**Flight Data Monitoring (FDM) Gap Analysis**

**Flight Data Monitoring (FDM) is the pro-active and non-punitive use of digital flight data from routine operations to improve aviation safety.**

**Consider each of the following elements as a pre requisite for an effective FDM system in your organisation – Does you FDM deliver the following:**

| **Check item** | **Satisfied: Y/N** | **Comments / Observations** |
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| 1. **Provide a high-level statement of your FDM system's safety objectives.**
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| 1. **A formal policy to address the risk management and conditions of use of FDM data?**

 **Specific evidence**  |  |  |
| 1. **Evidence of a commitment to a non-punitive/just safety culture.**
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| 1. **Demonstrate the provision of resources for the capture, transcription, replay and analysis of FDM data.**
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| 1. **Effectively Manage the Manning level to support an effective FDM system**

a) What are the manning levels/provision for your FDM programme? (Consider approximate time spent on the review and assessment of events x the number of events) |  |  |
| 1. **Accountability:**
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| 1. The manager responsible for the accident prevention and flight safety programme, which includes the FDM programme, is accountable for the discovery of issues and the transmission of these to the relevant manager(s) responsible for the process(es) concerned.
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| 1. The relevant manager is accountable for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.
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| 1. While an operator may contract the operation of a flight data analysis programme to another party the overall responsibility remains with the operator's accountable manager.
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| 1. Is FDM included in an appropriate manager's responsibilities? If not, who is responsible?
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| 1. Who has responsibility for the discovery and transmission of FDM issues?
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| 1. Who is responsible for taking action on FDM discovered issues?
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| 1. If a third party organisation analyses your FDM data, is there an agreement that sets out the demarcation between the FDM service provider's output and the Operator's responsibility for taking action?
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| 1. Who is responsible for taking action upon operational and airworthiness issues raised by FDM?
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| 1. Can you demonstrate appropriate training and competence for all relevant staff in respect of the FDM process?
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| 1. Does the program clearly:

i) Identify areas of operational risk and quantify current safety margins.ii) Identify and quantify operational risks by highlighting when non-standard, unusual or unsafe circumstances occur.iii) Use the FDM information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.iv) Put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified. v) Confirm the effectiveness of a remedial action by continued monitoring |  |  |
| 1. **Considering FDM procedures:**
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| 1. How are risks identified by FDM fed into your risk management or Safety Management System?
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| 1. How do you decide if there are changing, especially increasing, levels of risk? Give an example.
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| 1. How would you describe your criteria for acceptance of a particular risk or initiating remedial action?
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| 1. Do you have a procedure for putting in place remedial action and ensuring it is carried out? (Note — this may fall outside FDM area)
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| 1. Describe your process for deciding the success/failure criteria of follow-up actions.

Specific Evidence |  |  |
| 1. FDM and other safety measures and indicators make up a closed loop risk monitoring system. Give an example of the

i) Identification ii) Assessment, action and iii) monitoring of results.  |  |  |
| 1. How do you set an acceptable event rate to determine when action is needed?

 i) Give examples of effective remedial action taken because of FDM insight. |  |  |
| 1. **Flight Recorder Analysis Techniques**
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| 1. Exceedance Detection: This looks for deviations from flight manual limits, and standard operating procedures. A set of core events should be selected to cover the main areas of interest to the operator. The event detection limits should be continuously reviewed to reflect the operator's current operating procedures.
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| 1. All Flights Measurement: A system that defines what is normal practice. This may be accomplished by retaining various snapshots of information from each flight.
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| 1. Statistics: A series of measures collected to support the analysis process. These would be expected to include the numbers of flights flown and analysed, aircraft and sector details sufficient to generate rate and trend information.

i) Are your FDM events tailored to your particular operation or set to standard FDM supplier's defaults? ii) Have you added additional events to cover known issues and if so what is your review process to keep the program up to date? iii) Do you have a set of basic measures taken from every flight and if so how do you use them?iv) What supporting statistics are used (e.g. flights/hours scanned, airfield movements etc.)? v) Give details of the FDM system used, e.g. supplier, recorder hardware used etc. vi) Do you have access to full details of recorded parameters for all aircraft covered by the FDM program? vii) Do you have access to a complete list of current events, their logic and trigger levels? viii) Does the program allow you to identify which sector all events occur on? b. ix) Does the program allow you to use important discretes (stall warning, GPWS-modes, TCAS, autopilot/throttle etc.)? Please note any significant omissions. x) How many flights and hours were flown and scanned by the program in the last year?xi) Which airfield has the highest overall event rate per 1000 arrivals/departures? Please give details. |  |  |
| 1. **Flight Recorder Analysis, Assessment and Process Control Tools**

The effective assessment of information obtained from digital flight data is dependent on the provision of appropriate information technology tool sets. A program suite may include: Annotated data trace displays, engineering unit listings, visualisation for the most significant incidents, access to interpretative material, links to other safety information, and statistical presentations. |
| 1. Describe your data verification and validation process.
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| 1. Does your system provide data traces, listings and visualisations?
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| 1. Describe how these tools are regularly used.
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| 1. Do you have full access to interpretive material? (Flight manuals, operating manuals, etc.)
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| 1. What links do you have with other safety systems (Tech Logs, ASRs etc.) and how often are these used?
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| 1. Describe the basic bad data detection and validation routines which are built into your FDM program to increase the quality of the analysed data.
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| 1. What percentage of the events produced are validated/examined in detail individually?
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| 1. What proportion of your raw' events are invalid?
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| 1. FDM events should be tied in with relevant air safety reports or technical logs.

Give examples that:i) indicate the number of times per month this is carried out and ii) show how this process is achieved by either a manual or automatic link. |  |  |
| 1. **Education and Publication**

Sharing safety information is a fundamental principle of aviation safety in helping to reduce accident rates. The operator should pass on the lessons learnt to all relevant personnel and, where appropriate, industry. Similar media to air safety systems may be used. These may include: Newsletters, flight safety magazines, highlighting examples in training and simulator exercises, periodic reports to industry and the regulatory authority. |
| 1. What FDM reports are produced to a regular timescale?
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| 1. Which means of distribution of safety messages, to crews or other relevant personnel, do you use?

i) Newsletter or flight safety magazine ii) Simulator/training feedbackiii) Other means — please specify |  |  |
| 1. By what means do you inform the industry and the Authority of issues discovered through FDM?

i) Provide Specific Evidence  |  |  |
| 1. List the FDM trend and analysis reports given to management in the last year.
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| 1. List any other routine publications that contain FDM information circulated in the last year.
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| 1. Give details of both routine and one-off flight crew updates/FCNs using FDM information.
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| 1. Give examples of how training utilises FDM data, including its use to construct relevant simulator scenarios.
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| 1. Give examples of how any other Departments use your FDM data.
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| 1. In which industry safety information exchange groups do you participate regularly?
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| 1. **Accident and Incident Data Requirements: Major Incidents and Accidents take precedence over the requirements of an FDM system.**

(In these cases the FDR data shall be retained as part of the investigation data and may fall outside the de-identification agreements.) |
| 1. Describe your procedures to retain and protect data if an accident or reportable incident takes place.
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| 1. Describe how mandatory FDR data for serious incidents or accidents is handled
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| 1. Describe the FDM data processes when an incident or accident has occurred?
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| 1. Is FDM data substituted for the mandatory FDR data and if so on what authority?

**Note:**a) The use of FDM data may, on occasions, be appropriate background material to an investigation. Give details of any process in place to facilitate this under secure conditions. Has it been used? |  |  |
| 1. **Significant Risk-Bearing Incidents Detected by FDM**

Every crew member has a responsibility to report events using the company occurrence reporting scheme. Mandatory Occurrence Reporting is a further requirement under EU-OPS 1.420. Significant risk-bearing incidents detected by FDM will therefore normally be the subject of mandatory occurrence report by the crew. If this is not the case then they should submit a retrospective report that will be included under the normal accident prevention and flight safety process without prejudice. |
| 1. How do you confirm if an FDM exceedance has been the subject of a crew safety report?
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| 1. Describe how you estimate the severity of each FDM event or ASR and if it should be a mandatory report.
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| 1. If an ASR has not been submitted on a serious FDM detected event how do you follow this up with the crew?
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| 1. What is your management approach to retrospective reporting?
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| 1. Do you know how many ASRs have related FDM events?
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| 1. Verify that the correct functioning of both the FDM and ASR & MOR processes can be confirmed by cross-checking and associating FDM and relevant crew reports. (Do you attempt this?)
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| 1. ref – (f above) Please give specific examples such as hard GPWS warnings. heavy landings, turbulence. tail scrapes etc.
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| 1. Can FDM can be used to encourage and seek confirmation of crew compliance with ASR / MOR requirements. (Is this done?)
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| 1. If so please give an example of crews being requested to submit ASRs and their non-punitive treatment.
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| 1. **Data Recovery Strategy**

The data recovery strategy should ensure a sufficiently representative capture of flight information to maintain an overview of operations. Data analysis should be performed sufficiently frequently to enable action to be taken on significant safety issues and to enable an operational investigation before crew members memories of the event can fade. |
| 1. What are your data recovery objectives and targets? (If not 100% recovery and analysis how did you determine what constituted a representative sample?)
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| 1. What is your target for achieving timely processing and targets?
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| 1. If less than 100% describe how a representative capture covering all aspects of operations is ensured. (Types, bases, routes etc.)
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| 1. Give details of your systems recovery performance over the last year (as a percentage of flown flights/hours).

i) What is the average for each fleet? ii) What were the best and worst monthly figures for each fleet? |  |  |
| 1. Explain any gaps in FDM coverage (e.g. technical issues, short term disposal plans) and provide evidence of CAA dispensation.
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| 1. How is FDM data used for Alternative Training & Qualification Programme ATQP (if applicable)?
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| 1. If not applicable, is ATOP being considered?
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