HELICOPTER FLIGHT DATA MONITORING TOOLKIT

U.S. JHSIT

1ST Edition

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Thank you all for your contributions to helicopter flight data monitoring and for your exceptional commitment to making our industry safer.

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Introduction:

About the IHST:

The International Helicopter Safety Team (IHST) is a cooperative government-industry team formed in 2006, whose goal is to reduce the world-wide helicopter accident rate by 80 percent by the year 2016. The IHST structure is comprised of an executive committee and the following teams (multi-region):

- **Joint Helicopter Safety Analysis Team (JHSAT):** analyzes aviation accidents, identifies problems, and recommends solutions

- **Joint Helicopter Safety Implementation Team (JHSIT):** strategically addresses and/or implements JHSAT recommendations

The U.S. Regional JHSAT analyzed a group of U.S. helicopter accidents and recommended the following:

- Information recorders can be utilized reactively (after the accident) and proactively (to monitor precursor events and data needed for an SMS). Information recording devices will allow accident investigators to obtain essential information about the circumstances of an accident to allow greater understanding of accident causes and potential for safety improvements. **Proactive use of recorders allows the operator to provide individual aircraft flight operations oversight and to identify and correct poor habits and [standard operating procedures (SOP)] non-compliances before it escalates into an accident.** (Recommendation # IN2)

- Install [Health Usage Monitoring Systems] HUMS to detect needed maintenance interventions, and **utilize [Helicopter Flight Data Monitoring programs (HFDM)] to evaluate flight operations and address flight crew habits that may contribute to an accident.** (Recommendation # SE1)

Members of the U.S. Regional JHSIT evaluated these recommendations and researched existing flight data monitoring programs in both helicopter and fixed-wing operations. They also researched existing guidance material, which they found to be heavily focused on fixed wing operations. Recognizing that helicopter operations are unique and bare very few similarities to scheduled air carriers; the JHSIT determined specific guidance was needed for the implementation of HFDM programs in helicopter operations.

About this Document:

This document is designed to provide a summary of existing flight data monitoring guidance and to serve as a step-by-step guide to helicopter operators considering or currently implementing a Helicopter Flight Data Monitoring (HFDM) program in their organization. It is also intended to address some unique challenges specific to helicopter operations.

We hope that you will find this Toolkit to be a valuable resource as you work towards implementing an HFDM program. Additional HFDM guidance and resources are included in the Appendices section or as Attachments to this document. We encourage you to seek out information from others who have implemented HFDM programs in their respective organizations; there is no better resource available.

For more information about the International Helicopter Safety Team (IHST) and links to the following, please visit www.ihst.org.

- HFDM Toolkit and attachments
- Links to HFDM resources
- Safety Management Systems (SMS) Toolkit
- Training Toolkit
- Other valuable safety information

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Chapter 1: Why Helicopter Flight Data Monitoring (HFDM)?

What is HFDM?

Helicopter Flight Data Monitoring (HFDM) is a systematic method of accessing, analyzing and acting upon information obtained from flight data to identify and address operational risks before they can lead to incidents and accidents.

The information and insights provided by HFDM can also be used to reduce operational cost and significantly enhance training effectiveness and operational, maintenance and engineering procedures. Information from HFDM programs is unique since it provides objective data that otherwise is not available.

An HFDM program is a key component of a Safety Management System (SMS). For more information on SMS, please see the IHST SMS Toolkit at www.ihst.org.

Safety benefits

The following are just some of the safety benefits to be realized through an effective HFDM program:

- Accurate identification of risks with empirical data
- Just culture management of safety issues (Example: This is what really happened and why; enhanced data available for root cause analysis)
- Due to the protections afforded by an FAA-approved HFDM/FOQA program, a more open dialogue is possible between pilots and management based on digital data to determine how to improve operations and safety.
- Evidence-based decision making
- Enhanced training-scenarios
- Risk mitigation possible with empirical data (please see example below)

The following is an example of risk identification and mitigation possible through HFDM:

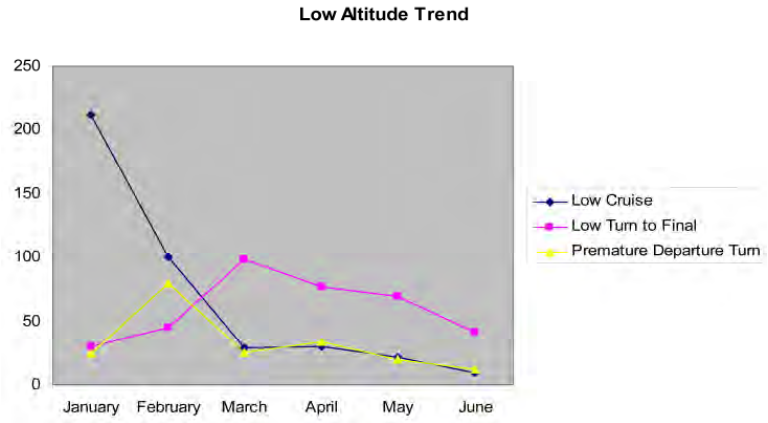


Figure 2, Air Logistics ALERTS Data – 95 % reduction in low cruise events over 5 month period

Costs of an accident

Before considering the operational and cost benefits HFDM has to offer, it is important to first consider the costs associated with accidents and some incidents:

- Loss of life
- Hull replacements costs
- Third party damage costs
- Loss of revenue through loss of assets
- Loss of revenue due to negative public perception (not only of your own operation, but of the industry as a whole)
- Reduction in company value (stock) due to the above
- Insurance deductibles
- Increase in insurance premiums
- Litigation

Operational and cost benefits

The following are just some of the cost benefits to be realized through an effective HFDM program:

Cost savings through reduction in incidents and accidents (long term)
Operational/procedural improvements – identify operation inefficiencies through flight data, and change procedures for potential cost savings (Example: implement stabilized approach for increased fuel efficiency)
Insurance savings based on long term safety improvements through HFDM
Increased aircraft availability due to quicker diagnosis/investigation
Repair savings as a result of fewer incidents and accidents or elimination of unnecessary inspections

Other intrinsic benefits

The following are just some of the other intrinsic benefits to be realized through an effective HFDM program:

- If HFDM is managed correctly utilizing just culture, an improvement in trust and respect between stakeholders is possible with a resultant improvement in communication.
- Increased communications lead to improvements not only in safety, but efficiency of operations and customer satisfaction.
- Problems and deviations are more readily identified
- Objective information and risk identification leads to accountability

Chapter 2: About HFDM

HFDM by another name

Flight Data Monitoring (FDM) programs have been in existence for over three decades with large airlines worldwide. Helicopter operators in the North Sea began investigating the use of FDM programs in the late 1990s. Today, a number of large helicopter operators have formal HFDM programs. Operators, regulators and various governing bodies have assigned various names to FDM programs. Table 1 (below) highlights some of program names/acronyms associated with helicopter FDM programs around the world. The IHST has identified "Helicopter Flight Data Monitoring" or "HFDM" as the designation for government/industry led flight data monitoring activities related to helicopter operations.

Program Acronym	Program Name	Organization
FOQA	Flight Operational Quality Assurance	FAA
FDA	Flight Data Analysis	ICAO
HFDM	Helicopter Flight Data Monitoring	CHC
HFDM	Helicopter Flight Data Monitoring	Cougar
HOMP	Helicopter Operations Monitoring Program	Bristow/Air Logistics
LAMP	Line Activity Monitoring Program	PHI
Others…		

Table 1 – Some HFDM program names in helicopter industry

A brief history

Long track records of effectively using FDM information—over 30 years in the case of British Airways and Scandinavian Airlines System—have provided airlines with clear evidence that data obtained in an FDM program represents a source of valuable information that can contribute greatly to aviation safety when used appropriately.

Since the late 1990s, most large airlines in the US, Europe and some Asian countries have adopted FDM as an operational best practice. Air Carriers that currently have FDM-type programs agree that the insights derived from these programs have prevented serious incidents and accidents and have led to improved operating efficiencies.

In late 1998, following the completion of an initial feasibility study, the UK Civil Aviation Authority (CAA) and Shell Aircraft Limited commissioned a study that laid the groundwork for much of the pioneering work done with HFDM programs. Together, the CAA, Shell Aircraft, Bristow Helicopters, Smith Aerospace Electronic Systems with technical support from British

Airways successfully demonstrated real safety benefits of HFDM programs applied to helicopters. Initially, five flight data recorder (FDR) equipped Super Puma aircraft were involved in this Helicopter Operations Monitoring Program (HOMP) funded by the CAA and Shell Aircraft. Follow-up studies involved a second aircraft type and expanded the analysis to low speed operations, pilot workload, mapping helideck environments and allocating severity values to HFDM events.

Today, most helicopter operators supporting the major Oil and Gas Producers (OGP) in the North Sea and around the world have active HFDM programs. Other segments of the helicopter industry are beginning to explore and implement HFDM programs. Historically, most operators embracing HFDM programs, both fixed and rotary wing, have operated large fleets comprised of large aircraft. Recent advances in technology have allowed smaller operators with light and legacy aircraft to embrace HFDM as a best practice.

Operator	Primary Industry (Secondary)
Bond	Oil and Gas (Search and Rescue)
Bristow	Oil and Gas (Search and Rescue)
Bristow/Air Logistics	Oil and Gas
CHC	Oil and Gas (Search and Rescue)
Cougar Helicopters	Oil and Gas (Search and Rescue)
Era Aviation	Oil and Gas (Emergency Medical Services)
PHI	Oil and Gas (Emergency Medical Services)
Arkansas Children's Hospital	Emergency Medical Services
Others…	

Table 2 – Current list of Operators with HFDM programs

Approved vs. non-approved programs

In some countries, the civil aviation regulatory agency may encourage or require operators to obtain approval for HFDM programs. It is important to check with your local regulatory agency to determine whether this is the case.

In the U.S. for example, the FAA has established formal policies, procedures and protocols to support HFDM (FOQA) programs. Operators are encouraged to develop HFDM programs in accordance with FAA Advisory Circular (AC) 120-82 (Attachment D). This document builds the foundation and outlines a plan for implementing and operating a successful HFDM program.

Benefits of an approved program will vary by country. Following is a list of benefits some operators **may** gain by obtaining regulatory approval:

1. In the U.S. for example, approved HFDM programs provide Federal protection of the data collected. Protection is even granted from the Federal Freedom of Information Act (FOIA) for HFDM/FOQA data.

2. A reduction in an exposure to liability for the operating certificate, pilots and organization as a whole.

3. Data cannot be shared with customers in approved programs unless the pilot involved grants permission to the company to do so via reports or summaries in a de-identified format.

While regulatory approval offers these benefits and others, it is important to note that some operators have implemented successful and effective programs without regulatory approval. This decision will depend on the goals and objectives of your HFDM program, as well as the structure of your organization.

Chapter 3: Prerequisites for an HFDM Program

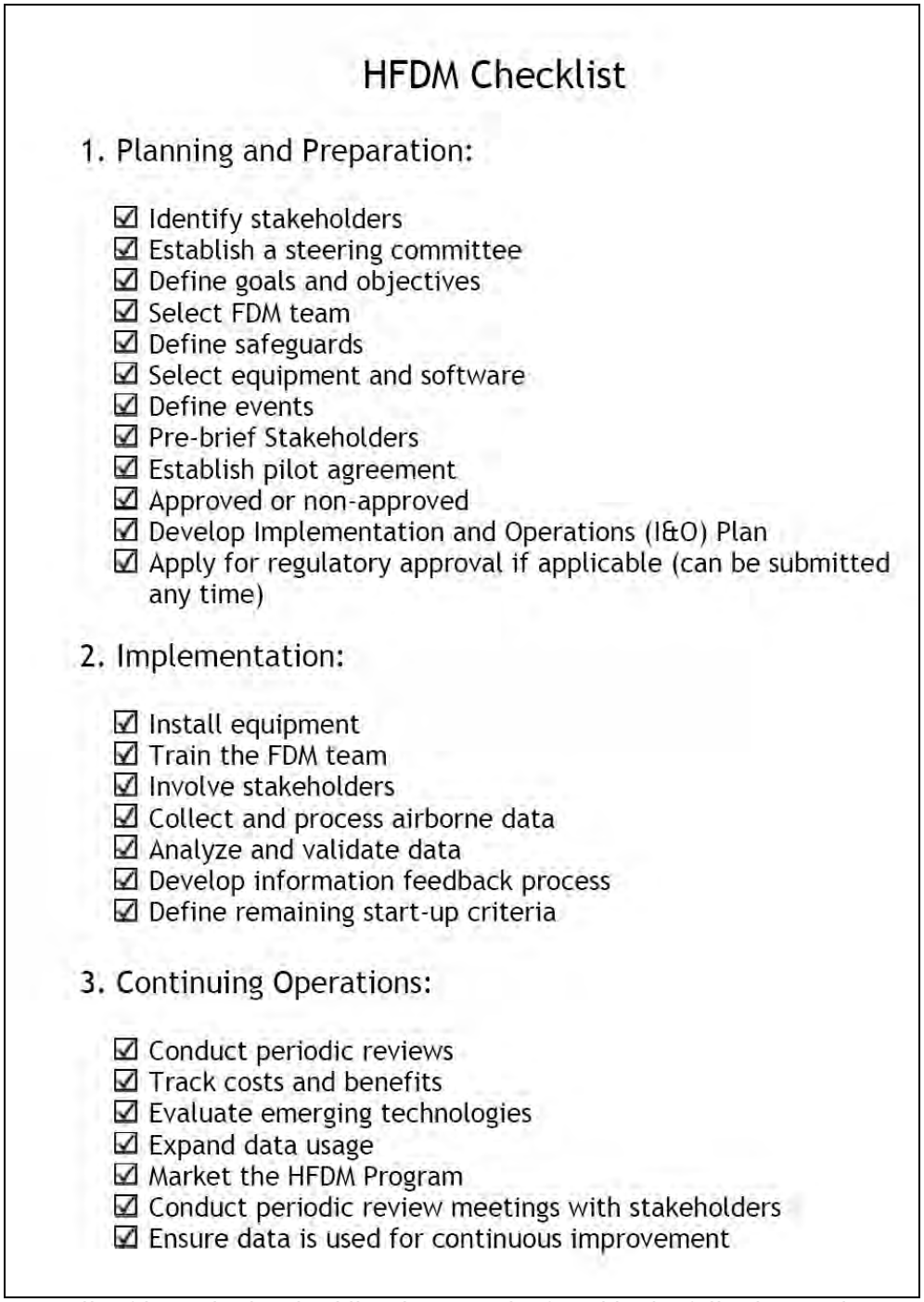
Do you have upper management's support?

Upper management support is absolutely mandatory for the success of an effective HFDM program. Upper management personnel must make his/her support of the HDFM program known to stakeholders and clearly communicate his/her expectations to each person who has a role to play in the program. An organization where a CEO "talks the safety talk", but doesn't "walk the safety walk" is very unlikely to succeed at any safety program.

Does your company have a "just culture"?

A "just culture" is absolutely mandatory for the success of an effective HFDM program. A just culture is a culture in which personnel are encouraged to and feel comfortable disclosing errors, including their own, while maintaining professional accountability. A just culture is not, however, tolerant of reckless behavior or intentional non-compliance with established rules or procedures. The target for an HFDM program is to maintain data security and crew confidentiality within a just culture. See Attachment J for more information about just culture.

Chapter 4: So I am ready for HFDM, where do I begin?



Details of items in the checklist above can be found in the following sections.

Planning and preparation

Identify stakeholders

Identify those who will be affected by the HFDM program. Every operation will have stakeholders; most will include at minimum:

- Management/Owners
- Flight department (including pilots)
- Safety department
- Maintenance department
- Training department
- IT department
- Legal staff
- Insurance carrier

During the process of identifying stakeholders, identification of the key stakeholders required to become part of the steering committee should begin to develop.

Establish a steering committee

Identify key stakeholders to participate in an HFDM steering committee. The composition of the steering committee will be heavily dictated by the size and scope of your operation. Too large a committee and it will become cumbersome, but capturing key stake holders will be instrumental in overcoming push back to the idea of a HFDM. Some stakeholders you may want to include in the steering committee are:

- HDFM Team Leader or Gatekeeper (may be the same)
- Company President or CEO
- Chief Pilot
- Pilot Union Representative (if applicable)
- Safety Department Representative
- Maintenance Department Representative
- Company Legal Representative

Define goals and objectives

The steering committee must set the goals and objectives for the HFDM program. These objectives will assist in setting the event triggers to capture the type of data needed, as well as drive the type of HFDM equipment required to achieve goals. Likewise, some goals and objectives may be driven by cost or the type of equipment available for your fleet. Some examples of goals and objectives are:

- Improved training programs that address authentic mission scenarios and promote improved decision making skills
- Improved data during incidents or abnormal events to allow root cause analysis
- Identify deviations from standardized procedures
- Identify ways to improve procedures and techniques to improve safety, operational efficiency and reliability
- Report to company management on safety risks and recommendations in a fact-based manner.

Select HFDM Team

Identify the all members of the HFDM Team, including the gatekeeper(s), and define team member responsibilities (see Attachment A). The "gatekeeper" is the HFDM Team member who is primarily responsible for the security of identified data. He/she is also the individual(s) who can link HFDM data to an individual flight or crewmember. The gatekeeper(s) **must be trustworthy** and respected by his/her peers. The gatekeeper is normally a member of the pilot union or group.

Another major challenge for many helicopter operators is their size; smaller operators often lack available resources, expertise and/or infrastructure for an in-house HFDM Team. These organizations may benefit by using a third party team for data analysis. This model has many advantages; however, if chosen, it is still necessary to choose a gatekeeper(s) within your own organization to coordinate with the third party.

For larger operators who decide to perform analysis in house, it is recommended that a dedicated data analyst be added. This will provide expertise on the software systems in use, which in turn will allow greater development of events and will reduce the burden on the pilot gatekeepers who will normally have line flying duties as well. It is not suggested that the dedicated analyst perform any crew contacts, but that he/she provides information to the gatekeeper(s) and assists with analysis and investigation of events.

Define safeguards

Confidentiality and security of data is essential to the success of the program! Define policies and procedures regarding the de-identification, analysis, and secure storage of all data gathered as part of the HFDM program. Also define exceptions to de-identification of data (i.e. urgent safety action required, **confidential** crew contact, gross negligence). Define a clear process for initiating corrective action in these cases to ensure confidentiality is maintained. Also include scenarios for information requests by pilots, maintenance personnel, etc. Ensure the gatekeeper and anyone who may have access to identified data has a clear understanding of these policies and procedures. For an example of an email one operator uses to initiate the crew contact process, please see Attachment C.

Select equipment & software

Equipment (hardware) and software decisions will impact the capital outlay, installation and certification costs, length of out of service time for installation, man hours, depth of the data collected, and ultimately, the goals and objectives your organization can realistically attain in their HFDM program. The type(s) and size(s) of aircraft in your fleet will also dictate the type of equipment available for your HFDM program. Many operators use a mix of equipment based on what is available for the aircraft different models in their fleet.

Light & legacy fleet

One historical challenge for "light and legacy" aircraft with regards to HFDM has been the lack of availability of low cost, lightweight, unobtrusive equipment. This challenge, combined with the fact that the majority of the worldwide helicopter fleet is in the "light and legacy" category, is one of the main reasons the helicopter community has not embraced HFDM earlier. However, within the past few years, practical HFDM equipment for light and legacy aircraft has come to market.

Many of the current "light and legacy" HFDM systems on the market cost less than $10,000 to install. This equipment may interface directly with aircraft systems or use independent inertial sensors to capture parametric data. Because it may not be

feasible to capture certain aircraft parameters with traditional sensors, some HFDM equipment records cockpit images to capture supplemental information that is otherwise unavailable.

Medium & heavy fleet

Traditional Equipment such as flight data recorders (FDR), quick access recorders (QAR), and multifunction data acquisition units (MFDAU) are currently being used in HFDM programs for medium and large aircraft. These devices, which are often required by the regulatory authority for medium to large aircraft, are beneficial in that they typically provide more parameters and data to support both operational and maintenance monitoring programs. This more complex equipment allows the operator to monitor a wider range of events.

Software

Selection of the appropriate software is just as important as selection of appropriate equipment. Some aircraft and/or HFDM equipment manufacturers offer software that is complimentary to the specific HFDM equipment installed in the aircraft. However, many HFDM equipment manufacturers do not. If this is the case, it is important to select a software analysis tool compatible with the equipment you have chosen and the goals and objectives of your HFDM program.

A list of equipment and software/analysis providers can be found in Appendices B and C. Survey other operators with similar aircraft types or the aircraft manufacturer to see what equipment and software they recommend.

Review your goals and objectives once more. **Will the equipment and software you have selected allow you to meet the goals and objectives of your HFDM program?**

Define events

It will be necessary to define "events" or operational limitations you would like to monitor in your HFDM program. In addition, levels of severity for events outside normal operational limitations. The events will be dictated by type of equipment you have chosen (available parameters) and may be tailored to the specific mission and standard operating procedures of your operation. Many operators find the defining events for multiple mission categories can be quite challenging. If this is the case, it is recommended to begin the program with a list of common events for all mission categories and then slowly begin to add more detail by mission. For a list of events one operator incorporated into their program, please see Attachment A.

Pre-brief stakeholders

What is HFDM and how will it affect them? Many longtime industry veterans are still unfamiliar with HFDM programs and their details, benefits and available equipment. All stakeholders need to understand the goals and objectives of the program and the sanctity of just culture, as well as the legal support behind an FAA-approved HFDM/FOQA program. It is important to ensure all parties understand the multiple safeguards as well as the overall organizational attributes derived from HFDM. This is even more important in a small operation, as de-identification presents a unique set of challenges in a group of a dozen or less pilots and managers.

Establish Pilot Agreement

Pilot agreements are necessary regardless of the size of operation. This agreement is a clear statement to each pilot or to the pilot group on the intended use for this collected data and some of the protections afforded to the pilots and operator for participation in regulatory

agency-approved programs. The agreement spells out the commitment to just culture by management to each pilot. (See Attachment B – Example Pilot Agreement)

Approved or non-approved

Decide whether or not your organization will request regulatory approval for you HFDM program. Please refer to Chapter 3, Section 3 for explanation and benefits of regulatory approval.

Develop Implementation and Operations (I&O) Plan

An I&O Plan is a living document and is required to obtain FAA approval; it is basically an operations manual for your HFDM program. Even if your company will not seek FAA approval, creating and maintaining an I&O Plan is a great way to formalize your program. Please see Attachment A, which was developed for an FAA-approved HFDM program and is provided as an example to highlight the various sections and content needed for successful implementation. This I&O Plan outlines the necessary components of an FAA-approved plan. This I&O was written with the guidance of FAA Advisory Circular (AC) 120-82, which outlines the minimum criteria for an FAA-approved program; AC 120-92 also proved useful in the creation of this I&O plan, outlining the benefits of Safety Management Systems (SMS).

Apply for regulatory approval (if applicable)

If the I&O plan is ready, submit for regulatory approval. This can also be submitted during ongoing implementation steps below.

Implementation

Install equipment

Develop an estimated timeline for installation of all equipment, including equipment and analysis software. If installation of equipment requires obtaining a Supplemental Type Certificate (STC), additional time and resources must be budgeted for this process. Coordination with maintenance and vendors will be required to track progress and resolve problems. (FAA AC 120-82)

Train the HFDM Team

If data analysis will take place within the organization, all HFDM Team members should receive training on the analysis and animation software they will be using. Additionally, HFDM Team members should visit other operators with established HFDM programs to gain further insight into the operation of an HFDM program. Other training should be provided as new equipment and/or software is added to the program.

If the data analysis will be contracted to a third party, the gatekeeper(s) or HFDM liaison should receive training required to perform his/her duties. This training is usually provided by the third party.

Involve stakeholders

Clearly communicate stakeholders' roles and responsibilities with regards to the implementation and ongoing operation of the HFDM program. Also communicate when they should expect updates regarding the HFDM program (i.e. quarterly, monthly, etc.).

Collect and process airborne data

Define policies and procedures regarding the collection and download of HFDM data. Will data be retrieved from a media card or by wireless data link (WDL)? Ensure there are no scheduling, locale, or manpower conflicts to resolve prior to implementation (Example: For an offsite base, define procedures for secure transfer of data to the analysis base). Ensure data is downloaded frequently enough that overwrite (media storage size limitation) is not an issue.

Analyze and validate data

Data validation is an essential step of the analysis process. The HFDM Team will need to ensure data is valid before taking action. Investigation of software or equipment installation may be necessary.

Develop information feedback process

Define policies and procedures for providing feedback for both positive and negative information discovered through the HFDM program. Communicate as many events as possible back to crewmembers through various means. Event severity may be a way to define method of feedback (email advisory, crew contact, etc.).

Define a schedule for HFDM program progress reports (safety risks, operational trends, etc.) to the pilot staff and upper management. Some operators accomplish this by publishing periodic safety bulletins or newsletters. **Completing the information loop is essential to the success of the program!**

Define remaining start-up criteria

Audit the program and talk with stakeholders to determine if there are "holes" or barriers to address prior to complete implementation and operation of the HFDM program. If you are applying for FAA-approval, has the I&O plan been approved?

Continuing Operations

Conduct periodic program audits

Implementation of an HFDM program is just the beginning! To meet an organization's goals and objectives, a program must continuously evolve and improve. Periodic audits of all aspects of the HFDM program will determine whether the program is working as well as it could or whether changes are required. These reviews will also identify when the program needs to be updated. The lessons the HFDM Team learns should be captured and documented so that subsequent efforts benefit from the team's experience.

Track costs and benefits

Justifying the investment in an HFDM program essential! Document initial and recurring costs of maintaining the program. Also, document downward safety trends and operational and maintenance savings as a result of the program. A decreased accident or incident rate as a result of additional information and safety awareness obtained through HFDM should be translated to cost savings for the purposes of evaluating the value of the program if possible. Many operators, use key performance indicators such as "events per flight" to track and demonstrate the effectiveness of the system.

Evaluate emerging technologies

The HFDM Team should continuously evaluate emerging technologies to ensure the program is being conducted with the most benefit to the organization. Emerging technologies could include updated equipment, analysis or simulation software, data transfer technology, etc.

Expand data usage

The integration of de-identified HFDM data with other internal safety programs (such as the FAA Aviation Safety Action Program (ASAP) for example) should be considered to further enhance the safety value of the information.

Market the HFDM Program

Communicate HFDM successes and lessons learned with stakeholders and other Operators. There is no greater marketing tool than the positive testimony of your peers.

Conduct periodic meetings with stakeholders

Conduct periodic meeting with stakeholders to report updated trends, risks, and corrective actions with stakeholders. Ensure corrective actions are assigned to an individual, so accountability is clear and can be tracked. Discuss status and/or effectiveness of previously recommended corrective actions.

Ensure data is used for continuous improvement

Once a corrective action is implemented, monitor its effectiveness and watch for other resultant risks or unintended consequences. Continue to track cost savings associated with previously implemented corrective actions.

Key Terms

Advisory Circular (AC). An Advisory Circular is the FAA's means of providing non-regulatory guidance to the public.

Aviation Safety Action Program (ASAP). An FAA voluntary program under which employees of Operators may report safety related events, including possible violations by the reporting employees themselves, of violations of FAA regulations. The objective of the ASAP is to encourage voluntary reporting of safety information that may be critical to identifying potential precursors to accidents. Under ASAP, safety issues are resolved through corrective action rather than through punishment or discipline.

Analysis Software. A software application program designed to: transform airborne-recorded data into a usable form for analysis; process and scan selected flight data parameters; compare recorded or calculated values to predetermined norms using event algorithms; and generate reports for review or trending when they are detected.

Crew Contact. The confidential process by which a gatekeeper may contact a pilot/crewmember for purposes of validating data or mitigating a risk identified through the HFDM process; the only case in which identity of individual crewmembers may be associated with HFDM data.

Data Validation. A process during which flight data are reviewed to see that they were not generated as a result of erroneous recording or damaged sensors.

De-identified Data. Data from which any identifying elements that could be used to associate them with a particular flight, date, or flight crew has been removed.

Equipment. For the purposes of this document, any hardware that captures data for the purposes of helicopter flight data monitoring

Event. An occurrence or condition in which predetermined values of aircraft parameters are measured. Events represent the conditions to be tracked and monitored during various phases of flight and are based on the sensory data parameters available on a specific aircraft fleet.

Event Category. Event categories are areas of operational interests (e.g., aircraft type, phase of flight, geographical location) on which event monitoring and trend analysis is based.

Event Levels. The parameter limits that classify the degree of deviation from the established norm into two or more event severity categories. When assigning levels to an event, consideration is given to compliance with federal regulations, aircraft limitations, and company policies and procedures.

Event Set. A collection of events designed to measure all aspects of normal flight operations for a particular aircraft type at a particular operator. The event set for a particular fleet may be limited by the available parameters on the aircraft.

Event Validation. The process in which an event is determined to be a valid sample of operation outside the established norm.

Federal Aviation Administration (FAA). The agency under the United States Department of Transportation tasked with the regulation and promotion of air commerce.

Flight Data Recorder (FDR). A device that records pertinent parameters and technical information about a flight. At a minimum, it records those parameters required by the governing regulatory agency, but may record a much higher number of parameters. An FDR is designed to withstand the forces of a crash so that information recorded by it may be used to reconstruct the circumstances leading up to the accident.

Flight Operational Quality Assurance (FOQA). A Helicopter Flight Data Monitoring program which combines flight data with other sources and operational experience to develop objective information to enhance safety, training effectiveness, operational procedures, maintenance and engineering procedures, and air traffic control (ATC) procedures. A common term used in the United States of America.

Gatekeeper. The HFDM Team member who is primarily responsible for the security of identified data. The gatekeeper is the individual(s) who can link HFDM data to an individual flight or crewmember. The gatekeeper is normally a member of the pilot union or group.

Helicopter Flight Data Monitoring (HFDM). A systematic method of accessing, analyzing and acting upon information obtained from flight data to identify and address operational risks before they can lead to incidents and accidents.

Helicopter Flight Data Monitoring (HFDM) Team. A group responsible for reviewing and analyzing flight and event data and identifying, recommending, and monitoring corrective actions. Including a pilot member(s) as part of the team is recommended.

Implementation and Operations Plan (I&O Plan). Required for FAA-approval; a detailed specification of key aspects of an HFDM program to be implemented by an operator, including:

- A description of the operator's plan for collecting and analyzing the data
- Procedures for taking corrective action that analysis of the data indicates is necessary in the interest of safety
- Procedures for providing the applicable regulatory agency with de-identified aggregate HFDM information/data
- Procedures for informing the applicable regulatory agency as to any corrective action being undertaken

International Helicopter Safety Team (IHST). A government-industry team formed in 2006, whose goal is to reduce the world-wide helicopter accident rate by 80 percent by the year 2016.

Joint Helicopter Safety Analysis Team (JHSAT). Analyzes aviation accidents, identifies problems, and recommends solutions.

Joint Helicopter Safety Implementation Team (JHSIT). Strategically addresses and/or implements JHSAT recommendations.

Just Culture. A culture in which personnel are encouraged to and feel comfortable disclosing errors, including their own, while maintaining professional accountability. A just culture is not, however, tolerant of reckless behavior or intentional non-compliance with established rules or procedures.

Parameters. Measurable variables that supply information about the status of an aircraft system or subsystem, position, or operating environment. Parameters are collected by a data acquisition unit installed on the aircraft and then sent to analysis and reporting systems.

Phase of Flight. The standard high-level set of activities performed by pilots on all operational flights (i.e., preflight, engine start, hover, taxi, takeoff, climb, cruise, descent, holding, approach, landing, taxi, and post flight operations).

Quick Access Recorder (QAR). A recording unit onboard the aircraft that stores flight-recorded data. These units are designed to provide quick and easy access to a removable medium, such as an optical disk or PCMCIA card, on which flight information is recorded.

Safety Management System (SMS). A systematic, explicit, comprehensive and proactive process for managing safety risks that integrates operations and technical systems with financial and human resource management to achieve safe operations and compliance with applicable regulations.

Stakeholder. Constituencies that are potential users of HFDM data and that have a stake in the program's success.

Steering Committee. An oversight committee formed at the beginning of HFDM program planning to provide policy guidance and vision for the HFDM effort. Membership may include senior management personnel and representatives from key stakeholder departments, such as flight operations, maintenance, training, and safety. A representative from the pilot staff/association is strongly recommended.

Wireless Data Link (WDL). A system that allows the high-speed transfer of onboard aircraft data to ground facilities using various wireless technologies. It may also allow for upload of data to the aircraft. Sometimes referred to as Ground Data Link (GDL).

Appendices

Appendix A: List of Attachments

To access attachments, visit www.ihst.org

Attachment	Title	Author	Date
A	Example Implementation and Operations Plan	S. K. Lau, CAPACG	May 2009
B	Example Pilot Agreement	Arkansas Children's Hospital	Sep 2009
C	Example Crew Contact Email		
D	Advisory Circular 120-82: Flight Operational Quality Assurance	U.S. Federal Aviation Administration	Apr 2004
E	CAP 739 Flight Data Monitoring: A Guide to Good Practice	U.K. Civil Aviation Authority	Aug 2003
F	Helicopter Operations Monitoring Programme (HOMP)	U.K. Civil Aviation Authority	Unknown
G	Light Data Recorder Feasibility Study	European Aviation Safety Agency	Dec 2008
H	General Aviation Flight Data Monitoring, Version 3	S. K. Lau, CAPACG	Apr 2007
I	Advisory Circular 120-92: Introduction to Safety Management Systems for Air Operators	U.S. Federal Aviation Administration	June 2006
J	A Roadmap to a Just Culture: Enhancing the Safety Environment	GAIN Working Group E	Sep 2004
K	CAA PAPER 2004/12: Final Report on the Follow-on Activities to the HOMP Trial	U.K. Civil Aviation Authority	Oct 2004
L	CAP 731 Approval, Operational Serviceability and Readout of Flight Data Recorder Systems	U.K. Civil Aviation Authority	July 2006
M	Role of Analytical Tools in Airline Flight Safety Management Systems	GAIN Working Group B	Sep 2004

Appendix B: HFDM Equipment Resources

Alaka'i Technologies	http://www.alakai1.com
Appareo Systems	http://www.appareo.com
Black Box Avionics	http://blackbox.aero
ECT Industries	http://www.ect-industries.fr
Honeywell	http://www.honeywell.com/sites/aero/Recorders.htm
L3 Communications	http://www.l-3ar.com
Outerlink	http://www.outerlink.com
Penny and Giles	http://www.pennyandgiles.com
Sagem Avionics	http://www.sagemavionics.com
Teledyne Controls	http://www.teledyne-controls.com
UHL Research Associates	http://www.uhlflight.com/pfpsoftware.html

* Note: Some Equipment Manufacturers also provide software and analysis services

Appendix C: HFDM Software and Analysis Resources

Aerobytes	http://www.aerobytes.co.uk
Austin Digital	http://www.ausdig.com
Baldwin Aviation	http://www.baldwinaviation.com
CAPACG	http://www.capacg.com
CEFA Aviation	http://www.cefa-aviation.com
Flight Data Services	http://www.flightdataservices.com
Flightscape	http://www.flightscape.com
Sagem AGS	http://www.sagem-ds.com/ags
Sim Author	http://www.simauthor.com
Teledyne Controls	http://www.teledyne-controls.com