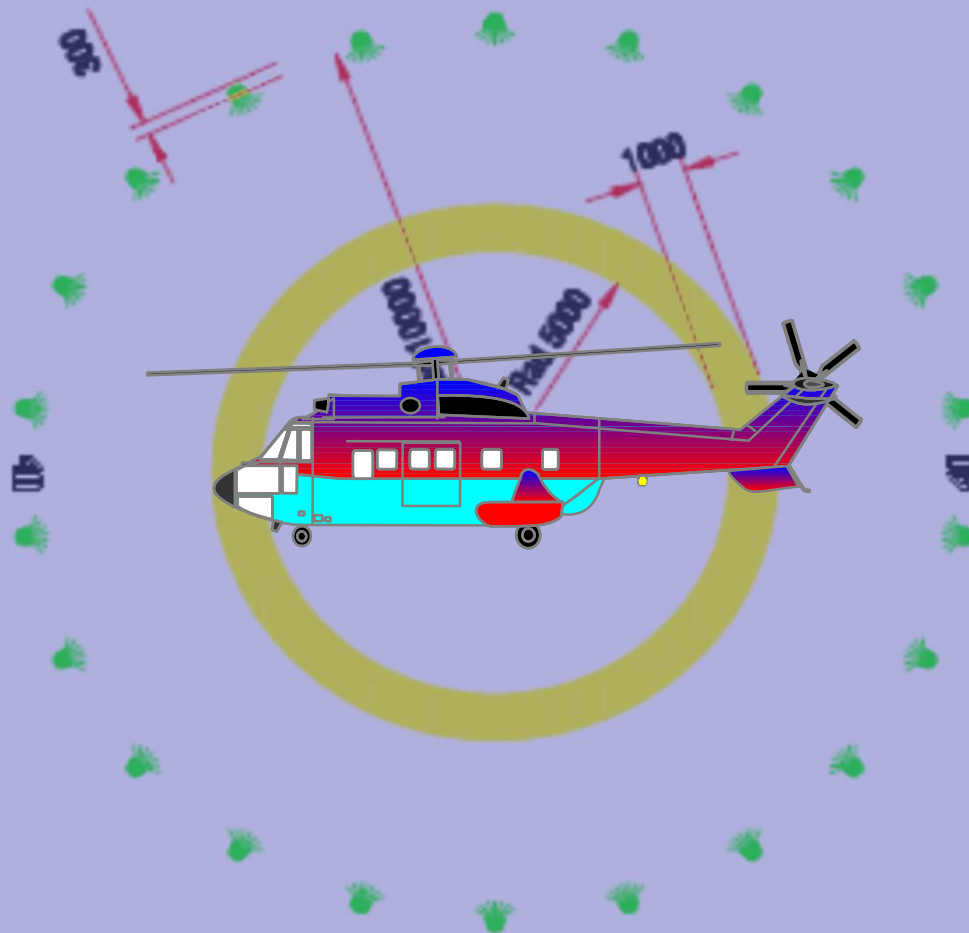
7 June 2017

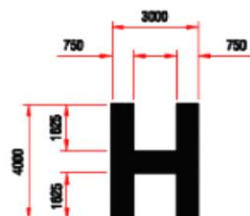
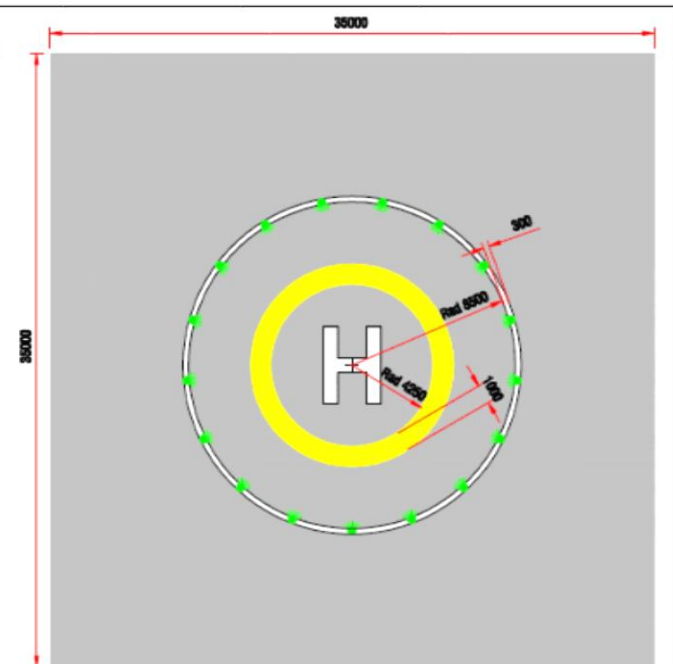
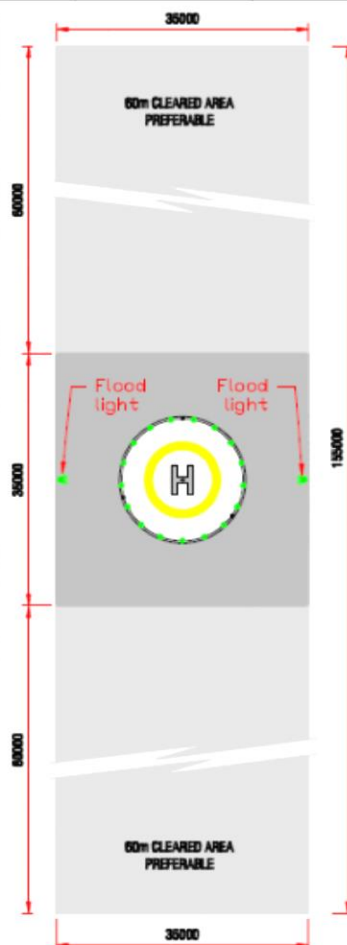
Ruby Jo



# 'D' Value





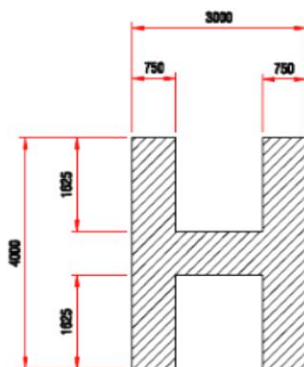


PRELIMINARY ISSUE[illegible]

COMMISSIONED FOR ARROW ENERGY Pty Ltd		BOWEN BASIN (Helicopter operations)	
CLIENT APPROVAL _____  DATE _____		APPROVAL _____  DATE _____	
COPYRIGHT This drawing remains the property of Flight Safety Pty Ltd/Flight Safety Helideck Certification Pty Ltd and may not be copied in any way without prior written approval from the company		Flight Safety Helideck Certification Pty Ltd Australia	
		 FLIGHT SAFETY <b>HELIDECK</b> CERTIFICATION	
		 FLIGHT SAFETY	
		ONSHORE HELIPAD DESIGN - T.B.A.	
SCALE	DRAWN BY H/Text Smith	DATE 17.07.2011	CHECKED BY Colin Veier
			DATE 18.07.2011
PROJECT No		SIZE LOC D SERIES	
		DWG No FBHC-ARROW-001	
		DRAWING TITLE	
		ONSHORE HELICOPTER LANDING SITE	
		REV No	
		(E)	



"D" VALUE MARKING  
Scale 1:50



ISSUED FOR FINAL CONSTRUCTION

NEW NAME

HELIPAD IDENTIFICATION MARKING  
Scale 1:100

SIZE OF FONT TO BE CONFIRMED

NOTE:  
QUANTITY AND POSITIONING OF FLOOD AND PERIMETER LIGHTING TO BE CONFIRMED BY FLIGHT SAFETY HELIDECK CERTIFICATION.  
ALL POSITIONING AND HEIGHT (DIMENSIONS) OF MARKINGS TO BE CONFIRMED BY FLIGHT SAFETY HELIDECK CERTIFICATION.

PAINT SPECIFICATION AND POSITIONING:

CONCRETE NATURAL GREY			HELIPAD BACKGROUND
YELLOW	BS381C: 309 BS4800: 10.E.53	CANARY YELLOW SUNFLOWER YELLOW	LANDING TARGET CIRCLE ACCESS ROUTES
WHITE	RAL8010 RAL8003	PURE WHITE SIGNAL WHITE	LETTER 'H' HELIPAD BORDER (ANTI SLIP) WEIGHT MARKINGS EMERGENCY EXIT
RED	BS381C: 537 BS4800: 04.E.53	SIGNAL RED POPPY RED	TIE DOWN POINT MARKERS

NOTE:  
HELIPAD IDENTIFICATION VARIES AND ALLOWANCES TO BE MADE FOR Q/ALL WIDTH OF WORDING TO BE USED.

NOTE:  
FINISHED SURFACE MUST CONFORM TO CAP 437 CHAPTER 3  
PAGE 12, 7.1 AND 7.7 WITH REGARDS "FRICTION" SURFACE.

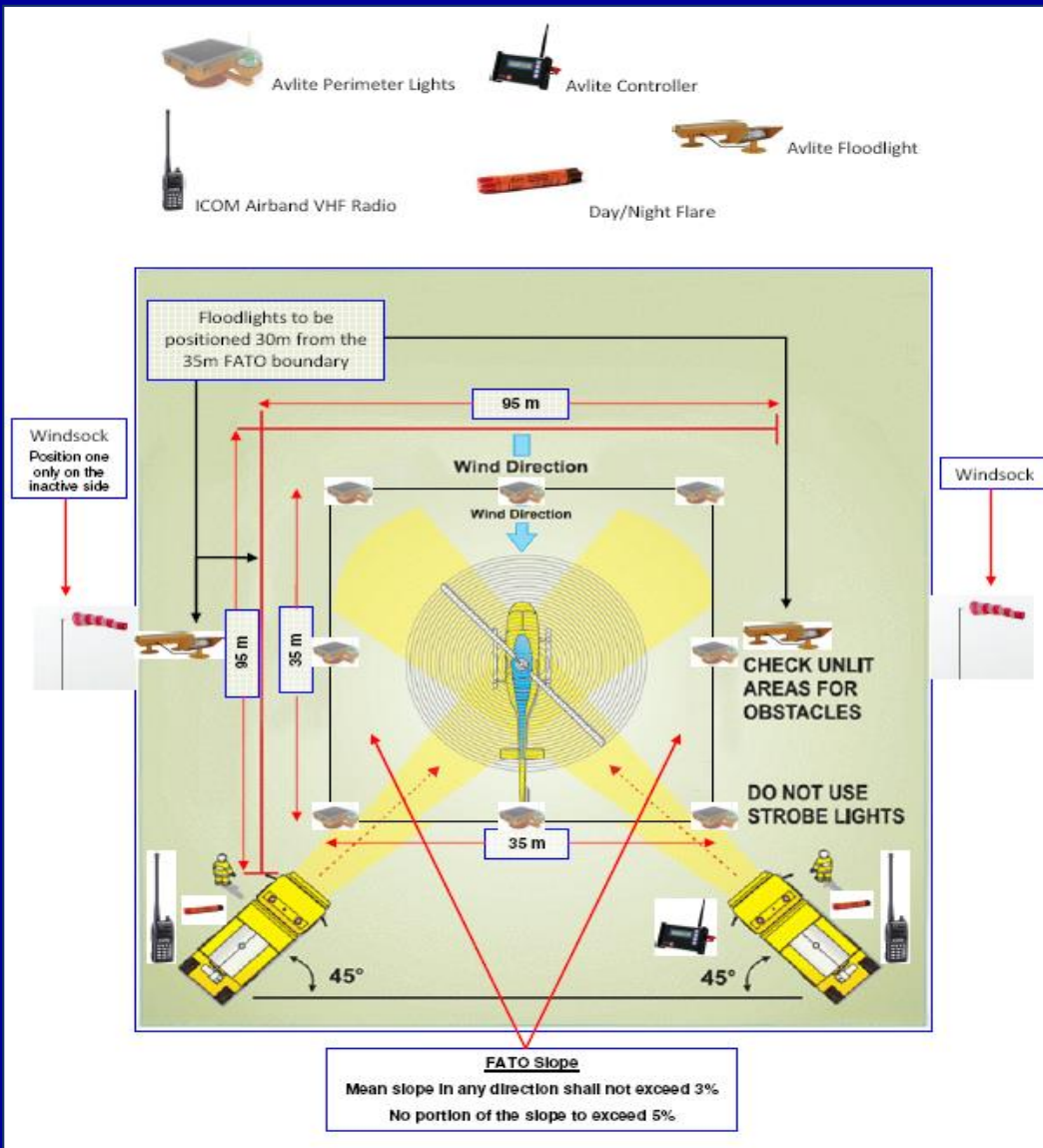
NOTE:  
NUMERALS/LETTERS CAN BE WHITE OR BLACK (WHICHEVER HAS MORE CLARITY)  
OR IF BLACK CAN BE UNDERScoreD WITH WHITE AND VISA VERSA.

STANDARD IDENTIFICATION MARKING SIZES REQUIRED FOR ONSHORE HELIPAD

<p>CLIENT APPROVAL</p> <p>APPROVAL</p> <p>DATE</p> <p>DATE</p>		<p>Flight Safety Helideck Certification Pty Ltd Australia</p> <p>FLIGHT SAFETY HELIDECK CERTIFICATION</p>				
		<p>HELIPAD MARKINGS</p>				
		SCALE	DRAWN BY Harriet Smith	DATE 15.04.2012	CHECKED BY Celine Weir	DATE 15.04.2012
PROJECT No		SIZE LOG D SERIES		DWG No FSHC-108		
COPYRIGHT		DRAWING TITLE				
<p>This drawing remains the property of Flight Safety Pty Ltd/Flight Safety Helideck Certification Pty Ltd and may not be copied in any way without prior written approval from the company ©</p>		<p>IDENTIFICATION MARKING SIZES REQUIRED FOR ONSHORE HELIPAD</p>				
		REV No A				

REV	NO	BY	DATE	REVISION	DATE	BY	DATE	REV	NO	BY	DATE	REVISION	DATE	BY	DATE
A	1	HS	18/11/18	"D" VALUE MARKING AMENDED. PAINT SAMES ADDED.		HS	18/11/18								

# PREPARED/UNPREPARED HELICOPTER LANDING SITE



- SELECTION
- HELIPAD LAYOUT
- HELIPAD SURFACE
- FATO - FINAL APPROACH AND TAKE-OFF PROFILES
- LIGHTING
- WIND INDICATOR
- EMERGENCY EQUIPMENT
- DOCUMENTED CONTROLS
- TRAINING

# Annex 14 VOL II FATO (Final Approach & Take Off) Day or Night VFR (Visual Flight Rules)

Annex 14 — Aerodromes

Volume II

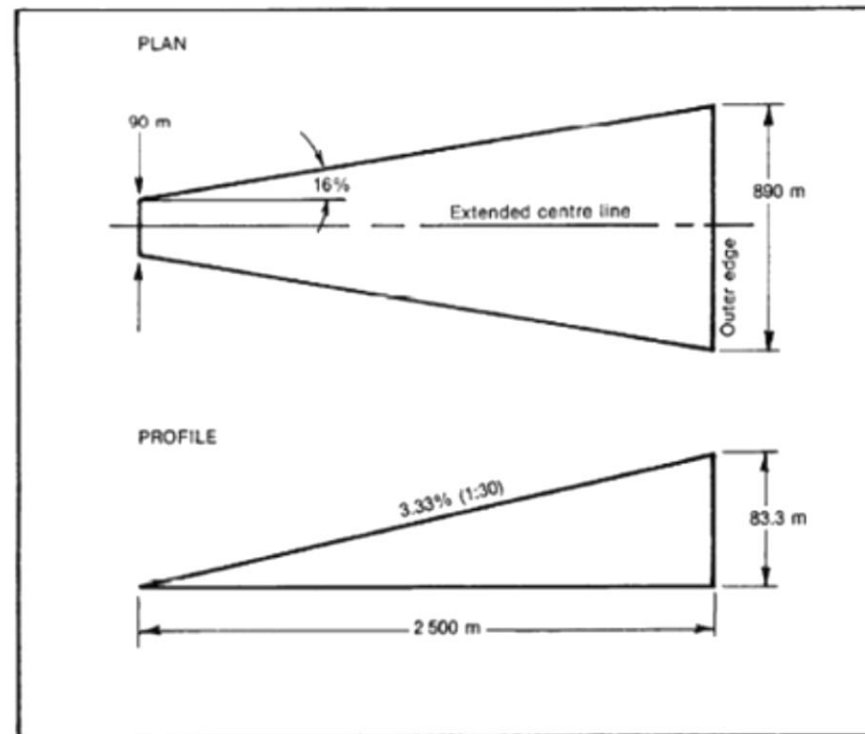


Figure 4-9. Approach surface for non-precision approach FATO



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## SBRWAME LOCAL AREA SUPPLEMENT

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**Note:**

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## Selection of Unprepared HLS

### For Aero Medical Evacuations by Care Flight Helicopter

**Responsibilities & Authority** – When nominated as the HLO for an AME task you are responsible for the safety of your personnel on the ground, the security at the HLS, Communications with the helicopter on the company designated AIR OPS channel, Response to Aviation Emergency Situations.

**Requirement** - A suitable helicopter landing site (HLS) within a short distance from the patient. Min 35m diameter clear circular area with 6m diameter helicopter landing area at its centre suitable for and capable of accepting twice the weight of the helicopter for landing on (a total of 12 Tonne will suffice in this instance).

Where a suitable area cannot comply with the above, relay this fact to the pilot so he can make a decision to either hoist the medical team down to the HLS or relocate to another site more suitable. **Note: The helicopter will NOT hoist at night.**

#### Prepare the HLS (Tick or Cross the Boxes)

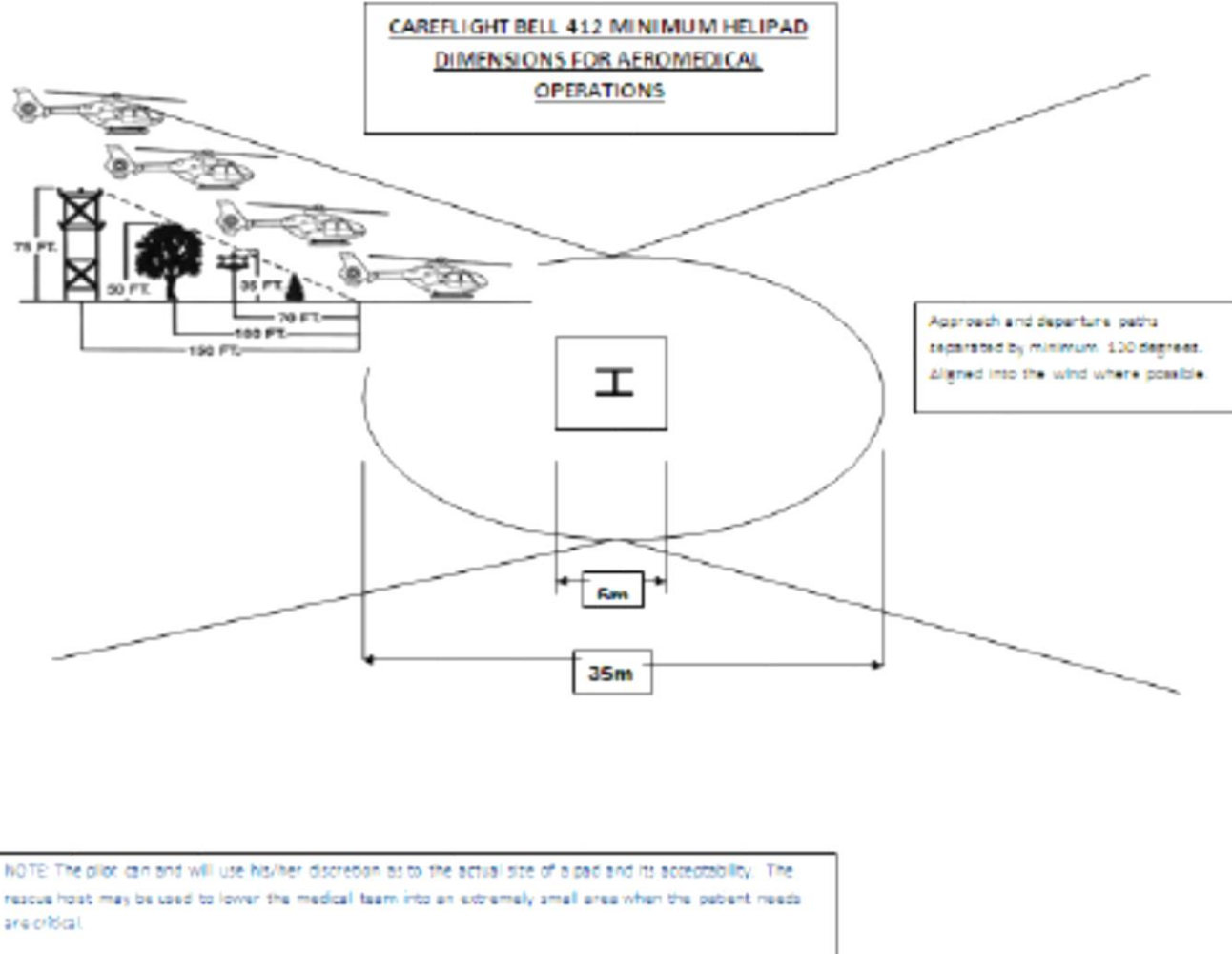
- ☐ There is a suitable HLS within a short distance of the patient?
- ☐ The surface is grassy and flat? or.
- ☐ The surface is dusty &/or not level? – ADVISE THE PILOT
- ☐ There are NO wires or obstructions across the HLS or on the approach and departure path?
- ☐ There ARE wires or other obstacles that encroach on the HLS? – **ADVISE THE PILOT**
- ☐ There is NO growth or fences above 1 m within 35m diameter from the centre of the selected HLS?
- ☐ There IS a clear area (i.e. no growth above 150 cm) of 6m diameter around the centre of the HLS for helicopter landing?
- ☐ All loose objects in the area are cleared away or secured?

#### Now look for

- ☐ Significant high ground/hazards (including wires) within visual distance of the HLS.....note direction from HLS (North/South/East/West) and note this on the diagram at Attachment A for ADVICE TO THE PILOT

#### Check also

- ☐ Only essential personnel are within a 60 metre safety area and that they have received a SAFETY BRIEFING and have appropriate Protective Equipment available.
- ☐ Fire Fighting and First Aid equipment prepared and ready where available
- ☐ Prepare strobes/mirror/lights/vehicles to assist pilot with HLS location identification.
- ☐ Vehicle lights are in position and turned on. If there is a windsock ensure it is in clear view & illuminated.



**FIGURE 2**

## **1. REGULATORY REQUIREMENTS**

The regulation of helicopter operations varies widely between countries and as such the first requirement when establishing a helicopter base is to ensure that National requirements are complied with in full.

Generic requirements for the operational environments to be provided at heliports are defined in international standards relating to the specification of physical design requirements of heliports and the performance characteristics of aircraft, as follows:

### **1.1. HELICOPTER LANDING SITES PHYSICAL DESIGN**

- i. ICAO Annex 14
- ii. ICAO Doc. 9261 Heliport Manual

### **1.2. AIRCRAFT PERFORMANCE CHARACTERISTICS**

- i. ICAO Annex 6
- ii. Joint Aviation Requirements (JAR-OPS 3)

Interpretation of the above requirements is complex. While the main requirements have been captured below, advice should be sought from SAI.

## **2. HELICOPTER LANDING SITES PHYSICAL DESIGN**

ICAO Annex 14 Volume II and the associated Heliport Manual (ICAO Doc 9261-AN/903) define a series of requirements in respect of heliports, relating to the following:

- Heliport Data
- Physical Characteristics
- Obstacle Limitation Surfaces
- Visual Aids
- Rescue and Fire-fighting Services

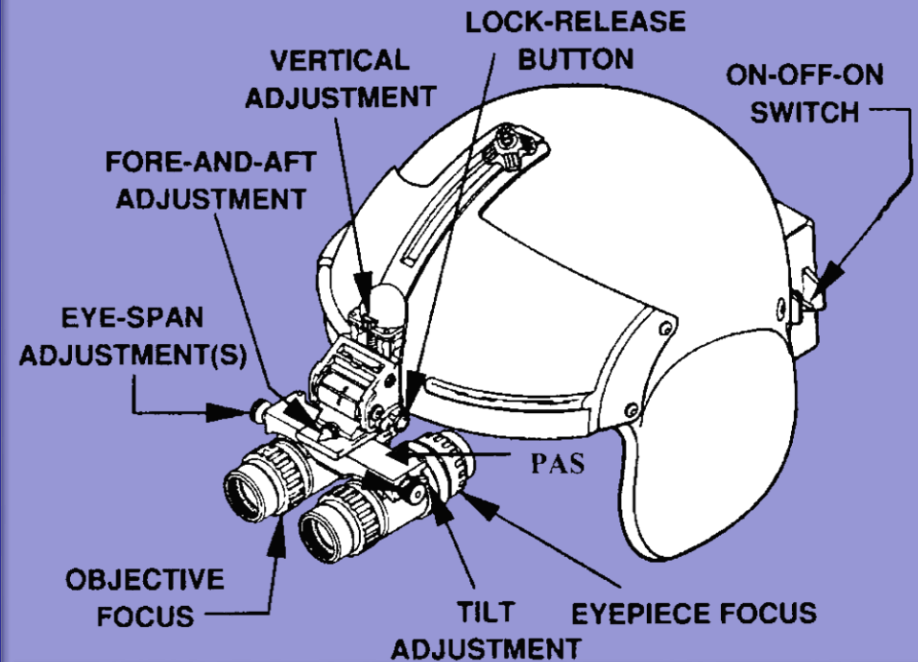
# HELICOPTER LANDING SITE OFFICER TRAINING

- **Safety Around Helicopters**
- **Ground to air signals/Helicopter marshalling**
- **Helicopter start-up and shut-down**
- **Night Vision Goggles**
- **Passenger Control**
- **Equipment/Crash Box, Flares, Anemometer, Lights**
- **HLS (Helicopter Landing Site) specifications & Setup:  
Certified, Prepared & Unprepared**
- **Day/Night Flight**
- **Search and Rescue**
- **HLSO Manual & HLSO Operations Manual/Duties and responsibilities**
- **Helicopters, specific roles and various types**

## Operational Equipment



## NVG How does it work



The ANVIS 9, Aviator Night Vision Goggles, Model M949 is based on the military DoD nomenclature AN/AVS-9. L3 has made significant design improvements to the Aviator NV imaging system (ANVIS). Improving situational awareness, system performance, in addition to ergonomic and technological enhancements benefit both law enforcement and civil operators. The M949 features binocular viewing for optimized depth perception. The large 25 mm eyepieces provide improved eye relief enabling excellent viewing while easily accommodating eye glasses. Ergonomically designed interface controls including inter-pupillary adjustments and vertical, fore-aft, and tilt adjustments provide improved viewing of the entire system field of view (40 degrees).

# GPS FLIGHT FOLLOWING

ARTEX 406 ELT



## TRACPLUS WEB - Information

### Starting TracPlus Web:

To start TracPlus Web, start Internet Explorer or Firefox browser and visit <https://web.daestra.com/maps/application.html>

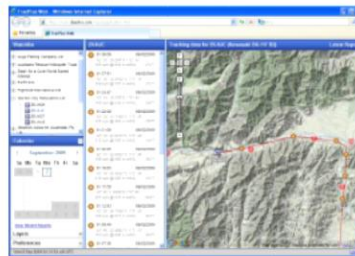


TracPlus Web Login

Enter your TracPlus username and password and press Login. Please note that your User name and password are case sensitive and must be entered as shown.

### Using TracPlus Web:

In the Watchlist, click on the asset that you wish to view. In TracPlus Web, assets are arranged by organization, so you will need to expand the relevant operator in order to find a specific asset. Clicking on the asset will re-center the asset in the map view and show the recent track.



### Additional Details:

Calendar: If you highlight most recent reports, this will always show most recent reports from all devices tracked

Layers: select the type of Googlemap you would like to view and tick or untick Trails depending on whether you would like to see your report trail on the map

Preferences: Number of reports you can view at a time,

Autocenter: if ticked centers the map on the unit you are tracking. Auto-Follow if ticked will follow this unit you are tracking

Right Click on the asset in the Watch list for any additional, enabled functionality such as send message or change reporting rate capability (this may not be enabled either for the device type or by the Owner of the device)

Units: Adjust Unit and Regional settings to suit your requirements

Track Data: The arrows that show in the Reporting Section refer to the Directional Heading.

**TIP:** Be sure to log out from TracPlus Web when finished. The logout link is the lower right hand corner of the window.

SPIDERTRACKS



# HELIPAD LIGHTING



**Annex 14 Compliant Perimeter Lights**  
Developed in association with  
**AVLITE SYSTEMS AUSTRALIA**



**Ruby Jo**









# ACCIDENTS

## Rotary Wing (Helicopter) Night Flying

Operations of rotary wing aircraft at night using visual flight rules (VFR) is an extremely dangerous tasking and has resulted in many fatalities. (Worldwide 285 fatal accidents between 2000 and 2010 source:

<http://www.aopa.org/asf/ntsb/searchResults.cfm?tss=4>

# BROWNOUT ACCIDENTS

The U.S. Military in Afghanistan and Iraq cites brownout as the cause in three out of every four helicopter accidents

<http://www.military.com/video/military-aircraft-operations/crash-landings/failed-cobra-takeoff-in-brownout/1047651081001/>

# Latest Unprepared Landing Site Accident



Rescue 700 (Bell 412)/Registration VH-EMZ  
Prince of Wales Island, Torres Strait  
13<sup>th</sup> June 2013



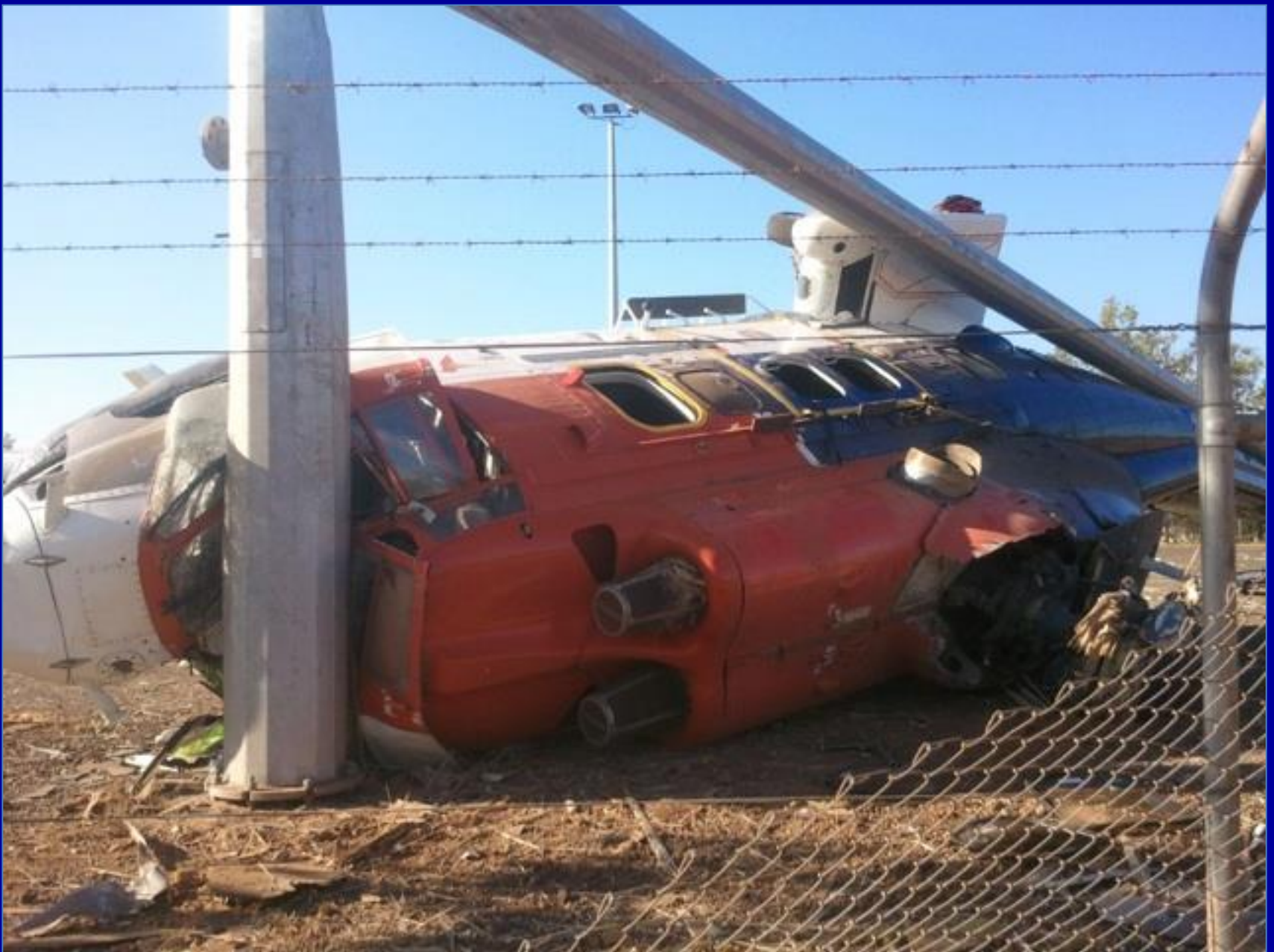


# SQUIRREL AS350

## GROUND RESONANCE ACCIDENT



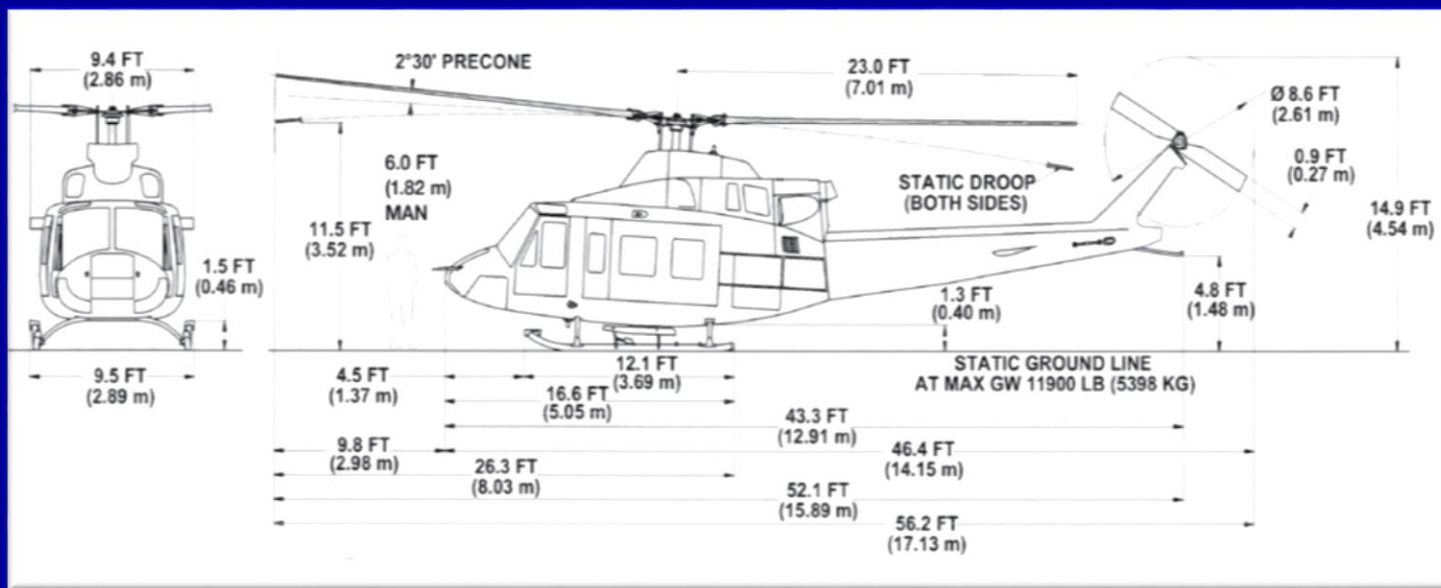




# EXAMPLES OF HELICOPTER TYPES



**Sikorsky S76 Capricorn**



## BELL 412EP



**AgustaWestland AW139**



**Eurocopter SA365 Dauphin**



**Eurocopter AS-355 Squirrel**



**S-70A-9 Black Hawk/NRL Grand Final 04/10/2009 ANZ Stadium Sydney**

## SYNOPSIS

Helicopter Emergency Medical Services conducted as Aerial Work Category operations have been the norm, but in the final analysis involve risk profiles that are unmanageable and therefore unacceptable – the following is recommended:

- Helicopter Landing Sites (including unprepared), require the implementation of minimum controls in accordance with I.C.A.O. ANNEX 14 VOL II, i.e. defined safe landing area, x 2 independent light sources and Wind Indicator
- Helicopter Landing Site Officer Training
- An HLSO Manual that defines company specific procedures
- Portable and/or fixed emergency equipment

**THE END**

**THANK YOU!**

**Any Questions?**