

FOQA or FDM?

Page One

Introduction

When looking for the best flight safety tools, Flight Data Monitoring (FDM) is one of the most powerful techniques available today. FDM involves processing recorded data from routine flights to assess operational risks.

In 1998, the Flight Safety Foundation published a comprehensive document on FDM, but adopted the name Flight Operations Quality Assurance (FOQA) to avoid sensitivities that the word monitoring might induce.

The two flight safety acronyms, FOQA and FDM, are usually considered to be synonymous. However there are differences which operators need to consider to be sure of selecting the right system. In this briefing note we will examine the differences between the two systems.

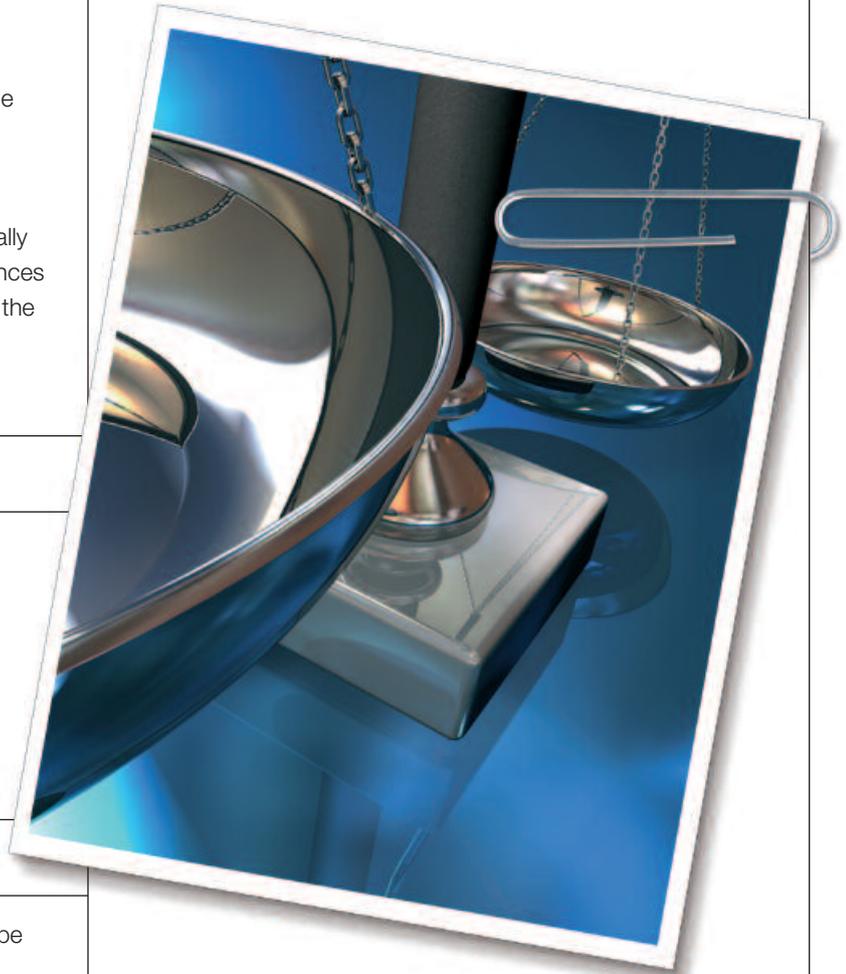
Legal Basis

FDM was introduced as an ICAO mandatory requirement on 1st January 2005 for all aircraft over 27 tonnes, and most National Aviation Authorities (NAAs) have legislated to bring FDM into force. The most noteworthy exception is the US Federal Aviation Authority (FAA) who decided not to mandate FDM, but to implement FOQA¹ as a voluntary program.

Authority Involvement

Outside the USA, most NAAs require an FDM system to be in place, and this is checked during scheduled audits². The NAAs ensure that effective procedures are in place, but they do not investigate specific events.

Within the US there are two alternative approaches to FOQA. Airlines that elect to operate under the FAA FOQA rule have immunity from action by the FAA and, in exchange for this immunity, they share their (de-identified) data with the FAA. Other operators prefer to operate a system outside the rule, partly to avoid sending sensitive data to the FAA and partly to have greater freedom when designing their system.



FOQA or FDM?

Page Two

System Design

When designing a safety system like this there are two different types of safety issues to address, namely individual events and repeated events. An example of an individual event might be an aircraft stall, whereas an example of repeated events might be long landings.

To be certain of catching an individual event it is necessary to monitor every flight as we simply cannot predict when such an event will occur. On the other hand, if we are concerned only with repeated events then it is possible to monitor a statistically meaningful sample of flights.

It is here that the main difference between FOQA and FDM systems arises. Both systems can identify individual events and both include statistical analyses; however in a FOQA program, statistical trend information is used as the primary source of information and analysts can drill down into the monitored flights for more detail, whereas in an FDM program, analysts examine the safety events from all flights before rolling these up into a statistical summary. These differences are reflected in the level of coverage (and hence the cost of the system), the design of the monitoring parameters and the approach to contacting crews.

Level of Coverage

For an FDM system, the intention is to monitor all flights and coverage levels often exceed 95%. Indeed, levels below 80% will be unacceptable under certain circumstances³.

For a FOQA system, the FAA recognizes that 100% is desirable, but they will accept coverage as low as 10%⁴. With very routine operations 10% can provide data suitable for statistical analysis but the drawback is that if an incident does occur, there is a 90% chance that will go undetected.

The original ICAO Annex 6 requirement for Flight Data Analysis made no reference to sampling, selection or representation, and the use of such small samples of data to represent a whole fleet's operation is, so far as FDS are aware, unacceptable outside the USA.

Crew contact

FOQA and FDM are excellent tools for identifying what has happened on a flight, but very poor for explaining why. To find out why an event occurred, it is often necessary to speak with the crew and possibly other parties such as Air Traffic Control. The event-focused approach of FDM tends to result in a higher number of crew contacts than in a typical FOQA program.

Event definitions

Related to the previous points, FOQA systems often have events that are statistically based whereas FDM events tend to be derived from an airline's Standard Operating Procedures (SOPs). For example, a FOQA system might have a warning for "One Standard Deviation below Average Glideslope < -3 dots between 500ft and 200ft" whereas the FDM equivalent might be "Glideslope Deviation more than 2 dots at 500ft".

A FOQA event is suited to automated analysis whereas the FDM event is more suitable as the basis for a pilot interview.



FOQA or FDM?

Page Three

Selecting the Right System

For an airline that has a routine schedule and a good safety standard it is logical to adopt a statistical approach and identify variations from a baseline of previous flights to determine any changes in safety standards. In this case the FOQA approach is ideal.

On the other hand, FDM may be the better choice if one or more of the following conditions are met:

Operations are not routine

For example, a corporate operator who jets all over the world may not fly the same sector often enough to allow sampling to be meaningful.

The operation is not safe to start with

If an operator starts from the assumption that their operation is safe, they risk building in hazards for the long term. For example, an FDS customer who started operating with a new approach procedure into one airfield found a fundamental safety issue that would not have been identified if the monitoring simply looked for differences from previous flights.

Operations are international

For a US operator flying within the 50 states there is no need to implement FDM or FOQA, however some overseas NAAs now expect operators to meet the ICAO standards irrespective of the aircraft's registration. FDS know of one US carrier who has been refused access into foreign airspace for lack of a program meeting the ICAO regulation.

Individual serious events are a concern

If you need, or want, to know about all the serious events that occur in your operation, a statistical sampling based system will not suffice.



FOQA or FDM?

Page Four

Summary Table		
TOPIC	FDM	FOQA
Legal basis	Mandatory	Voluntary FAA rule offers specific protection
Applicable	Any ICAO country	USA only
Authority Involvement	No data sent to NAA	Operators may send data to the FAA
Typical Coverage	>80%	>10%
Targeting rare events	Yes	No
Monitoring trends	Yes	Yes
Crew contacts	More	Fewer
Events and trends	Safety events collated into statistical trends	Trend information with drill down for more detail
Event definitions	Usually derived from SOPs	Tend to be statistically based
Cost	Higher	Lower

Conclusion

While both FOQA and FDM are excellent tools for aviation safety, differences have evolved with FOQA meeting the particular needs of the US aviation industry and FDM reflecting the ICAO mandate as applied by other NAAs.

US operators wishing to comply with international standards need to be aware that FDM and FOQA systems are not identical. Care should be taken to make certain that the chosen system will meet the operator's safety needs both now and into the future.

Flight Data Services can provide expert advice to help you choose a system that is right for you.

¹ See the advisory circular AC 120-82 for the FAA definition of FOQA

² For example, European Aviation Safety Agency ACJ OPS 1.037(a)(4)

³ TGL 44 to Appendix 1 to OPS 1.978(b)(9) Use of FDM in support of an ATQP program.

⁴ FAA advice to a US operator.

Find out more

UK

T: +44 (0) 1329 223663

F: +44 (0) 1329 223664

USA

T: +1 (623) 932 4426

F: +1 (623) 932 4427

E: enquiries@flightdataservices.com

