Helicopter Operations Monitoring Program (HOMP)

A Flight Data Management Program for helicopters that was developed in the United Kingdom in joint cooperation by:

- Bristow Helicopters
- Royal Dutch Shell
- British Airways
- The Civil Aviation Authority

Currently in use by Bristow EH to monitor our North Sea flight operations.
2005: A decision was made by Air Logistics LLC to put together a FOQA program as a proactive solution to improve the safety of flight operations in the Gulf of Mexico as well as help deal with the Industry’s accident and incident rate.
Start Up

• Our partner Bristow UK, already operating an established FOQA program, was initially consulted for their help in the development of this initiative.

• Representatives of the Airline Industry having many years of experience with FOQA were visited about their active programs and for recommended procedures concerning our planned implementation and FAA approval.

• CAPACG was subsequently contracted for help in preparation of an approved FOQA Implementation and Operations (I & O) Plan.
Why an FAA Approved FOQA Program?

• Access to safety related information between industry FOQA participants.
• Protected communication between HOMP and Air crew members.
• Incentives provided by FAA for operators and crew members that participate in FOQA.
Agreement

• In order to have a successful program it is imperative that open communications between concerned parties always be maintained.

• An agreement between the company and the pilots union was completed to insure crewmember confidentiality and that except in the case of deliberate or illegal acts, the program would be non-punitive in nature.
Priorities

Air Logistics Fleet

- 124 Small, Single Engine Aircraft
  - >80% of the fleet was flown single pilot to remote locations and with limited oversight.
  - > 80% of the operations (sorties) and flight time was logged in these aircraft.
  - Historically, most helicopter incidents and accidents have occurred in small aircraft.
Priorities cont.

- 23 Medium and large aircraft.
  - <20% of the fleet were crew served aircraft and with good crew resource management and two pilots on board there is naturally some operational oversight.
  - FOQA technology for these aircraft was then incomplete but on the horizon.
- Consequently the small helicopter fleet was selected as a priority for HOMP.
• Air Logistics researched the availability of an off the shelf flight monitoring device for small helicopters, but found nothing suitable.

• Air Logistics partnered with Appareo Systems to design and manufacture the Air Logistics Event Recorder for Training Standardization (ALERTS) for that purpose.

• An ALERTS prototype was tested in one of our training aircraft beginning in 2006, to develop the analysis and visual software.
• ALERTS STC issued August 2007 with phased installations beginning in September 2007.

• All operational B206/407 aircraft were equipped with ALERTS by December 2008.
HOMP in Practice

- **ALERTS Operations**
  - Pilot installs SD card in on board ALERTS during preflight inspection.
  - He/She removes the SD card during post flight duties.
  - The days flight data is then uploaded into a Remote Data Kiosk (RDK) that is located in the pilots ready room at each base operations.
HOMP Software

• ALERTS
  • A Web Based integrated system designed by Appareo for analysis, and trending of HOMP data for our Bell 206 and 407 aircraft.
  • Daily flight Data is pre-processed by each RDK, then uploaded to the Appareo Web Application for analysis through a user defined event set.
Validation

• **Appareo ASF** [3D Flight recreation software]
  - The analyst downloads and verifies each event from the web application daily.
  - Record of all events are stored; for trend analysis and for future system development.
  - ASF is used by the analyst for pilot debriefings by graphically recreating event flight data.
Implementation

- Collection and analysis of recorded data began in September 2007 as each Bell 206 & 407 was equipped with ALERTS.
- Pilot de-briefings began immediately, along with the first flight data analysis.
- FAA approval for the Air Logistics LLC FOQA Program April 2008.
In October 2008 the sale of some 53 Bell 206B, L-1, L-3, & L-4 aircraft was agreed upon by the Bristow Group and Rotorcraft Leasing Corporation.

A phased transfer of these aircraft to RLC was not completed until February 2009.

Consequently, the data for this report has been affected by the reduction of those aircraft being monitored through that phase.
ALERTS Phase 1 Event Triggers

Excessive Bank Angle
Excessive climb
Excessive Descent <500ft.
Excessive Descent >500ft
Excessive Pitch Angle Landing
Excessive Pitch Angle T/O
Excessive Roll Rate
Excessive Yaw Rate
Low Cruise
Low Cruise Offshore
Low Turn to Final
Negative G Loading
Premature Departure Turn
Steep Turn

An angle of bank that is > 35°
A rate of climb that is > 1500’ ft./min.
A rate of descent below 500’ AGL > 750 ft/min
A rate of descent above 500’ AGL > 1250 ft/min
A pitch up angle landing < 150’ AGL that is > 18°
A pitch down angle during take off that is > 13°
A rate of roll that is > 30°/sec.
A rate of yaw that is > 30°/sec.
Extended flight over land that is < 250’ AGL
Extended flight over water that is < HSAC altitudes
Final turn for landing that is < 300’ AGL
Vertical G loading that is < +.2 G
A turn from the take off heading at < 300’ AGL*
An angle of bank that is > 45°
## January 2009 Event Table

<table>
<thead>
<tr>
<th>January Valid Events</th>
<th>206B-3</th>
<th>206L-1</th>
<th>206L-3</th>
<th>206L-4</th>
<th>407</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive Bank Angle</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>57</td>
<td>63</td>
<td>133</td>
</tr>
<tr>
<td>Excessive climb</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Excessive Descent &lt;500ft.</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>48</td>
<td>203</td>
<td>256</td>
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<tr>
<td>Excessive Descent &gt;500ft</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>12</td>
<td>75</td>
<td>95</td>
</tr>
<tr>
<td>Excessive Pitch Angle Landing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>56</td>
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<td>Excessive Pitch Angle T/O</td>
<td>0</td>
<td>12</td>
<td>2</td>
<td>25</td>
<td>14</td>
<td>53</td>
</tr>
<tr>
<td>Excessive Roll Rate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Excessive Yaw Rate</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Low Cruise</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>5</td>
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<td>Low Cruise Offshore</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Low Turn to Final</td>
<td>10</td>
<td>0</td>
<td>1</td>
<td>36</td>
<td>58</td>
<td>105</td>
</tr>
<tr>
<td>Negative G Loading</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Premature Departure Turn</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>16</td>
<td>20</td>
<td>41</td>
</tr>
<tr>
<td>Steep Turn</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td><strong>23</strong></td>
<td><strong>14</strong></td>
<td><strong>211</strong></td>
<td><strong>513</strong></td>
<td><strong>784</strong></td>
</tr>
</tbody>
</table>
Event Percentages by Month

October 2008
- Excessive Bank Angle: 12%
- Excessive Climb: 3%
- Excessive Descent <500ft: 10%
- Excessive Descent >500ft: 3%
- Excessive Pitch Angle Landing: 28%
- Excessive Pitch Angle T/O: 5%
- Excessive Roll Rate: 0%
- Excessive Yaw Rate: 1%
- Low Cruise: 1%
- Low Cruise Offshore: 1%
- Low Turn to Final: 1%
- Negative G Loading: 10%
- Premature Departure Turn: 0%
- Steep Turn: 0%

November 2008
- Excessive Bank Angle: 13%
- Excessive Climb: 5%
- Excessive Descent <500ft: 11%
- Excessive Descent >500ft: 2%
- Excessive Pitch Angle Landing: 32%
- Excessive Pitch Angle T/O: 2%
- Excessive Roll Rate: 1%
- Excessive Yaw Rate: 0%
- Low Cruise: 1%
- Low Cruise Offshore: 0%
- Low Turn to Final: 1%
- Negative G Loading: 0%
- Premature Departure Turn: 1%
- Steep Turn: 1%

December 2008
- Excessive Bank Angle: 0%
- Excessive Climb: 15%
- Excessive Descent <500ft: 13%
- Excessive Descent >500ft: 0%
- Excessive Pitch Angle Landing: 24%
- Excessive Pitch Angle T/O: 2%
- Excessive Roll Rate: 1%
- Excessive Yaw Rate: 2%
- Low Cruise: 5%
- Low Cruise Offshore: 1%
- Low Turn to Final: 0%
- Negative G Loading: 1%
- Premature Departure Turn: 1%
- Steep Turn: 1%

January 2009
- Excessive Bank Angle: 17%
- Excessive Climb: 33%
- Excessive Descent <500ft: 12%
- Excessive Descent >500ft: 7%
- Excessive Pitch Angle Landing: 5%
- Excessive Pitch Angle T/O: 7%
- Excessive Roll Rate: 5%
- Excessive Yaw Rate: 1%
- Low Cruise: 7%
- Low Cruise Offshore: 1%
- Low Turn to Final: 13%
- Negative G Loading: 1%
- Premature Departure Turn: 0%
- Steep Turn: 17%
Bell 206B-3 Valid Events

Bell 206B-3 Valid Events

- Excessive Bank Angle
- Excessive climb
- Excessive Descent <500ft.
- Excessive Descent >500ft
- Excessive Pitch Angle Landing
- Excessive Pitch Angle T/O
- Excessive Roll Rate
- Excessive Yaw Rate
- Low Cruise
- Low Cruise Offshore
- Low Turn to Final
- Negative G Loading
- Premature Departure Turn
- Steep Turn

Graph showing the number of events for each month from October to January.
Bell 206L-1 Valid Events

- Excessive Bank Angle
- Excessive climb
- Excessive Descent <500ft.
- Excessive Descent >500ft
- Excessive Pitch Angle Landing
- Excessive Pitch Angle T/O
- Excessive Roll Rate
- Excessive Yaw Rate
- Low Cruise
- Low Cruise Offshore
- Low Turn to Final
- Negative G Loading
- Premature Departure Turn
- Steep Turn

Bell 206L-1 Valid Events

October
November
December
January
Bell 206L-3 Valid Events

Bell 206L-3 Valid events

- Excessive Bank Angle
- Excessive climb
- Excessive Descent <500ft.
- Excessive Descent >500ft
- Excessive Pitch Angle Landing
- Excessive Pitch Angle T/O
- Excessive Roll Rate
- Excessive Yaw Rate
- Low Cruise
- Low Cruise Offshore
- Low Turn to Final
- Negative G Loading
- Premature Departure Turn
- Steep Turn
Bell 206 L-4 Valid Events

Bell 206L-4 Valid Events

- Excessive Bank Angle
- Excessive climb
- Excessive Descent <500ft.
- Excessive Descent >500ft
- Excessive Pitch Angle Landing
- Excessive Pitch Angle T/O
- Excessive Roll Rate
- Excessive Yaw Rate
- Low Cruise
- Low Cruise Offshore
- Low Turn to Final
- Negative G Loading
- Premature Departure Turn
- Steep Turn
Landing Trend

Landing Phase

- Excessive Descent <500ft.
- Low Turn to Final
- Excessive Pitch Angle Landing

October November December January
Departures Trend

![Graph showing departures trend with labels for Excessive Pitch Angle T/O, Premature Departure Turn, and Excessive climb. The graph includes data points for October, November, December, and January.]
Vertical Speed Trend

![Vertical Speed Trend Graph]

- **Excessive Descent <500ft.**
- **Excessive Descent >500ft**
- **Excessive climb**

**Vertical Speed**

- October
- November
- December
- January
Attitude Trend

![Graph showing Attitude Control with trends from October to January for Excessive Bank Angle, Steep Turn, Excessive Yaw Rate, and Excessive Roll Rate.](image-url)
Altitude Trend

Altitude Trend

- Low Cruise
- Low Cruise Offshore
- Premature Departure Turn
- Low Turn to Final
Valid Events by Seniority

Events by Seniority

- October (1174): <1 Year = 142, >1 & <5 Years = 159, >5 & <10 Years = 411, >10 Years = 462
- November (1030): <1 Year = 96, >1 & <5 Years = 398, >5 & <10 Years = 407, >10 Years = 306
- December (803): <1 Year = 48, >1 & <5 Years = 129, >5 & <10 Years = 331, >10 Years = 306
- January (784): <1 Year = 63, >1 & <5 Years = 104, >5 & <10 Years = 353, >10 Years = 264

Legend:
- <1 Year
- >1 & <5 Years
- >5 & <10 Years
- >10 Years
Pilot with Valid Events by Seniority

Pilots Generating Events by Seniority

- October (108)
  - <1 Year: 23
  - >1 & <5 Years: 49
  - >5 & <10 Years: 15
  - >10 Years: 21
- November (72)
  - <1 Year: 8
  - >1 & <5 Years: 34
  - >5 & <10 Years: 11
  - >10 Years: 19
- December (77)
  - <1 Year: 10
  - >1 & <5 Years: 32
  - >5 & <10 Years: 15
  - >10 Years: 20
- January (96)
  - <1 Year: 19
  - >1 & <5 Years: 41
  - >5 & <10 Years: 13
  - >10 Years: 23
Fall/Winter Trend

Recorded Operations/Flight Time/Events

October: 13507 Operations, 6067 Flight Time, 1173 Events
November: 11758 Operations, 4323 Flight Time, 1030 Events
December: 8856 Operations, 3190 Flight Time, 803 Events
January: 10761 Operations, 3742 Flight Time, 784 Events
HOMP Benefits

• Trending of data helps our flight standards department to set priorities in initial and recurrent training.
• Oversight helps to increase our pilots situational awareness and to minimize complacency.
• Pilots talk about their HOMP events and others naturally learn from those experiences and increase awareness.
Looking Forward

- Appareo ALERTS Phase 2 is in final development and will enhance the effectiveness of HOMP for our small aircraft fleet.
- FlightScape Insight has been selected to provide Flight Data Management for our Sikorsky S76 and S92 fleet. Training and Implementation is to begin in March 2009.
“TARGET ZERO”

• A Bristow Group global safety initiative and vision that strives to achieve:
  • Zero Accidents
  • Zero Harm to People
  • Zero Harm to the Environment
• The Helicopter Operations Monitoring Program is but one part of that culture.
“TARGET ZERO”

- **AI Rate**
- **AA Rate**
- **# Air Incidents**
- **# Air Accidents**

HOMP Begins in September 2007

- 2005: 3.73 (134,063 hrs)
- 2006: 3.46 (144,679 hrs)
- 2007: 1.42 (140,544 hrs)
- 2008: 0.00 (136,398 hrs)
Questions?

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