International Association of Oil & Gas Producers

IOGP REPORT 690-5

Helicopter and Equipment

1. Equipment serviceability

1A. Purpose

Ensuring that all critical safety equipment is serviceable.

1B. Expectations

Equipment fitted to contracted aircraft is serviceable within defined limits specified in the Minimum Equipment List (MEL)/Minimum Departure Standard (MDS).

1C. Processes and Practices

1C.1 The MEL and contracted MDS, if applicable, includes serviceability requirements for all company required installed equipment described in this document.

1C.2 Unless otherwise stated, the maximum deferable period for all company required installed equipment is Category C or equivalent terminology (10 days).

1C.3 The MDS is agreed with the aircraft operator prior to contract start and updated as required.

1C.4 If no MEL or MDS is in place, all aircraft equipment is serviceable on departure.

2. Certification standard

2A. Purpose

Ensuring the relative merits of safety features, design standards, and service experience are assessed to select reliable and resilient aircraft and equipment, suitable for the intended operations.

2B. Expectations

Contracted helicopters meet an appropriate certification standard.

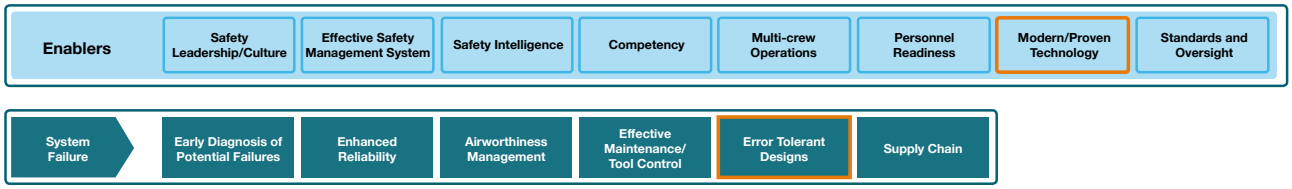
2C. Processes and Practices

2C.1 Contracted helicopters are certified to one of the following specifications:

- 2C.1.1 United States Code of Federal Regulations Title 14 Part 29, Amendment 45 – Airworthiness Standards Transport Category Rotorcraft (Federal Aviation Regulation (FAR) 29)
- 2C.1.2 Joint Aviation Authorities Joint Airworthiness Regulations 29 – Issue 1 (JAR 29)
- 2C.1.3 European Aviation Safety Agency (EASA) CS-29, Certification Specifications, Acceptable Means of Compliance for Large Rotorcraft, Initial issue
- 2C.1.4 United States Code of Federal Regulations Title 14 Part 27, Amendment 31 - Airworthiness Standards Transport Category Rotorcraft (FAR 27)
- 2C.1.5 Joint Aviation Authorities Joint Airworthiness Regulations JAR 27, Issue 1
- 2C.1.6 EASA CS-27, Acceptable Means of Compliance for Small Rotorcraft, initial issue

Guidance documents

- Norske Olje & Gas 066
- BARSOHO BIG - 1.7: Modern/Proven Technology
- HeliOffshore Safety Performance Model



3. Instrument flight rules - equipment

3A. Purpose

Ensuring the relative merits of safety features, design standards, and service experience are assessed to select reliable and resilient aircraft and equipment, suitable for the intended operations.

3B. Expectations

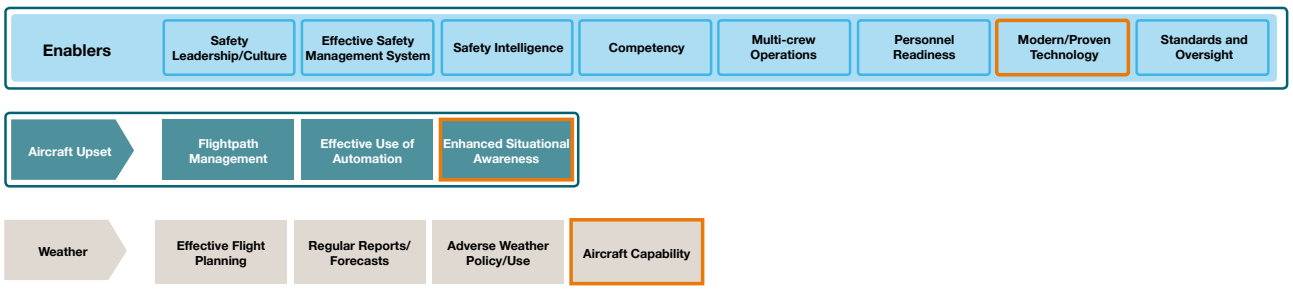
Contracted helicopters are equipped for Instrument Flight Rules (IFR) operations.

3C. Processes and Practices

3C.1 Contracted helicopters are fully equipped for IFR operations relevant to the region of operations.

Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



4. Aircraft automation

4A. Purpose

Ensuring the relative merits of safety features, design standards, and service experience are assessed to select reliable and resilient aircraft and equipment, suitable for the intended operations.

4B. Expectations

Contracted aircraft are equipped with appropriate flight automation.

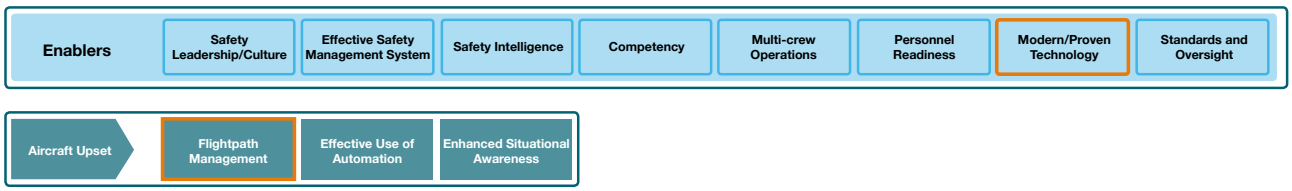
4C. Processes and Practices

4C.1 Contracted aircraft have a four-axis Automatic Flight Control System (AFCS).

4C.2 For further information and operational requirements, see 690-2 Aircraft Operations, Section 5C.

Guidance documents

- ICAO Annex 6
- HeliOffshore Flightpath Management Recommended Practices
- HeliOffshore Safety Performance Model



5. Aircraft-mounted emergency locator transmitters

5A. Purpose

Ensuring the relative merits of safety features, design standards, and service experience are assessed to select reliable and resilient aircraft and equipment, suitable for the intended operations.

5B. Expectations

Contracted aircraft are fitted with a compliant automatic, fixed or deployable Emergency Locator Transmitters (ELT), depending on the regulatory requirements of the operating region.

5C. Processes and Practices

5C.1 The ELTs are compliant with European Technical Standard Order (ETSO) C126a or later approved version.

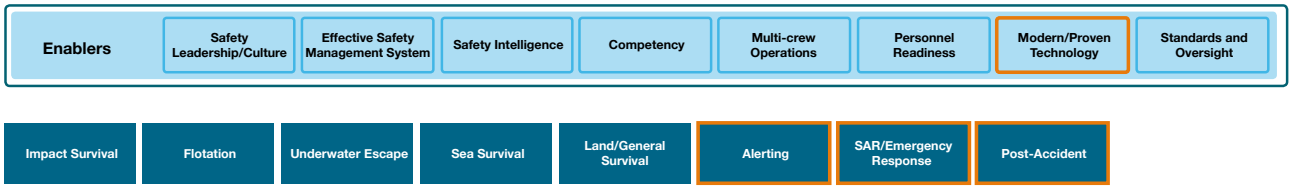
5C.2 ELT/Crash Position Indicator (CPI) has a minimum specification of Cosmicheskaya Sistema Poiska Avariynyh Sudov (COSPAS)/Search and Rescue Satellite Aided Tracking System (SARSAT), 406 MHz capable, with an identification code registered to the aircraft and aircraft operator, GPS capability, and can transmit on 121.5/243 MHz.

5C.3 The ELT is registered with the appropriate national agency and the responsible parties registered as ELT contacts are detailed in the aircraft operator's Emergency Response Plan.

5C.4 For the requirements of ELTs fitted to life rafts, see Section 690-5, Section 11.

Guidance documents

- ICAO Annex 6
- ICAO Annex 10 Vol 3
- HeliOffshore Safety Performance Model



6. Underwater locator beacon fitted to cockpit voice recorder and flight data recorder

6A. Purpose

Ensuring the relative merits of safety features, design standards, and service experience are assessed to select reliable and resilient aircraft and equipment, suitable for the intended operations.

6B. Expectations

Contracted aircraft are fitted with a Cockpit Voice Recorder (CVR)/Flight Data Recorder (FDR) that is fitted with an Underwater Locator Beacon (ULB) for offshore/over water flights.

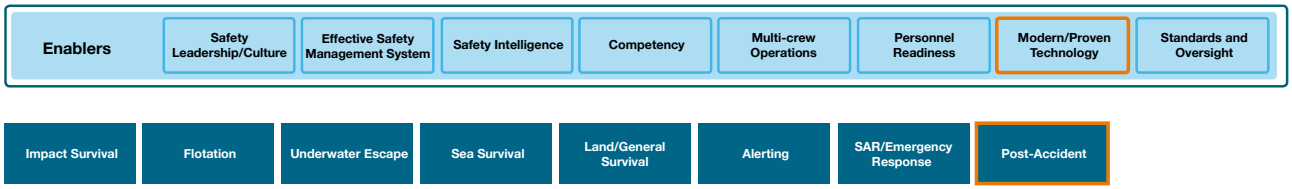
6C. Processes and Practices

6C.1 The ULB has a minimum 90-day battery life and is compliant with ETSO C121a or later approved version.

6C.2 The ULB is attached to the CVR and FDR, or combined CVR/FDR.

Guidance documents

- ICAO Annex 6
- EASA Air Ops CAT.IDE.A.185
- SAE AS8045A – Minimum Performance Standard for Acoustic Underwater Locating Devices
- HeliOffshore Safety Performance Model



7. Helicopter Terrain Awareness Warning System

7A. Purpose

Ensuring the relative merits of safety features, design standards, and service experience are assessed so as to select reliable and resilient aircraft and equipment, suitable for the intended operations.

7B. Expectations

Contracted helicopters are fitted with a Helicopter Terrain Awareness Warning System (HTAWS) as a minimum.

7C. Processes and Practices

7C.1 HTAWS is fitted when available for the helicopter type and region.

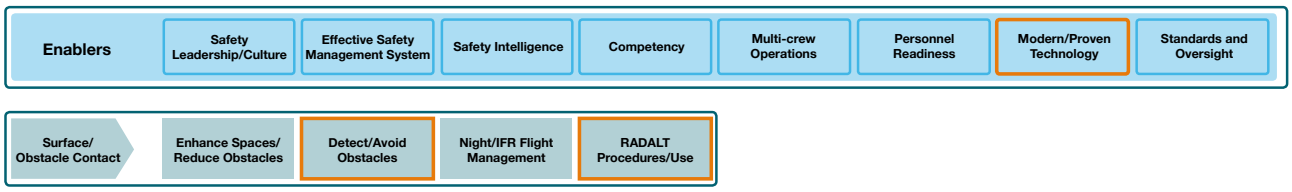
7C.2 If available and certified for the type, offshore modes are installed.

7C.3 There is a documented process to ensure that the latest version of the database for predictive terrain hazard warnings is installed.

7C.4 For further information and operational requirements, see 690-2 - Aircraft Operations, Section 6C.

Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



8. Airborne Collision Avoidance Systems

8A. Purpose

The prevention of mid-air collisions.

8B. Expectations

Contracted aircraft are fitted with an Airborne Collision Avoidance System (ACAS).

8C. Processes and Practices

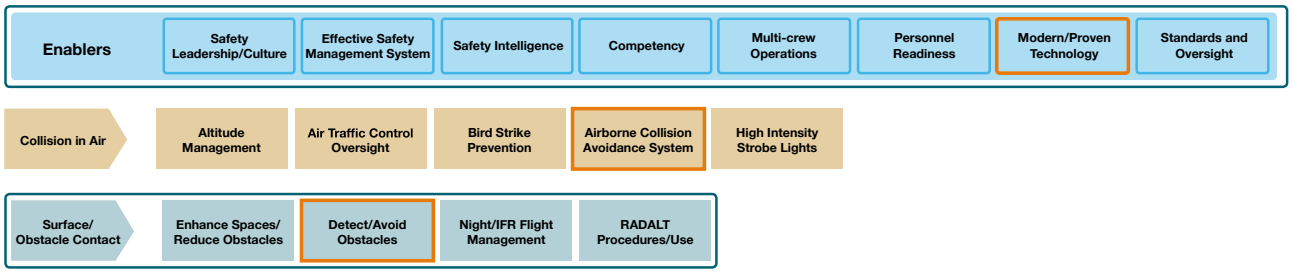
8C.1 At a minimum, ACAS I is installed.

8C.2 ACAS II is installed, if available and certified and retrofittable, for the aircraft type unless operations are in low density air traffic areas and supported by a Risk Assessment.

8C.3 For operational requirements, see 690-2 - Aircraft Operations, Section 7.

Guidance documents

- ICAO Annex 10
- BARSOHO Implementation Guidelines v4 7.4
- HeliOffshore Safety Performance Model



9. Helicopter Flight Data Monitoring

9A. Purpose

The use of flight data to obtain operational feedback and reduce risks.

9B. Expectations

Contracted aircraft are fitted with Helicopter Flight Data Monitoring (HFDM) recording equipment.

9C. Processes and Practices

9C.1 The minimum recorded and synchronized parameters of the HFDM system are:

- 9C.1.1 GPS location
- 9C.1.2 Radar height above ground level (AGL)
- 9C.1.3 Altitude
- 9C.1.4 Ground speed
- 9C.1.5 Indicated air speed (can be derived from video recording)
- 9C.1.6 Vertical speed
- 9C.1.7 Heading
- 9C.1.8 UTC time
- 9C.1.9 Pitch and roll attitudes
- 9C.1.10 Pitch, roll, and yaw rates
- 9C.1.11 Normal, longitudinal, and lateral accelerations
- 9C.1.12 Weight on wheels with elapsed flight time; (when the Radar Altimeter (RadAlt) indicates the aircraft has landed or if calculated AGL is used, when parameter is less than 10 feet)
- 9C.1.13 Minimum record rate 1 per second

9C.2 A serviceability policy for both airborne and ground station equipment has been established.

- 9C.2.1 System unserviceability is not to exceed 25 flight hours between data downloads.

9C.3 For further information and system requirements see 690-2 - Aircraft Operations, Section 8C.

Guidance documents

- UK CAA CAP 739
- FAA CA 120.82
- HeliOffshore Safety Performance Model

10. Health and usage monitoring system

10A. Purpose

Ensuring the early detection of impending critical failures to facilitate timely corrective action.

10B. Expectations

Contracted helicopters have a health and usage monitoring system (HUMS) installed, which is supported by the Original Equipment Manufacturer (OEM) and meets the documented certification requirements, such as CS-29.1465.

10C. Processes and Practices

10C.1 A serviceability policy for both airborne and ground station equipment has been established (See 690-4 - Engineering, Section 34).

10C.2 The HUMS tracks vibration data using a combination of spectrum analysis and advanced diagnostic (proprietary signal processing) techniques.

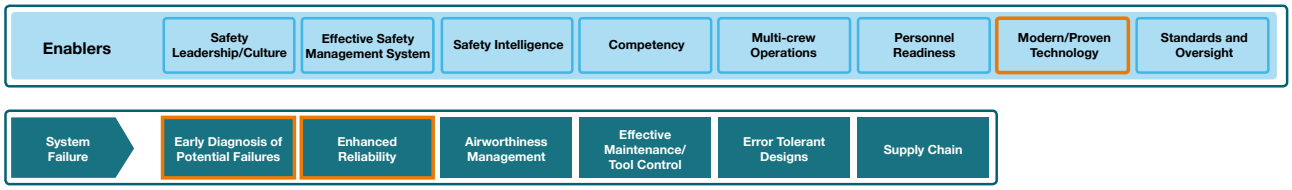
10C.3 It has a diagnostic capability for every dynamic component in the drive train, including:

- 10C.3.1 Engine to main gearbox input drive shafts
- 10C.3.2 Main gearbox shafts, gears, and bearings
- 10C.3.3 Accessory gears, shafts, and bearings
- 10C.3.4 Tail rotor drive shafts and hanger bearings
- 10C.3.5 Intermediate and tail gearbox gears, shafts, and bearings
- 10C.3.6 Main and tail rotor track and balance
- 10C.3.7 Engine health

10C.4 For further information and system operational requirements, see 690-4 - Engineering, Sections 31, 32, 33, 34, 35 and 36.

Guidance documents

- ICAO Annex 6
- HeliOffshore HUMS Best Practice Guide
- EASA CS29.1465
- CAP 753 - Vibration Health Monitoring
- HeliOffshore Safety Performance Model



11. Life rafts

11A. Purpose

Ensuring occupants can survive after a ditching event.

11B. Expectations

Contracted offshore helicopters are fitted with life rafts compliant with ETSO C70 (or ETSO 2C505) sufficient for the maximum number of persons on board.

11C. Processes and Practices

11C.1 Helicopters with a Maximum Operational Passenger Seating Capacity (MOPSC) of 9 or less have at least one life raft certified to carry all aircraft occupants.

11C.2 Helicopters with a MOPSC of 10 or more have two life rafts, each certified for 50% overload to enable any one life raft to be used by all occupants.

11C.3 All life rafts are equipped with an ELT which has COSPAS-SARSAT with an identification code registered to the aircraft and aircraft operator, 406 MHz, GPS, and transmits on 121.5/243 with voice capability, in addition to an approved offshore survival kit.

11C.4 All loose equipment is attached to the raft with a lanyard.

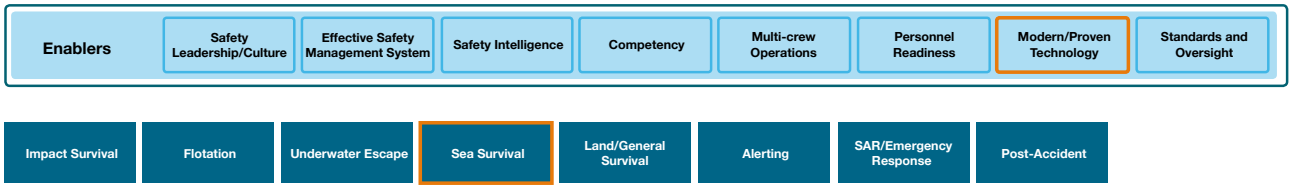
11C.5 A minimum of one life raft is externally mounted.

11C.6 For external rafts, the primary deployment method is by single action from the normal crew positions; the secondary deployment is from the passenger compartment with the cabin in an upright attitude; and deployment is possible from outside the helicopter when in either an upright or inverted attitude.

11C.7 All life rafts are reversible or self-righting, double chambered, and capable of being tethered to the aircraft and be readily accessible in the event of ditching.

Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



12. Helicopter cabin push-out windows

12A. Purpose

Ensuring the occupants can escape in the event of a capsize or submersion.

12B. Expectations

Helicopters are fitted with emergency push-out windows in locations suitable for emergency underwater egress.

12C. Processes and Practices

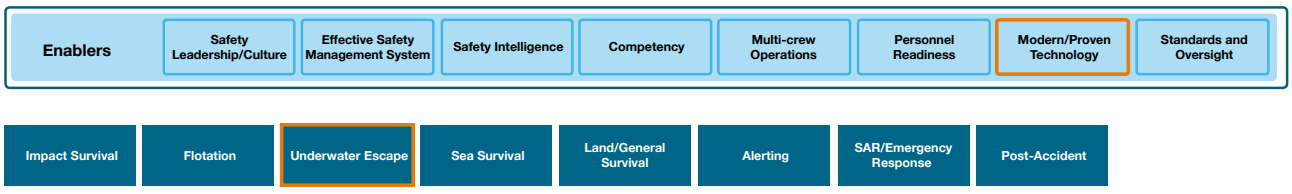
12C.1 Emergency push-out windows and Type IV exits are installed in all locations that are suitable for emergency underwater egress (typically those greater than 430 mm by 356 mm).

12C.2 All push-out windows and Type IV Emergency Exits are clearly highlighted with Helicopter Emergency Escape Lighting (HEEL) – see 690-5, Section 13 – Emergency Exit Lighting.

12C.3 There is a suitable means of opening that is resistant to inadvertent operation and which is suitably marked by placards and contrasting colour(s).

Guidance documents

- EASA AMC1 SPA.HOFO.165(h) Additional procedures and equipment for operations in a hostile environment
- UK CAA CAP 562 Civil Aircraft Airworthiness Information and Procedures. Leaflet 25-100
- UK CAA CAP 747 GR No 9
- RAF IAM (Report No.528) and University of Loughborough Report on body size for the Joint Aviation Authorities (JAA) in 2001
- HeliOffshore Safety Performance Model



13. Helicopter emergency exit lighting

13A. Purpose

Ensuring the occupants can escape in the event of a capsize or submersion.

13B. Expectations

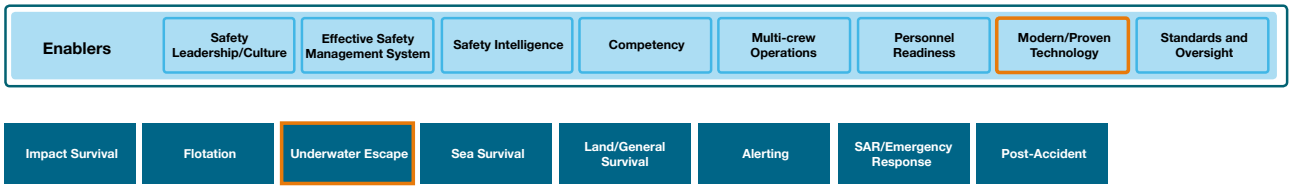
HEEL systems are fitted.

13C. Processes and Practices

13C.1 Emergency exit marking systems which identify emergency escape hatches, exits and push-out windows by illuminating their perimeter (e.g., HEEL path lighting) and is automatically activated following the flooding of the cabin.

Guidance documents

- ICAO Annex 6
- BARSOHO Implementation Guidelines v4 20.3
- HeliOffshore Safety Performance Model



14. Seating layout

14A. Purpose

Ensuring the occupants can escape and survive in the event of a crash, capsize or submersion.

14B. Expectations

That the occupants can safely escape from the helicopter.

14C. Processes and Practices

14C.1 Helicopter passengers are seated no more than one seat from a push out window or emergency exit.

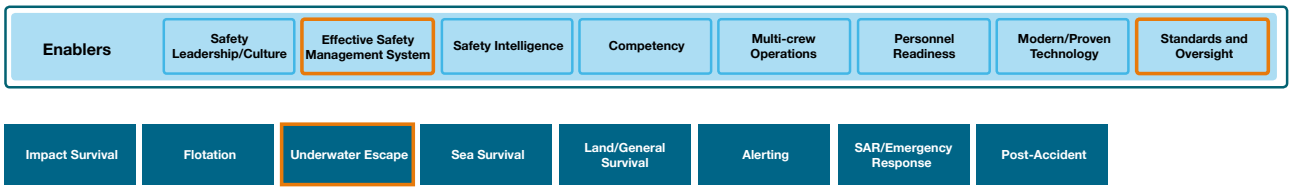
14C.2 Helicopter seat rows are aligned with push out windows or emergency exits.

14C.3 Sideways-facing seats are not used.

14C.4 For further information on seating of passengers see Report 690-3, Section 5, Passenger handling

Guidance documents

- EASA AMC1 SPA.HOFO.165(h) Additional procedures and equipment for operations in a hostile environment
- BARSOHO Implementation Guidelines v4 20.3
- HeliOffshore Safety Performance Model



15. Tail camera

15A. Purpose

Improving situational awareness.

15B. Expectations

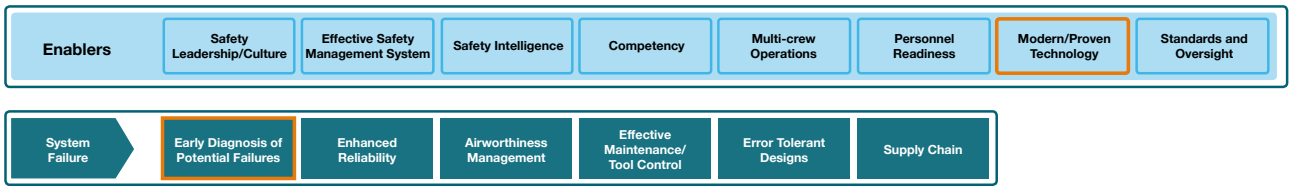
A forward-facing tail camera is fitted, if available.

15C. Processes and Practices

15C.1 A forward-facing tail camera with presentation of the picture in the cockpit is fitted, where available for the aircraft type.

Guidance documents

- BARSOHO Implementation Guidelines v4 4.2
- HeliOffshore Safety Performance Model



16. Cockpit camera

16A. Purpose

Preventing recurrence of accidents or incidents and supporting accident and incident investigations.

16B. Expectations

A cockpit camera is fitted.

16C. Processes and Practices

16C.1 The cockpit is equipped with a camera, with adequate fidelity and a recording function.

16C.2 The camera is fitted in the cockpit with a clear view of the instrument panel and relevant controls.

16C.3 Procedures are in place to use the data from cockpit cameras for accident and incident investigation.

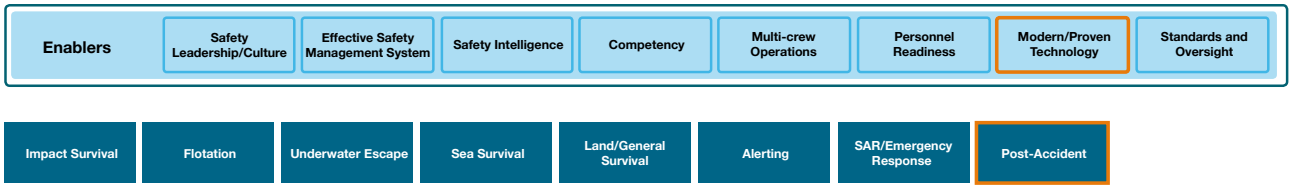
16C.4 Procedures are in place to safeguard the recordings and prevent unauthorized use.

16C.5 Maintenance requirements are in place that periodically check the serviceability of the camera system.

16C.6 The cockpit camera recording system is capable of recording data for a duration that exceeds the total flight time without overwriting data.

Guidance documents

- US National Transportation Safety Board, Safety Recommendation A-00-031:
- Fact sheet – FAAs Response to NTSB's "Most Wanted" Safety Recommendations:
- Transportation Safety Board Of Canada. Air Transportation Safety Investigation A18W0116
- HeliOffshore Safety Performance Model



17. Helicopter flotation gear

17A. Purpose

Ensuring the helicopter floats after a ditching or survivable water impact.

17B. Expectations

Contracted helicopters are fitted with automatically deployed flotation equipment.

17C. Processes and Practices

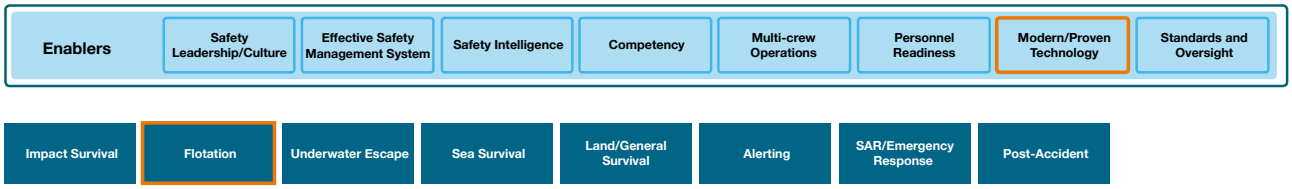
17C.1 Flotation equipment fitted is appropriate to Significant Wave Height (SWH) conditions in the area of operations.

17C.2 Commercial Air Transport (CAT) operations are not conducted with SWH over the ditching certified capability – see 690-2 Aircraft Operations, section 22C.2.

17C.3 Procedures are in place for float arming during offshore flying.

Guidance documents

- ICAO Annex 6
- UK CAA CAP 1145
- HeliOffshore Safety Performance Model



18. Flight following

18A. Purpose

Ensuring timely alerting and location identification to aid SAR services.

18B. Expectations

A satellite flight following, or Automatic Dependent Surveillance – Broadcast (ADS-B) system is installed and serviceable.

18C. Processes and Practices

18C.1 The prime flight following system may be unserviceable for no more than one day. In the event of unserviceability, the following is to apply:

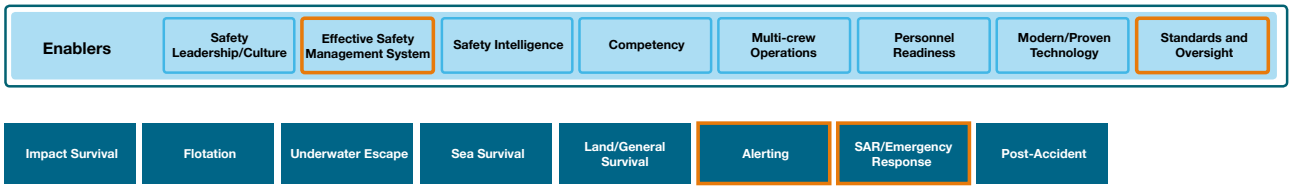
18C.1.1 Continuous communication between flight crew and a ground radio operator is acceptable, provided the procedure is documented, including the obligation of ground operators of keeping up-dated records of aircraft position.

18C.1.2 Where there is more than one period of unserviceability in 30 days the client/customer is consulted.

18C.2 For further information on Flight Following, see Report 690-2, Section 35, Flight following

Guidance documents

- ICAO Annex 6
- BARSOHO Implementation Guidelines v4 20:6
- HeliOffshore Safety Performance Model



19. Passenger seats and harnesses

19A. Purpose

Ensuring occupants survive a crash impact.

19B. Expectations

High-back Passenger Seats are fitted with four-point Upper Torso Restraint (UTR) Harnesses.

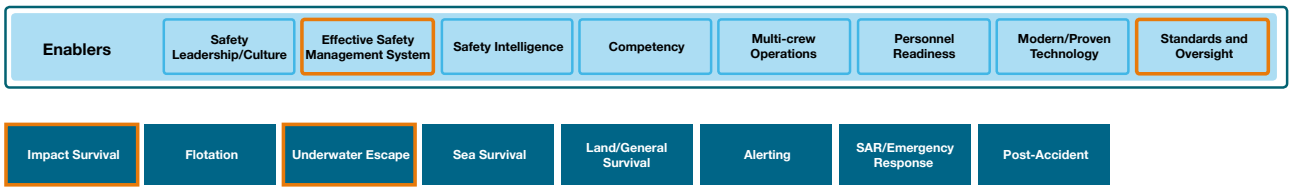
19C. Processes and Practices

19C.1 Seat belts consist of four separate straps.

19C.2 Loop type straps present a snagging hazard and are not to be used.

Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



20. Survival kits

20A. Purpose

Ensuring the occupants can survive in the operating environment post an emergency.

20B. Expectations

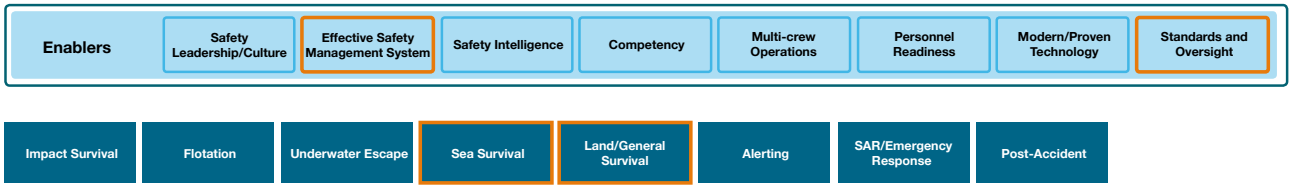
Survival kits are carried.

20C. Processes and Practices

20C.1 Survival kits appropriate to the area of operations are carried.

Guidance documents

- ICAO Annex 6
- HeliOffshore Safety Performance Model



21. High Intensity Strobe Lights

21A. Purpose

Ensuring visibility of the helicopter to all other traffic.

21B. Expectations

High Intensity Strobe Lights (HISL) are fitted.

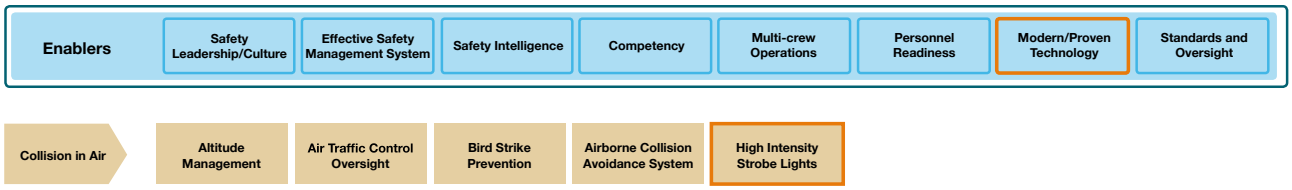
21C. Processes and Practices

21C.1 HISL are installed, if available and certified for the aircraft type, unless operations are in low density air traffic areas and supported by a Risk Assessment.

21C.2 Restrictions are placed on the use of HISL on the ground.

Guidance documents

- ICAO Annex 8
- UK CAA CAP 562, Leaflet 33-20
- HeliOffshore Safety Performance Model



22. Continuous improvement of aircraft operational safety systems

22A. Purpose

Aircraft operators improve aircraft systems to enhance operational safety where possible.

22B. Expectations

Contracted aircraft are equipped with enhanced operational safety systems, where available from the OEM.

22C. Processes and Practices

22C.1 The operator and the Company collaborate to review the benefits of safety enhancements developed by the OEM and implement as agreed.

Guidance documents

- HeliOffshore Safety Performance Model