



**Research Update**  
**Briefing for 01 May 2019 HSRMC**

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# Contents:

- **Survivability**
  - Ditching & water impact
  - Equipment standards
- **Operational Issues**
  - Triggered lightning strike forecasting
  - Operations to moving helidecks
  - Helicopter TAWS

# SURVIVABILITY

# Survivability – Ditching & Water Impact (1)

## EASA Rule Making Task RMT.0120

### Phase 1

- New CS and AMC published in Amendment 5 to CS 27 & 29 in June 2018.
- Main features are:
  - Revised ditching stability requirements incorporating irregular wave testing.
  - Automatic deployment of emergency floatation systems.
  - Automatic arming/disarming of emergency floatation systems.
  - Minimum size (= Type IV) for underwater escape exits (equivalent to XBR).
  - Maximum operating force of 50lbs.
  - Seat rows aligned with underwater escape exits.
  - Provision of hand holds next to underwater escape exits.



# Survivability – Ditching & Water Impact (2)

## EASA Rule Making Task RMT.0120

### Phase 1...continued

- Egress possible through any ditching emergency exit with a door in the open and locked position.
  - Externally mounted life rafts.
  - Life raft release from flight deck, cabin and externally for all foreseeable floating attitudes.
  - Direct boarding of life rafts.
  - Black/yellow striped markings/controls for underwater escape exits.
  - Flight crew exit operation for all pilot heights and seat conditions.
  - Provisions to assist passenger cross-cabin escape.
- Will only apply to new helicopter designs.

# Survivability – Ditching & Water Impact (3)

## EASA Rule Making Task RMT.0120 Phase 2

- Reviewing new CS and AMC to determine which elements, if any, to mandate retrospectively to the current helicopter fleet under Part/CS 26.
- Note that the RMT process has been modified and EASA Safety Committee will now vet the NPA prior to publication.
- Three meetings held so far with agreement on the following features:
  - Automatic float deployment. **Y**
  - Black/yellow striped markings/controls for underwater escape exits. **Y**
  - Maximum operating force = 50lbs. **Y**
  - Life raft deployment including external release upright or capsized. **Y**
  - Auto float arming. **?**
  - Irregular wave testing/restriction to 4m significant wave height. **?**
  - Review of EFS design for crash resistance. **?**
  - Optimisation of cabin configurations for underwater escape. **?**
  - Hand holds at passenger exits. **X**
  - Direct entry (step in) to life raft. **X**
  - Flight crew exit operation for all pilot heights and seat conditions. **X**
  - Provisions to assist passenger cross-cabin escape. **X**

# Survivability - Equipment Standards (1)

## ASD-STAN Working Group D12 WG2 - Ditching Equipment



### ▪ Emergency Breathing Systems:

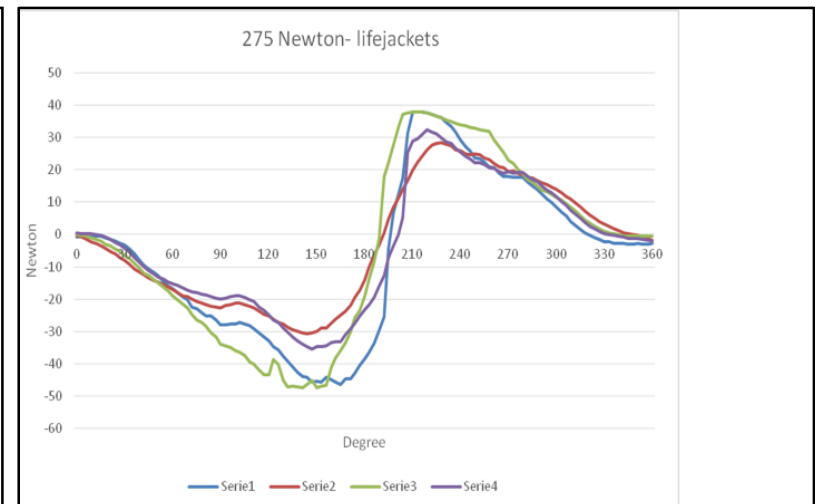
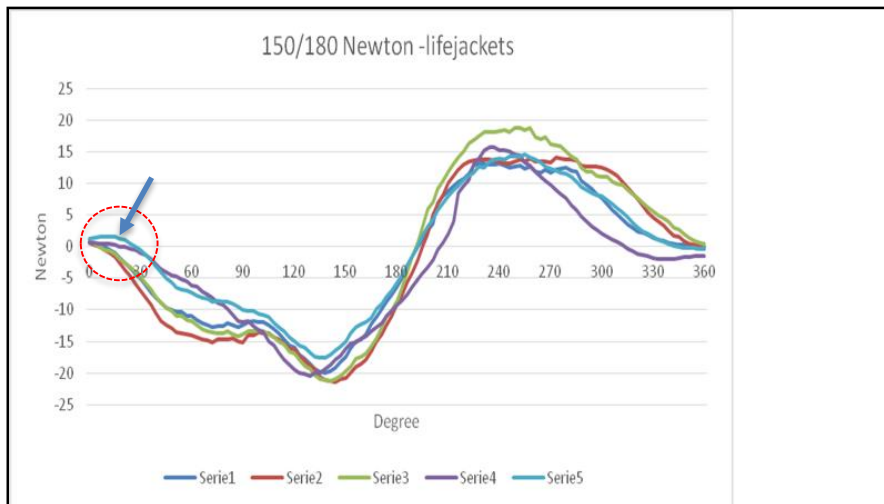
- EN 4856: 2018 published in December 2018.
- EASA have confirmed EN 4856 will be republished under cover of a new ETSO in September 2019.
- No major differences to CAP 1034 except; bottle capacity specified, compatibility testing added.
- New EASA air operating rules (SPA.HOFO.165(c)) applicable from 1<sup>st</sup> July 2018 take over from CAA SD-2015/005 but, unlike lifejackets and immersion suits, EBS is not required to be approved.
- Unlikely that existing EBS will need to be recertified.
- Some minor modifications will eventually be proposed to align the EBS standard with the lifejacket and immersion suit standards.



# Survivability - Equipment Standards (2)

- Life jackets:

- Final review of new standard (prEN 4862) at next meeting in mid-June 2019. Will then be frozen pending completion of work on immersion suit standard
- Main issue addressed has been provision of self-righting capability vs stability.
- Must self-right or, by definition, not a lifejacket.
- Some favour stability, citing that survivors must be conscious to exit the helicopter and can therefore right themselves, but what about fatigue, exposure, injury?
- Number of lifejackets tested; no data/evidence to define minimum stability required; can only definitively state that positive stability required up to tbd heel angle.





# Survivability - Equipment Standards (3)

- Immersion suits:

- Work on new standard (prEN 4863) approx. 80% complete; expected to be completed Q3 2019.
- Main change is the introduction of four levels of insulation to permit a better overall solution for differing operating environments (sea temperatures). Currently only one level of insulation equivalent to SOLAS Class B.
- Expecting manufacturers to produce a single suit 'shell' with a range of liners.
- Single standard for both integrated and non-integrated suits.



Category	1	2	3	4
Sea temp (°C)	≥12	≥7	≥2	<2
Time (hrs)	-	4	4	6
SOLAS equivalent	-	Class C if <6	Class B	Class A

# Survivability - Equipment Standards (4)

- Life rafts:

- Work on new standard (prEN 4886) started in Q4 2018. Agreed that starting point will be existing ETSO-2C505 standard.
- Bristow DO and Airbus Helicopters providing input on integration aspects.
- Separate sub-group established, 2<sup>nd</sup> meeting end May 2019.
- Issues to be addressed include:
  - Externally-mounted life rafts;
  - Improved puncture resistance;
  - Improved boarding provisions.

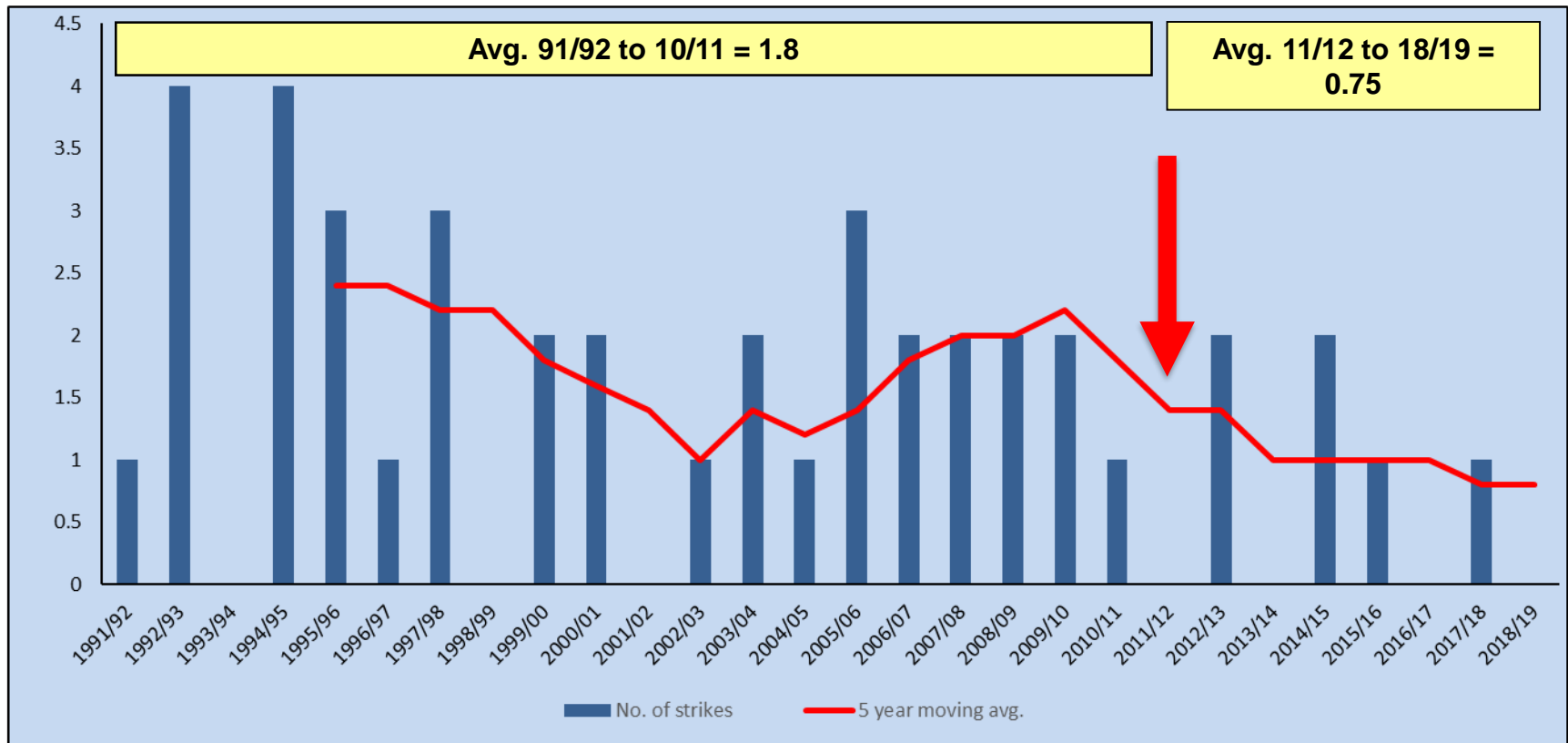


# OPERATIONAL ISSUES

# Triggered Lightning Strike Forecasting (1)

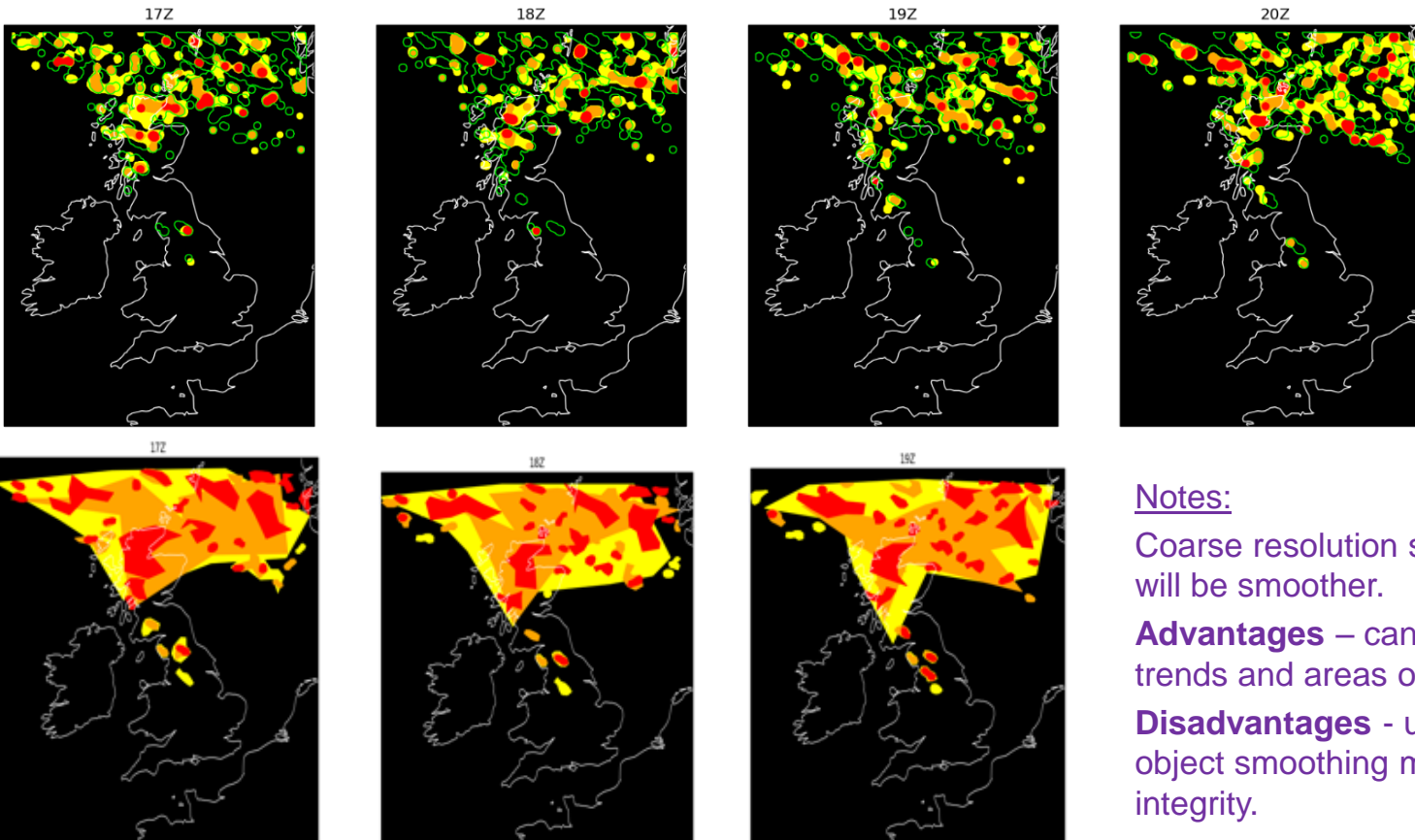
- Current Performance:

- Triggered lightning forecasting introduced winter 2011/12 (initial trial system).
- Some trial 'seasons' (2011/12 and 2013/14) inconclusive due to warmer than average temperatures and consequent absence of lightning risk.
- Lightning strikes investigated and improvements introduced.



# Triggered Lightning Strike Forecasting (2)

- Addressing display volatility:
  - Occurs in conditions of scattered showers.
  - Averaging methodology.



## Notes:

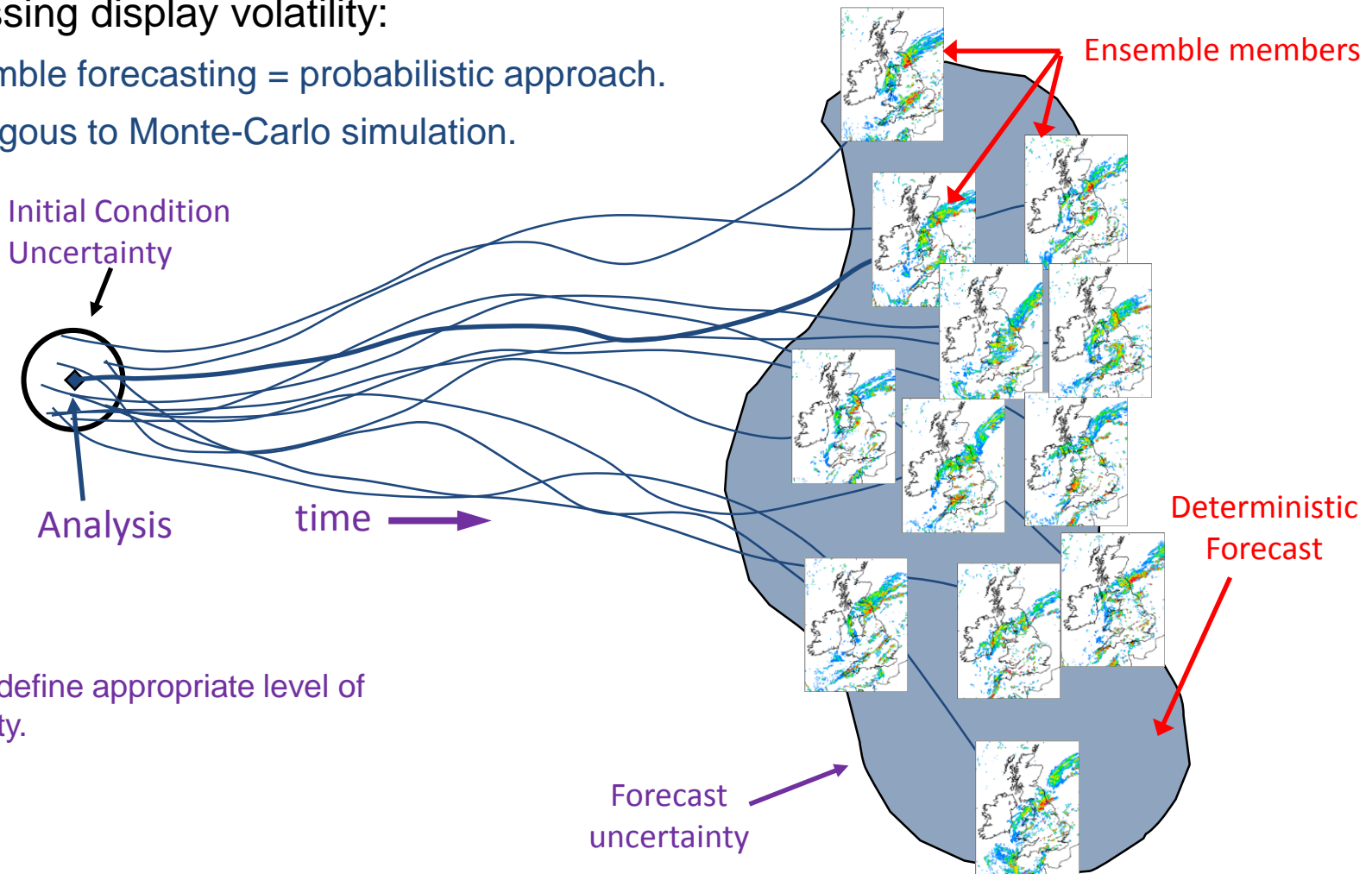
Coarse resolution shown – final version will be smoother.

**Advantages** – can more easily identify trends and areas of higher risk.

**Disadvantages** - using temporal & object smoothing may impact scientific integrity.

# Triggered Lightning Strike Forecasting (3)

- Addressing display volatility:
  - Ensemble forecasting = probabilistic approach.
  - Analogous to Monte-Carlo simulation.



## Notes:

Need to define appropriate level of probability.

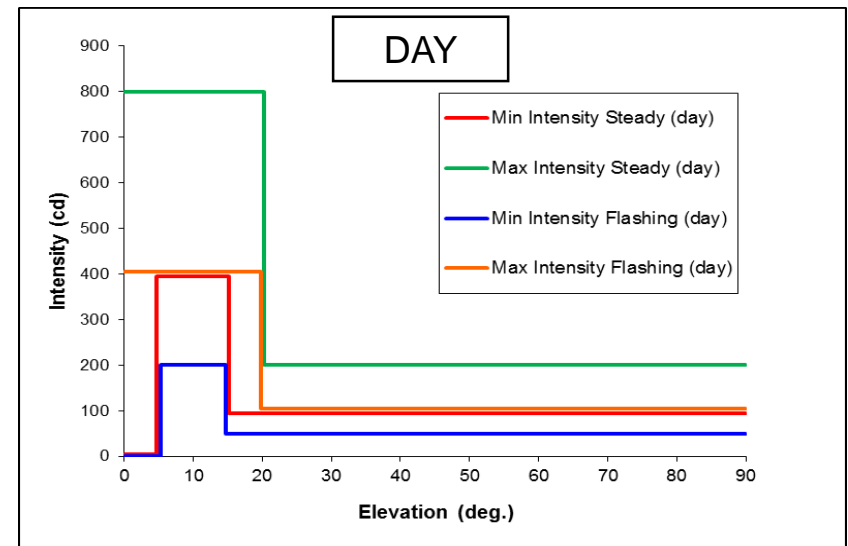
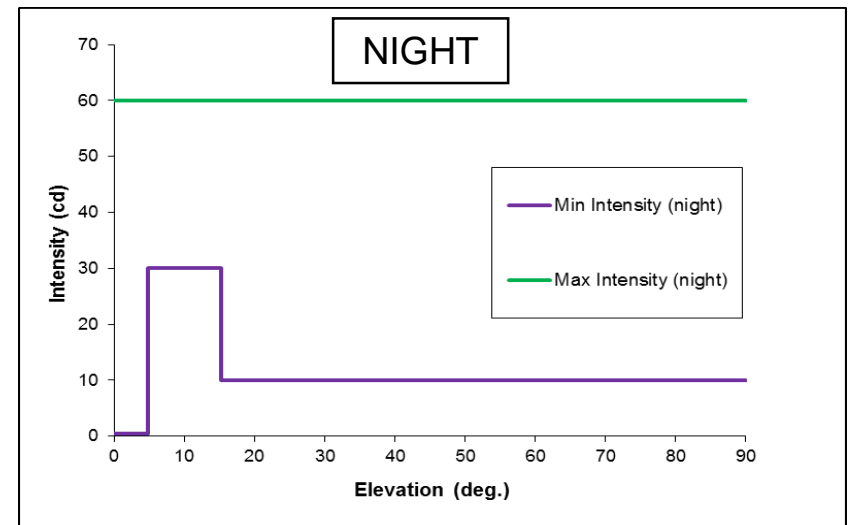
# Operations to Moving Helidecks (1)

- Helideck Monitoring System (HMS) specification:
  - Rev.9 of HMS standard published by HCA in April 2018.
  - Will be updated later this year:
    - Change WSI axis from kts to % of max WSI for helicopter type selected (feedback from HTC).
    - Add material relating to approval of HMS.
    - Modify the traffic light intensity specification (feedback from trials on Captain and Alba FSU).



# Operations to Moving Helidecks (2)

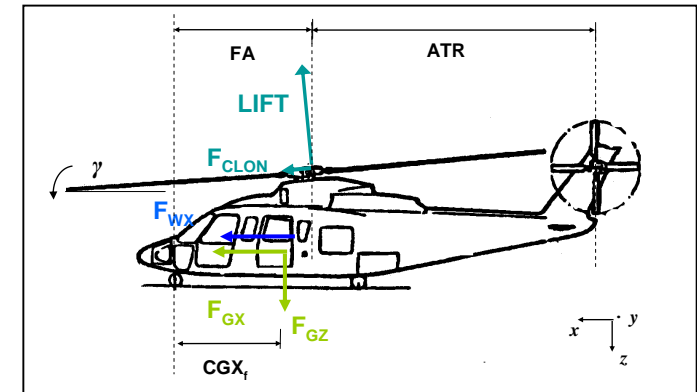
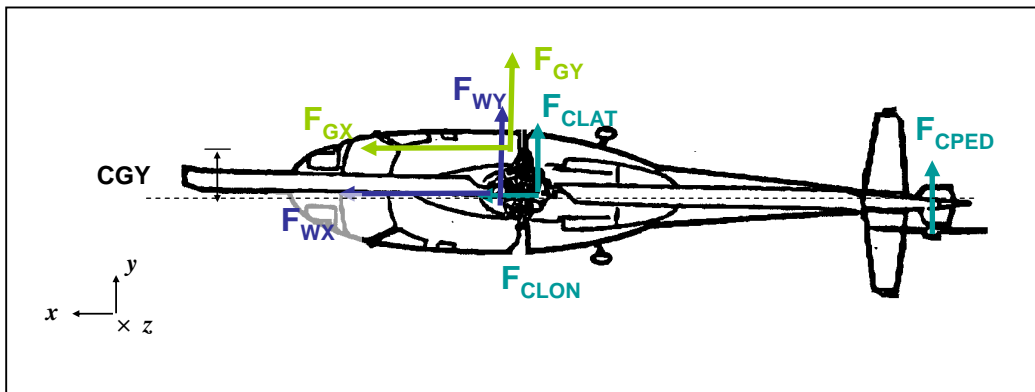
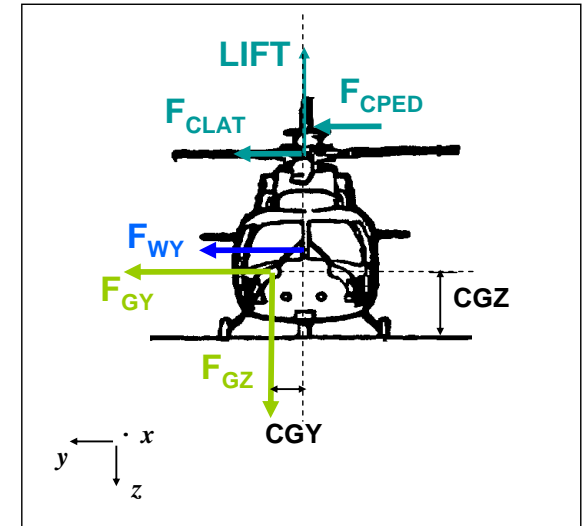
- In-service trials:
  - Trial declared complete at 31 March 2019.
  - Main/only issue was intensity of 'traffic lights.'
  - 17 proformas received:
    - 13 bright day, 2 overcast day, 1 twilight, 1 night (no moon).
    - On approach, 15 'about right', 2 too dim (both bright day).
    - On deck, 15 'about right', 2 too bright (one bright day and one night (no moon)).
  - Aircraft always at close range on deck and lights always in flashing mode, therefore intensity for flashing mode can be reduced:
    - Max and min intensity for flashing mode (day) halved.
    - Min intensity for flashing mode (night) reduced from 40cd to 30cd (same as perimeter lights).





# Operations to Moving Helidecks (3)

- Potential further work on HMS standard:
  - Helicopter type-specific MSI/WSI limits to be developed – pending helicopter operator support.
  - Classification of helicopter types for landing (touchdown) limits (pitch/roll/heave rate) - pending OHSLG agreement.
  - Helideck classification scheme to be reviewed and updated - pending OHSLG agreement.



# Helicopter TAWS (1)

## Phase 1, CAP 1519 Retrofit:

- Agreed to defer implementation of Mode 7 due to OEM concerns mainly regarding alert message:
  - OEMs want “Power, Power”, operators want “Check Airspeed”.
  - “Power, Power” is a command (arguably inappropriate for a caution) and also would exacerbate near VRS situations (e.g. Sumburgh accident).
  - OEMs concerned that a pitch down in response to “Check Airspeed” could result in the aircraft being flown into the terrain.
  - Have proposed to split Mode 7 into Mode 7A and 7B:
    - 7A – provides “Check Airspeed” alert, but inhibited when below TBD height.
    - 7B – provides “Power, Power” alert, active when Mode 7A is inhibited.
- Mode 7 will remain in the -036 software for the Honeywell Mk XXII EGPWS, but deactivated by not selecting an alert envelope - so could readily be activated if/when issues resolved.
- Modes 1 to 6 considered to be totally ‘de-risked’ by Airbus Helicopters.
- Leonardo have issues regarding inhibition of Mode 1 during OEI operations (no issues for the helicopter operators).

# Helicopter TAWS (2)

## Phase 2, Formal Standard (MOPS):

- EUROCAE WG110 formed following CAA initiative, supported by EASA.
- Launch meeting held December 2018:
  - Chaired by Honeywell (Yasuo Ishihara – also chaired RTCA SC for HTAWS)
  - Secretary is Mark Prior (ex Bristow TP, now contracted to CAA, jointly funded with HeliOffshore)
  - Agreed:
    - basis for MOPS will be CAP 1519;
    - will be called Offshore HTAWS;
    - will initially focus on offshore operations only, onshore and/or SAR can follow.
- Second meeting held end March 2019:
  - Presentation on Cranfield research from Matt Greaves & Polly Dalton on alert form/format well received.
  - Presentation on Sikorsky analysis – results look promising.
  - Good discussion on producing Mode 7 alert envelopes for new types (i.e. where there is insufficient FDM data available). Sikorsky will investigate ideas proposed and report back at next meeting.
- Third meeting scheduled for end June 2019.

Thank you for your attention...

**Any questions?**