

HFDM *and* HUMS



**Listening To Our Aircraft –
A Proactive Approach to Safety for Aircraft
Maintenance and Flight Crew Training**



A VIH Aviation Group Company

A Healthy Aircraft is a Safe Aircraft

Cougar Helicopters is at the forefront of aircraft monitoring technology, allowing us to observe aircraft performance on a per-flight basis. Our experienced engineers have something new in their toolbox - computer modules which assess primary mechanical and airframe parts, enabling them to perform condition-based maintenance for our fleet.

Monitoring flight data not only allows us to oversee the health of our aircraft, but also how the aircraft is flown. Flights can be digitally recreated from acquired data, allowing actual flights to be used as training modules for recurrent pilot training.

These initiatives are among the many that make Cougar Helicopters a leader in flight safety.

HFDM

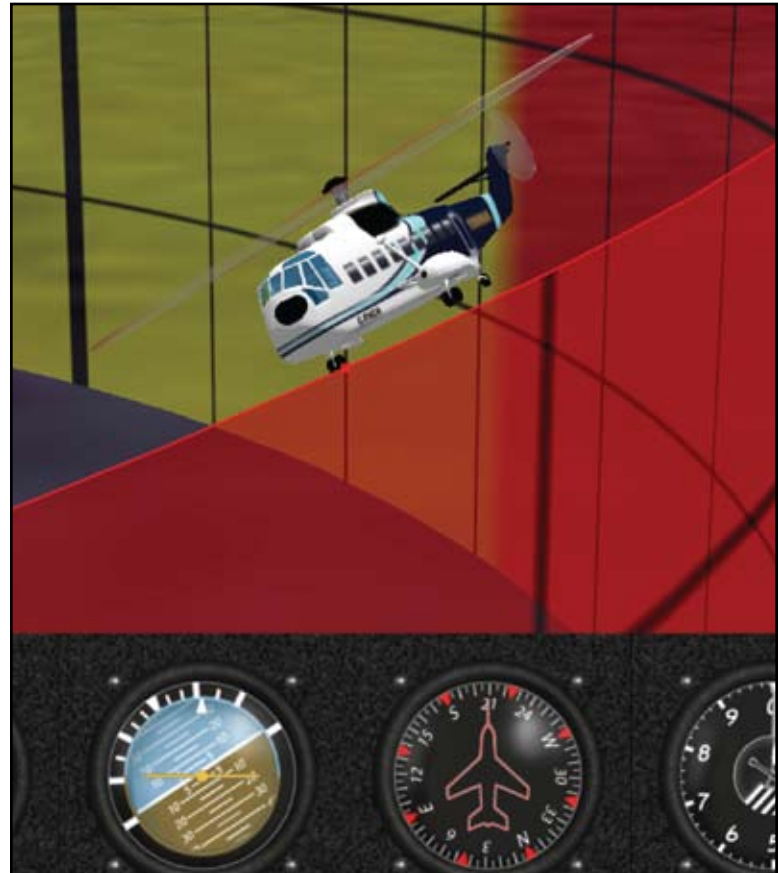
Helicopter Flight Data Monitoring

The ability to look back upon our daily performance with a critical eye allows us to identify our strengths, as well as areas for improvement. It is an invaluable resource to assist in pilot recurrent training, and to provide our HFDM experts a visual reference of aircraft performance in all stages of flight.



The Sikorsky S-92 is equipped with a Multi Purpose Flight Data Recorder (MPFR), which collects data from all aircraft instruments onboard. This information is downloaded on a daily basis by Cougar Avionics, and is then processed in FlightScape software. Standard Operation Procedures, or SOP filters have been configured in FlightScape and are run

on all flight data. Any SOP exceedences or procedural deviations are identified and investigated for all phases of flight. Data from the MPFR can be translated into 2-D profiles or 3-D animation to recreate a virtual version of each flight. This information is invaluable to assist in training pilots with focused individual training curriculums. Cougar employs a full time HFDM data analyst to gather, process, and disseminate this information.



S-61 Appareo ALERTS

Cougar Helicopters has equipped our S-61 aircraft with the Appareo ALERTS Flight Data Recorder System. This recorder collects flight data from aircraft instruments and records it to an SD data card. After each flight, this information is downloaded to a RDK (remote data kiosk). The data is then uploaded via the Internet and sent to the Appareo processing center in Fargo, North Dakota. The data is accessed and transferred to Cougar's HFDM department, allowing our HFDM technicians to evaluate flight data from our S-61 aircraft anywhere in the world. This information can then be used to assist in training pilots with focused individual training curriculums for the S-61.

HUMS

Health and Usage Management System

Aircraft health is a term that speaks volumes. Ensuring that each aircraft is operating at optimum performance before every flight is a part of Cougar's dedication to safety. For the Sikorsky S-92, HUMS provides invaluable flight data to assist in the transition from time-based maintenance to condition-based maintenance. HUMS uses specialized software designed to identify trends or anomalies in key aircraft systems, allowing them to be assessed and corrected. Cougar has a dedicated aircraft maintenance engineer appointed to the monitoring and management of our HUMS data.

HUMS is a standard feature of the S-92 aircraft used by Cougar Helicopters. Numerous sensors located on all primary mechanical and airframe parts relay precise information about the performance of these parts to the flight data retrieval unit. In flight, pilots can view and monitor this data via the multi-function display (MFD), and make informed decisions. After each flight all HUMS flight data is downloaded to a ground station. Anomalies in aircraft performance are detected and reported to Maintenance instantly, allowing immediate responses to potential issues. Providing our maintenance department an in-depth view of the health of each aircraft before and after each flight ensures that our fleet of aircraft is always ready for service.

HUMS performs and assists in the following functions:

- Built-in tests
- Mechanical Diagnostics

- Usage Monitoring
- Exceedance / Event Monitoring
- Engine Vibration monitoring
- Rotor Track and balance

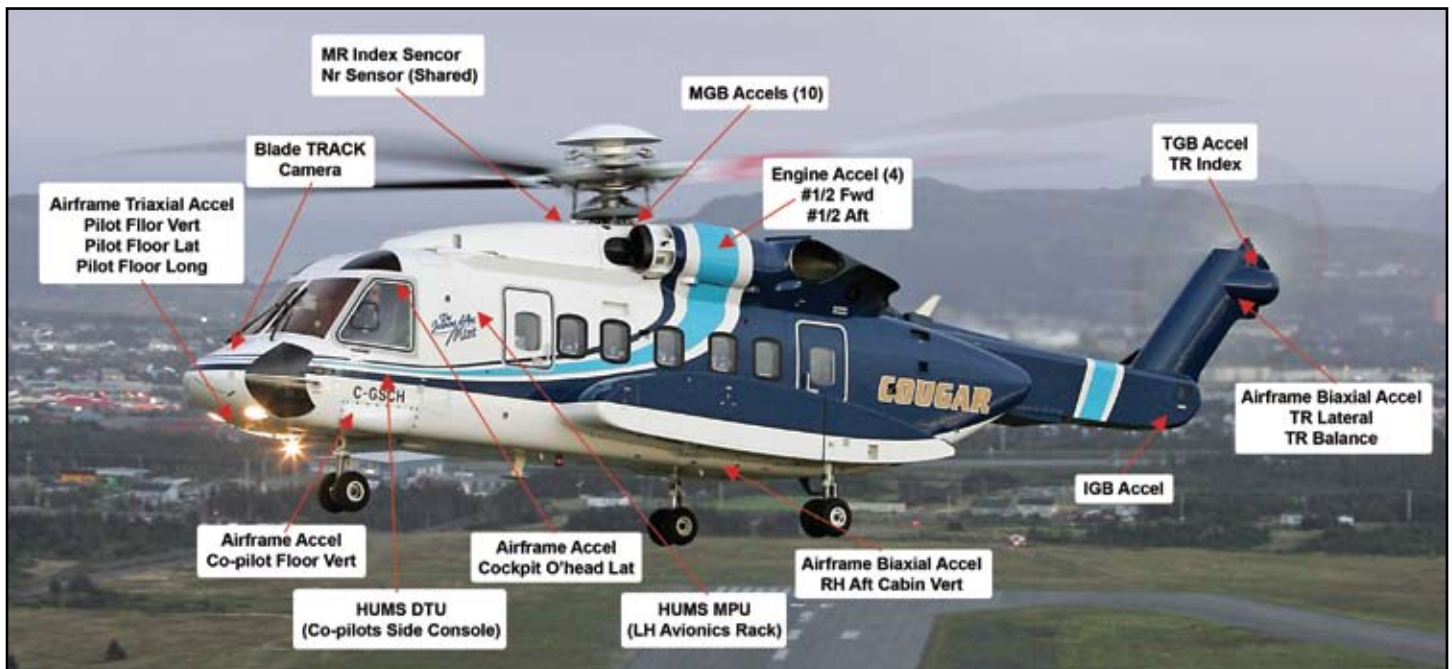
Globally, HUMS data is gathered every day, from virtually all S-92 operators worldwide and is forwarded to Sikorsky's 24/7 Fleet Management Operations Center (FMOC) for additional oversight and monitoring.

VXP

Vibration eXPert

The Sikorsky S-61, a safe, proven, and comfortable aircraft, has been used by Cougar since our beginnings in offshore service. Over time we have modified our S-61 fleet, tailoring them to our specifications and to the needs of our clients. One such modification is the addition of VXP, or Vibration eXPert system. This optional installment allows us to monitor vibration in the main airframe and major component parts such as the main rotor, tail rotor, drive train, and transmission. Vibration information is received from Vibration Acquisition Data Units located throughout the aircraft, and is analyzed on a per-flight basis by Cougar Maintenance. Our VXP representative reviews and tabulates all VXP data daily. Aberrant vibrations can be adjusted as required based on the data received from VXP, allowing us to continue to provide safe, comfortable, reliable service with the Sikorsky S-61.

HUMS Sensors & Locations





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40 Craig Dobbins' Way | St. John's International Airport | St. John's, Newfoundland | Canada A1A 4Y3

Phone: (709) 758-4800 | Fax: (709) 758-4850 | Email: info@cougar.ca | Web site: www.cougar.ca