



# **FDM 101**

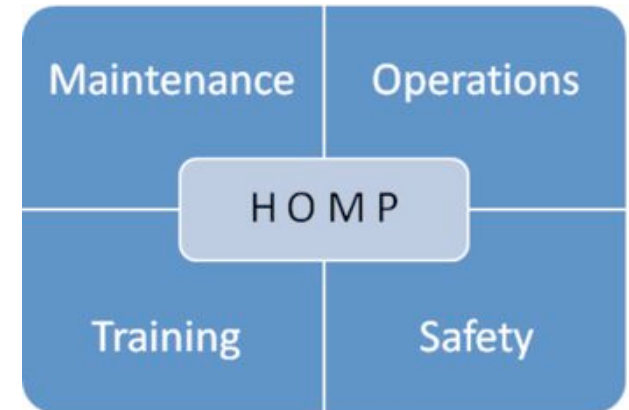
## Flight Data Monitoring Workshop

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)



smiths



## 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

	Major Carrier	Regional Carrier
ASAP	93 percent	91 percent
FOQA	86 percent	10 percent

## Question: Why Flight Data Monitoring?



**The Heinrich Pyramid**

- 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)



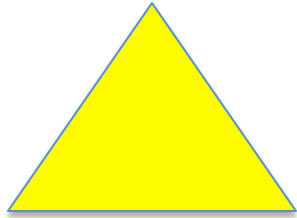
# Helicopter FDM & the Oil and Gas Industry

Operator	Primary Industry (Secondary)
Bristow	Oil and Gas (SAR)
Bristow/Air Logistics	Oil and Gas
CHC	Oil and Gas (SAR)
Cougar Helicopters	Oil and Gas (SAR)
Era Aviation	Oil and Gas (EMS)
PHI	Oil and Gas (EMS)
Arkansas Children's Hospital	EMS
Baldwin Aviation	Multi/Organizational-based

## Exploring FDM in HEMS – no formal programs, yet.

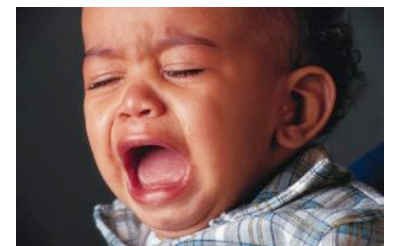
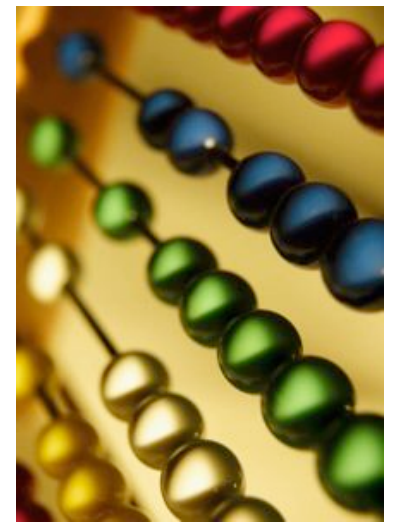
- Recommendations from NTSB Hearings
  - AAMS
  - AMOA
  - HAI
- Flight data retrieval systems for helicopters
- FOQA programs
- Interest from several operators such as Air Methods, Trumahawk, OmniFlight, etc.
- IHST/FSF HEMS FOQA Trial





## ***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”

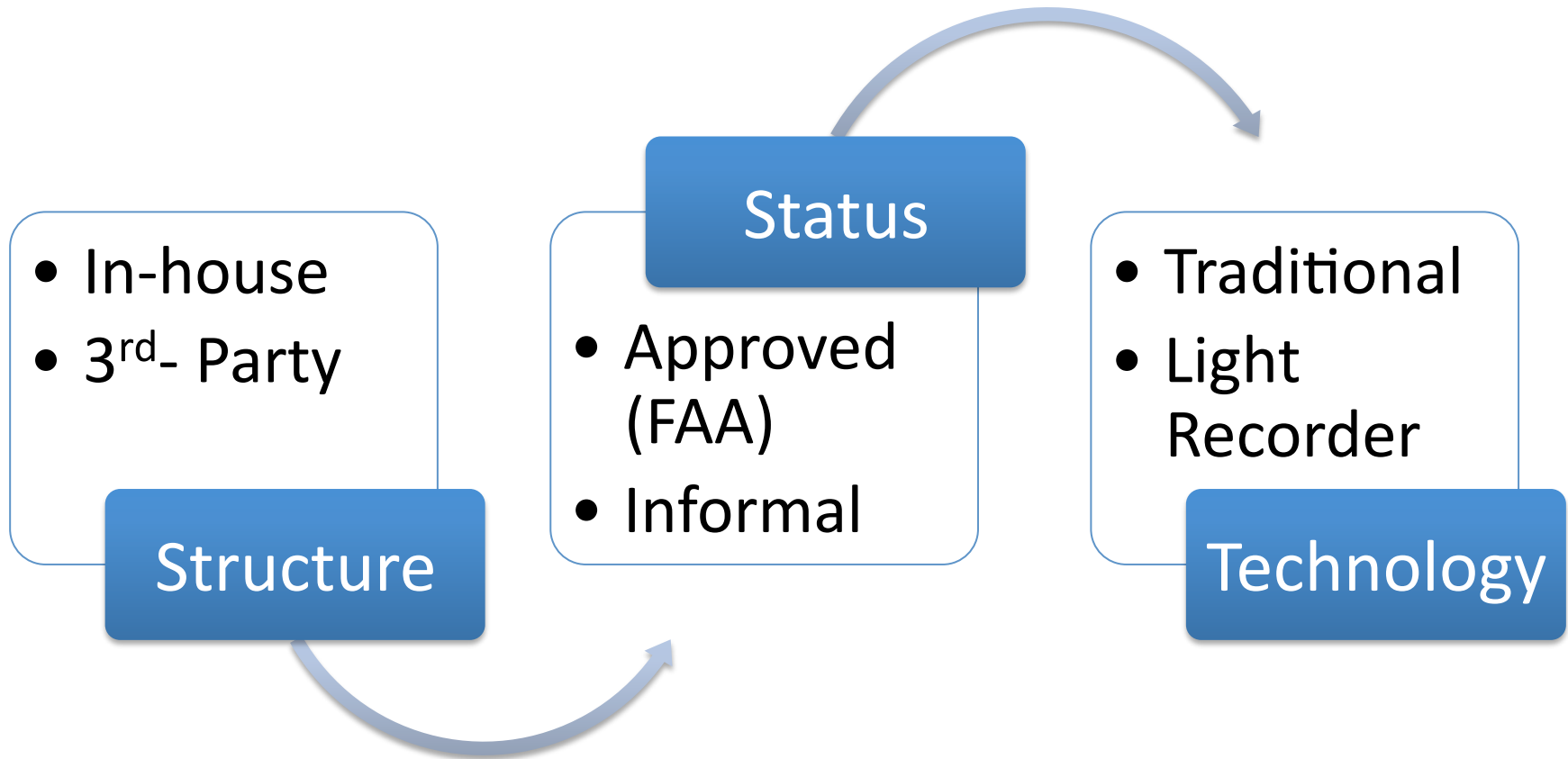


# FOQA is not a “silver bullet”

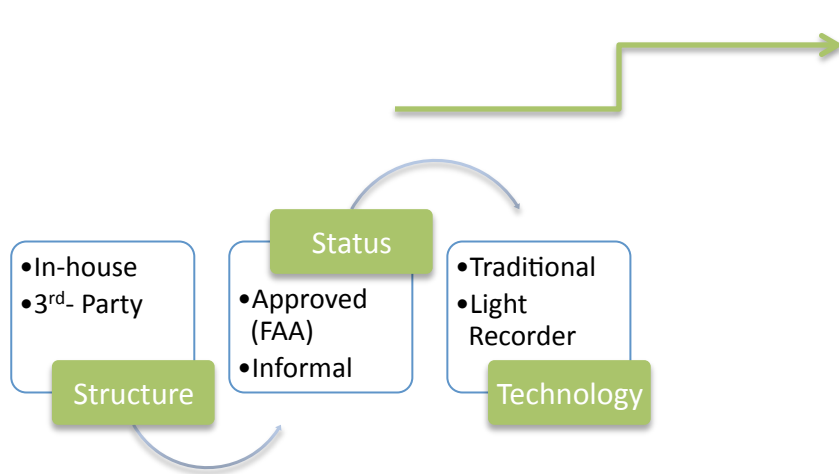
Flight Operational Quality Assurance Programs are only effective when coupled with an active SMS in a “just culture.”



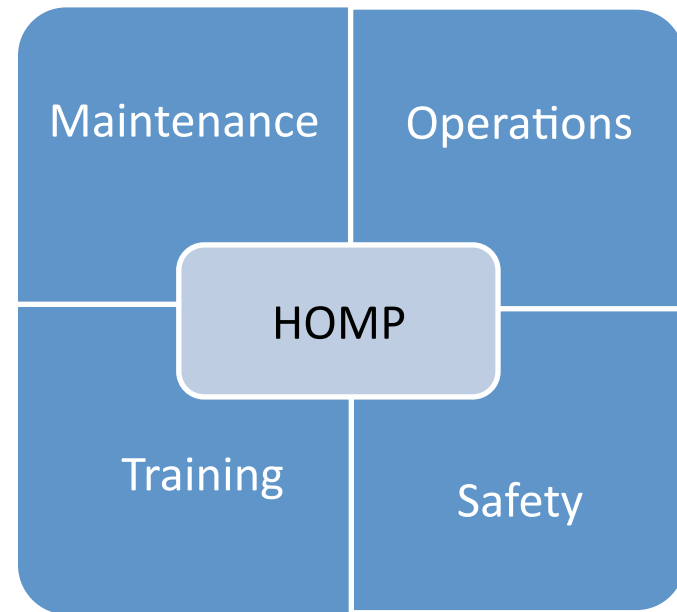
# Program Management Decisions



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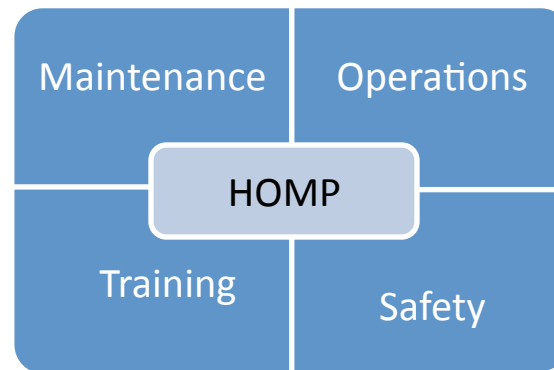
- Process begins with needs assessment.
- Include all stakeholders



# 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

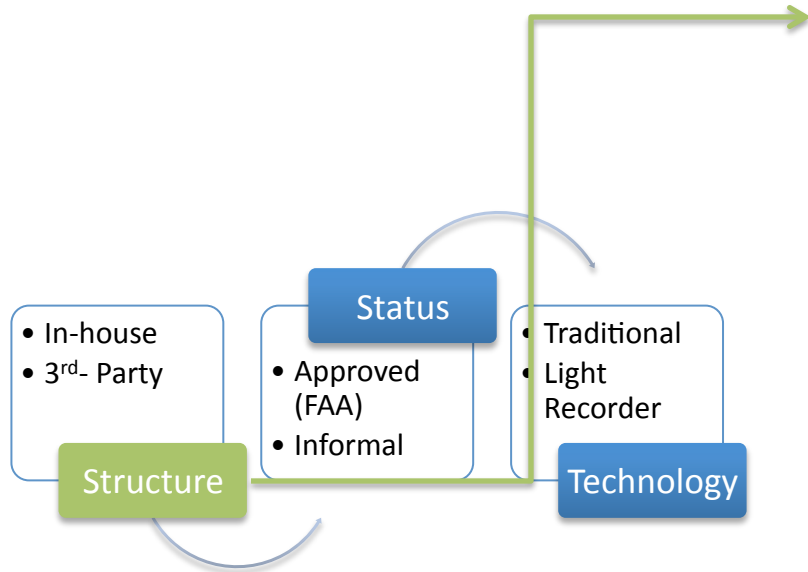
## ✓ Training

- 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

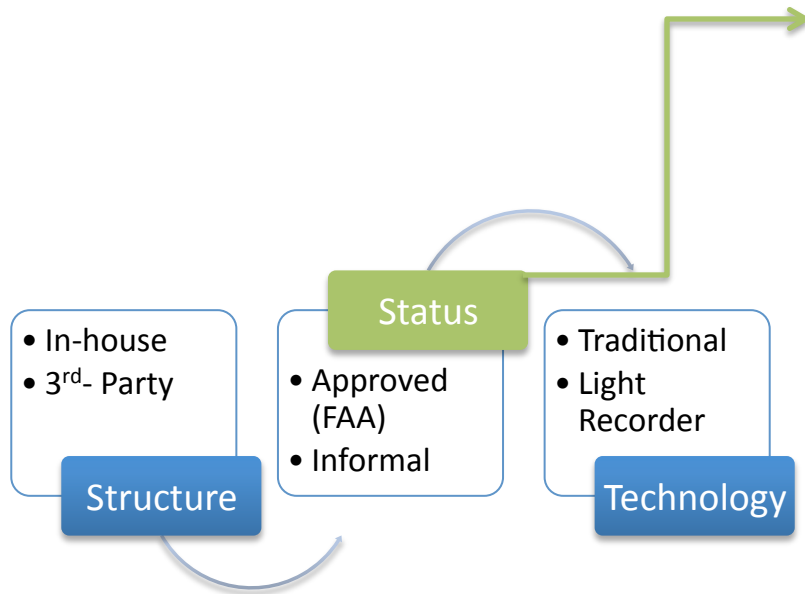
# Program Management Decisions



- 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



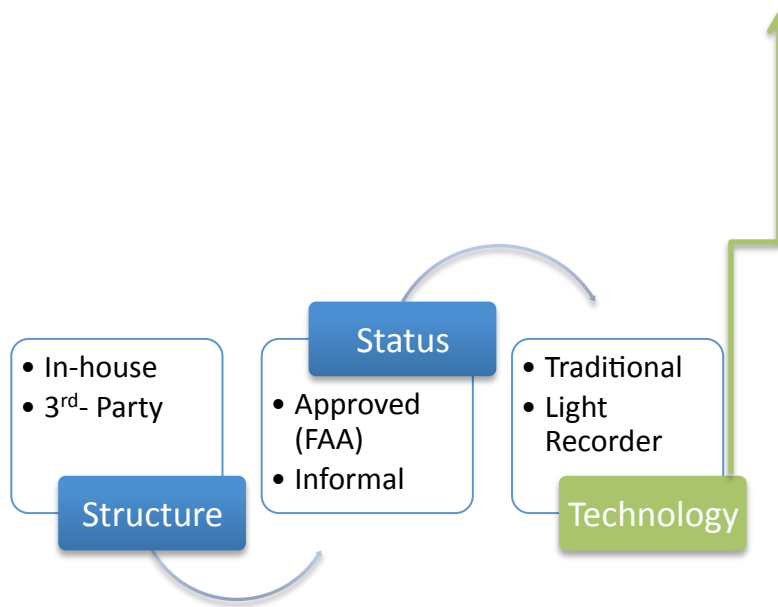
- Approved versus “non-approved” or informal
- Establish program IAW AC 120-82 (recommendation)
- Different motives (next)
  - Air Logistics/Bristow
  - PHI
- Incentives of FAA-approved programs (next slide)

## 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

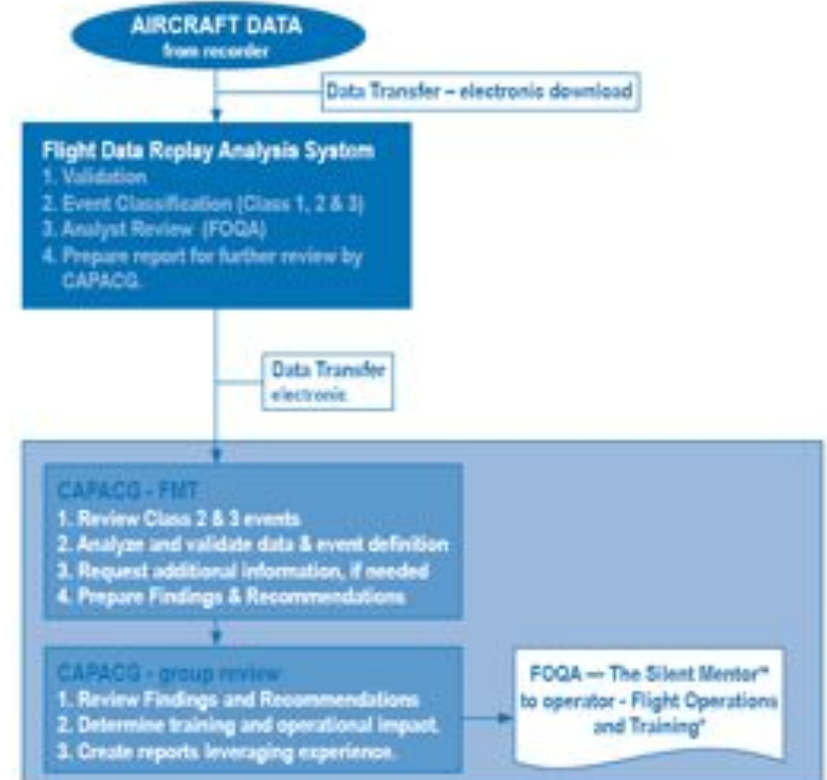


# FDM Process – the 4 R's

- **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.

## FOQA Process Model - FOQA "light" concept

The illustration below represents the typical model for General Aviation aircraft.



# 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

1. PURPOSE: This advisory circular (AC) provides guidance on one means, but not necessarily the only means, of developing, implementing, and operating a voluntary Flight Operational Quality Assurance (FOQA) program that is acceptable to the Federal Aviation Administration (FAA).

a. FOQA is a voluntary safety program that is designed to make commercial aviation safer by allowing commercial airlines and pilots to share de-identified aggregate information with the FAA so that the FAA can monitor national trends in aircraft operations and target its resources to address operational risk issues (e.g., flight operations, air traffic control (ATC), airports). The fundamental objective of this new FAA/pilot/carter partnership is to allow all three parties to identify and reduce or eliminate safety risks, as well as minimize deviations from the regulations. To achieve this objective and obtain valuable safety information, the airlines, pilots, and the FAA are voluntarily agreeing to participate in this program so that all three organizations can achieve a mutual goal of making air travel safer.

b. A cornerstone of this new program is the understanding that aggregate data that is provided to the FAA will be kept confidential and the identity of reporting pilots or airlines will remain anonymous as allowed by law. Information submitted to the FAA pursuant to this program will be protected as "voluntarily submitted safety related data" under Title 14 of the Code of Federal Regulations (14 CFR) part 193.

(d) In general, aggregate FOQA data provided to the FAA under 14 CFR part 193, section 193.401 should be stripped of information that could identify the submitting airline prior to leaving the airline premises and, regardless of submission venue, should include the following statement:

WARNING: This FOQA information is protected from disclosure under 49 U.S.C. 40123 and part 193. It may be released only with the written permission of the Federal Aviation Administration Associate Administrator for Regulation and Certification.



# 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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\*enhanced, thanks to Dick Healing, R3 Consulting