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Basic Aviation Risk Standard

Resource Sector

Version 3

Contents

Purpose

This document is to provide Companies engaged in the resource sector with a standard to assist in the risk-based management of aviation operations supporting their activities.

All national and international regulations pertaining to aviation operations must always be followed. The detail contained in this standard is intended to supplement those requirements.

Document Structure

The standard is presented in a risk-based format to emphasise the relationship between threats to aviation operations, associated controls and applicable recovery/mitigation measures as presented in Figure 1.

The risk-based presentation is further intended to assist all Company personnel engaged in coordinating aviation activities to manage and understand the aviation risk to their operation.

As a basic standard, all Companies and aircraft operators are encouraged to further risk-assess all controls to the level of detail they consider necessary for their individual operations.

Aircraft Operator Review

This standard is designed to be used as a primary reference for the review and approval of aircraft operators supporting Companies engaged in the resource industry.

Variations

Any variation to this standard is at the discretion of each individual Company. It is recommended that each variation be assessed to demonstrate that the risks associated with the variation are tolerable and justify safe continuation of operations.

A diagram showing the Basic Aviation Risk Standard Variance Process is presented in Figure 2 on page 7.

Key Definitions

Company

Refers to the individual company using this standard to support their aviation operations.

Operator

Refers to an aircraft operating company used to provide aviation services.

Hostile Environment

An environment in which a successful emergency landing cannot be assured, or the occupants of the aircraft cannot be adequately protected from the elements, or search and rescue response/capability cannot be provided consistent with the anticipated exposure.

Non-Hostile Environment

An environment in which a successful emergency landing can be reasonably assured, and the occupants of the aircraft can be adequately protected from the elements, and search and rescue response/capability can be provided consistent with the anticipated exposure.

Long-term contract

Any contract using dedicated aircraft for a planned duration of greater than six months.

Competent Aviation Specialist

A Company designated aviation advisor or Flight Safety Foundation accredited Auditor.

Additional definitions related to the use of this standard are presented in Appendix 3.

Figure 1: Schematic of Aviation Risk Management Controls and Recovery Measures

- Drummed Fuel
- Special VFR
- Flight Data Monitoring
- Autopilot
- TAWS
- Passenger Briefing
- Multi-language Briefing
- Airfield Control
- TCAS
- High Intensity Strobe Lights
- Minimum Equipment List (MEL)
- Sub-chartering Aircraft

Aircraft Accident

Recovery Measures

- Aircraft Certification Standards
- Emergency Response Plan
- Emergency Locator Transmitter
- Satellite Flight Following
- Flight Following
- Survival Kit
- Aircrew Survival Vests with EPIRB
- First-Aid Kit
- Passenger Dress Requirements
- Cockpit Voice Recorder (CVR)/ Flight Data Recorder (FDR)
- Upper Torso Restraint
- Limitations in Sideways Seating
- Crash Boxes
- Rescue Fire Fighting
- Insurance

All Threats 1.0: Common Controls

Common controls that apply to all threats outlined in this standard

Common Control 1.1: Approved Aircraft Operators

Only appropriately licensed aircraft operators who have been reviewed and endorsed for use by a competent aviation specialist are to be used in support of Company activities.

Common Control 1.2: Aircrew Qualifications and Recency

Aircrew are to meet the minimum experience requirements presented in Appendix 1.

Common Control 1.3: Aircrew Check and Training

All aircrew shall receive annual recurrent training to the standards of the appropriate civil aviation authorities, and a minimum of two flight checks annually at not less than a frequency of every six months for long-term contracted operations. These flight checks at minimum shall include a combination of a proficiency check (non-revenue) and a route check (revenue-flight permissible).

Where distinct climatic seasons are experienced, such as snow/ice winter conditions, training related to the seasonal change is recommended. Before commencing flight duties in a new location on long-term contract, all crew members shall receive a documented line check that includes orientation of local procedures and environment.

Common Control 1.4: Maintenance Personnel Qualifications

Maintenance personnel are to meet the minimum experience requirements presented in Appendix 1.

Common Control 1.5: Maintenance Training

The aircraft operator or maintenance service provider shall establish a recurrent training program for maintenance personnel at periods not exceeding three years. The training should at least include human factors in maintenance and company maintenance documentation and procedures, and where appropriate include technical components for aircraft and systems being maintained.

Common Control 1.6: Basic Aircraft Equipment Fit

Aircraft basic equipment fit shall meet the minimum requirements presented in Appendix 2.

Common Control 1.7: Drug and Alcohol Policy

The aircraft operator shall have a Drug and Alcohol policy which meets all requirements of the local regulatory authority when such requirements exist. When no such regulatory requirements exist the operator shall at minimum meet the requirements of the contracting Company.

Common Control 1.8: Flight Time Limits

Unless local regulatory requirements are more stringent the following flight time limits are to be applied.

Single Pilot	Dual Pilot
8 hours daily flight time	10 hours daily flight time
40 hours in any 7-day consecutive period	45 hours in any 7-day consecutive period
100 hours in any 28-day consecutive period	120 hours in any 28-day consecutive period
1000 hours in any 365-day consecutive period	1200 hours in any 365-day consecutive period

Common Control 1.9: Aircrew Duty Time

A duty day shall not exceed 14 hours and where 12 hours have been exceeded must be followed by a rest period of 10 hours. Crews on rotational assignments that arrive following overnight travel or travel exceeding four timezones change should not be rostered for flying duties until the 10-hour rest period is met.

Regulatory approved fatigue management programs may be used in lieu of the above limits when reviewed and endorsed by competent aviation specialist advice.

Common Control 1.10: Maintenance Duty Time

The aircraft operator or maintenance service provider shall establish a fatigue management program to minimise the effects of acute and chronic fatigue amongst maintenance personnel. This shall include maximum working hours, minimum rest periods and roster schedules. The requirement to conduct overnight maintenance should be reviewed by a competent aviation specialist.

Common Control 1.11: Aircraft Operator Safety Management System

All aircraft operators shall have a Safety Management System (SMS) commensurate with the size and complexity of their operation. Additional information useful for operators' SMS development as follows:

ICAO Safety Management System

Flight Safety Digest Volume 24 No 11 - 12, Nov - Dec 2005

International Helicopter Safety Team – SMS Toolkit

Common Control 1.12: Accident and Incident Notification

As part of their Safety Management System, the aircraft operator shall advise the Company of any incident, accident or non-standard occurrence related to the services provided to the Company that has, or potentially has, disrupted operations or jeopardised safety.

Common Control 1.13: Operational Risk Assessment

Before commencing operations for any new or existing aviation activity a documented assessment of operational risks and their respective mitigation shall be conducted by the aircraft operator. Guidance for the conduct of a risk assessment can be obtained by the aircraft operator from the Flight Safety Foundation.

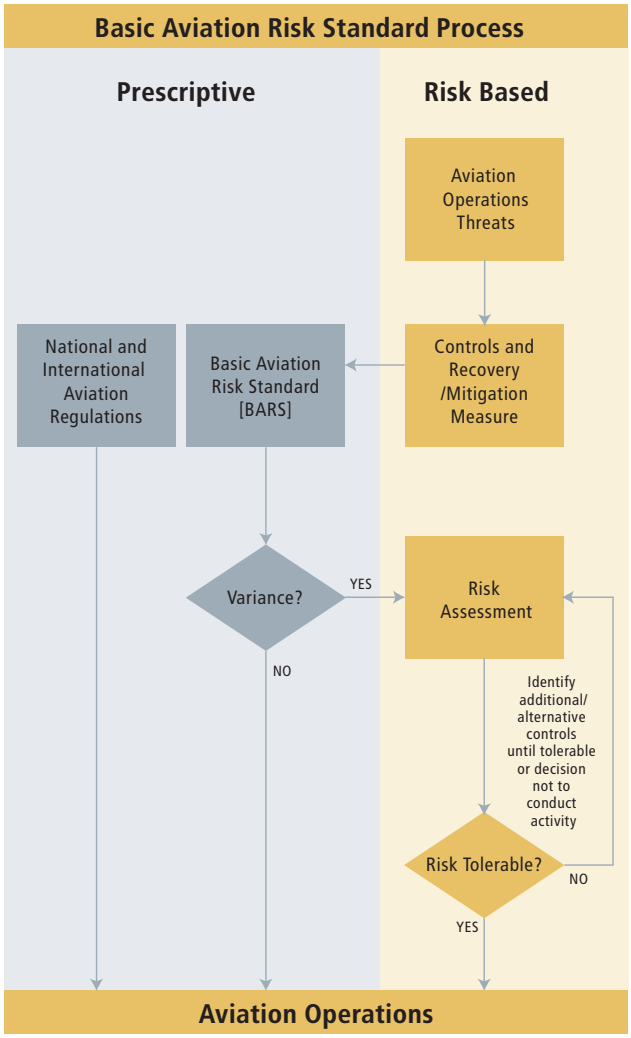
Common Control 1.14: Helicopter External Loads and Offshore Operations

For Companies involved in helicopter external load and offshore operations, additional controls addressing these activities are presented in Appendices 4 and 5 to this document respectively.

Common Control 1.15: Airborne Geophysical Operations

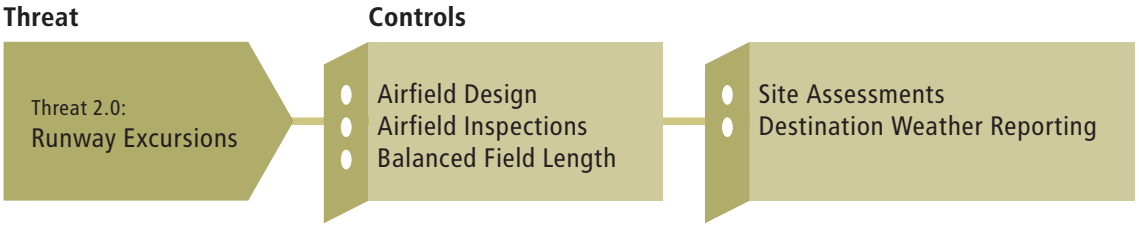
Companies engaged in airborne geophysical operations shall ensure aircraft operators supporting this flight regime are members of the International Airborne Geophysics Safety Association (IAGSA) and comply with all requirements of the *IAGSA Safety Manual.*

Figure 2



Threat 2.0: Runway Excursions

The aircraft departs the runway during take-off or on landing and results in an aircraft accident



Control 2.1: Airfield and Helipad Design

Where local guidance is not acceptable to Company, *ICAO Annex 14 Aerodromes, Volume I* ('Aerodrome Design and Operation') and *ICAO Annex 14, Volume II* ('Heliports') are to be used for design considerations when constructing (or major rework) permanent long-term Company owned and operated airfields and helipads supporting production operations.

Prevailing **winds** and location of mining/facility infrastructure in relation to the proposed airfield or helipad departure and approach splays shall also be included in initial design considerations.

Control 2.2: Airfield Inspections

In addition to any regulatory required reviews, all Company owned and/or operated airfields should have a minimum of an annual operational control and safety review by qualified airfield specialists.

Control 2.3: Landing Site Assessments

Aircraft operators shall have a means of conducting landing site assessments prior to commencing operations which must further be incorporated into the operational risk assessment (Control 1.13).

Control 2.4: Balanced Field Length

All multi-engine aeroplanes shall meet balanced field requirements so that following an engine failure on take-off the aircraft will be able to stop on the remaining runway and stop-way, or continue (using the remaining runway and clearway) and climb achieving a net climb gradient greater than the take-off path obstacle gradient.

Control 2.5: Balanced Field Length – No Performance Charts

Multi-engine aircraft that do not have the appropriate Flight Manual performance charts to achieve Control 2.5 shall restrict payload to ensure that in the event of an engine failure the net take-off path clears obstacles by 35 feet up to a height of 1500 feet above the aerodrome using the following conditions:

- Failure occurs when the aeroplane has reached published best Rate of Climb (V_Y) speed.
- Undercarriage up if retractable
- Flaps are fully retracted
- Propeller on inoperative engine feathered.

Control 2.6: Destination Weather Reporting

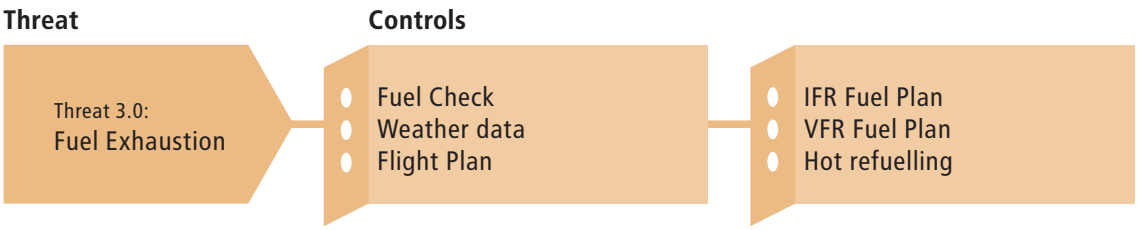
For Company owned and operated airfields and helidecks, the following data shall be communicated to arriving aircraft either by an Automatic Weather Observation System (AWOS) and/or trained weather observer:

- Wind indication system
- Temperature
- Barometric pressure
- Cloud ceiling height and visibility

All equipment shall be maintained on a current calibration register.

Threat 3.0: Fuel Exhaustion

Aircraft conducts a forced landing or ditching as a result of fuel exhaustion and leads to an aircraft accident



Control 3.1: Fuel Check

The aircraft operator shall have procedures in place that require the Pilot-in-Command to ensure the required amount of fuel is on board the aircraft prior to each flight.

Control 3.2: Flight Plan Weather Data

All aircrew are to have access to reliable weather information when determining fuel loads in pre-flight planning.

Control 3.3: Flight Plan

Wherever practical flights are to be conducted on an Instrument Flight Rules (IFR) flight plan lodged with the relevant regulatory agency. When not possible, use of Visual Flight Rules (VFR) flight plans is permitted but shall be lodged with a responsible party (regulatory authorities, aircraft operator or Company site representative) and flown under a flight-following regime.

Control 3.4: IFR Fuel Plan

In addition to operational holding fuel requirements, fuel loads shall cover fuel used during start-up, taxi, en route, approach and transit to the alternate destination (if required). Additional variable reserves of 10% of the total trip fuel and 30 minutes as fixed reserve are to be carried.

Control 3.5: VFR Fuel Plan

Fuel loads are to cover the planned route. An additional variable reserve of 10% of the total trip fuel and 30 minutes as fixed reserve is to be carried.

Control 3.6: Hot Refuelling

Hot refuelling shall only be conducted when considered operationally necessary and must be approved by Company prior to use. Aircraft operator shall have documented procedures covering all aspects of hot refuelling.*

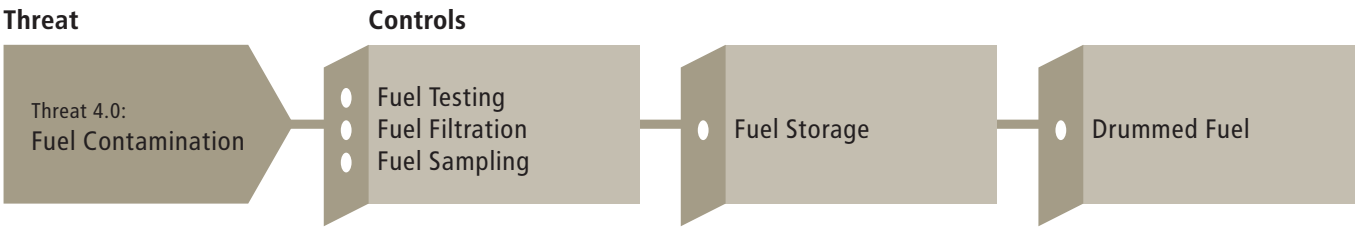
**Note 1* – Documented procedure to include the following considerations:

- A pilot shall remain at the controls at all times. No passengers are to be onboard during refuelling.
- Fire fighting capability is to be available and manned.
- The aircraft operator's Operations Manual is to detail all aspects of hot refuelling, including personnel training, sequence of aircraft grounding and duties of personnel (in addition to the pilot) required: (minimum of three for helicopter ops – one for refuelling, one for pump shut-off and one for fireguard).
- Radios are not to be used during refuelling.
- Anti-collision lights, radio altimeter, radar, transponder and DME equipment should be switched OFF.
- Prior to removing the fuel cap and inserting the fuel nozzle or connecting the pressure hose into the aircraft fuel tank, grounding wires running from the fuel station and from the fuel hose to the aircraft should be connected.
- When refuelling is completed, the Pilot-in-Command shall verify that all equipment is removed, the fuel cap has been securely replaced and the aircraft is properly configured for flight.
- Correct fuel loads should be confirmed by the Pilot-in-Command prior to departure.

Note 2 – Refuelling fixed wing aircraft with engines operating must not be conducted unless the aircraft is fitted with an Auxiliary Power Unit (APU) which goes unserviceable at an outstation without ground power assistance and where power is required for refuelling. A formal approval from the local regulatory body (where required) must be in place prior to hot refuelling taking place on any fixed wing aircraft. APU running without engines operating does not constitute hot refuelling and is acceptable.

Threat 4.0: Fuel Contamination

Aircraft forced to put down at unprepared sites with minimal warning as a result of contaminated fuel causing loss of engine power and results in aircraft accident



Control 4.1: Fuel Testing

Testing of the fuel supplied shall include use of water detector capsules or any equivalent that is able to test for water in suspension. The Pilot-in-Command will ensure that the quality of the fuel being uplifted is acceptable for operation of the aircraft.

Control 4.2: Fuel Filtration

Fuel delivery systems including portable systems are to be fitted with water blocking filtration of the Go No-Go types. Filter canisters are to be marked with the next date of change or inspection cycle. All filters must be replaced at nominated pressure differentials as annotated on the filter housing or as recommended by the manufacturer, but as a minimum will be replaced annually.

Control 4.3: Fuel Sampling

When incorporating supply fuel tanks in Company owned and operated facilities, a slope at the base with a sump drain at the tank low point (or equivalent) for sampling purposes shall be specified for installation.

When using a dedicated fuel source, a sample from the source shall be retained in a clear jar with screw-top-lid, labelled with the current date and retained until completion of the daily flying activities.

Control 4.4: Fuel Storage

Prior to testing and approval for use, all fuel storage facilities shall be allowed to settle 1 hour for each 1 foot of fuel depth after the tanks have been re-supplied, or in the case of drum-stock when the barrels have been moved to the vertical. Additional storage requirements include:

- Fuel systems should be identified by placard during the settling period indicating the time when settling will be completed
- All steel tanks should be lined with an approved epoxy liner unless the tanks are constructed of stainless steel
- All Company new-build fuel systems should have stainless steel and connection welded plumbing.

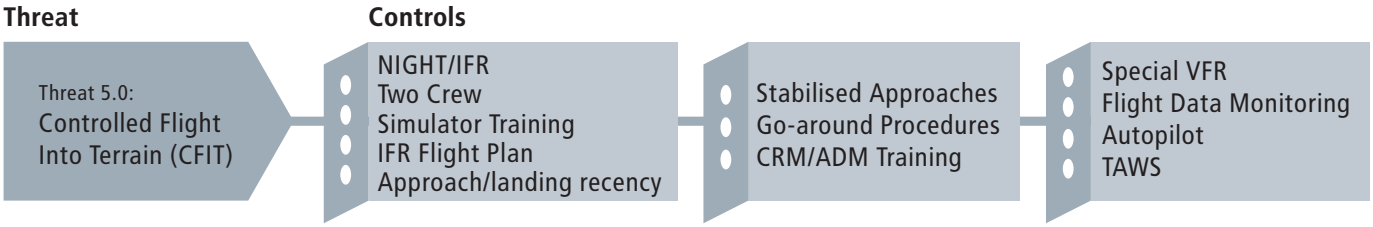
Control 4.5: Drummed Fuel

Aircraft operator shall have procedures for the use of drum-stock that require:

- The seals to be tight and not broken prior to use
- Fuel is to be consumed within 12 months of packaging date
- Drums are to be stored horizontally with bungs at 3 and 9 o'clock, should have minimal contact with the ground (using wooden slats or equivalent), and covered where possible
- Use of drummed fuel to be contingent on thorough sampling and testing procedures
- Testing procedures to use water detector capsules or an approved equivalent
- Before fuelling the aircraft, a small amount of fuel to be pumped into a container to remove any contaminants from the hose and nozzle.

Threat 5.0: Controlled Flight Into Terrain (CFIT)

An airworthy aircraft under the control of crew is flown into the ground (or water) resulting in an accident



Control 5.1: Night or Instrument Flight Rules (IFR) – Two crew operations

Flights flown at night or in IFR shall be crewed by two pilots who hold valid and current instrument and night flying ratings using Standard Operating Procedures (SOPs) contained in the Operations Manual. For additional reference see *FSF ALAR Toolkit* (www.flightsafety.org).

Control 5.2: Special VFR Procedures

Planned use of Special VFR procedures shall only be used when endorsed by aviation specialist advice.

Control 5.3: Night or IFR – Aircraft

Flights flown at night or under IFR shall be conducted in a multi-engine aircraft.

Control 5.4: Night or IFR – Flight Planning

Flights flown at night or under IFR shall be conducted in compliance with an IFR flight plan.

Control 5.5: Night or IFR – Simulator Training

For long-term contracts, crews operating any aircraft at night or under IFR shall attend initial and recurrent type specific simulator training or Flight Training Devices when reasonably available for that aircraft type.

Control 5.6: Night or IFR Approach/Landing Recency

IFR and night approach recency is to meet that of the local regulatory environment, but not less than 3 night take-off and landings for each pilot in the preceding 90 days.

Control 5.7: Stabilised Approaches

Aircraft operators are to detail type-specific stabilised approach in the relevant section of the Operations Manual. For additional information see *Flight Safety Foundation ALAR Briefing Note 7.1* (www.flightsafety.org).

Control 5.8: Mandatory Go-around Procedures

Aircraft operators are to have mandatory no-fault go-around procedures in the relevant section of the Operations Manual.

Control 5.9: Flight Data Monitoring

When available for the aircraft type, contracts that are for duration of three-years or greater and which specify individual aircraft are to have operational Flight Data Monitoring capability that is routinely used to assess operational approach and landing standards.

Control 5.10: Multi Crew Operations

Procedures outlining duties and responsibilities of all crew members shall be prescribed by the aircraft operator in those cases where multi-crew operations are conducted.

Control 5.11: CRM/ADM Training

All flight crew (including cabin attendants) shall have successfully completed Crew Resource Management (CRM) or Threat and Error Management (TEM) training at intervals not exceeding two years. Completion of an Aircrew Decision Making (ADM) course is acceptable for approved single pilot operations.

Control 5.12: Night or IFR – Autopilot

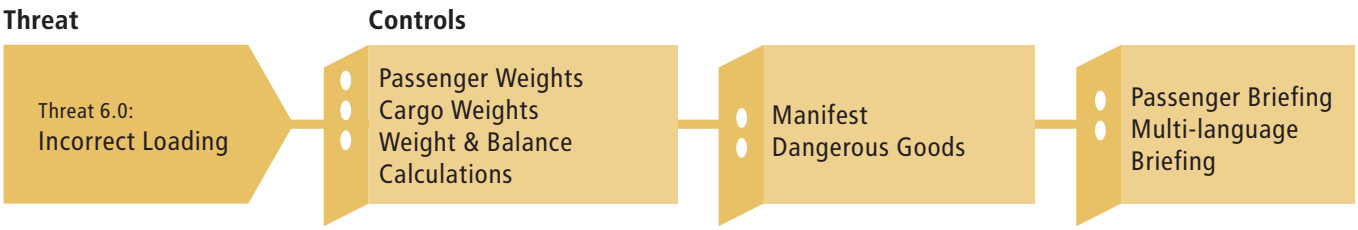
For night or IFR flights, an autopilot or AFCS must be fitted and in normal operations coupled during the flight and approach.

Control 5.13: Terrain Awareness Warning Systems (TAWS)

Aircraft that may be tasked to provide flight under IFR or at night and on long-term contract shall be fitted with an approved and serviceable Class A TAWS when an approved modification exists for the aircraft type. The aircraft operator is to have corresponding procedures outlining the action to be taken by aircrew in the event of an alert.

Threat 6.0: Incorrect Loading

Incorrect loading of passengers and/or their lack of proper safety awareness results in an aircraft accident



Control 6.1: Passenger Weight

For fixed wing aircraft with a maximum gross take-off weight (MGTOW) less than 5700kg, and all helicopters regardless of MGTOW, actual body weight (including hand luggage) is to be used.

If within regulatory and operator operating guidance, standard weights based on seasonal averages acceptable to Company may be used for fixed wing aircraft with a MGTOW exceeding 5700kg unless aviation specialist advice provides alternative guidance.

Control 6.2: Cargo Weight

All baggage and cargo will be weighed separately and appear on the manifest and measures are to be taken to ensure that effects of rain do not alter the weight prior to loading. Cargo will not normally be carried inside the passenger compartment during passenger carrying operations. Should it be necessary, the cargo must be adequately secured using nets and straps, and must not obstruct normal or emergency exits and where practical should be placed forward of the passengers.

Control 6.3: Weight and Balance Calculations

Prior to take-off the Pilot-in-Command (PIC) is to ensure that fuel and oil requirements are correct, and that weight and centre of gravity limits of the aircraft have been calculated and are within limits for flight. Use of an approved load-sheet is acceptable for use and must be available in the cockpit at all times.

Control 6.4: Manifest

A passenger manifest is to be raised for each flight or, where applicable, each sector. At a minimum the passenger's full name shall be recorded. The manifest shall always accurately reflect the occupants of an aircraft when in flight, and a copy must be accessible by flight following personnel at all times.

Control 6.5: Dangerous Goods Cargo (Hazardous Materials)

Carriage of dangerous goods is to comply with current International Air Transport Association (IATA) guidance (or similar guidance such as Title 49 of the Code of Federal Regulations) associated with Dangerous Goods Regulations. The aircraft operator shall have appropriate procedures and trained personnel for the carriage and acceptance of dangerous goods. All aircrew are to have completed dangerous goods awareness training at intervals not exceeding two years.

Control 6.6: Passenger Briefing

Passengers shall be briefed on emergency procedures and safety matters prior to flight. Minimum briefing requirements must include:

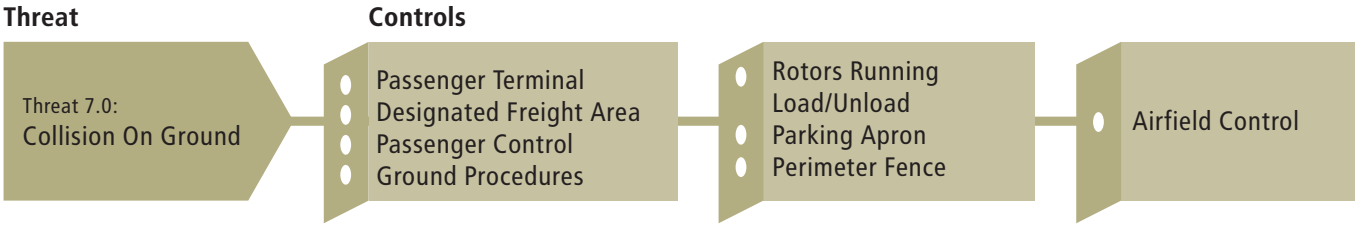
- No smoking around the aircraft and apron area, or at any stage during flight
- General description of aircraft and specific avoid/danger areas
- Location of non-smoking and fasten seatbelt signs and briefing cards
- Use of seat belts and shoulder harnesses
- Location and operation of oxygen masks, if applicable
- Means of communication between crew and passengers and the BRACE position
- Location and use of normal and emergency exits and all life-saving equipment
- Guidance on the use of Personal Electronic Devices (PEDs).

Control 6.7: Multi-language Briefing

When the first language in the area of operations is not English, the aircraft operator is to provide emergency exit decals and briefing in the local language as well as English.

Threat 7.0: Collision on Ground

Aircraft and object collide on ground resulting in aircraft accident



Control 7.1: Passenger Terminal Area

Company owned and operated airfields shall have a waiting area for passengers offering security, basic amenities, protection from the elements and a barrier from the aircraft movement area. Separation between incoming and outgoing passengers should be designated.

Written safety material that reinforces key aircraft safety information should be displayed in the waiting area, which may also serve for video briefing and check-in process.

Control 7.2: Designated Freight Areas

Company owned and operated airfields, helipads and helidecks shall have a designated and secure freight area that provides a controlled environment clear of the aircraft movement area and public thoroughfare.

Control 7.3: Passenger Control

All passenger movements to and from the designated aircraft movement area are to be conducted under the control of a designated Passenger Control Officer (PCO) or Helideck Landing Officer (HLO) who are in a position to signal or communicate with the crew at all times. The PCO can be provided by the Company or the aircraft operator, and if required may be a crew member in a multi-crew operation.

If not a crew member of the aircraft, the PCO and HLO position must be identified by a distinguishing vest.

Control 7.4: Ground Procedures

The Operations Manual must include reference to ground handling and manoeuvring of aircraft.

Control 7.5: Rotors Running Load/Unload

When loading or unloading passengers from helicopters with rotors running, the pilot at the controls is only to be engaged in essential cockpit duties associated with identification of external hazards and passenger movement around the aircraft. Rotors running passenger transfer must only be conducted under the supervision of a designated PCO or HLO.

Control 7.6: Parking Apron

For all Company owned and operated airfields, the parking apron area shall be assessed by the aircraft operator as being suitable for operation of their aircraft type. This shall also include consideration of other transient aircraft traffic, helicopter operations, refuelling considerations and Pavement Classification Number (PCN). For long-term operations and where practical, taxi lines specific to the contracted aircraft type should be painted in the apron area for obstacle-clearance manoeuvring purposes.

Control 7.7: Perimeter Fence

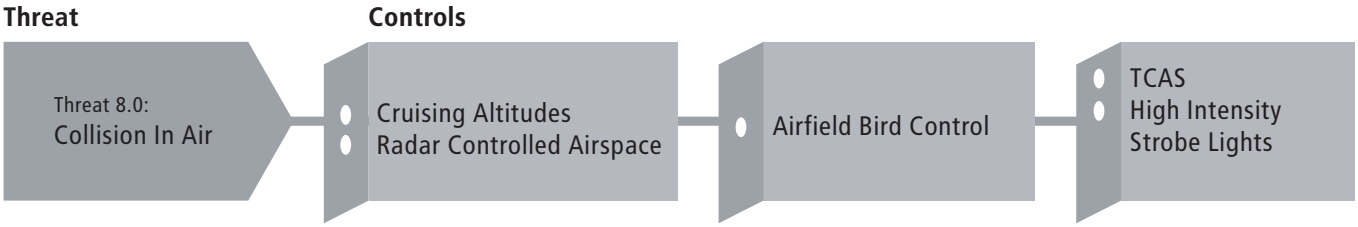
A perimeter fence aimed at preventing access by livestock, animals and itinerant pedestrian traffic shall be constructed around all Company owned and operated airfields.

Control 7.8: Airfield Control

All Company owned and operated airfields shall have personnel assigned the responsibility of providing oversight and management of the airfield and operating standards. Duties will include having a basic understanding of the local aviation regulatory system, certification requirements of the airfield and daily airfield reporting officer duties.

Threat 8.0: Collision in Air

Aircraft and object collide in air resulting in an aircraft accident



Control 8.1: Cruising Altitudes

All operations will attempt to comply with the ICAO cruising altitudes for both VFR and IFR flight unless circumstances, such as weather, demand non-standard procedures. Where known bird migratory routes are identified, practical attempts are to be made to plan cruise altitudes above 3000 feet above ground level.

Control 8.2: Radar Controlled Airspace

Consideration in using radar controlled airspace when determining cruising altitudes shall be made by the Pilot-in-Command.

Control 8.3: Airfield Bird Control

When required, active bird control shall be conducted at all Company owned and operated airfields and the presence of birds recorded on a periodic basis. Where possible, birds are to be dispersed or removed in accordance with local wildlife regulatory standards. Seeding grass, open waste disposal and water ponds should be restricted to remove attractions for birds.

Where bird activity is known to exist, aircraft operators are to minimise the risk of bird strike during all operations.

Control 8.4: Traffic Collision Avoidance System (TCAS)

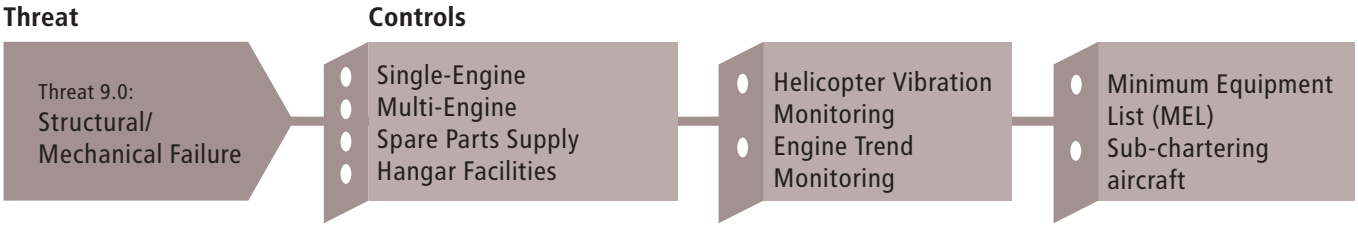
Aircraft capable of being flown at night, under the IFR and on long-term contract shall be fitted with a TCAS. The aircraft operator shall have documented procedures describing the action to be taken in the event of TCAS alert.

Control 8.5: High Intensity Strobe Lights

Aircraft on long-term contract operating in airspace without radar coverage and where the potential for conflicting traffic is assessed as being high shall have high intensity strobe or pulse lights fitted. Potential conflicting activities will include low level VFR flights and high density operations in uncontrolled airspace.

Threat 9.0: Structural or Mechanical Failure

Structural or mechanical failure of the aircraft resulting in loss of control and crash



Control 9.1: Single-Engine Aircraft

Single engine aircraft shall only be used for passenger flights in a non-hostile environment under day visual conditions.

All single-engine aircraft used for passenger carrying operations are to have turbine engines.

Control 9.2: Multi-Engine Aircraft

Multi-engine aircraft capable of sustaining a 1% net climb gradient above the route lowest safe altitude or 500 feet above the terrain in the area of operations with One Engine Inoperative (OEI) shall be used whenever the following conditions exist:

- When operating in a hostile environment
- Any portion of the flight will be in instrument (non-visual) or night conditions
- When operating on extended over water flights.

Control 9.3: Supply of Spares

Maintenance organisations are to have a list of Approved Suppliers who are listed in a Quality Assurance surveillance program to ensure that parts received conform to FAA-approved (or equivalent) design data, and are in a condition for safe operation.

Control 9.4: Hangar Facilities

Hangar facilities suitable for the level of activity performed are to be accessible for aircraft operating on all long-term contracts. Long-term field operations, particularly in high rainfall, arctic or desert environments, shall at a minimum have sheltered arrangements for the conduct of scheduled and non-scheduled field aircraft servicing.

Control 9.5: Helicopter Vibration Monitoring

Helicopters on long-term contracts shall have a plan endorsed by an aviation specialist to fit Health Usage Monitoring System (HUMS) or airframe and engine Vibration Monitoring System (VMS), where systems have been developed and approved for the helicopter type. The aircraft operator shall follow documented procedures to routinely download and analyse data.

Control 9.6: Engine Trend Monitoring

All single-engine turbine aircraft on long-term contract shall have a plan endorsed by an aviation specialist to fit automatic electronic engine trend monitoring system when available for the aircraft type. The aircraft operator shall follow documented procedures to routinely download and analyse engine trend data.

Control 9.7: Minimum Equipment List (MEL)

Aircraft operators shall develop an MEL for all long-term contracted aircraft. All equipment installed on an aircraft should be operational unless operated in accordance with an approved MEL, or otherwise as approved by the appropriate civil aviation authority under an established program for deferred defects. Such programs shall not be contrary to the Type Data Certificate or equivalent. The aircraft operator shall provide training for aircrew and engineers in the understanding and operation of their approved MEL.

Control 9.8: Sub-chartering

Sub-chartering (cross-hiring) by the aircraft operator shall not be undertaken unless with the documented approval of the contracting Company. Regardless of ownership, contracted aircraft must be operated and controlled in accordance with the Air Operators Certificate they are operated under.

Threat 10.0: Weather

Weather conditions force the aircraft to deviate from original flight path and causes an aircraft accident

Control 10.1: Adverse Weather Policy

When weather conditions have the potential to make normal aircraft operations, or the ability to provide suitable rescue and response capability marginal, an Adverse Weather Policy shall be developed to provide a formalised process between the aircraft operator and the Company about when flying operations should be restricted or temporarily halted.

Control 10.2: Wind Shear Training

Aircrew operating aeroplanes on long-term contracts are to have ongoing training addressing the identification and recovery measures associated during microburst and windshear phenomenon.

Control 10.3: VFR Minimums

Aircraft operating under VFR shall be flown in accordance with the local regulatory minimums for flight under the VFR for departure, enroute and destination legs. Localised Standard Operating Procedures are to be developed for those areas, such as mountainous jungle operations, where rapidly changing VFR conditions can be prevalent.

Control 10.4: Cold Weather Training

Aircrew who operate aircraft in a cold weather environment (ground snow and ice) shall undergo annual training prior to the onset of the winter season that addresses:

- Pre-takeoff inspections
- Anti-icing and De-icing including use of holdover time tables
- In-flight icing and associated hazards
- Cold weather operational take-off, approach and landing
- Runway visibility, contamination and performance considerations.

Free online courses addressing the above that are readily available include *NASA aircraft on-line icing courses* (http://aircrafticing.grc.nasa.gov/).

Control 10.5: Thunderstorm Avoidance

Aircraft operations shall have thunderstorm avoidance techniques outlined in the Operations Manual.

Control 10.6: Weather Radar

All aircraft contracted to be able to operate under IFR or at night shall be fitted with a serviceable weather radar. In the event the weather radar becomes unserviceable, the aircraft may be flown in Visual Meteorological Conditions (VMC) only and must not be flown in Instrument Meteorological Conditions (IMC), or at night unless the weather forecasts indicate there is no likelihood of thunderstorms, lightning, turbulence or icing.

Defences 11.0: Aircraft Accident

Mitigating defences in the event of an aircraft accident

Defence 11.1: Aircraft Certification Standards

Aircraft designed to the latest certification standards have increased crashworthiness and survivability characteristics when compared to those aircraft certified to older standards. Consideration to the certification standard should be given when selecting aircraft for all long-term contracts.

Defence 11.2: Emergency Response Plan

All aircraft operations (including Company owned or operated airports) shall have an Emergency Response Plan (ERP) commensurate with the activity undertaken. Factors taken into account shall include documented land-before-last-light limitations, exposure considerations, local Search and Rescue (SAR) capabilities, hazards associated with the surrounding environment and reporting officials.

The ERP shall be exercised annually for all long-term operations, and include a bridging document detailing lines of communications between the Company and aircraft operator.

Defence 11.3: Emergency Locator Transmitter

An Emergency Locator Transmitter (ELT) meeting the requirements of Technical Standard Order (TSO) 126 (406MHz) or equivalent shall be fitted to all contracted aircraft. The responsible party noted on ELT registration as the primary contact is also to be detailed in the aircraft operator's Emergency Response Plan.

Defence 11.4: Satellite Flight Following

All aircraft on long-term contracts operating in hostile environments shall be fitted with satellite flight following systems. The system shall be monitored by designated flight following personnel with no secondary duties and who, if required, are able to initiate the Emergency Response Plan. The system components shall comprise a cockpit distress function with corresponding audio at the base station, cockpit indication of functionality, satellite telephone with text back-up, internet-based monitoring system and ability to adjust reporting intervals based on altitude.

Defence 11.5: Flight Following

Where flights are conducted outside of controlled airspace or are not subject to any form of position reporting, the aircraft operator in conjunction with the Company shall establish a system of flight following appropriate for the operation. At all times, an Emergency Response Plan must be able to be activated in the event of distress or loss of communications.

Defence 11.6: Survival Kit

Survival kits appropriate for the geographical location and climatic conditions (offshore, jungle, arctic, desert, etc.) shall be carried for those operations where search and rescue response times would necessitate use of the equipment.

Defence 11.7: Aircrew Survival Vest with EPIRB

Aircrew operating helicopters in hostile environment shall wear a survival vest which at minimum contains a voice-capable GPS Emergency Position Indicating Radio Beacon (EPIRB).

Defence 11.8: First-Aid Kit

A minimum of one first-aid kit is to be carried on all contracted aircraft.

Defence 11.9: Passenger Dress Requirements

Operators shall require passengers to wear clothing and footwear appropriate to the environment being flown over regardless of the flight duration.

Defence 11.10: Cockpit Voice Recorder (CVR)/Flight Data Recorder (FDR)

Aircraft on long-term contract and certificated with a seating capacity of more than nine passenger seats shall be fitted with a Cockpit Voice Recorder and Flight Data Recorder when available for the aircraft type.

Defences 11.0 (cont.)

Defence 11.11: Upper Torso Restraint

All helicopter and single-engine aeroplane crew and passenger seats shall be fitted with upper torso restraints and worn by crew and passengers at all times.

Defence 11.12: Limitations in Sideways Seating

Sidewards facing seats are to be avoided during take-off and landing, unless regulatory approved shoulder restraints are used and passengers briefed on the importance of their use accordingly.

Defence 11.13: Crash Boxes

Company owned and operated landing sites supporting long-term operations shall have a crash box accessible to personnel at the airfield or primary helipad supporting long-term operations. Contents of the crash box shall be tailored to the environment and aircraft type, but at a minimum should include:

- Rescue axe
- Bolt cutters
- Crowbar
- Grab Hook
- Hacksaw and six spare blades
- Fire resistant blanket
- Fire resistant gloves
- Adjustable wrench.

Defence 11.14: Rescue Fire Fighting

All Company owned or operated helipads or airfields shall have a means of extinguishing a fire with trained and experienced personnel that is commensurate with the potential risk.

Defence 11.15: Insurance

It is the responsibility of the contracting Company to determine the level of insurance required in line with Company risk management standards.

Each operator shall provide documentary evidence to the contracting Company of the required insurance coverage. Such insurance shall not be cancelled or changed materially during the course of the contract without at least 30-days written notice to the Company.

The Company shall be named as additional insured under the contract.

Appendices

Appendix 1:

Aircrew Qualifications and Experience

Pilot-in-Command – Aeroplanes and Helicopters

Qualifications	> 5700 kg Multi-Engine	< 5700 kg Multi-Engine[1]	Single-Engine
Licence	ATPL	CPL	CPL
Instrument Rating	Command, multi-engine	Command, multi-engine	Not required
Experience			
Total Hours	3000	2500	2000
Total Command	2500	1500	1500
Total Command Multi-Engine	500	500	N/A
Total Command on type[2]	100	100	100
Experience in Topographical Area	One year experience in area similar to specified in contract (arctic, offshore, high density altitude mountainous, jungle, international operations, etc).		

Co-Pilot – Aeroplanes and Helicopters

Qualifications	> 5700 kg Multi-Engine	< 5700 kg Multi-Engine	Single-Engine
Licence	CPL	CPL	CPL
Instrument Rating	Command	Co-Pilot	
Experience			
Total Hours	500	250	250
Total Multi-Engine	100	50	
Total on type[2]	50	10	10

Both Pilot-in-Command and Co-Pilot – Aeroplanes and Helicopters

Qualifications	
Total Hours previous 90 days[3]	50 hours, 10 on aircraft type
Night recency previous 90 days	3 night take-offs and landings
CRM/ADM initial and refresher	Every 2 years
Dangerous Goods Awareness	Every 2 years
Accident and Violation Record	2 years accident free for human error causes, subject to review by the Resource Company

Maintenance Personnel – Aeroplanes and Helicopters

Qualifications	Chief Engineer	Line Engineer
Total time on Aeroplanes/Helicopters (whichever applicable)	5 years	2 years
Engine/Airframe/Avionics Rating (where appropriate)	Yes	Yes
Accident and Violation Record	2 years accident free for human error causes, subject to review by the Resource Company	

(1) Includes following type series: King Air 300, Twin Otter, Beech 1900, CASA 212, Metro III/23 and Dornier 228.
(2) Competency-Based Training (CBT) reviewed and endorsed by aviation specialist may be used in lieu of 100-hours.
(3) If not met, a non-revenue check-flight by qualified company check pilot is required.

Basic Aircraft Equipment Fit

Helicopters and Aeroplanes

<table>
<tr><th>Equipment</th><th>Multi-Engine</th><th>Single-Engine</th></tr>
<tr><td>Two VHF Transceivers</td><td colspan="2" rowspan="9">Required</td></tr>
<tr><td>One HF Receiver, if VHF coverage is not assured for the entire area</td></tr>
<tr><td>Mode C or S Transponder</td></tr>
<tr><td>TSO 126 ELT</td></tr>
<tr><td>GPS (IFR TSO required for night or IFR operations)</td></tr>
<tr><td>Upper Torso Restraints
(Helicopter and SE Aeroplane only)</td></tr>
<tr><td>First-Aid Kit</td></tr>
<tr><td>One Fire Extinguisher</td></tr>
<tr><td>Survival Equipment, tailored to environment</td></tr>
<tr><td>Internal PA system or effective ability to communicate with passengers</td><td colspan="2" rowspan="2">Required for passenger carrying operations</td></tr>
<tr><td>Passenger Briefing Cards</td></tr>
<tr><td>Autopilot or AFCS(1)</td><td rowspan="6">Required IFR or Night</td><td rowspan="12">Optional</td></tr>
<tr><td>Two ADF, if NDB approach is only approved instrument approach available</td></tr>
<tr><td>Two VOR/ILS</td></tr>
<tr><td>Instantaneous VSI</td></tr>
<tr><td>Radio Altimeter with audio/visual alert</td></tr>
<tr><td>Colour Weather Radar (see 10.6)</td></tr>
<tr><td>TCAS</td><td rowspan="6">Required for dedicated long-term contracts</td></tr>
<tr><td>TAWS</td></tr>
<tr><td>CVR/FDR, or as required by local CAA</td></tr>
<tr><td>HUMS, UMS or VMS</td></tr>
<tr><td>FDM – contracts exceeding 3 years</td></tr>
<tr><td>High Visibility Pulse Lights – in areas of traffic</td></tr>
<tr><td>External Mirrors for situational awareness</td><td colspan="2" rowspan="2">Optional</td></tr>
<tr><td>External Loud Hailer for passenger control</td></tr>
</table>

(1) The following twin engine aircraft are exempt from this requirement: DHC-6 Twin Otter, Beech 99, Beech 1900, Beech King Air 90/100/200, Embraer Banderante and Fairchild Swearingen Metro III/IV.

Appendix 3:

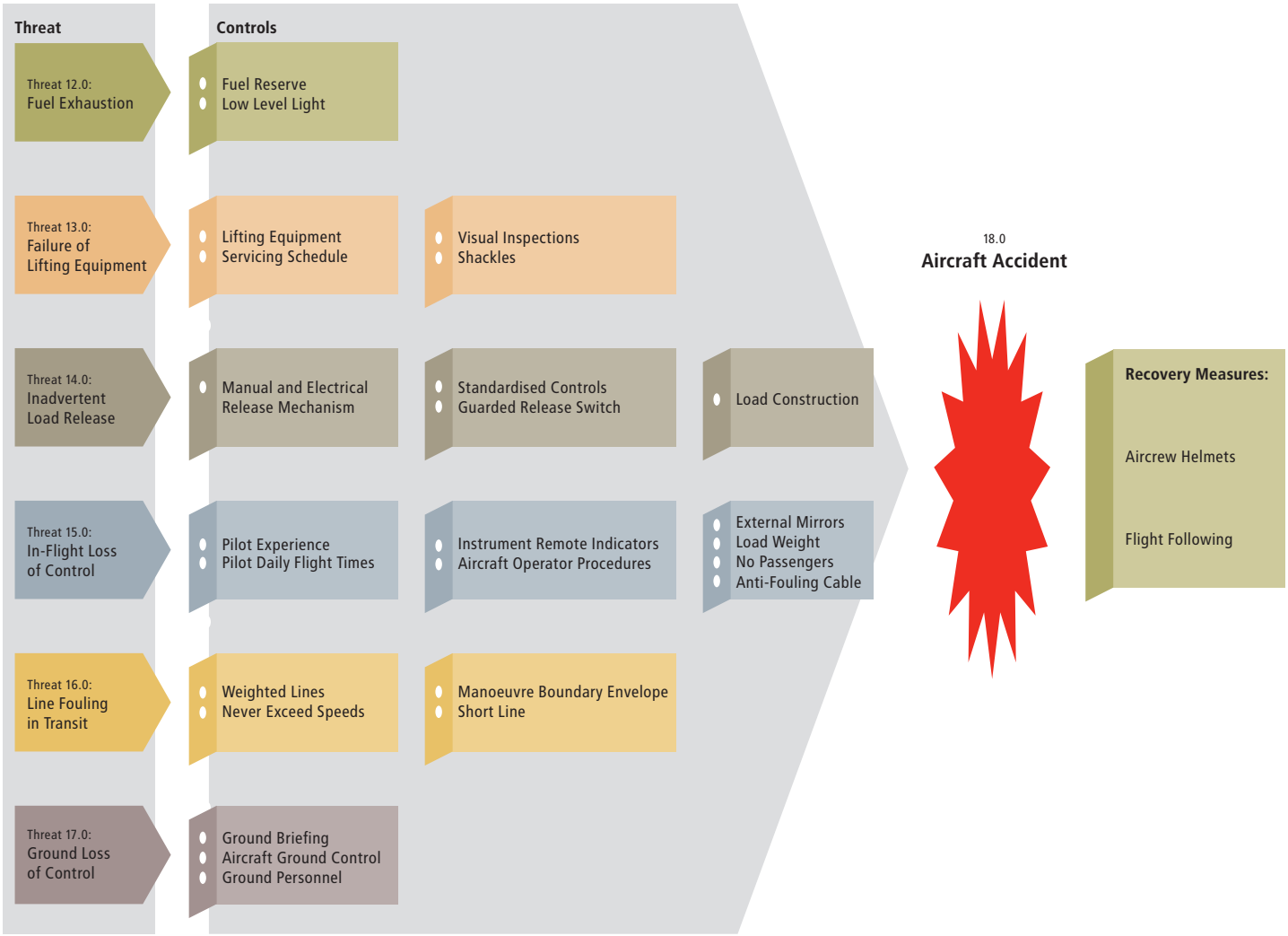
Abbreviations

AD	Airworthiness Directives
ADD	Aircraft Deferred Defect
ADELT	Automatically Deployable Emergency Locator Transmitter
ADM	Aircrew Decision Making
AFCS	Automatic Flight Control System
AFM	Aircraft Flight Manual
AGL	Above Ground Level
ALAR	Approach and Landing Accident Reduction
AME	Aircraft Maintenance Engineer (unlicensed)
AOC	Air Operator's Certificate
APU	Auxiliary Power Unit
AP	Autopilot
AMSL	Above Mean Sea Level
ARA	Airborne Radar Approach
ASB	Alert Service Bulletins
ATC	Air Traffic Control
ATPL	Air Transport Pilot Licence
AUW	All Up Weight
AVAD	Altitude Voice Alert Device
AVGAS	Aviation Gasoline (piston-engine aircraft fuel)
AVTUR	Aviation Turbine (jet and turbine-engine aircraft fuel)
AWOS	Automated Weather Observation System
BARS	Basic Aviation Risk Standard
CAA	Civil Aviation Authority
CDP	Critical Decision Point (twin engine helicopter operations)
CFIT/W	Controlled Flight into Terrain/Water
COSPAS	Russian satellite system used to track EPIRB distress signals
C of G	(Aircraft) Centre of Gravity
COM	Company Operations Manual
CPL	Commercial Pilot's Licence
CRM	Crew Resource Management
CVR	Cockpit Voice Recorder
DG	Dangerous Goods
DH	Decision Height
DME	Distance Measuring Equipment
DSV	Drilling Support Vessels
ECTM	Engine Continuous Trend Monitoring
EGPWS	Enhanced Ground Proximity Warning System
E, I & R	Electronics, Instruments and Radio
ELT	Emergency Locator Transmitter
EPIRB	Emergency Position Indicating Radio Beacon
EPR	Engine Pressure Ratio
ERP	Emergency Response Plan
ETOPS	Extended Range Twin-engine Operations
ETP	Equal Time Point
FAA	Federal Aviation Authority (USA)
FADEC	Fully Automated Digital Engine Control
FCU	Fuel Control Unit
FDR	Flight Data Recorder
FDM	Flight Data Monitoring
FOD	Foreign Object Debris (or Damage)
FOQA	Flight Operations Quality Assurance Program
FPSO	Floating Production and Storage Offload
GNSS	GPS approach procedures
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
H1	ICAO Annex 14 heliport fire fighting category – up to but not including 15m overall helicopter length
H2	ICAO Annex 14 heliport fire fighting category – from 15m up to but not including 24m
H3	ICAO Annex 14 heliport fire fighting category – from 24m up to but not including 35m
HF	High Frequency
HLO	Helideck Landing Officer
HOMP	Helicopter Operations Monitoring Program
HOR	Hourly Operating Rate
HUET	Helicopter Underwater Escape Training
HUMS	Health and Usage Monitoring System
IAGSA	International Airborne Geophysics Safety Association
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
ICUS	In Command Under Supervision
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
ILS	Instrument Landing System
IOSA	IATA Operational Safety Audit

IRT	Instrument Rating Test
IVSI	Instantaneous Vertical Speed Indicator
JET A1	Jet fuel for turbine-powered aircraft
LAME	Licensed Aircraft Maintenance Engineer
LOFT	Line Oriented Flight Training
LOS	Limited Obstacle Sector
LSALT	Lowest Safe Altitude
MAP	Missed Approach Point
MAUW	Maximum All Up Weight
MEL	Minimum Equipment List
MGTOW	Maximum Gross Take-Off Weight
MMEL	Master MEL issued by the aircraft manufacturer
MODU	Mobile Drilling Unit
MOE	Maintenance Organisation Exposition
MR	Maintenance Release
MSC	Monthly Standing Charge
MSDS	Material Safety Data Sheet
NDI	Non-Destructive Inspection
NDT	Non-Destructive Testing
NOTAM	Notice to Airmen
NPA	Non-Precision Approach
NVFR	Night Visual Flight Rules
OEI	One Engine Inoperative
OFS	Obstacle Free Sector
OGP	International Association of Oil and Gas Producers
PCN	Pavement Classification Number
PCO	Passenger Control Officer
PNR	Point of No Return
PPE	Personal Protective Equipment
PSR	Point of Safe Return
PIC	Pilot-in-Command
PUS	Permissible Unserviceability Schedule
QAR	Quick Access Recorder
RA	Risk Analysis
RCC	Rescue Coordination Centre
RPT	Regular Public Transport
RVSM	Reduced Vertical Separation Minima
SART	Search and Rescue Transponder Beacon
SARSAT	American satellite system used to track EPIRB distress signals
SEIFR	Single-Engine IFR
SLA	Safe Landing Area
SMS	Safety Management System
SOP	Standard Operating Procedure
STC	Supplementary Type Certificate
STOL	Short Take Off and Landing
SVFR	Special Visual Flight Rules
TAWS	Terrain Awareness Warning System
TBO	Time between Overhaul
TCAS	Terminal Collision Avoidance System
TCAS I	Traffic Collision Avoidance System. Visual display of traffic – info only
TCAS II	Provides visual display and audio conflict resolution
TEM	Threat and Error Management
TLP	Tension Leg Platform
TSO	Technical Standards Order
TVF	Target Validation Fix
UMS	Unit Monitoring System
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VMS	Vibration Monitoring System
V_{MCA}	Minimum Control Speed – Air
VOR	VHF Omni Directional Range navigation system
VSI	Vertical Speed Indicator
Vtoss	Take Off Safety Speed
VXP	Chadwick vibration analysis system for helicopters
V_y	Best Rate of Climb Speed
V_1	Decision Speed on Takeoff
V_R	Rotate Speed
V_2	Take-off Safety Speed
V_{NE}	Velocity Never Exceed

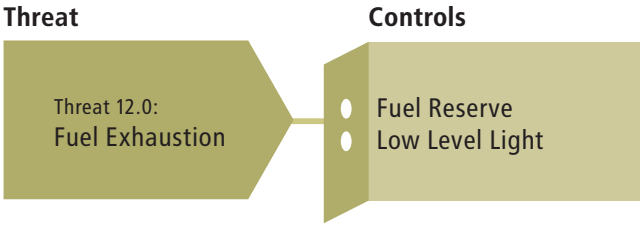
External Load Operations

Figure 2: Schematic of Aviation Risk Management Controls and Recovery Measures for External Loads



Threat 12.0: Fuel Exhaustion – External Load Operations

The helicopter operates on minimum fuel load to maximise lifting capability and runs out of fuel and suffers an engine flame-out resulting in an aircraft accident



Control 12.1: Fuel Reserve

A minimum fuel reserve of 20 minutes is to be maintained at all times.

Control 12.2: Low Level Light

When available for the aircraft type, a fuel low level warning light is to be fitted.

Threat 13.0: Failure of Lifting Equipment – External Load Operations

The lifting equipment fails and drops the load, resulting in an accident on the ground

Control 13.1: Lifting Equipment

Whether steel, Kevlar or other synthetic lifting devices are used, the aircraft operator is to ensure the serviceability and certified safe working load of the equipment is adequate for the task and appropriate to the material used for the line.

Control 13.2: Servicing Schedule

Lifting equipment is to conform to a servicing schedule that provides all necessary documentation associated with inspections, certification and serviceability. Copies of this servicing schedule are to be made available to the aircraft operator's representatives in the field.

Control 13.3: Visual Inspections

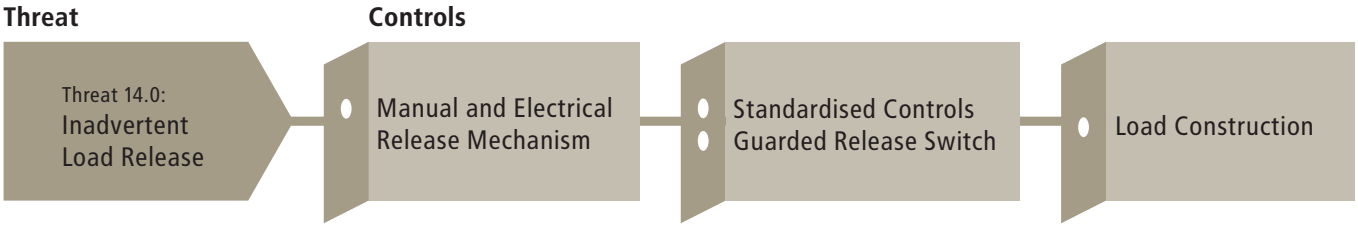
All lifting equipment (cables, lines, straps, baskets, swivels, clevises etc) shall be inspected by appropriately qualified personnel on a daily basis prior to flight. Any signs of wear, fraying, corrosion, kinks or deterioration should result in the equipment being discontinued for use.

Control 13.4: Shackles

The shackles used to connect the cable to the aircraft shall conform with specific Flight Manual supplements regarding the diameter of the shackle rings and their use with respective hook types on the aircraft.

Threat 14.0: Inadvertent Load Release – External Load Operations

The load is inadvertently released in flight, falls to the ground and causes an accident



Control 14.1: Manual and Electrical Release Mechanisms

The aircraft is to have serviceable cockpit manual and electric release mechanisms and an external manual release at the hook.

Control 14.2: Standardised Controls

When practical, for aircraft of the same or similar type, the aircraft operator is to standardise the electrical load release switches, particularly when located on the cyclic and collective controls.

Control 14.3: Guarded Release Switch

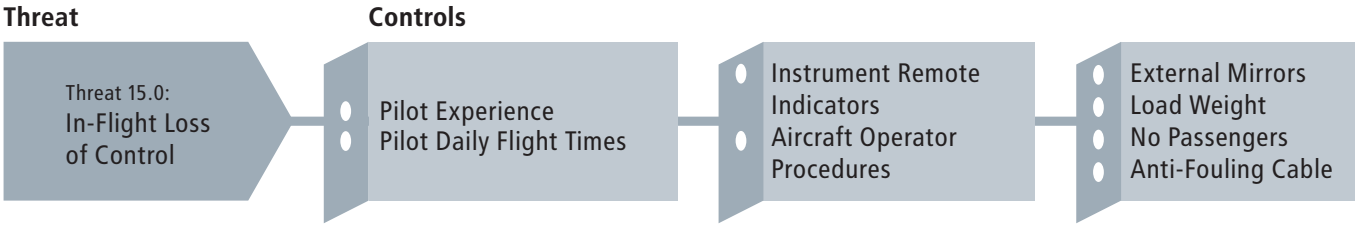
When possible for the type, all electrical release switches shall be guarded to prevent inadvertent activation.

Control 14.4: Load Construction

The aircraft operator is to ensure that all loads are rigged by appropriately qualified personnel.

Threat 15.0: In-Flight Loss of Control – External Load Operations

Poor manipulative control in-flight results in loss of control and an aircraft accident



Control 15.1: Pilot Experience

The following minimum requirements are required for aircrew engaged in external load activities:

- Successful completion of operator's external load training program tailored to the vertical reference, and the long-line (> 50 feet), or the short-line (< 50 feet), whichever is applicable
- 200 hours external load operations, 100 of which must be vertical referencing, if used in that role
- An annual long-line and/or external load base check with an operator's check and training Pilot-in-Command.

Control 15.2: Pilot Daily Flight Times

Where the external load moves are more than three (3) per hour, the following flight times are to be adhered to:

Single-pilot operation	Two-pilot operation
3-hour maximum flight time per flying period, followed by a 30-minute rest-break. Hot refuelling does not constitute a rest-break.	5-hour maximum flight time per flying period, followed by a 60-minute rest-break.
6-hour maximum flight time per calendar day.	8-hour maximum flight time per calendar day.

Control 15.3: Instrument Remote Indicators

For single-pilot operations using vertical referencing techniques and where the aircraft instruments are not in the pilot's scan, remote indication of fire warning light and torque gauge shall be fitted where possible for the aircraft type.

Control 15.4: Aircraft Operator – Procedures

The helicopter operator shall have documented procedures addressing competency requirements of the aircrew and groundcrew (where applicable) engaged in the external load activity. Ability to operate in the environmental and terrain conditions where the activity is being conducted shall form part of the competency procedures.

Control 15.5: Aircraft External Mirrors

Where available for the aircraft type, external mirrors showing the hook area shall be fitted to the aircraft.

Control 15.6: Load Weight

All loads shall have accurate weights provided to the pilot before each lift. Standard load plans can be used as long as the weights are accurately known (compressors, rig break-down, sample bags etc). When operationally necessary, a load meter should be fitted to the aircraft.

Control 15.7: No Carriage of Passengers

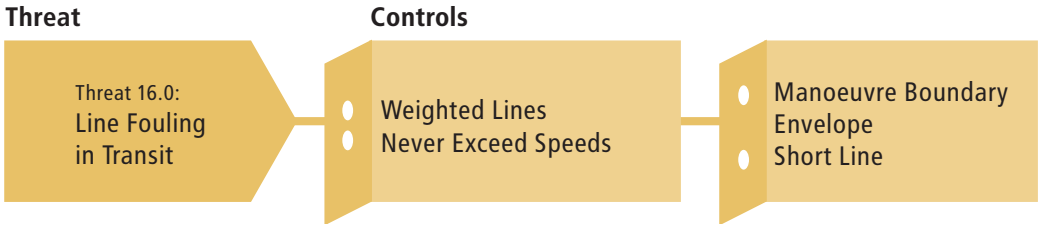
Passengers are prohibited from travel on helicopters during external load operations, including transit with an empty line attached. If the aircraft is used for passenger operations without a load at any time, seating restraint requirements are to meet the expectations of Defence 11.11.

Control 15.8: Anti-Fouling Cable

When available for the aircraft type, protective assemblies to prevent cables from chaffing and fouling on the skids/fuselage shall be installed.

Threat 16.0: Line Fouling In Transit – External Load Operations

The load becomes detached from the line, or the line is flown empty, which when above a certain speed causes it to stream up and rearwards into the tail rotor and results in an accident



Control 16.1: Weighted Lines

The long-line shall be suitably weighted if to be flown without a load attached. Pre take-off checks, designed to ensure aircrew involved in repetitive loads are aware of when the line is attached, are to be implemented.

Control 16.2: Never Exceed Speeds (Vne)

All applicable Vne speeds are to be briefed and understood by all aircrew prior to commencement of operations. If aircraft Air Speed Indicator (ASI) is calibrated in different units of measurement than the documented Vne speeds, a separate risk assessment shall be conducted and reviewed with specialist aviation personnel prior to start.

Control 16.3: Manoeuvre Boundary Envelope

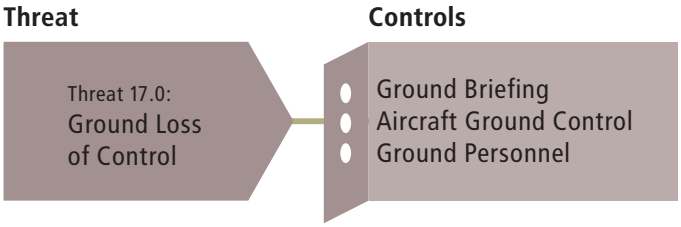
All safe transit speeds, maximum angle of bank, maximum allowable rate of descent and general handling associated with stable load operations are to be briefed and understood by all aircrew prior to commencement of operations.

Control 16.4: Short-Line (< 50 feet)

Transit with a short-line and no load attached is not permitted.

Threat 17.0: Ground Loss of Control – External Load Operations

A departure from normal operations on the ground results in loss of control of the load and aircraft and results in an aircraft accident



Control 17.1: Ground Briefing

The Aircraft Pilot-in-Command is responsible for ensuring all personnel involved in the external load activity are thoroughly briefed in all aircraft operator expectations prior to commencement of operations. This brief is to include all aircraft emergency scenarios that could involve the groundcrew.

Control 17.2: Aircraft Ground Control

A pilot is to remain at the controls of an operating helicopter under power and whilst on the ground at all times. The controls must not be left unattended with the aircraft under power under any circumstances, even to assist in activities such as hot refuelling or load attachment.

Control 17.3: Ground Personnel

Ground personnel are to wear appropriate Personal Protective Equipment (PPE) including hard hats with chin straps, impact resistant goggles, gloves, safety shoes and means of ground-to-air communications with the aircrew and high visibility vests.

Defences 18.0: Aircraft Accident – External Load Operations

Mitigating defences in the event of an aircraft accident.

Defence 18.1: Aircrew Helmets

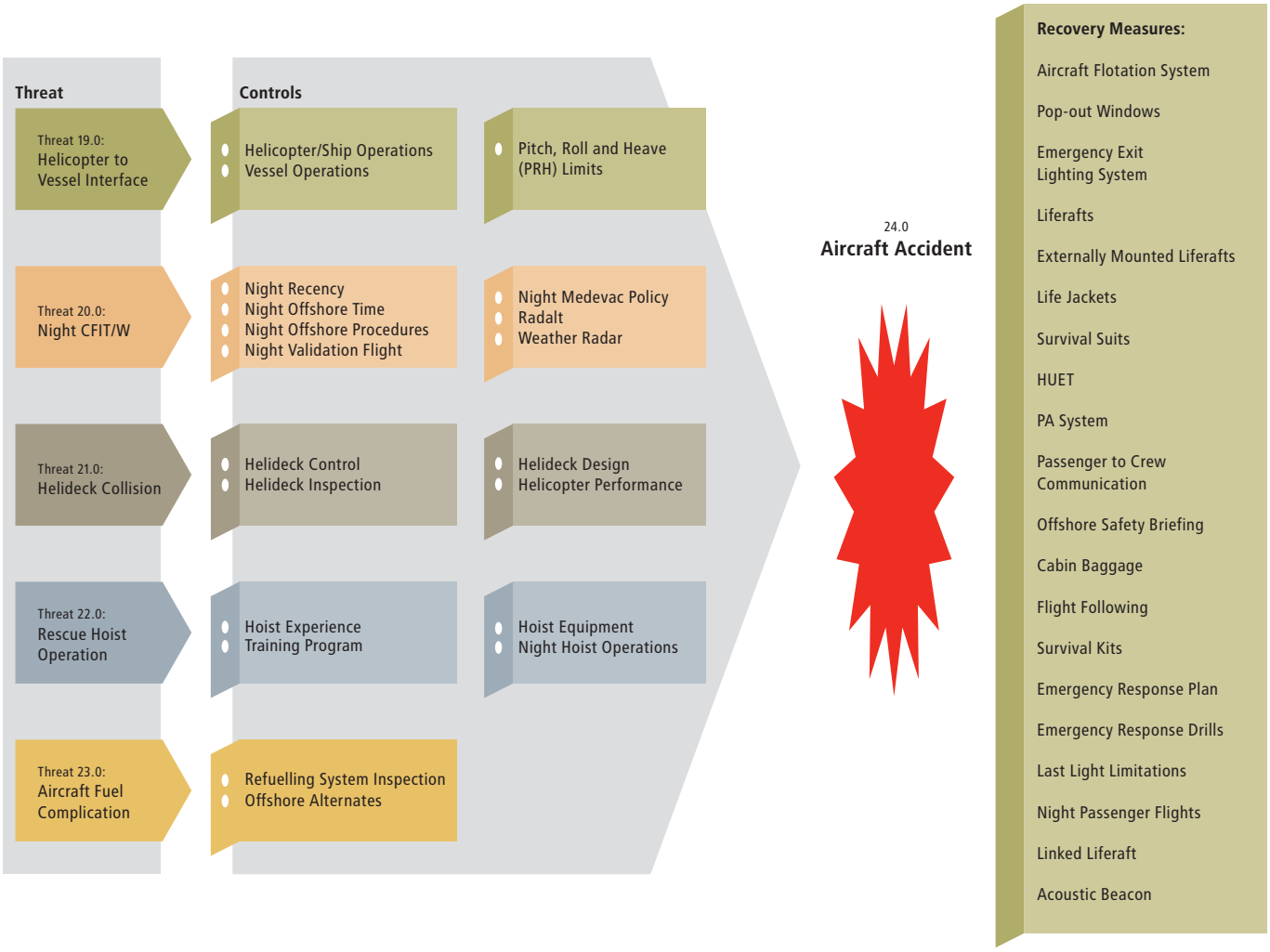
Aircrew involved in external load activities shall wear serviceable flying helmets to appropriate industry standard.

Defence 18.2: Flight Following

Positive continuous communication and flight following shall be maintained with the aircraft either by ground support crew or designated flight following personnel. Scheduled operations normal calls shall be established for every 15 minutes but no later than 30 minutes.

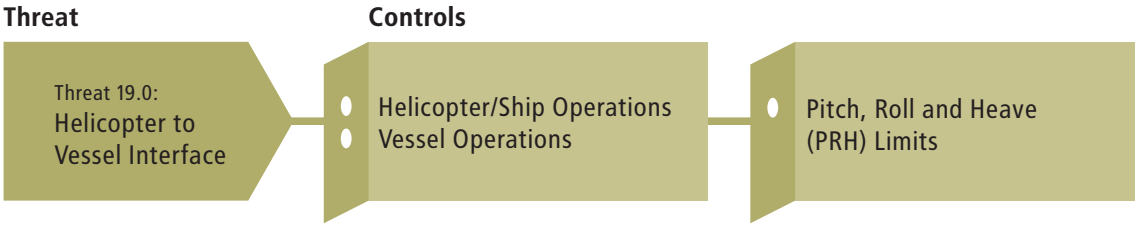
Offshore Operations

Figure 3: Schematic of Aviation Risk Management Controls and Recovery Measures for Offshore Operations



Threat 19.0: Helicopter to Vessel Interface – Offshore Operations

Helicopter operates to a floating structure and crashes on deck



Control 19.1: Helicopter/Ship Operations

All helicopter-to-ship operations shall be conducted in accordance with the standards contained in the International Chamber of Shipping (ICS) *Guide to Helicopter/Ship Operations.*

Control 19.2: Vessel Operations

Floating vessels include Floating Production Storage Offload (FPSO), Mobile Drilling Unit (MODU), Diving Support Vessels (DSV), Derrick barges and seismic vessels.

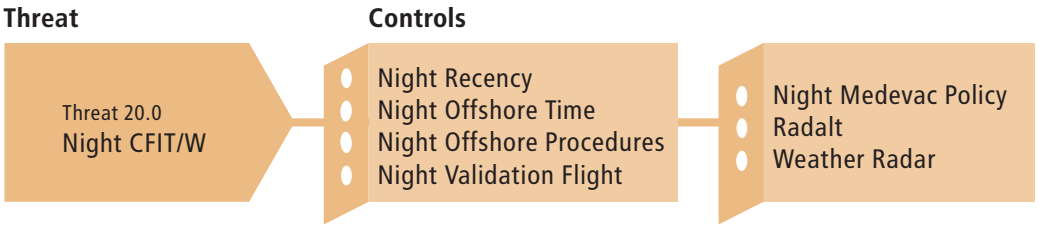
The Pitch, Roll and Heave of floating vessels shall be measured as close to helideck level and centreline as possible to provide accurate readings that can be communicated to the helicopter from the vessel, and verified by the crew as being within limits before landing.

Control 19.3: Pitch, Roll and Heave (PRH) Limits for Landing

For operations to floating helidecks, the aircraft operator shall have industry validated pitch, heave and roll landing limits (such as the Helideck Certification Agency Helideck Landing Limits) documented in their Operations Manual.

Threat 20.0: Night Controlled Flight Into Terrain/Water (CFIT/W) – Offshore Operations

The helicopter operating at night flies into the water whilst still in an airworthy and operational state



Control 20.1: Night Recency

All offshore crews rostered for night support shall maintain a recency of 3 night deck landings every 90 days.

Control 20.2: Night Offshore Time

Aircrew shall have 25 hours night offshore time before operating as Pilot-in-Command offshore at night.

Control 20.3: Night Offshore Procedures

Night offshore operations shall be flown with two qualified pilots, in a multi-engine aircraft to be operated and equipped for flight under Instrument Flight Rules. The aircraft operator is to have documented Standard Operating Procedures (SOPs) pertaining to night offshore operations which shall include reference to stabilised approach criteria and missed approach/ go-around protocol.

Control 20.4: Night Validation Flight

Non-revenue night validation flights conducted by suitably qualified check and training personnel shall be conducted to all new-build platforms as close to operational start-up as practicable with the objective of validating helideck and platform lighting, and instrument/visual approaches to the platform in ambient surroundings.

Control 20.5: Night Medical Evacuation (Medevac) Policy

Company in consultation with the aircraft operator shall develop a night medevac policy when the capability is required. In recognition of the higher risk profile, night offshore medevac flights shall only be requested in life threatening situations where patient stabilisation until first light is not considered an option by the Offshore Installation Manager (OIM) in consultation with medical staff.

Control 20.6: Serviceable Radio Altimeters

All offshore helicopters are to be equipped with at least one radio altimeter with dual displays, both of which shall be serviceable for any flight at night or flight conducted under IFR. This requirement supersedes what may be outlined in the regulatory approved MEL.

Control 20.7: Weather Radar

All offshore helicopters flown at night or under IFR shall be fitted with colour weather radar having a minimum range scale of 2.5 nm with one half nm range scale graduations.

Threat 21.0: Helideck Collision – Offshore Operations

The helicopter collides with an obstacle on the helideck and crashes into the water adjacent to the platform

Control 21.1: Helideck Control – Helicopter Landing Officer (HLO) and Assistants

All offshore installations shall have a trained HLO available for all helicopter movements with all relevant duties and responsibilities clearly outlined in a current and up-to-date HLO Manual. Recurrent training should be scheduled for every three years.

Any personnel designated as an assistant to the HLO shall receive formalised and documented training from an approved HLO, and where possible include participation in periodic emergency drills.

In addition to standard PPE, all helideck personnel are to wear and be identified by a high visibility vest.

Control 21.2: Helideck Inspection

All helidecks shall have an annual helideck inspection conducted by appropriately qualified aviation specialists or the aircraft operator. Documented findings and action plans resulting from any inspection shall be retained by the HLO.

Prior to commencing operations to a new helideck, or with a new operator to an existing helideck, experienced and qualified personnel from the aircraft operator shall perform an inspection and brief all relevant offshore personnel in the safe operating practices and procedures for the helicopter type being used.

Control 21.3: Helideck Design

Unless local regulatory requirements specify otherwise, all new helidecks shall conform to the standards of *ICAO Annex 14* 'Aerodromes' Volume II and shall be designed to accommodate the largest helicopter anticipated for use in the life of the structure. For practical implementation, standards and practices, CAP 437 'Offshore Helicopter Landing Areas' and the *ICAO Heliport Manual* should be used.

Bow mounted helidecks on FPSOs may require larger than normal diameter decks up to 1.5D (D = overall length of the helicopter with rotors turning) due to PRH considerations. Aviation advice shall be consulted prior to final design review.

A second helicopter may only be landed on an obstructed deck if all aspects have been risk assessed, reviewed with an aviation specialist prior to performing the activity and a procedure is included in the operator's Standard Operating Procedures or Operations Manual.

Control 21.4: Helicopter Performance

Offshore helicopters are to be flown to minimise exposure time over the helideck edge and are to be operated to Performance Class 2 requirements, or better, at all times.

Threat 22.0: Rescue Hoist Operations

The helicopter is required to perform hoisting operations and, through manipulative error, results in an abnormal situation resulting in an accident

Control 22.1: Aircrew Hoist Experience

All aircrew assigned to hoist operations shall have completed an approved and documented training program reviewed by the Company aviation specialist personnel. To maintain currency, a minimum of 3 hoist cycles within the past 12 months is to form part of the training schedule for all aircrew.

Control 22.2: Training Program

The aircraft operator will establish a documented training program and minimum qualification criteria for all personnel involved in hoist operations, including (but not limited to) the aircrew, hoist operator and down-the-wire swimmer (where applicable).

The training program shall include an initial competence course followed by annual refresher training.

Control 22.3: Hoist Equipment

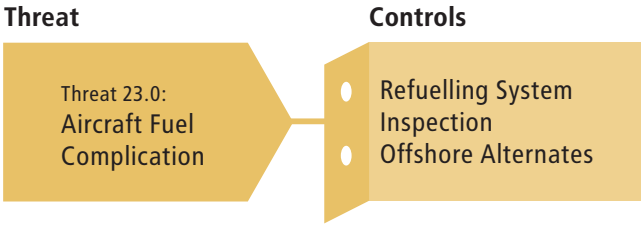
All role specific equipment including the hoist, lifting device, harnesses, PPE and associated tools are, at minimum, to be maintained, tested and certified in accordance with the manufacturers approved maintenance program.

Control 22.4: Night Hoist Offshore Operations

Night hoist operations shall only be conducted in an aircraft that is specifically equipped to do the task (including auto-hover capability) and with a crew specifically trained in night hoist operations.

Threat 23.0: Aircraft Fuel Complication – Offshore Operations

The helicopter experiences fuel supply complications resulting in engine flame-out and aircraft accident



Control 23.1: Refuelling System Inspection

An initial and then annual inspection thereafter of offshore installation fuel system is to be conducted by the aviation specialist designated by the Company or aircraft operator. The inspection schedule shall include a review of refuelling procedures that encompasses daily testing, sampling and sample retention practices.

Control 23.2: Offshore Alternates

One-way fuel computations and offshore-only alternate diversion shall not be used unless the offshore destination has been approved for OEI landings by specialist aviation advice.

Defences 24.0: Helicopter Accident – Offshore Operations

Mitigating defences in the event of an aircraft accident

Defence 24.1: Aircraft Flotation System

Offshore helicopters are to be fitted with a pop-out flotation system. Automatic inflation systems are to be installed on the aircraft when available for the aircraft type.

Defence 24.2: Pop-out Windows

When an approved modification exists, emergency pop-out windows are to be installed.

Defence 24.3: Emergency Exit Lighting System

When an approved modification exists, an emergency exit lighting system is to be fitted to the aircraft.

Defence 24.4: Liferafts

Two approved liferafts that are reversible or self-righting, double chambered and capable of being tethered to the aircraft, shall be carried and be readily accessible in the event of ditching. Each liferaft is to have an overload capacity that is equal or greater to the total occupants carried in the aircraft.

Defence 24.5: Externally Mounted Liferafts

When an approved modification exists, externally mounted liferafts are to be fitted to the helicopter and able to be deployed internally or externally.

Defence 24.6: Life Jackets

Constant wear, double chambered passenger life vests manufactured to an aviation authority approved TSO must be worn at all times in offshore operations. Where approved by the local authority, life vests with crotch strap designs are preferred over those without.

Defence 24.7: Survival Suits

Survival suits certified for use by the local regulatory authority shall be provided to crews and passengers for helicopter offshore operations in hostile environments and when required by risk assessment.

Defence 24.8: Helicopter Underwater Escape Training (HUET)

All flight crews and passengers shall complete a HUET course that includes use of a Modular Egress Training Simulator (METS) at least every four years unless local regulation requires greater frequency or an established internal variance process is in place.

Defence 24.9: Public Address (PA) System

The helicopter shall be fitted with a PA system of sufficient clarity and volume so that passengers are capable of understanding instructions from the crew at all times during flight.

Defence 24.10: Passenger to Crew Communication

A means by which the passengers are able to communicate with the crew is to be made available. Where possible, this should consist of providing at least one two-way headset to a designated passenger.

Defence 24.11: Additional Offshore Safety Briefing

In addition to the briefing requirements contained in 6.6, the following aspects (but not limited to) are to be provided via video brief prior to boarding the aircraft for both onshore and offshore legs:

- Demonstration on the use of the lifejackets used in that helicopter
- Briefed on the proper use of survival suits, including the need to have suits fully zipped with hoods and gloves ON during take-off and landing or otherwise advised by the Pilot-in-Command
- Demonstration of liferaft deployment and boarding
- Demonstration of deployment of all survival equipment
- Boarding and disembarkation instructions.

Defences 24.0 (cont.)

Defence 24.12: Cabin Baggage

Only soft cover books or securely bound magazines are permitted as carry-on baggage. Briefcases, laptop computers and newspapers are specifically prohibited as carry-on baggage and must be secured in the baggage compartment.

Defence 24.13: Flight Following

Dedicated aircraft flight following shall be provided by a responsible person capable of initiating the Emergency Response Plan. The flight following at minimum must consist of constant radio contact being maintained, with aircraft reporting intervals detailing the aircraft position and altitude not to exceed 15 minutes.

Where possible, and available for the aircraft type flown, an approved satellite system shall be provided to augment the flight following system. Satellite reporting intervals should be increased to two-minute intervals with higher reporting frequencies encouraged at lower levels, and can be used in lieu of the scheduled radio transmissions.

Defence 24.14: Survival Kits

Offshore-specific survival kits, that at a minimum, are to comply with local regulatory standards are to be carried and packed into the aircraft liferafts.

Defence 24.15: Emergency Response Plan (ERP)

Provision is to be made for aviation emergencies in offshore Emergency Response Plans.

Defence 24.16: Emergency Response Drills

Emergency drills (at minimum desk-top) with specific objectives shall be conducted within 30 days of a new project start, and annually thereafter for ongoing operations.

To test the integrity of the ERP, worst-case scenarios involving last-light, weather and aircraft disposition shall be designed for the exercise.

Bridging communications between the Company, the aircraft operator and all SAR resources shall be tested and validated during the drill.

Defence 24.17: Last Light Limitations

Daytime flights offshore are to be scheduled so that helicopters land 30 minutes prior to official sunset. Daytime flights offshore, where a ditching prior to darkness would limit the ability to provide a rescue within the anticipated occupant survival time, should be further reduced in duration to allow for appropriate response.

Defence 24.18: Night Time Offshore Passenger Flights

Night passenger flights shall only be conducted after risk assessment that involves the aircraft operator. At minimum, this RA should include:

(1) the existence, availability and effectiveness of available night SAR resources;

(2) SAR response times; and

(3) survival times of personnel given environmental conditions and mitigating measures (such as survival suits). In this review it is expected that dedicated night SAR helicopters with full night hoisting capability would be available.

Defence 24.19: Linked Liferaft

For long-term operations consideration ought to be given to request the aircraft operator establish a linked liferaft capability to supplement any hoist or other means of rescue, particularly if anticipated sea survival times are marginal. In addition to initial crew training, an annual currency requirement is to be maintained.

Defence 24.20: Acoustic Beacon

All offshore helicopters shall have an underwater acoustic beacon (pinger) that transmits when submerged. If equipped with a CVR, the pinger should be attached to that CVR.

Notes

Notes

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Pursuing the continuous improvement of global aviation safety and the prevention of accidents

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