

**MARITIME HELICOPTERS,
INC.
(APPENDIX E)**

Flight Data Monitoring

**August 24, 2020
Rev1**

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Log of Revisions

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1. BACKGROUND

Flight Operational Quality Assurance (FOQA) is defined as a program to improve flight safety by providing more information about, and greater insight into, the total flight operations environment through selective automated recording and analysis of data generated during flight operations. Analysis of FOQA data can reveal situations that require improved operating, training, and maintenance procedures, practices, equipment, and infrastructure.

In support of the public safety objective, the FAA has publicly endorsed the development and implementation of voluntary FOQA programs as a tool for continuously monitoring and evaluating operational practices and procedures. In Advisory Circular (AC) 120-59 (as amended), Air Carrier Internal Evaluation Programs, the FAA states, “public safety is enhanced if deficiencies are identified and immediately corrected when they are discovered by the certificate holder rather than when they are discovered by the FAA.” FOQA programs can provide the quantitative and objective information needed to identify deficiencies during the certificate holder’s internal audit and evaluation process.

FOQA programs are based on the premise that air carriers have primary responsibility for continuously monitoring and ensuring that their operations are safe and in compliance with their operating standards and the regulations. A FOQA program will assist Maritime Helicopters, Inc. in identifying and addressing operational deficiencies and trends that are not generally detectable with other procedures. Additionally, analysis of some FOQA program data may contribute to improved safety and efficiency in the design and operations of air traffic control (ATC) systems, aircraft, and airports. Many potential applications of FOQA data have been identified to date.

These applications aim to improve safety, evaluate, and enhance training practices, revise operating procedures, assist aircraft engineering programs, improve maintenance efficiency, and assist manufacturers in aircraft design and modification.

Several foreign air carriers have successfully implemented FOQA-type programs that use flight- recorded data to improve operational safety and performance. Lengthy track records in effective usage of this information (over 20 years in the cases of British Airways and Scandinavian Airlines System) have provided foreign carriers with clear evidence that FOQA program data represent a source of valuable information that, when used appropriately, can contribute greatly to aviation safety. Airlines that currently have FOQA-type programs agree that the insights derived from these programs have prevented serious incidents and accidents and have led to improved operating efficiencies.

FOQA information can be included in the voluntary audits and evaluations described in AC 120-59 to determine the causes of deficiencies and to suggest enhancements to operating practices. Title 14 of the Code of Federal Regulations (14 CFR) part 13 states the conditions under which information obtained from an approved voluntary FOQA program will not be used in legal enforcement actions against an operator or its employees. In addition, 14 CFR part 193 contains provisions for certain protection from public disclosure of voluntarily submitted safety related information, when such information has been designated by an FAA order as protected from disclosure under that part.



2. INTRODUCTION

The plan presented in this document specifies the organization, technology, policies, procedures, and operational processes used in the Maritime Helicopters, Inc. FOQA Program (Non-FAA approved).

The core objective and intent of the Maritime Helicopters, Inc. FOQA program is to facilitate the free flow of safety information. The FOQA program will:

- a. Collect operational flight data.
- b. Develop methods to analyze the collected flight data, such as triggered events and routine operational measurements.
- c. Establish procedures for comparing the collected data with established procedures and standards and the use of analyzed data in formal awareness and feedback programs to enhance safety in the following areas:
 - i. Flight procedures
 - ii. Flight training procedures and qualification standards
 - iii. Crew performance in all phases of flight
 - iv. Air traffic control procedures
 - v. Aircraft maintenance programs
 - vi. Aircraft and airport design and maintenance
- d. Perform trend analyses of FOQA data to identify potential problem areas, evaluate corrective actions, and measure performance over time.

3. FOQA PROGRAM STAKEHOLDERS

The FOQA program will provide large amounts of previously unavailable data to significantly improve the problem definition process and allow assessment and resolution of systemic safety and efficiency issues. Beneficiaries or stakeholders within Maritime Helicopters, Inc. include, but are not limited to, the following:

- a. Flight Safety
- b. Flight Training and Standards
- c. Flight Operations
- d. Maintenance
- e. Pilot's

4. PROTECTIVE PROVISIONS, PILOT AGREEMENT, AND CORPORATE POLICY STATEMENT

Key to the success of the Maritime Helicopters, Inc. are specific protective provisions that will protect both Maritime Helicopters, Inc., and its employees as a result of information and data that are collected and analyzed by the FOQA program. In establishing these protective provisions, Maritime Helicopters, Inc. has pursued the following distinct courses of action. Maritime Helicopters, Inc. has established a corporate policy endorsed by senior management providing that no pilot shall ever be subject to disciplinary action by Maritime Helicopters, Inc. from data or information that is produced by the FOQA program, and Maritime Helicopters, Inc.

5. DATA PROTECTIVE PROVISIONS AND SECURITY

General

Key areas that were considered in developing the protective provisions for the FOQA program include:

- a. Confidentiality provides that the identity of individual crewmembers cannot be associated with any FOQA data, except for the purposes of crew-contact as provided for in this plan.
 - i. Anonymity provides that any identification of airline flight and/or flightcrews with specific FOQA flight data necessary during an analysis is eliminated permanently at the earliest possible time and in accordance with the pilot agreement.
 - ii. Data access and control identifies data that require protection and assigns overall responsibility for data protection. In addition, data access and control provides guidelines and procedures to protect data; provides authorized access to data, data processing and storage locations; provides authorized access to reports and other data outputs, and requires the destruction of data after the retention period has expired.
 - iii. FOQA facilities provides secure, controlled access facilities for all systems, offices, equipment, workstations, computers, and peripherals associated with the FOQA program. Additionally, secure systems will also be provided for storage of all FOQA-related materials, including paper, media, and backup devices.



FAA FOQA Enforcement Policy

The Maritime Helicopters, Inc. FOQA Program **does not** incorporate the protections codified in the FOQA Rule, part 13, section 13.401, which states that except for deliberate or criminal acts, the Administrator will not use Maritime Helicopters, Inc.'s FOQA data or aggregate FOQA data in an enforcement action against Maritime Helicopters, Inc. or its employees when such FOQA data or aggregate FOQA data is obtained from a FOQA program that is approved by the Administrator.

Legislation

In the Federal Aviation Reauthorization Act of 1996, Congress included specific provisions pertinent to the public release of safety-related information that was voluntarily submitted to the FAA. Specifically, the Reauthorization Act added a new section—49 U.S.C. § 40123—to the FAA's governing statute to protect voluntarily submitted information from disclosure if the Administrator finds that (1) the disclosure of the information would inhibit the voluntary provision of that type of information and that the receipt of that type of information aids in fulfilling the Administrator's safety and security responsibilities; and (2) withholding such information from disclosure would be consistent with the Administrator's safety and security responsibilities.

The Administrator has issued a rule, 14 CFR part 193, which accomplishes the purposes set forth in this legislation. This rule describes the provisions for designating information that would be protected. Information collected under an FAA-approved voluntary FOQA program has been designated by FAA Order 8000.81 as coming under the provisions of this rule.

6. FOQA PROGRAM COMPONENTS

The principal components that will compose the FOQA program at Maritime Helicopters, Inc. are described below and are illustrated in Figure 1.

Aircraft Fleet

The DHC-6-400 will be the launch aircraft for the Maritime Helicopters, Inc. FOQA program. The aircraft will be used to initiate the FOQA program. This aircraft will be equipped with the Latitude Technologies ION100-004 IONode Flight Data Monitoring System on a schedule established by Maritime Helicopters, Inc. The Bell 412 will be added during 4th quarter 2020. Additional aircraft will be added to the FOQA program pending approval from the FOQA Monitoring Team (FMT) as sufficient experience is gained on data acquisition and analysis.

Airborne Data Acquisition System

Maritime Helicopters, Inc. will be utilizing the Latitude Technologies ION100-004 IONode Flight Data Monitoring System. The Latitude Technologies system transmits the recorded information wirelessly to a base station.

Data Download and Airborne System Maintenance and Support

The Flight Data Acquisition Management System and Quick Access Recorder will be maintained per the FAA-approved Maritime Helicopters, Inc. aircraft maintenance program. The Maintenance Department will be responsible for managing this process. The Latitude Technologies system will automatically transfer the recording wirelessly each time the aircraft returns to the hangar. The FOQA Manager will be responsible for coordinating maintenance issues with the Maritime Helicopters, Inc. Maintenance Department regarding data download and any Flight Data Acquisition Management System problems discovered during data analysis.

Ground Data Replay and Analysis System (GDRAS)

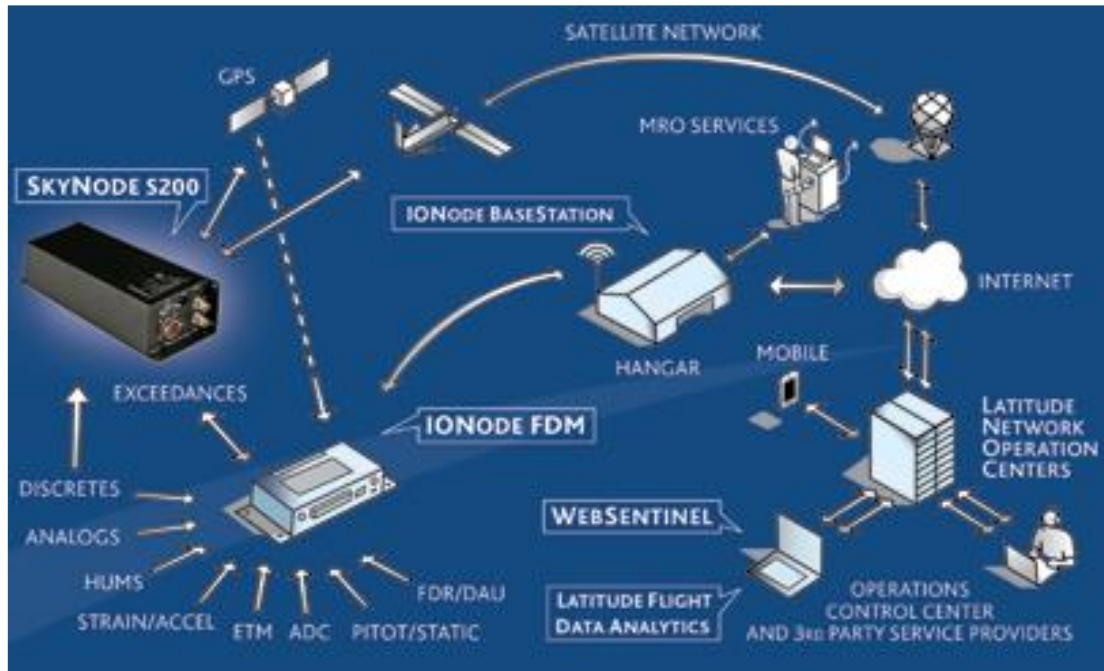
The GDRAS is designed to process and analyze data from all FOQA-equipped aircraft in the Maritime Helicopters, Inc. fleet. It will apply protective mechanisms, including removal of identifying information in accordance with the provisions described in the previous sections. The GDRAS will also include trend analysis capabilities to explore historical data and analyze similar event data from past flights to determine if any patterns exist or if further study is warranted.

JH Data Consulting will provide the GDRAS system.

Other Equipment

Maritime Helicopters, Inc. will be investigating several other components to incorporate into the FOQA program as the technology becomes available and requirements are identified and refined. The addition of these components is subject to approval by the FMT.

FIGURE 1. FOQA SYSTEM ARCHITECTURE



Equipment Upgrade, Modification, or Replacement

The equipment used initially in the FOQA program, including airborne and ground systems, may be upgraded, modified, or replaced with equipment from the same or a different vendor that will provide comparable or superior functionality to the equipment described in this section.

Documentation of such changes in airborne or ground systems will be maintained in the FOQA office and will be made available to the FAA on request. This plan will be revised whenever changes to airborne or ground-based systems are made.



7. FOQA ORGANIZATIONAL STRUCTURE

The Maritime Helicopters, Inc. FOQA organization structure is illustrated in Figure 2:

Personnel

The FOQA Program will consist of the following personnel:

a. Flight Operational Quality Assurance (FOQA) Steering Committee

The FOQA Steering Committee is chaired by the Quality and Safety Manager and serves as the advisory group for the FOQA program. Members of this committee include the Director of Operations, Chief Pilot, Assistant Chief Pilot Rotary Wing, Assistant Chief Pilot Fixed Wing, Director of Maintenance, and a company pilot.

b. FOQA Program Manager

The FOQA Program Manager is responsible for the overall management, administration, security, and maintenance of the FOQA program. These duties include interfacing with the FAA, vendors, and other entities. The program manager's primary duties include addressing the FOQA data needs and reporting requirements of Flight Operations, Training, and Safety.

The FOQA Program Manager will be Scott Fell.

c. FOQA Monitoring Team (FMT)

The FMT is chaired by the FOQA Program Manager. The FMT meets once per month to conduct reviews of aggregate trend data to identify recommendations to stakeholders.

The FMT will consist of the FOQA Steering Committee.

d. FOQA Gatekeeper (s)

The FOQA Gatekeeper(s) will have access to identifying data, in accordance with the pilot agreement. The gatekeeper will manage password selection and maintenance, control access to identifying data, and perform any necessary crew contacts.

MHI Gatekeepers are:

FW- Mark Hedlund

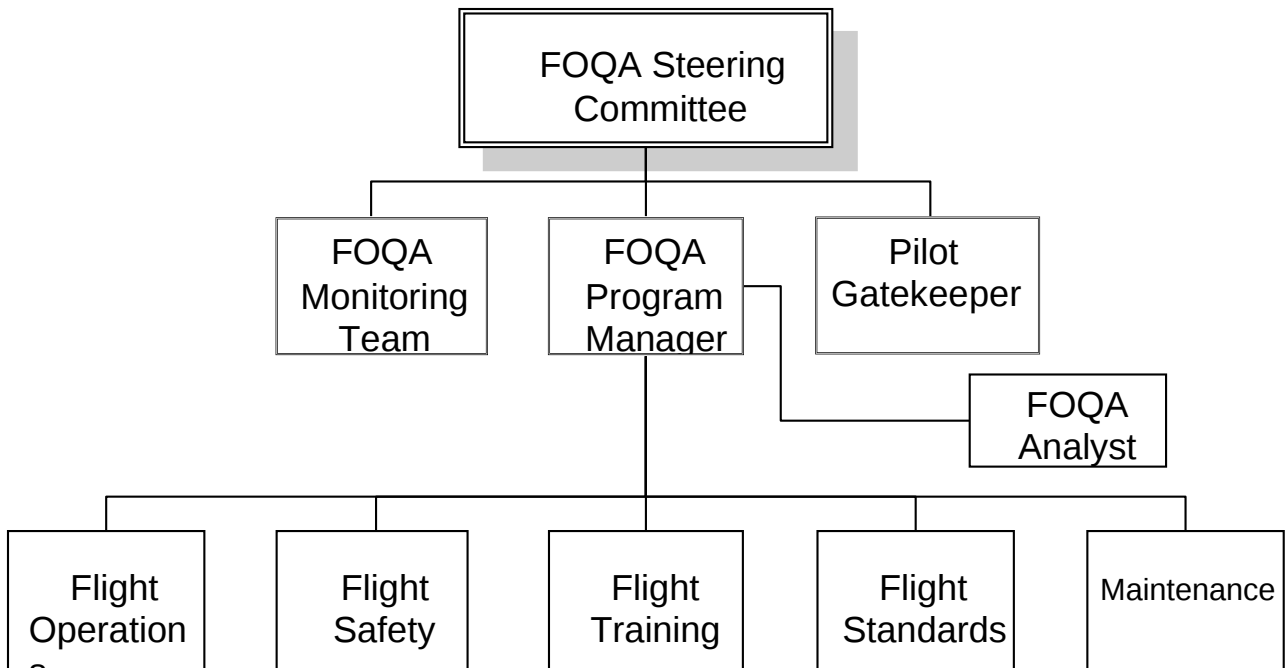
RW- Dave Jones



e. FOQA Analyst

The FOQA analyst will assist the FOQA Manager and is responsible for the day-to-day operations of the FOQA GDRAS, generating GDRAS-related reports, and assisting the FMT in reviewing and analyzing data.

The FOQA analyst services will be provided by JH Data Consulting.

FIGURE 2. FOQA ORGANIZATIONAL STRUCTURE



8. EDUCATION AND TRAINING

Pilot education about the Maritime Helicopters, Inc. FOQA Program will be accomplished through the Monthly Quality and Safety Letter.

Each of the FOQA stakeholders will be provided with information about the FOQA program through reports generated from periodic FOQA meetings, bulletin boards, and an initial FOQA overview report that will be developed and distributed during the initial implementation of the FOQA program.

All FOQA personnel will receive training on the GDRAS software. Additionally, FOQA stakeholders should visit other operators with established FOQA programs. Other training will be provided as new hardware and/or software is added to the program.

9. DATA ANALYSIS PROCEDURES

Data Usage and Management

All processed FOQA data will be maintained by the GDRAS subject to periodic deletion as determined by the FOQA Steering Committee and in accordance with the Maritime Helicopters, Inc. record retention policies.

The FMT will be responsible for developing reports summarizing the information obtained through the FOQA Program. The reports will include summaries of the most recent information obtained through the FOQA Program as well as trend information to demonstrate the effectiveness of prior corrective actions. These reports will be distributed to Flight Operations, Flight Training, Flight Safety, Maintenance Engineering, and other involved stakeholders on a regular basis. The FMT will solicit recommendations from the recipients of the reports to improve their usefulness as the program proceeds.

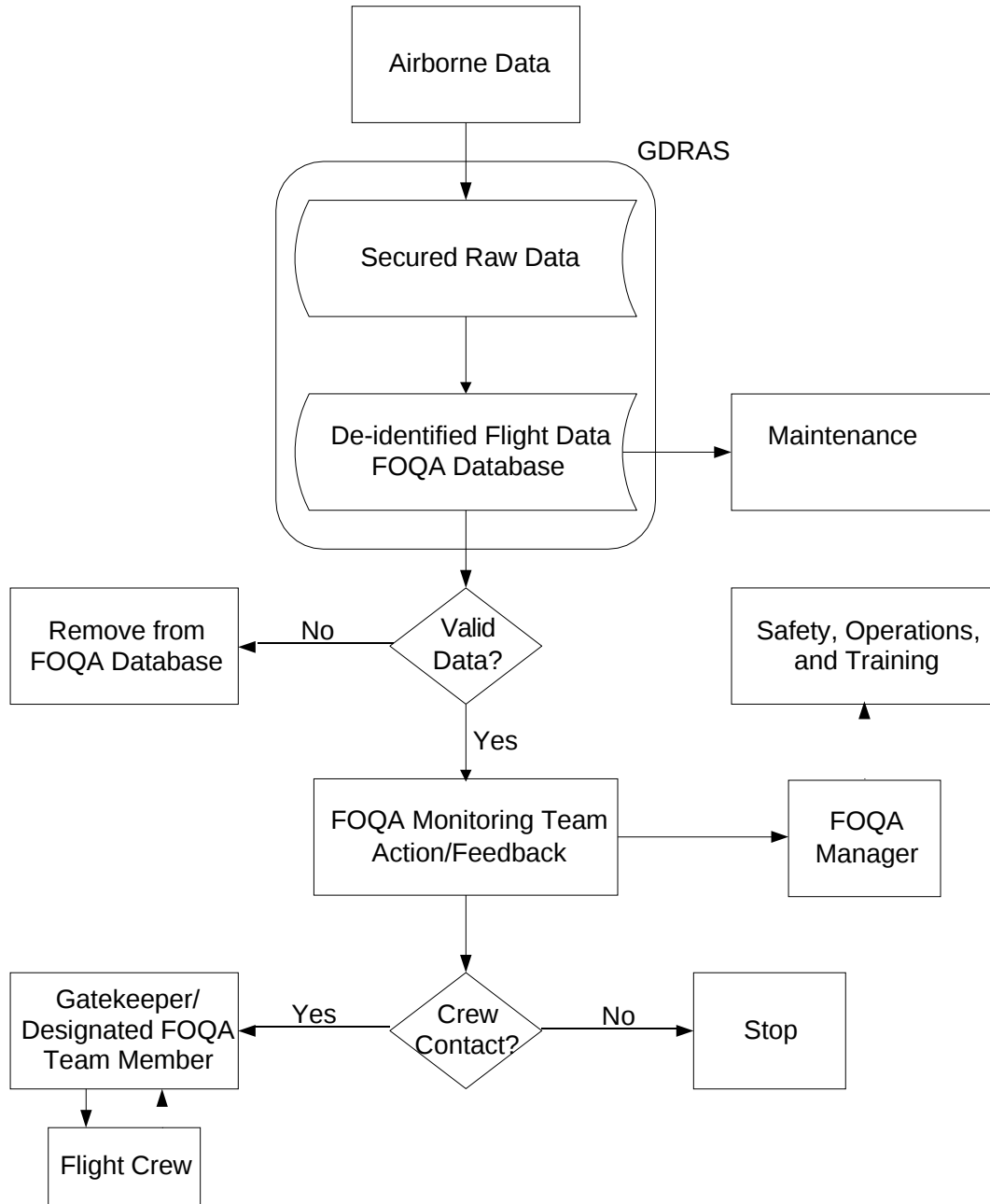
The FMT has established the following reports:

Quarterly report from FOQA data by individual aircraft type.

Flight Data Collection and Analysis

The manner in which FOQA data is processed is illustrated in Figure 3. Maintenance Engineering retrieves data from the aircraft and forwards it to the FOQA office. The ground analysis station will process the recorded flight data. Provisions for security and tracking of the media will be established through coordination between the FOQA Program Manager and the Maintenance Engineering.

Flight data will be processed by the FOQA Analyst to determine what occurred and whether the recorded information was legitimate. A preliminary analysis will use the GDRAS to interpret identified events or trends and determine whether the information was valid or invalid because of bad data, a faulty sensor, or some other invalidating factor. In the event that the data reveal a situation of immediate concern to Maintenance Engineering, the FOQA Program Manager will notify that department.

FIGURE 3. FOQA DATA PROCESSING




Data Classifications and Definitions

Parameters and measurements used in the Maritime Helicopters, Inc. FOQA program are contained in Appendix II of this Plan. The definitions will be programmed into the GDRAS to measure events and/or monitor trends. The performance limits that define these definitions will be continually reviewed by the FMT to determine they are consistent with the FOQA program goals, applicable publications, and guidance materials, which may include, but are not limited to, the following:

- Flight Operations Manual (FOM)
- Quick Reference Handbook (QRH)
- Maritime Helicopters, Inc. flight training materials
- Approved Flight Manual (AFM)
- Manufacturer Maintenance Manuals

The event set for the Maritime Helicopters, Inc. FOQA Program is contained in Appendix I. This event set will be modified as deemed appropriate by the FMT and additional event sets will be defined as needed. The FOQA Program Manager will be responsible for maintaining the event sets and coordinating with the FMT.

Data Definition Maintenance

The procedures for validating, reviewing, and defining event and trend definitions will be established by the FMT and they will determine whether the information is valid and reflects Maritime Helicopters, Inc. qualification and performance standards, training practices, and aircraft performance limits. All changes in the event and trend definitions will be logged and the FOQA Program Manager will maintain the records.

Data Review and Evaluation

All data recorded by the Maritime Helicopters, Inc. FOQA Program will be evaluated by the FMT on a periodic basis as determined by the FOQA Program Manager. FOQA data should be evaluated to determine if the program is accurately monitoring collected information for events and trends. The review and evaluation of the measurements, profiles, events, and trends used in the Maritime Helicopters, Inc. FOQA Program should reflect changes, updates, or enhancements to policy and procedures within all stakeholders' departments. Consideration should also be given to any changes, updates, or enhancements to policies and procedures within the FAA and industry.

Data Trending and Record Retention

De-identified flight data stored in the GDRAS will be periodically deleted as determined by the FOQA Steering Committee. Trend data will be maintained for a period of time as specified by the FMT in consultation with the FOQA Steering Committee. Maintenance Engineering shall retain the data as long as necessary to satisfy manufacture's warranties.

10. PROGRAM AND DATA DOCUMENTATION

Operational Development

The FOQA Program Manager will develop appropriate documentation for support of the FOQA operation. This documentation will be used to provide routine support for the process and facilitate any personnel transitions that may occur during the program.

Information and Data Control

The FOQA Program Manager will maintain a history of the information used in the FOQA program. When a FOQA or safety issue is identified, a log will be maintained to provide a reference document. This document will provide a way to track how Maritime Helicopters, Inc. addresses trends revealed by analysis of the FOQA data. This will include:

- A description of the identified issue
- Analysis that was accomplished
- Specific corrective actions or recommendations taken or made
- Personnel who were notified (e.g., flightcrews [de-identified], Engineering Maintenance, Flight Operations, Flight Training, Flight Safety)
- Resolution of actions or recommendations

The log will be used to generate a summary report for presentation to the FOQA Steering Committee and senior management. This log will be maintained in the FOQA office in a secure place. The FOQA Steering Committee will establish the retention period for this log.

Plan Revision Control

Standard revision control methodology and a distribution list will be established for this Plan. A revision control page that identifies the pages to be added, removed, and/or replaced, will be submitted with any revisions. Each revised page will indicate the page number and date. Revisions to the plan will be provided as necessary and appropriate. All revisions to the plan, including event definitions, will be submitted to Maritime Helicopters, Inc.

11. FAA ACCESS

Any information that is shared with the FAA must be approved by the Maritime Helicopters, Inc. FOQA Steering Committee. Only de-identified FOQA data or aggregate information may be released.

Since the MHI FOQA program is non-approved any FOQA data or information shared with the FAA **is not** protected from use by the FAA for enforcement purposes in accordance with 14 C.F.R. section 13.401.

Any de-identified FOQA data or aggregate FOQA data that leaves Maritime Helicopters, Inc.'s property will be clearly labeled as follows: "WARNING: This FOQA information is protected from disclosure under 49 U.S.C. 40123 and 14 CFR part 193. This information may be released only with the written permission of the Federal Aviation Administration Associate Administrator for Regulation and Certification." Airline identity and other information that could be employed to derive airline identity will be removed from any FOQA aggregate data submissions which Maritime Helicopters, Inc. provides to the FAA in compliance with section 13.401, unless Maritime Helicopters, Inc. elects to include that information.

In the event that Maritime Helicopters, Inc. chooses to allow FOQA data or aggregate FOQA data that includes airline identity information to be removed from Maritime Helicopters, Inc.'s property, all such data will be labeled as the confidential and proprietary property of Maritime Helicopters, Inc., in addition to the preceding warning.

MHI will not be included in any industry information sharing activities.



APPENDICES

**APPENDIX I. RW EVENT PARAMETERS AND DEFINITIONS/
FW EVENT PARAMETERS AND DEFINITIONS**

APPENDIX II. GLOSSARY

**APPENDIX I. RW EVENT PARAMETERS AND DEFINITIONS**

Event Name	Event Description	Parameters and Basic Event Definition
Excessive Pitch Down during Take-Off	An event designed to detect excessive nose down attitudes while taking off.	Nose down attitude is greater than 10°
Excessive Pitch Up during Landing	An event designed to detect excessive nose up attitudes while landing.	Nose up attitude is greater than 18° and airspeed is less than 40 Kts.
Excessive Bank	An event to detect excessive bank angles in flight.	Bank angle is greater than 50°.
Excessive Descent less than 500' AGL	An event to detect excessive rates of descent close to the ground.	Vertical Speed is greater than 1000 fpm and airspeed is less than 30 kts.
Excessive G loading	An event to detect excessive G loading.	Normal acceleration is > 2.
Excessive Pitch	An event to detect abrupt pitch attitude changes.	Pitch attitude nose down is greater than 15 ° or Pitch attitude nose up is greater than 20°.
Excessive Pitch Rate	An event to detect excessive pitch rate changes.	Pitch Rate is greater than 20° per second.
Excessive Roll Rate	An event to detect excessive roll rate changes.	Roll Rate is greater than 30° per second.
Excessive Yaw Rate	An event to detect excessive yaw rate changes.	Yaw Rate is greater than 30° per second.
Fast Hover	An event to detect excessive speed while close to the ground.	Airspeed greater than 10 Kts. And Elevation < 10'.
Negative G Loading	An event to detect negative G Loading.	Normal acceleration <.5.



APPENDIX I. FW EVENT PARAMETERS AND DEFINITIONS

Event Name	Event Description	Parameters and Basic Event Definition
Logging Start	Logs engine(s) start time	
Logging end	Logs engine(s) shutdown time	
Takeoff	Logs aircraft Takeoff time	
Landing	Logs aircraft Landing time	
Top of Climb	Logs aircraft level off altitude	
Top of Descent	Logs beginning of the aircraft descent	
Start of Approach	Logs the start of the aircraft approach	
Unstable Approach-Bank Angle	An event to detect approach with bank angles not stabilized	Low-> 0 sec <1000' AGL 15° Moderate-> 5° <500' AGL 15° Severe-> 2 sec <300' AGL 10°
Unstable Approach-Vertical Speed	An event to detect approach with vertical speed not stabilized	Low- 750 fpm 5 sec/ 900 fpm 4 sec/ 1000 fpm 4 sec <1000' AGL Moderate- 750 fpm 5 sec/ 900 fpm 4 sec/ 1000 fpm 4 sec <500' AGL Severe-750 fpm 5 sec/ 900 fpm 4 sec/ 1000 fpm 4 sec <300' AGL
Unstable Approach-Flap Setting	An event to detect an approach with incorrect flap setting	Low- 8° @1000' AGL Moderate- 8° @500' AGL Severe- 8° @300' AGL
Unstable Approach-High Speed	An event to detect a high speed during an approach	Low- <1000' AGL 0 sec >105 kts/ 3 sec >100 kts/ 12 sec >95 kts Moderate- <500' AGL 0 sec >105 kts/ 3 sec >100 kts/ 12 sec >95 kts Severe- <300' AGL 0 sec >105 kts/ 3 sec > 100 kts/ 12 sec > 95 kts
Unstable Approach-Slow Speed	An event to detect slow speed during an approach	Low- <1000' AGL 3 sec <62 kts Moderate-<500' AGL 3 sec <62 kts Severe- <300' AGL 3 sec <58 kts



Event Name	Event Description	Parameters and Basic Event Definition
Hard Landing	An event to detect a hard Landing of the aircraft	Low-G Limit 1.6 Moderate- G Limit 1.8 Severe- G Limit 2.0
Bank Angle- (Condition 1)	An event to detect bank angles below 20' AGL	Low- 5 sec 12° Moderate- 0 °sec 15° Severe- 0 sec 17°
Bank Angle- (Condition 2)	An event to detect bank angles between 20' – 400' AGL	Low- 10 sec 10° Moderate- 5 sec 15° Severe- 0 sec 30°
Bank Angle- (Condition 3)	An event to detect bank angles above 400' AGL	Low- 10 sec 32° Moderate- 5 sec 35° Severe- 2 sec 40°
Pitch Angle- (Condition 1)	An event to detect pitch angle below 20' AGL	Low- 2 sec 15° Moderate- 1 sec 18° Severe- 0 sec 20°
Pitch Angle- Condition 2	An event to detect pitch angles between 20' to 500' AGL	Low- 2 sec 15°degree Moderate- 1 sec 18° Severe- 1 sec 20°
Pitch Angle- (Condition 3)	An event to detect pitch angles above 500' AGL	Low- 3 sec 15° Moderate- 2 sec 18° Severe- 1 sec 20°
Low Airspeed- (Condition 1)	An event to detect low airspeed with flaps Up	Low- 1 sec 80 kts Moderate- 3 sec 80 kts Severe- 0 sec 75 kts
Low Airspeed- (Condition 2)	An event to detect low airspeed with flaps 10 and 20	Low- 1 sec 68 kts Moderate- 3 sec 68 kts Severe- 0 sec 57 kts
Low Airspeed- (Condition 3)	An event to detect low airspeed with flaps 37	Low- 2 sec 62 kts Moderate- 4 sec 62 kts Severe- 0 sec 58 kts
Stall Warning	An event to detect activation of Stall Warning	Severe- 0 sec
Master Warning	An event to detect activation of Master Warning Panel	Severe 0 sec
Fuel Warning	An event to detect activation of Fuel Warning	Severe 0 sec

APPENDIX II. GLOSSARY

GLOSSARY	
Term	Definition
ACARS	Aircraft Communications Addressing and Reporting System. ACARS is a VHF air/ground data link that uses nearly 600 VHF frequency locations throughout North and Central America, Hawaii, the Caribbean, and several U.S. territories. It relays Aircraft Operational Control (AOC), Airline Administrative Control (AAC), and Air Traffic Control (ATC) messages between ground-based organizations and the cockpit.
ACMS	Aircraft Condition Monitoring System. An airborne unit that can create reports such as long-term trend data and aircraft/engine monitoring. ACMS is mainly used for maintenance applications.
Aggregate Data	Detailed data grouped according to some criterion and combined using mathematical or statistical methods (e.g., sum, count, average, standard deviation).
Air Carrier	An organization that undertakes -- either directly or by lease or some other arrangement -- to engage in air transportation.
ARINC	Aeronautical Radio Incorporated. The ARINC organization is the technical, publishing, and administrative support arm of the Airlines Electronic Engineering Committee (AEEC) groups. AEEC standards define avionics form, fit, function, and interfaces.
ATC	Air Traffic Control. A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.
COTS	Commercial-Off-the-Shelf. Products, components, or software that are readily available through normal commercial channels, as opposed to custom-built units that would achieve the same functionality.
DAR	Digital ACMS Recorder. See ACMS.
Data Frame	A data map. See LFL.
De-identified Data	Data from which any identifying element that could be used to associate them with a particular flight, date, or flightcrew has been removed.

GLOSSARY	
Term	Definition
DFDAU	Digital Flight Data Acquisition Unit. A device that acquires aircraft data via a digital data bus and analog inputs, and formats that information for output to the flight data recorder in accordance with requirements of regulatory agencies. In addition to the mandatory functions, many DFDAUs have a second processor and memory module that enables them to perform additional Aircraft Condition Monitoring System (ACMS) functions/reports. The DFDAU can provide data and pre-defined reports to the cockpit printer, or a display for the flightcrew, or directly to Aircraft Communications Addressing and Reporting System (ACARS) for transmittal to a ground station, or to a Quick Access Recorder (QAR) for recording/storage of raw flight data.
DFDMU	Digital Flight Data Management Unit. A unit that performs the same data conversion functions as the DFDAU and has the added capability to process data onboard the aircraft. Additionally, this unit has a powerful data processor designed to perform in-flight airframe/engine and flight performance monitoring and analysis. Some DFDMUs have ground data link and ground collision avoidance systems incorporated into the units.
DFDR	Digital Flight Data Recorder. A digital 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. A DFDR 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.
DMU	Data Management Unit. A unit that performs the same data conversion functions as a Flight Data Acquisition Unit (FDAU) with the added capability to process data onboard the aircraft. Additionally, this unit has a powerful data processor designed to perform in-flight airframe/engine and flight performance monitoring and analysis. Some DMUs have ground data link and ground collision avoidance systems incorporated into the unit.
EGT	Exceedance Guidance Team. See FMT.
EMT	Event Monitoring Team. See FMT.

GLOSSARY	
Term	Definition
Event	An occurrence or condition in which pre-determined limits of aircraft parameters have been exceeded. Events represent the conditions to be tracked and monitored during various phases of flight and are based on sensory data parameters available on a specific aircraft fleet. Events may be categorized at different severity levels based on the degree to which the associated limits were exceeded. Most FOQA trend analysis is based on event monitoring and tracking.
Event Set	A collection of events designed to measure all aspects of normal flight operations for a particular aircraft type at a particular air carrier. Individual events within the event set would be customized to the approved limitations for the aircraft type and in accordance with the air carrier's operational procedures. The event set for a particular fleet may be limited by the available parameters on the aircraft.
FAR	Federal Aviation Regulations. Federal rules that govern airworthiness and the conduct of flight operations by certificate holders, among other safety matters.
FDAU	Flight data acquisition unit. See DFDAU.
FDR	Flight data recorder. A required 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. See DFDR.
FMT	FMT. A group comprised of representatives from the pilot association, if applicable, and the air carrier. This group, sometimes referred to as the Exceedance Guidance Team (EGT) or Event Monitoring Team (EMT), is responsible for reviewing and analyzing flight and event data, and determining and monitoring corrective actions.
FOQA	Flight Operational Quality Assurance. A voluntary program for the routine collection and analysis of flight operational data to provide more information about, and greater insight into, the total flight operations environment. A FOQA program combines these 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 procedures.
Gatekeeper	The FOQA team member who is primarily responsible for the security of identified data. The gatekeeper is the only individual who can link FOQA data to an individual flight or crewmember. The gatekeeper is normally a member of the pilot association.
GDL	Ground Data Link. See WDL.

GLOSSARY	
Term	Definition
GDRAS	Ground Data Replay and Analysis System. A software application 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 exceedance reports for review or trending when exceedances are found.
I&O Plan	Implementation and Operations Plan. A detailed specification of key aspects of a FOQA program to be implemented by an air carrier, 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 FAA with de-identified aggregate FOQA information, and procedures for informing the FAA as to any corrective actions being undertaken.
LAN	Local Area Network. A communications network that serves users within a confined geographical area, typically linked together by cable.
LFL	Logical Frame Layout. A data map that describes the format in which parameter data are transcribed to a recording device. This document details where each bit of data is stored.
LRU	Line Replaceable Unit. A unit that can be replaced by line maintenance personnel without removing the aircraft from service for an extended period.
Mapping	See LFL.
MEL	Minimum Equipment List. A list of required equipment that, under certain conditions, might be inoperative.
MTBF	Mean Time Between Failure. The life expectancy of a component or part, expressed in flight hours.
OQAR	Optical Quick Access Recorder. See QAR. A QAR that stores data on an optical disk.
PAI	Principal Avionics Inspector. The FAA employee responsible for oversight and inspection of avionics at a specific air carrier.
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.
PCMCIA card	Personal Computer Memory Card International Association card. A credit card-sized data storage and transfer device that was originally developed for portable computers and may be used on some QARs. The Personal Computer Memory Card International Association was organized in 1989 to promote standards for these memory or input/output (I/O) devices.

GLOSSARY	
Term	Definition
PMI	Principal Maintenance Inspector. The FAA employee responsible for oversight and inspection of aircraft maintenance functions at a specific air carrier.
POI	Principal Operations Inspector. The FAA employee responsible for operational oversight of a specific air carrier.
QAR	Quick Access Recorder. 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. QARs may also store data in solid-state memory that is accessed through a download reader. QARs have now been developed to record an expanded data frame, sometimes supporting 2,000 plus parameters at much higher sample rates than the FDR. The expanded data frame greatly increases the resolution and accuracy of the ground analysis programs.
SRU	Shop Replaceable Unit. A unit that must normally be replaced in a maintenance facility during heavy maintenance checks.
SSFDR	Solid State DFDR. A DFDR that utilizes solid-state memory for recording flight data. See DFDR.
STC	Supplemental Type Certificate. An addendum to the Type Certificate. An STC is required for any new equipment installed on a model of aircraft after that model of airplane has been issued a Type Certificate. See TC.
TC	Type Certificate. The initial certificate issued for every new model of aircraft. The TC lists components and equipment installed on that model of aircraft.
WAN	Wide Area Network. A communications network in which computers are connected to each other over a long distance, using telephone lines, cable connections, or satellite links.
WDL	Wireless Data Link. A system allowing 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).



APPENDIX IV. REFERENCES

CFR Part 193, Protection of Voluntarily Submitted Information
CFR Part 13, Section 13.401, Flight Operational Quality Assurance Program AC 00-46, as amended, Aviation Safety Reporting System (ASRS)
AC 00-58, as amended, Voluntary Disclosure Reporting Program
AC 120-59, as amended, Air Carrier Internal Evaluation Programs: Air Carrier Internal Evaluation-Model Program Guide
AC 120-66, as amended, Aviation Safety Action Program
Flight Safety Foundation, FAA Contract Report, Air Carrier Voluntary Flight Operational Quality Assurance (FOQA) Program, 1992
General Accounting Office, GAO/RCED-98-10, Aviation Safety—Efforts to Implement Flight Operational Quality Assurance Programs, December 1997