

Research Update for 24 February 2016 HSRMC Meeting:

Note: Item numbers correspond to the joint industry HSRMC research programme.

(1). HUMS

All work on the advanced HUMS VHM data analysis using advanced anomaly detection (AAD) techniques has been completed, and the overall final project report has been published on CAA's website as CAA Paper 2011/01. A summary of the HSRMC-funded S61 and S.Puma MRGB seeded defect testing should ideally be produced and published but this is unlikely to happen in the near future due to pressures on resources at CAA.

Overall the project has been very successful and Oil & Gas UK are progressing implementation. AgustaWestland have licensed the GE system for the AW139 which was presented at the 11 December 2012 ASTG meeting. Eurocopter is developing its own version of AAD initially for implementation on MARMS HUMS on the EC225 and EC175; presentations were given at the ASTG meetings on 14 December 2011, 18 September 2012 and 01 December 2015. Sikorsky is developing an equivalent system for the S92 for which some information has been received.

It is understood that the AW139 system is performing well, the Sikorsky S92 system less so. The Airbus Helicopters EC225/EC175 WebHealth system is available but not being used by operators pending availability of associated procedures. A presentation was given to the 01 December 2015 OGUK ASTG meeting on WebHealth by Airbus Helicopters. Presentations from the other OEMs are to be invited at subsequent ASTG meetings.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 2/2011, G-REDL near Peterhead, Safety Recommendation 2011-041.

(2). Side-Floating Helicopters

Ditching, Water Impact and Survivability: The EASA review of the regulations and advisory material on ditching and water impact (Rule-making task ref. RMT.0120 (27&29.008)) was launched in January 2013. The NPA is nearing completion and is expected to be published around end February 2016, with a workshop being held in March 2016 to provide an opportunity for discussions with the industry. The NPA will only cover rule changes for new helicopter designs; EASA have agreed that the working group can continue and produce a second NPA to cover retrospective action. Presentations on the RMT were given at the 03 December 2013 ASTG, the 04 June 2014 OGUK Aviation Seminar and at HeliTech on 07 October 2015.

One Atmosphere, an Australian company, attended the 13 July 2015 HSRMC meeting and gave a presentation on their Pegasus post crash buoyancy system. They have been contracted by the Australian military to produce a system initially for the Tiger attack helicopter, but are funded by the Australian government to develop the concept for civil applications such as the side-floating scheme. The system is very light and compact, and operates independently of the aircrafts' existing EFS, being powered by batteries and activated by water pressure switches. It utilises chemical gas generation and novel fabric for the floatation bags.

In terms of progress since July 2015, One Atmosphere have acquired an A109 airframe and have just received Marine Board approval to conduct helicopter capsizing trials. Australia's civil aviation regulator (CASA) has been briefed and recognise the potential merits of the R&D work to increase helicopter safety over water. It is hoped that CASA experts will observe the trials and assist with the evaluation of the data. Video of the trials should be available to demonstrate the increased ease of escape from a ditched helicopter in a side-floating attitude. Final testing isn't expected until mid-2016, but some initial video could be available in May, provided there are no schedule slippages. Regarding certification, Defence Certification is likely to be expedited (for a number of reasons); for civil certification it may be

necessary to make additional applications to include the side-floating concept (it wasn't part of the original submission/certification plan). Following completion of successful side-floating testing One Atmosphere intend to conduct concurrent Australian and European certification exercises.

EBS Specification: The EBS technical standard published in CAP 1034 is presently being used by CAA to approve Category A EBS for compliance with CAA Safety Directive SD-2015/001 following publication of CAP 1145. A new ASD-STAN working group (D1S9) has been established to produce a formal specification and met for the first time on 27 January 2016. Gavin Anthony (QinetiQ) has been elected as chairman and D Howson (UK CAA) is the secretary. The author of the specification in CAP 1034, Dr Coleshaw, is participating as a subject matter expert (SME) and all equipment manufacturers and other interested parties (e.g. EASA, test facilities) are represented. The working group will produce a prEN standard which will then be submitted for adoption as a EN. EASA will issue an ETSO to cover the prEN/EN. The prEN should be completed within 6 months. It has been agreed that the scope of the working group be expanded to review and revise the existing standards for immersion suits, life jackets and life rafts as recommended by EASA RMT.0120. The next meeting has been scheduled for 16 & 17 March 2016.

Presentations on the work have been given at the 11 May 2010 HSRMC meeting, the 08 June 2011 Oil & Gas Aviation Symposium, the 05/06 December 2011 EASA ditching workshop and the 23-27 September EASA RMT.0120 meeting.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 2/93, G-TIGH near the Cormorant 'A' platform, East Shetland Basin, Safety Recommendations 93-26, 30 and 31.
- Aircraft Accident Report 7/2008, G-BLUN at the North Morecambe gas platform, Safety Recommendation 2008-036.
- Aircraft Accident Report 1/2011, G-REDU at the ETAP Central Production Facility Platform, Safety Recommendation 2011-065.

(3). Operations to Moving Decks

The current plan is to launch an initial system in the 8th Edition of CAP 437 around mid 2016. The scope of this system was discussed and agreed with the HCA Helideck Steering Committee and includes the following elements:

- New heave rate measure (SHR) – the modified version of this (hysteresis added) has been tested off-line on data from the Foinaven FPSO and the Alliance DSV; it should ideally be trialled in-service before being widely introduced.
- Helideck traffic lights – this addresses misreporting of deck motion which accounts for about a third of the related MORs.
- Relative wind monitoring - this addresses the West Navion accident scenario (G-BKZE, November 2001, which involved loss of vessel heading control), and the passage of line squalls while on-deck (NB: Also applicable to fixed helidecks.)
- Initial MSI/WSI advisory only limits – initial advisory limits will be produced for the S.Puma; it is intended that limits for the AW139 and S92 will follow.
- New HMS display – human factors design principles have been employed to develop an improved 'standard' display and to incorporate the additional information required for the new scheme.

Following a competitive tender, Fugro GEOS were contracted to produce a prototype system for trials on Chevron's 'Captain' FPSO with Bristow Helicopters. The trial commenced on 27 April 2015 and, by mutual agreement at the 09 September progress meeting, was suspended in September 2015 pending implementation of some system improvements. Modified software is expected to be installed by end February and there is a possibility of extending the trial to a second vessel, Chevron's 'Alba'. No significant changes to the

specification have been identified apart from the intensity of the helideck-mounted repeater lights. A set of non-Atex lights has been produced by Orga for evaluation onshore at Aberdeen. Once the intensity has been confirmed, Atex certificated pre-production prototypes will be produced for evaluation offshore.

Further development of the MSI/WSI and, in particular, the production of validated helicopter type-specific limits will be considered once work on the initial system has been completed and it has been incorporated in CAP 437.

Presentations on this project have been given by Atkins at the Oil & Gas Aviation Seminar in September 2010, by CAA at the EASA Rotorcraft Forum in December 2010, and by Atkins at the September 2012 European Rotorcraft Forum.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 3/2004, G-BKZE at the West Navion drill ship, Safety Recommendations 2003-133 and 135.

(4). Helideck Lighting

All work on the development and validation of the specification has been completed and reported in CAP 1077. The specification was added to CAP 437 in the 7th Edition issued in February 2013. Letters to industry advising CAA's position on helideck lighting and the timescales for the introduction of the new lighting have been issued. An update to the specification in CAP 437 (Appendix C) has been produced, consulted on and will be incorporated in the next update (8th Edition) around mid 2016. The main reason for the update was to add tolerances on the circle and H dimensions and locations to assist addressing the practical issues that have arisen with early installations.

A working group was established by Oil & Gas UK to pool experience and expertise to address installation issues; the working group last met on 29 January 2014. Ownership of the working group has been transferred to Step Change in Safety which has formed a working group and is 'on the case'.

HCA have issued letters of approval to Orga, Tranberg and IMT for their respective systems. CAA has been approached by most of the lighting manufacturers to approve their products. This is being addressed via CAA International on a commercial basis as this work is currently outwith CAA's remit (offshore helidecks are unlicensed).

CAA met with FricTape to discuss their novel 'NetLight' solution on 25 August. FricTape are confident that all concerns/issues raised can be addressed. More recently, FricTape have redesigned their net to comprise a linear inner section that is compatible with the H marking, and a radial outer section that is compatible with the circle marking. Trials on the Petrojarl 'Foinaven' and Centrica 'DPPA' are planned..

CAA is working up an in-service trial of an onshore version of the new lighting provided by Calzoni at St. George's hospital in London. The Calzoni offshore system is marketed by Tranberg. The relevance of this to offshore installations is that it will provide an opportunity to evaluate the compatibility and durability of the system with skid fitted helicopters.

Presentations on this project have been given by CAA at the 10 June 2008 Oil & Gas UK Aviation Symposium, the 11/12 June 2008 RAeS Maritime Operations of Rotorcraft conference, the 22 -24 March 2010 CHC Safety & Quality Summit, and the 21/22 September 2010 OGP Aviation Sub Committee.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 5/88, G-BHYB near the Fulmar A oil platform, Safety Recommendation 4.4.
- Aircraft Accident Report 1/2011, G-REDU at the ETAP Central Production Facility platform, Safety Recommendation 2011-053.

(5). Helicopter Flight Data Monitoring (HFDM)

The remaining HFDM research is the provision of a measure of low airspeed for use in the ground-based analysis system. This work has been using a database of Bristow S.Puma data including low airspeed as measured by a HADS. As a result of the work completed to date, it has now been established that this data is unreliable due to the HADS sticking. Although it is now clear that flight trials will need to be performed to generate a new database, analysis performed by GE Aviation has demonstrated significant potential of the concept. The final report on the GE work has been completed and accepted.

EASA have tendered a research project to develop a low airspeed sensor for helicopters which, if successful, could negate the need for this work. Unfortunately no bids for the project were received.

On a more positive note, additional effort is being put into HFDM to implement the pilot workload algorithms to enable turbulence around offshore installations to be mapped and monitored objectively. HFDM programmes are also to be used to 'road test' the proposed new HTAWS warning envelopes on a range of helicopter types – see item 12.

As part of CAP 1145 Action A04, new HFDM guidance material is to be produced by CAA working with the helicopter operators to support the EASA SPA.HOFO HFDM mandate which is expected to take effect from mid-2018.

(6). Offshore Approaches

Work completed and reported to date comprises:

- Trials of Differential GPS (DGPS) guided offshore approaches – see CAA Paper 2000/05.
- Follow-on studies to DGPS trials - see CAA Paper 2003/02.
- Effect of helicopter rotors on GPS reception; data collection trials and analysis – see CAA Paper 2003/07.
- Three-phase hazard analysis covering en-route navigation, WXR approaches and GPS enhanced WXR approaches - see CAA Paper 2009/06.
- The EU 6th Framework GIANT work including the design, hazard analysis and simulator trials of the SBAS Offshore Approach Procedure (SOAP), and EGNOS reception trials – see CAA Paper 2010/01.

Further work was performed as part of an EU 7th Framework project called HEDGE which comprised the production and trials of a demonstrator SOAP system on a Bond Offshore Helicopters AS332L2. Two sets of daylight trials (the first in January 2011, the second in November 2011) have been completed and reported. The main result of significance was the success of the integration of AIS which was well received by the pilots and found to be very helpful in improving situational awareness.

Night trials to explore the integration of SOAP with the new helideck lighting were to be performed but were delayed due to aircraft availability (resulting from the EC225 restriction) and the lack of a new helideck lighting system (until September 2014). These trials are currently pending establishment of a way forward with HeliOffshore.

Initial discussions were held with the Joint Operator's Review (JOR) on 13 August 2014, however, the JOR was superseded by HeliOffshore shortly thereafter. Sikorsky have developed a system similar to SOAP for the S-92 which has been certificated by the FAA and which was announced at the 04 June 2013 Oil & Gas UK Aviation Seminar. Airbus Helicopters and AgustaWestland are also believed to have equivalent offerings. Although not believed to be fully in line with SOAP, it may be possible to use one or more of these systems as a vehicle for in-service trials.

Current CAA thinking is that a good way forward would be to conduct a gap analysis to establish the differences between the OEM systems and SOAP. This may result in improvements to the OEM systems and/or SOAP, and identify a suitable candidate(s) for limited introduction into service trials.

Presentations on this project have been given by Helios at the 10 June 2008 Oil & Gas UK ASTG Seminar and at the 11/12 June 2008 RAeS Maritime Operations of Rotorcraft conference, and by CAA at the 02-03 December 2009 EASA Rotorcraft Symposium and the 22 -24 March 2010 CHC Safety & Quality Summit.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 5/88, G-BHYB near the Fulmar A oil platform, Safety Recommendation 4.4.
- Aircraft Accident Report 7/2008, G-BLUN at the North Morecambe gas platform, Safety Recommendation 2008-033.

(7). Helideck Friction

The programme of work at NLR in The Netherlands has been completed which comprised the following main elements:

- a review of the current helideck friction measuring techniques;
- full scale testing of profiled helidecks;
- investigation of the effectiveness of low profile helideck nets.

The results from all of this work have been used to develop a new approach to helideck friction measurement and monitoring of both flat, textured finish helidecks and profiled (typically aluminium) helidecks. An outline proposal was presented to the HCA Helideck Steering Committee on 10 July 2014 which was broadly agreed. This has been developed further and was presented to HCA again on 29 July 2015 and was agreed in principle. The next step will be to produce a paper for circulation to the wider industry in anticipation of incorporation of the new scheme in the 8th Edition of CAP 437 around mid 2016. The 01 December 2015 OGUK ASTG was briefed on CAA's current proposals.

Related AAIB Safety Recommendations:

- Although there are no AAIB Safety Recommendations that correspond directly, this work is closely related to the work on operations to moving decks.

(8). Helideck Environmental Research

All research has been completed and reported and, where applicable, incorporated in CAP 437. Use of helicopter FDM to map and monitor the environments around offshore platforms is starting to be addressed by the helicopter operators/HeliOffshore – see item 5.

The importance of the hazard presented by turbine exhaust plumes was highlighted by the issue of Sikorsky Safety Advisory SSA-S92-10-002 in April 2010. The turbine exhaust stacks on the Ninian Southern platform have been re-routed as a result, and a new project to implement the turbine exhaust plume visualisation system researched and reported in CAA Paper 2007/02 is being worked up for implementation on the Ninian Central. CFD studies have been performed in Norway to identify the location of turbine plumes as a function of wind speed/direction and turbine load which has been extended to cover all Norwegian installations. This work has been discussed at the HCA Helideck Steering Committee and a response submitted regarding concerns over the treatment of rate of change of temperature in exhaust plumes. Norway remains committed to its approach, but it was agreed by the HCA Helideck Steering Committee that it will not be adopted in the UK sector.

As regards the issue of cold flaring, the NTSB issued five Safety Recommendations concerning loss of engine power on helicopters operating to and from offshore oil platforms on 02 September 2014. The NTSB recommends that the addressees "...identify and develop comprehensive systems and procedures to mitigate the risk of ingestion of raw gas discharges, such as methane, by helicopters operating in the vicinity of offshore oil platforms. After appropriate mitigations are developed as recommended in Safety Recommendation A-14-69, require fixed [and mobile] offshore oil platform operators to implement these systems and procedures." CAP 437 is referenced.

Related AAIB Safety Recommendations:

- AAIB Bulletin 3/96, G-AYOM at the Claymore Accommodation Platform, Safety Recommendation 96-1.

(9). Extension of HUMS to Rotors

The initial study on extending HUMS to rotors comprised a review of all relevant work (including the earlier HSRMC-funded studies) in order to form a consolidated view of the state of the art of the application of VHM techniques to the detection of rotor system potentially catastrophic failures (PCFs). The study has been completed and was published in CAA Paper 2008/05.

Further work entailing the application of the advanced anomaly detection (AAD) techniques developed on the transmission HUMS research (see item 1 above) to in-service tail rotor HUMS data was contracted to GE Aviation and has been completed. The slightly mixed results of this work were presented at the 07 December 2009 HSRMC meeting. Whereas it seems possible to detect faults prior to the start of the last flight (provided that both axial and radial vibration data are available), on-board analysis would be required to provide timely warnings. The main problems are the 'noisy' nature of the data and, in the case of the S.Puma study, the lack of axial vibration data. The final report on this work has been completed and accepted, and has been published as CAA Paper 2012/01.

As regards main rotor health monitoring and further work on tail rotors, CAA and AgustaWestland (AW) agreed a Non-Disclosure Agreement (NDA) which has enabled CAA to participate in the AW Rotorcraft Technology Validation Programme (RTVP). This major programme includes significant work on rotor HUMS. The initial meeting between CAA and AgustaWestland was held on 01 February 2012 at which GE Aviation presented the work on the application of AAD to tail rotor VHM data. AW are attending HSRMC meetings and providing regular updates; AW also provided a brief at the 11 December 2012 ASTG meeting.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 1/2005, G-BJVX near the Leman F platform in the North Sea, Safety Recommendation 2004-040.
- Aircraft Accident Report 7/2010, G-PUMI at Aberdeen Airport, Safety Recommendation 2010-027.

(10). Tail Rotor Strike Warning

A feasibility study on the provision of a tail rotor strike warning system is included in the joint industry HSRMC work programme, but the scope of the work required has not been defined and no funding is available to proceed at present. Bell Helicopter is understood to have produced a tail rotor strike warning system and have been invited to give a presentation at the 71st HSRMC meeting.

(11). TCAS

All work including dedicated and in-service trials have been completed outside of the HSRMC research programme by Bristow Helicopters. Bristow has EASA TCAS II STCs for the AS332L, S92 and S76 and has applied for a FAA STC for the S92 with the FAA doing a demo flight probably in December 2012. All UK Bristow S92s have TCAS II and the S76C++

fleet is being equipped. Eurocopter has a TCAS II system certified for the EC 225 which will be an option on the EC175. AgustaWestland is to offer TCAS II on the AW189. Sikorsky has no TCAS II systems yet but has plans. Bristows are retrofitting their fleet; the other operators have been slower on the uptake.

A presentation of the work at Bristows was given to the 54th HSRMC meeting on 30 January 2008, at the 16-19 September 2008 European Rotorcraft Forum in Liverpool, and at the 02-03 December 2009 EASA Rotorcraft Symposium.

(12). HTAWS Warning Envelopes

This project comprises the development of improved 'Classic Mode' EGPWS warning envelopes for offshore helicopter operations, and effectively addresses a number of AAIB Safety Recommendations made in the report on the accident to G-REDU in February 2009 near the ETAP platform.

Eurocopter EC225 and Sikorsky S76 flight data from Bristow Helicopters' Flight Data Monitoring (FDM) programme has been used to establish the limits of normal operations for the spectrum of helicopter technological standards and a broad range of types of operation. This has enabled the Classic Mode warning envelopes and their associated input parameters to be refined, and has also allowed new warning envelopes to be developed. The revised and new warning envelopes have been tested using the available data from 10 occurrences and have demonstrated a worthwhile improvement in performance in terms of warning time for all but two incidents with a 'nuisance' alert rate of better than 1:100 flights. An updated interim report covering this work was produced and circulated to relevant industry contacts on 14 December 2015.

A meeting was held with Honeywell, the leading HTAWS manufacturer, on 17 June 2015 to review the work to date. Honeywell have agreed to produce an engineering prototype ('red label') HTAWS computer for use in Bristow's flight simulators to enable the modifications to be evaluated by pilots in terms of effectiveness. It is presently expected that the hardware will be available in time for the trials to be performed during Q1/Q2 of 2016.

In the meantime, the agreed preliminary warning envelope definitions have been supplied to the helicopter operators for implementation in their FDM analysis programmes. This will enable the envelopes to be assessed, primarily for nuisance alert rate, across a wider range of helicopter types – see item 5.

In addition, the contract for the work on warning form/format was let to Cranfield University working with Royal Holloway University of London in June 2015. The formal project launch meeting took place on 30 July but Cranfield were authorised to start work on the literature review at the beginning of June and also attended the 17 June meeting with Honeywell. The last progress meeting was held on 27 November 2015; the next has been scheduled for 10 March 2016. This work is due to be completed by June 2016. A second set of flight simulator trials is envisaged once this work has been completed and the results implemented in the prototype HTAWS computer.

This project was proposed by Bristow Helicopters and Shell Aircraft and is being jointly funded by Bristow Helicopters, OGP, Shell Aircraft, Oil & Gas UK, HeliOffshore and BP.

Presentations on the work to date were given to the 28/29 September 2011 OGP Aviation Safety Committee, the 08 November 2011 HSRMC meeting and the 07/08 December 2011 EASA Rotorcraft Symposium.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 1/2011, G-REDU at the ETAP Central Production Facility platform, Safety Recommendations 2011-060, 061, 062 and 063.

(13). Triggered Lightning Strike Forecasting

A programme of work to investigate and demonstrate the feasibility of forecasting/predicting triggered lightning strikes to helicopters has been undertaken in response to requests from industry. The work is being performed by the UK Met Office and is funded by Oil & Gas UK, CAA Norway, CHC and seven individual oil/gas companies.

The Met Office helicopter triggered lightning product was evaluated through in-service trials on the OHWeb weather information service during the winter 2012/13, 2013/14 and 2014/15 'lightning seasons' by all three Aberdeen-based helicopter operators. The performance of the system was most recently discussed during an OHWeb User Forum on 20 January 2015, and subsequently during an end of season project review meeting on 30 April 2015. Overall the system is considered to be working well, although the volatility of the risk remains a challenge for operators on days when the risk is related to scattered showers rather than frontal activity. Developments to address the impact on operations include:

- Provision of advance warning (3 days) of high risk days;
- A facility to allow over flight of high risk areas;
- Review of thresholds of risk area boundaries;
- Alignment of lightning and wave height forecasts.

Measures to address all of these aspects were developed and agreed for implementation for the winter 2015/16 'season' at the project meeting held on 11 September 2015. Specifically:

- Advance warning (3 days) of high risk days contracted;
- High risk areas downgraded to medium risk if OAT at planned flight level $<-10^{\circ}\text{C}$ or $>+10^{\circ}\text{C}$;
- Threshold for high risk area boundary reduced from 10mm/hr to 6mm/hr;
- Triggered lightning and wave height forecasts aligned.

In addition, operating areas lacking precipitation radar coverage such as Scatsta and the Norwegian coast are likely to suffer from reduced performance. By including precipitation radar data from non-UK sources (under the EUMETNET OPERA project), the accuracy of the forecasts will be improved. The Met Office has produced a costed proposal for Norway to consider. The Met Office is also investigating the costs and feasibility of installing a precipitation radar on Scatsta. An end winter 2015/16 'season' meeting has been arranged for 21 April 2016.

Presentations on this work have been given at the 08 June 2011 and 13 June 2012 Oil & Gas UK Aviation Seminars.

Related AAIB Safety Recommendations:

- Aircraft Accident Report 2/97, G-TIGK North Sea 6 NM south-west of the Brae A oil platform, Safety Recommendation 95-45.

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Nomenclature

AAD	Advanced Anomaly Detection
AAIB	Air Accidents Investigation Branch (of the UK DfT)

AIS	Automatic Identification System
CAA	Civil Aviation Authority (UK)
CAP	Civil Aviation Publication (UK CAA)
CFD	Computational Fluid Dynamics
C-NLOPB	Canadian Newfoundland and Labrador Offshore Petroleum Board
DGPS	Differential GPS
DWR	Diving at Work Regulations
EASA	European Aviation Safety Agency
EBS	Emergency Breathing System
EGPWS	Enhanced Ground Proximity Warning System
EHEST	European Helicopter Safety Team
ETSO	European Technical Standards Order
EU	European Union
FDM	Flight Data Monitoring
FDR	Flight Data Recorder
FPSO	Floating Production Storage & Offloading
GE	General Electric
GIANT	GNSS in Aviation
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
HADS	Helicopter Air Data System
HCA	Helideck Certification Agency
HEDGE	Helicopters Deploy GNSS in Europe
HFDM	Helicopter FDM
HLL	Helideck Limitations List
HMS	Helideck Monitoring System
HOMP	Helicopter Operations Monitoring Programme
HSE	Health & Safety Executive (UK)
HSRMC	Helicopter Safety Research Management Committee
H-TAWS	Helicopter TAWS
HUMS	Health & Usage Monitoring System
ICAO	International Civil Aviation Organisation
JIP	Joint Industry Project
MOR	Mandatory Occurrence Report
MRGB	Main Rotor Gear Box
MSI	Motion Severity Index
NDA	Non-Disclosure Agreement
NPA	Notice of Proposed Amendment
NTSB	National Transportation Safety Board (USA)
OEM	Original Equipment Manufacturer
OGP	International Oil & Gas Producers Association
OGUK	Oil & Gas UK
OHWeb	Offshore Helicopter Website (weather information)

OPERA	Operational Programme for the Exchange of Weather Radar Information
PCF	Potentially Catastrophic Failure
RAeS	Royal Aeronautical Society (UK)
RNAV	Area Navigation
RTVP	Rotorcraft Technology Validation Programme
SBAS	Space-Based Augmentation System (for GPS)
SHR	Significant Heave Rate
SME	Subject Matter Expert
SOAP	SBAS Offshore Approach Procedure
TAWS	Terrain Awareness Warning System
TCAS	Traffic Alert & Collision Avoidance System
VHM	Vibration Health Monitoring
WSI	Wind Severity Index
WXR	Weather Radar

**PROPOSED HSRMC RESEARCH PROGRAMME – FUNDING STATUS AS AT
11 February 2016.**

Item	CAA Project Code	Title	Funding Status
1. ONGOING WORK			
1	5.1	HUMS - advanced analysis of HUMS data.	Study completed. Final report published in CAA Paper 2011/01.
2	5.3	Ditching/Water Impact - side floating helicopter design study.	Study completed by Eurocopter/Aer Azur under contract to EASA. Final report published on EASA's website.
		Ditching/Water Impact - EBS specification.	Study completed. Final report published in CAP 1034.
		EASA Rule Making Task RMT.0120 (27&29.008).	Sufficient funding available to complete all work currently identified.
3	5.10	Operations to Moving Helidecks – generation of MSI / WSI operating limits and in-service trials.	Sufficient funding available to complete all work currently identified.
4	8.2	Helideck Lighting - in-service trials of new scheme (circle & 'H' lighting).	All work completed. Final report published in CAP 1077. Implementation in progress.
5	14.3	HOMP - extension to low airspeed regime.	Project on hold.

Item	CAA Project Code	Title	Funding Status
2. EXTENSIONS TO EXISTING PROGRAMMES			
6	5.7	Offshore Approaches (GIANT) – development and simulator evaluation of 'full' GPS approach + EGNOS reception study.	Study completed. Final report published in CAA Paper 2010/01.
		Offshore Approaches (HEDGE) – <ul style="list-style-type: none"> demonstration of the integration of the SOAP procedure with the enhanced helideck lighting, safety assessment of the visual segment, integration of AIS into the navigation display, addition of RNAV guidance to assist shuttling. 	Sufficient funding available for AIS receiver integration and flight demonstration of integration with helideck lighting only. Further funding required for in-service trials.
7	8.1	Helideck Friction - review of measuring techniques.	Study completed. Final report to be published as a CAA paper.
		Helideck Friction – testing of aluminium decks and development of pass/fail criterion.	Study completed. Final report to be published as a CAA paper.
		Helideck Friction – effect on resistance to sliding of landing nets.	Study completed. Final report to be published as a CAA paper.
8	8.5	Helideck Environment - review of CAP 437 vertical wind component criterion.	Study completed. Final reports published in CAA Papers 2008/02 and 2008/03.
3. NEW PROJECTS			
9	-	HUMS – preliminary study on extension to rotor systems.	Study completed. Final report published in CAA Paper 2008/05.
		HUMS - application of advanced data analysis techniques to HUMS tail rotor data.	Study completed. Final report published in CAA Paper 2012/01.
		HUMS – AgustaWestlands Rotorcraft Technology Validation Programme (RTVP).	No funding required at this time.
10	5.16	Tail Rotor Strike Warning.	Insufficient funding to proceed at present.
11	-	TCAS - in-service trials.	Trials completed and implementation in progress.
12	-	HTAWS - warning envelopes.	Sufficient funding committed to complete all work currently identified.
		HTAWS - warning form/format.	Most of the funding received allowing work to start.
13	-	Triggered Lightning Strike Forecasting.	Sufficient funding committed to complete all work currently identified.