FDM 101
Flight Data Monitoring Workshop

Presented at HAI Heli-Expo 2009
February 23, 2009
Overview

• FDM basics

• FDM program decisions

• Process

• Resources
Flight Data Monitoring History

• 1960s – FDM with British Airways and TAP Air Portugal
• 1993 – FSF recommends FOQA beyond airlines
• Late—1990s Airline FOQA becomes commonplace
• 2002 – Final CAA HOMP trial paper issued
• June 2005 – FSF/NBAA C-FOQA Trial
• Late 2006 – New recorder technology enables GA FDM
• 2008 – Bristow/Air Logistics FAA-approved HOMP
• 2009 – IHST/FSF Helicopter FDM Trial
Flight Data Monitoring defined

• Definition: “A systematic method of accessing, analyzing and acting upon information obtained from digital flight data records of routine operations to improve safety”

• FDM involves the pro-active use of flight data to identify and address operational risks before they can lead to incidents and accidents. (HOMP Study – UK CAA, Shell Aircraft, Bristow and BA)

• Flight Data Monitoring (FDM) is the technology and methodology for collecting and analyzing data recorded in flight. (FAA)
FDM by any other name...

- FOQA – Flight Operational Quality Assurance (FAA)
- FDA – Flight Data Analysis (ICAO)
- FDM – Flight Data Monitoring (CHC)
- HFDM – Helicopter Flight Data Monitoring (Cougar)
- HOMP – Helicopter Operations Monitoring Program (Bristow/Air Log)
- LAMP* – Line Activity Monitoring Program (PHI)
- HUMS – Health & Usage Monitoring Program (MX)
- MOQA – Maintenance Operational Quality Assurance (MX)

*the light came on!
What is FOQA?

• Flight Operational Quality Assurance (FOQA) is an FAA program that standardizes the FDM process for interested parties. (AC 120-82)

• FOQA versus ASAP Landscape – US Airlines

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<thead>
<tr>
<th></th>
<th>Major Carrier</th>
<th>Regional Carrier</th>
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<tbody>
<tr>
<td>ASAP</td>
<td>93 percent</td>
<td>91 percent</td>
</tr>
<tr>
<td>FOQA</td>
<td>86 percent</td>
<td>10 percent</td>
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Question: Why Flight Data Monitoring?

- For every major accident there are several less significant accidents, hundreds of reportable incidents and thousands of unreported incidents.
- Below this lie the normal variations present in all operations.
- FDM gives more detail on the incidents, encourages more consistent reporting and fills in the void below this that we know very little about. (HOMP Study)
Answer: Discovering the unknown!

- The HOMP (trial) provided valuable new information on the risks associated with helicopter offshore operations.
- Events have identified hazards which otherwise would not have come to light.
- The operator has been able to take appropriate corrective and preventative measures.
- The measurements are building a useful picture of everyday operations which has not previously available.
- The HOMP has shown how pro-active use of flight data in a FDM program can significantly enhance the safety of helicopter offshore operations. (HOMP Study – [www.caa.co.uk](http://www.caa.co.uk) - CAA Paper 2002/02)
## Helicopter FDM & the Oil and Gas Industry

<table>
<thead>
<tr>
<th>Operator</th>
<th>Primary Industry (Secondary)</th>
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<tbody>
<tr>
<td>Bristow</td>
<td>Oil and Gas (SAR)</td>
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<tr>
<td>Bristow/Air Logistics</td>
<td>Oil and Gas</td>
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<td>CHC</td>
<td>Oil and Gas (SAR)</td>
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<tr>
<td>Cougar Helicopters</td>
<td>Oil and Gas (SAR)</td>
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<td>Era Aviation</td>
<td>Oil and Gas (EMS)</td>
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<td>PHI</td>
<td>Oil and Gas (EMS)</td>
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<td>Arkansas Children’s Hospital</td>
<td>EMS</td>
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<tr>
<td>Baldwin Aviation</td>
<td>Multi/Organizational-based</td>
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Exploring FDM in HEMS – no formal programs, yet.

- Recommendations from NTSB Hearings
  - AAMS
  - AMOA
  - HAI
- Flight data retrieval systems for helicopters
- FOQA programs
- Interest from several operators such as Air Methods, Tramahawk, OmniFlight, etc.
- IHST/FSF HEMS FOQA Trial
Caution!

- Upon implementation - *organizations must be prepared for immediate results* – following AC 120-82 will reduce the likelihood of a surprise.
- Be aware of the different emotions associated with FOQA implementation
  - “Geez that’s neat”
  - “Wow, we’re collecting a lot of data”
  - “Crap, how do we manage all of this information”
Flight Operational Quality Assurance Programs are only effective when coupled with an active SMS in a “just culture.”
Program Management Decisions

- **Structure**
  - In-house
  - 3rd-Party

- **Status**
  - Approved (FAA)
  - Informal

- **Technology**
  - Traditional
  - Light Recorder
Program Management Decisions

• Process begins with needs assessment.
• Include all stakeholders

- In-house
- 3rd-Party

- Approved (FAA)
- Informal

- Traditional
- Light Recorder

- Maintenance
- Operations
- Training
- Safety

HOMP
MOST Model

- **Maintenance**
  - Engine trend monitoring
  - Exceedance reports
  - HUMS
  - Trouble shooting
  - Fuel savings

- **Operations**
  - Insurance reductions
  - Automated data transfer from aircraft
  - Automated OOOI reporting
  - Automated billing
  - Fuel savings
  - Automated aircraft tracking

- **Training**
  - Provide feedback to instructor/students (e-debrief)
  - Validation of training programs
  - Training footprint analysis and adjustment

- **Safety**
  - Fleet oversight
  - SOP adherence
  - ID of adverse safety trends
  - Uncover threats and errors
  - Mitigate risk
Program Management Decisions

• Corporate Infrastructure
  – Size of company
  – Safety Organization
  – IT Department

• Personnel
  – Cost
    • FT/PT FMT
    • Flight Qualified?
    • Revenue/productivity lost
  – Training
    • Workforce stability
Program Management Decisions

- Approved versus “non-approved” or informal
- Establish program IAW AC 120-82 (recommendation)
- Different motives (next)
  - Air Logistics/Bristow
  - PHI
- Incentives of FAA-approved programs (next slide)
FOQA Benefits – FAA approved programs

• Enforcement incentives – FAR violations revealed only by FOQA that receive corrective action and do not involve criminal or intentional actions will not be pursued.

• Data protection – FOQA data will be de-identified and protected from Freedom of Information Act (FOIA) release under FAR Part 193. – FAA Legal Office will defend any attempts to override Part 193 by other authorities. (FAA AFS-230)
Program Management Decisions

- Technology Selection
  - Fleet types (stability)
  - Common across fleets
- Fleet equipage survey
  - What’s installed?
- Available equipment
- STC versus 337 installations
- Ground analysis tools
  - Web-based
  - IT requirements
FDM Process – the 4 R’s

• **Record**
  – Aircraft flight data (FDR/DFDAU/QAR/WQAR)
  – Light Recorder (Appareo ALERTS)

• **Retrieve**
  – Manual, electronic or wireless

• **Review**
  – Validate, classify and analyze with ground analysis station

• **Report**
  – FMT review, meaningful findings and recommendations, group review to determine operational and training impact.
FDM Resources

1. FAA – inform local POI and AFS-230
2. FAA – AC 120-82 (FOQA)/AC 120-92 (SMS)
3. FAA – AC 120-66 (ASAP)
4. FSF – Flight Safety Digest 1998 and other resources at [www.flightsafety.org](http://www.flightsafety.org)
5. Vendors on display
6. IHST FDM Tool Kit (release date TBD)
7. FDM Workshop participants
8. HOMP Study – [www.caa.co.uk](http://www.caa.co.uk) - CAA Paper 2002/02
The power of plus...

- Properly managed SMS components convert data into useful information and the end user gains knowledge based on facts that reduce risk and increase safety*
- SMS Plus/FDM Plus
- Heli-Expo Booth #2713
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  VP of FDM Services
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*enhanced, thanks to Dick Healing, R3 Consulting