Civil Aviation Authority

# Offshore Helicopter Flight data Monitoring – Guidance On Best Practice

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# Background

- Objective:

  To generate HFDM best practice guidance material specifically targeted at offshore helicopter operations.

- Drivers:
  - To improve safety by promoting more efficient and effective application / use of HFDM.
  - EASA SPA.HOFO.145 mandate (by 01 January 2019) for HFDM - to provide a ‘yardstick’ / ‘level playing field’.
  - UK review of offshore helicopter operations (CAP 1145) – to provide improved information in relation to operational cause occurrences (under-reported in MORS / ECCAIRS).
  - UK AAIB Safety Recommendations 2016-009 and 2016-010.

# General Approach (1)

- Review and utilise (where appropriate) existing material:
  - UK CAA - CAP 739, Flight Data Monitoring, 2nd Edition, June 2013.
  - UK CAA - CAA Paper 2002/02, Final Report on the Helicopter Operations Monitoring (HOMP) Trial, September 2002.
  - UK CAA - CAA Paper 2004/12, Final Report on the Follow-on Activities to the HOMP Trial.
  - Global HFDM Steering Group – Helicopter Flight Data Monitoring Industry Best Practice, Version 1.1, 01 April 2012.
  - EASA – Developing Standardised FDM-Based Indicators, December 2013.

# General Approach (2)

- Review existing events and measurements:
  - Adherence to RFM limits.
  - Adherence to SOPs.
  - Analysis of ‘critical operations’, e.g. approaches, (application of EOFDM WGA and WGB methodology).
- Develop new material for:
  - Environmental monitoring.
  - Usage monitoring.
  - HTAWS.
  - Supporting Evidence-Based Training (EBT).

# Environmental Monitoring (1)

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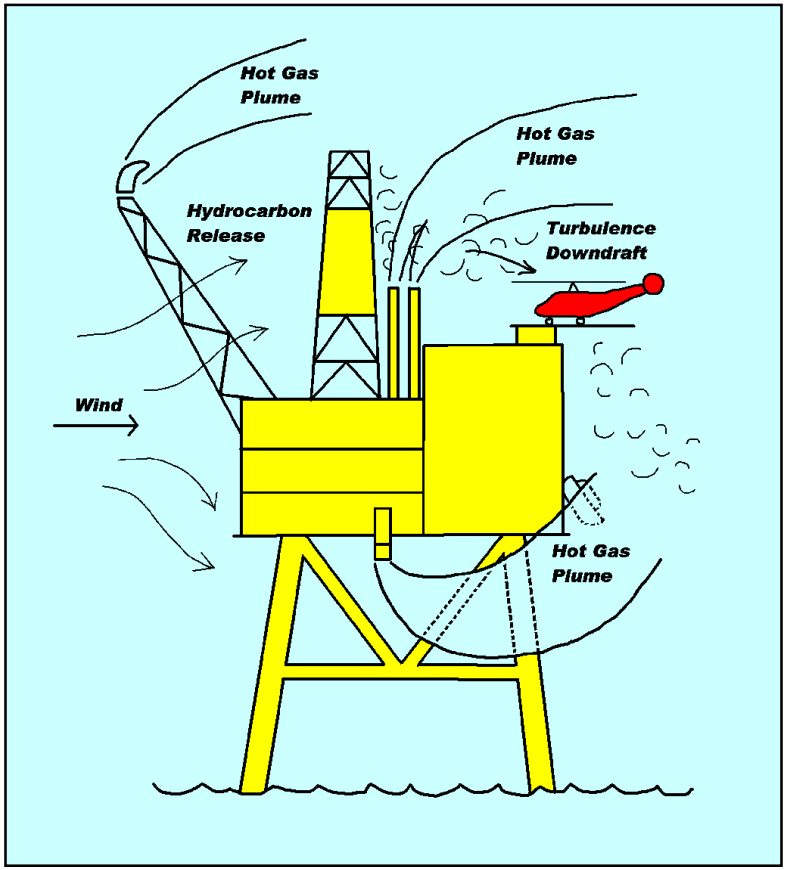
Significant hazards presented by:

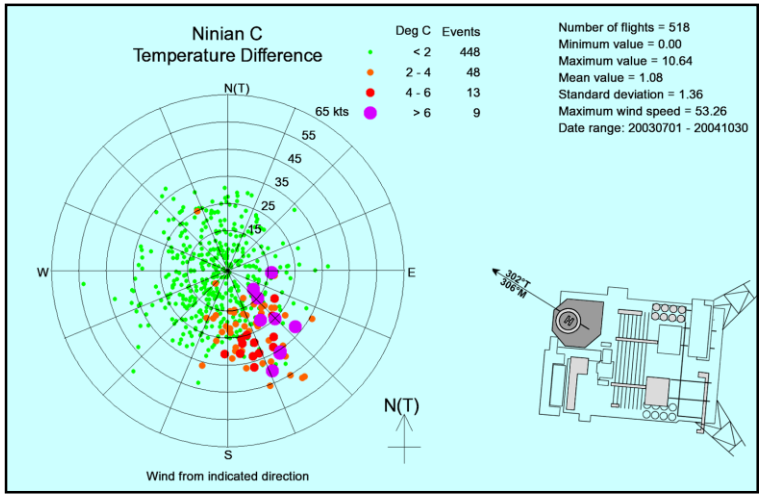
- Temperature rise above reported ambient due to:
  - Platform-mounted gas turbine exhausts;
  - Flaring.
- Turbulence due to:
  - Platform-mounted gas turbine exhausts;
  - Platform structure.

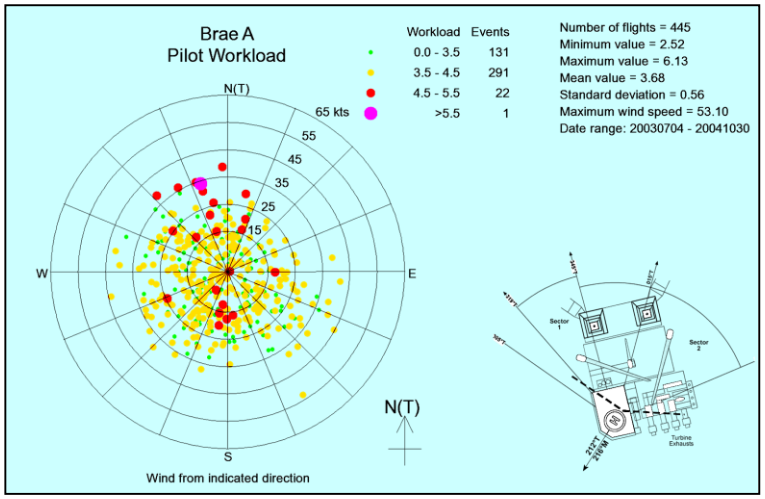


# Environmental Monitoring (2)

- Produce derived parameters based on:
  - Temperature - OAT sensor;
  - Turbulence - collective & cyclic control inputs.
- Use derived parameters to:
  - generate <u>events</u>, and
  - collect <u>measurements</u>

  for each approach as a function of platform, wind speed and wind direction.
- Add Aerad information, e.g. plan view.
- Add Helideck Limitations List (HLL) information, e.g. restricted sectors.



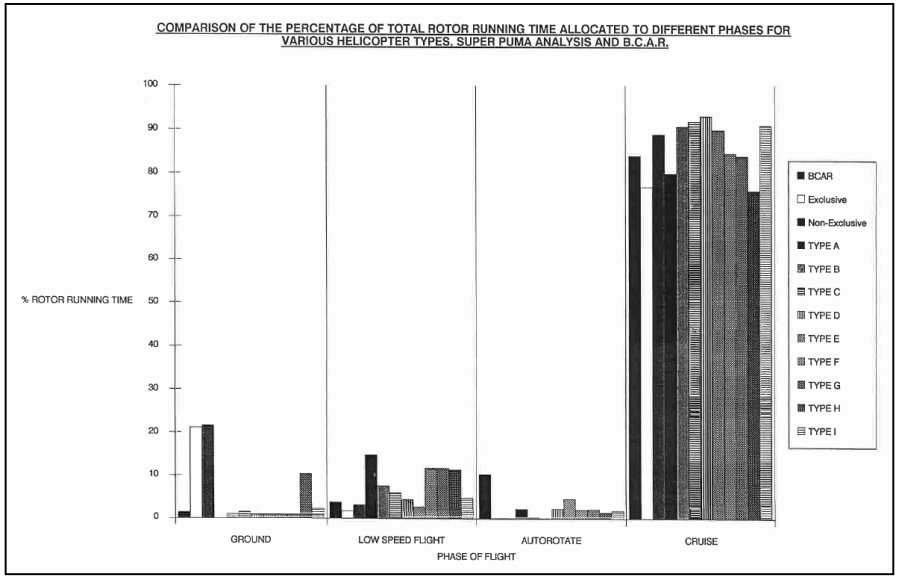
# Environmental Monitoring (3)

- Review plots and adjust operating limits as and when required:
  - Validate/refine existing HLL entries.
  - Add or delete HLL entries.
  - Monitor for significant changes to platform topsides, and review limits and / or procedures.
  - Identify ‘problem’ platforms to platform operator/owner for rectification / mitigation.

# Usage Monitoring

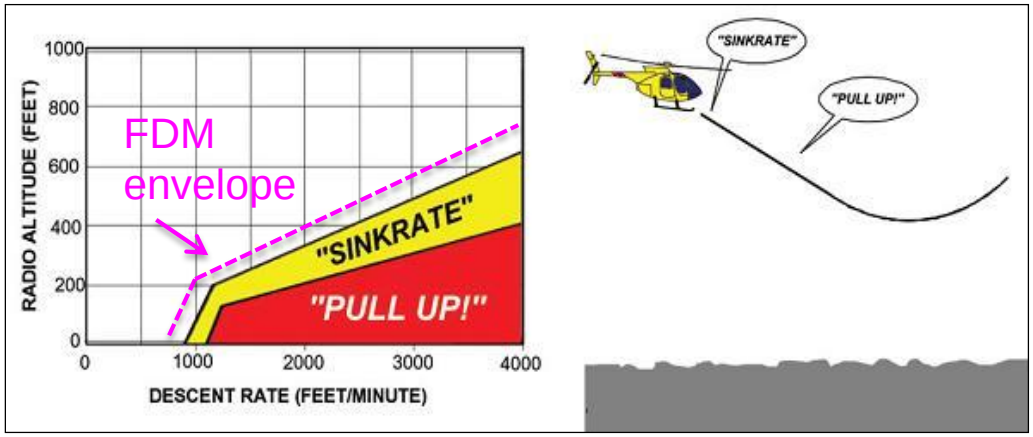
- Assumed usage spectrum used with load / strain data from flight testing to determine component lives and maintenance schedule.
- Deviations from the assumed spectrum could compromise airworthiness and, hence, safety.
- Important part of continued airworthiness.
- Usage spectrum can vary significantly between individual aircraft – need to monitor usage by ‘tail number’.
- Impractical to achieve ‘by hand’ but could be performed by FDM.

| MAJOR PHASE | CRITERIA |
|---|---|
| GROUND | Weight switch made and no normal acceleration activity |
| GROUND -Taxi | Weight switch made and normal acceleration activity |
| LOW SPEED FLT -Hover | Weight switch off; Airspeed < 40knots; Take-off recorded earlier and one engine torque > 10% |
| FORWARD FLT -Climb | Weight switch off; Airspeed > 40 knots; Rate of climb more than 4FPS and one engine torque > 10% |
| FORWARD FLT -Level | Weight switch off; Airspeed > 40 knots; Rate of climb/descent less than 4FPS and one engine torque > 10% |
| FORWARD FLT -Descent | Weight switch off; Airspeed > 40 knots; Rate of descent more than 4FPS and one engine torque > 10% |
| AUTOROTATION | Weight switch off; Average engine torque =< 5%; Rate of descent => 0 FPS |
| INDETERMINATE | No other phase identified |



# HTAWS (1)

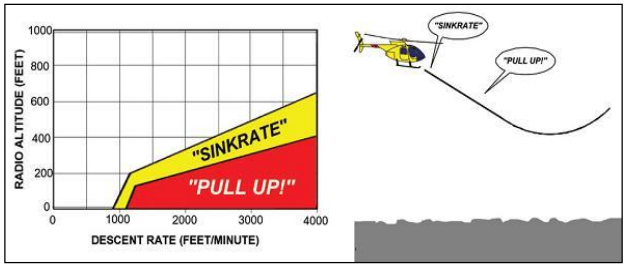
HTAWS = Helicopter Terrain Awareness & Warning System.

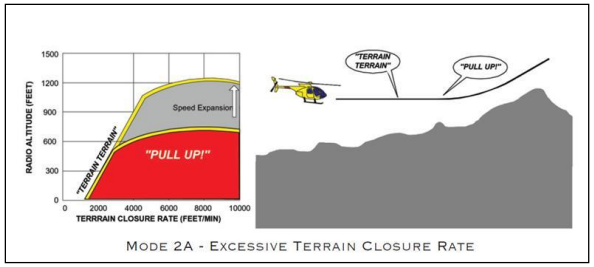



- EASA SPA.HOFO.160 c) mandate (new registrations from 01 January 2019).
- New HTAWS standard to be voluntarily implemented by industry early 2018.
- Warnings and cautions deliberately set to minimise alert rate during normal operations – HTAWS alert means the helicopter is potentially seconds from impact.
- HFDM needs to monitor <u>proximity to</u> HTAWS alerts and not HTAWS alerts.

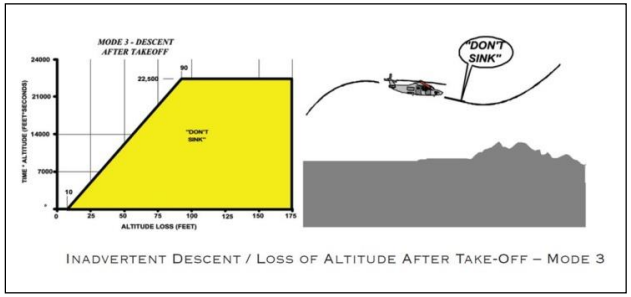
# HTAWS (2)

- There are a number of alert ‘envelopes’ to monitor (current envelopes shown).

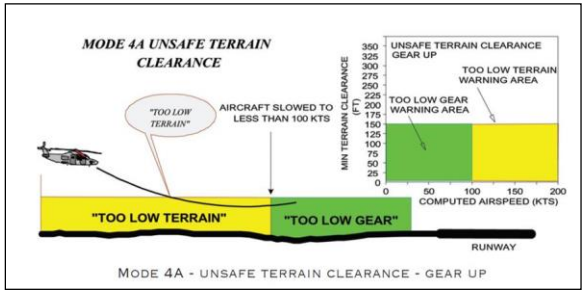


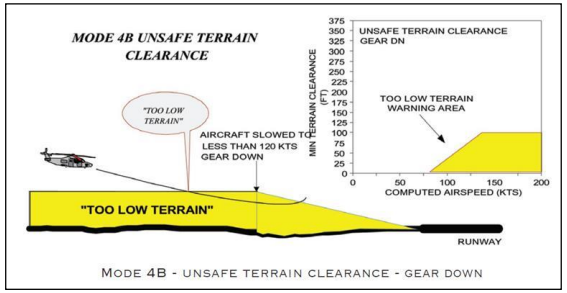

Mode 2A - Excessive Terrain Closure Rate



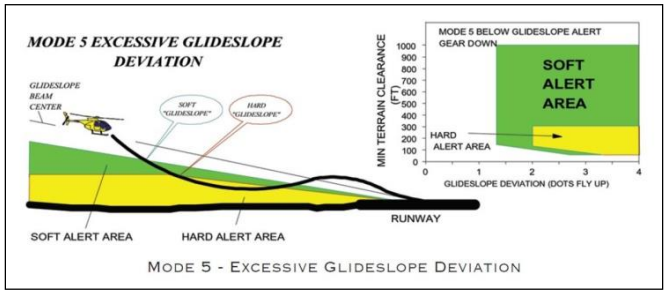

Inadvertent Descent / Loss of Altitude After Take-Off – Mode 3



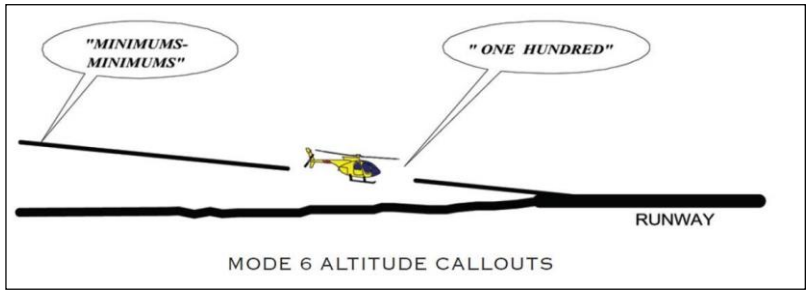

Mode 4A - unsafe terrain clearance - gear up




Mode 4B - unsafe terrain clearance - gear down




Mode 5 - Excessive Glideslope Deviation




MODE 6 ALTITUDE CALLOUTS

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Thank you for your attention…

# Any questions?