CGI

Boosting flight safety in Business and General Aviation

CGI's Virtual Flight Recording Service - A Foundation for Safety Management Systems

CGI is making advanced flight recording and monitoring solutions accessible to BGA by leading a consortium in the development of the Universal Virtual Flight Data Recorder (UVFDR).

Given the important role of BGA to our society, a similar level of safety as demonstrated in Commercial Air Transport is highly desirable.

Commercial Air Transport (CAT) has seen a significant decline in accident rates over the past 25 years. Despite a steady growth in flights, the absolute number of air accidents in commercial jet operations continues to decrease.

One of the critical reasons for this significant development is the detailed understanding of the root cause and contributing factors of each incident and accident, so that important lessons can be learned and implemented in a timely fashion. Crash-protected flight recorders, which often provide some of the most important clues in an investigation, have therefore played a pivotal role in making Commercial Air Transport as safe as it is today. So have Safety Management Systems (SMS), Flight Data Monitoring (FDM) and Flight Operations Quality Assurance (FOQA) programs, which implement important lessons learnt from such investigations.

The importance of Business and General Aviation (BGA) to our society is hard to overstate.

BGA operators play many critical roles in private, business and government services. BGA missions range from search and rescue to medevac, police and firefighting, and from business transportation, to providing a lifeline upon which many local and regional economies in remote parts of the world depend.

However, most aircraft types commonly operated by small businesses and private individuals cannot be equipped with traditional flight recording systems in a practical manner. Given the nature of their typical missions, many BGA flights also have a higher risk of ending far away from civilisation after encountering an emergency, especially in remote, mountainous, or oceanic areas. Finding the location where the flight ended can then pose an additional challenge in a situation where timely assistance is of the essence.

CGI is leading the consortium developing the Universal Virtual Flight Data Recorder (UVFDR).

Developed to meet ICAO's standards and recommended practices for a Global Aeronautic Distress and Safety System (GADSS) for Commercial Air Transport, CGI's Universal Virtual Flight Data Recorder (UVFDR) service is designed to provide Global Aircraft Tracking (GAT), Autonomous Distress Tracking (ADT), the Timely Recovery of Flight Recorder Data (TRFD), autonomous and manual triggering of distress alerts as well as post-flight localisation and rescue support. CGI's UVFDR service is not limited to CAT, however. It can be used with data transmitted from any aircraft equipped to transmit the relevant data while airborne, using for example a handheld device or an electronic flight deck.

The increasing ubiquity of passenger cabin connected services drives a rapid development of faster and more reliable mobile satellite services. As the available data communication bandwidth increases and global data communication services become available to an increasing number of devices, the per-unit cost of satellite data connectivity continues to go down. This brings continuous flight data transmissions within the technical reach of modern avionics for light aircraft. And in turn, makes proven concepts such as Safety Management Systems underpinned by sophisticated FDM and FOQA programs, accessible to small businesses and private owner/operators of light aircraft.

CGI's UVFDR service works by replicating the function of a traditional crash-protected flight recorder (Black Box) in a virtual, cloud-based environment. Data transmitted by an airborne aircraft to CGI's UVFDR is kept safe in an assured, authenticated and provenance-controlled cloud storage system. Besides enabling aviation safety investigators to select and quarantine flight data for forensic analysis required by aviation safety investigation authorities, CGI's UVFDR can also be used as part of a sophisticated, near real-time FDM and FOQA system. Developed to be offered as a managed service, aircraft operators and data service providers will be able to use a UVFDR instance stand-alone for alerting and monitoring of all subscribed aircraft in flight or use it as a database underlying a wider FDM, FOQA, and SMS implementation. In this way, the UVFDR service will be able to bring all the functions of GADSS to the BGA community through a simple subscription.

In case of an emergency, incident or accident, the data is already on the ground and available to access.

Easy and cost-effective integration with existing SMS, FDM and FOQA services.

The UVFDR is designed for use with any aircraft equipped to send engineering telemetry and operational data to the ground, irrespective of the type of equipment through which the data is sent. Even if that data is sent through a handheld device connected to onboard avionics (e.g. an electronic flight bag) or a communication system integrated with the aircraft avionics. Providers of aviation data services, like our industry partner SatAuth, can add the UVFDR service to their portfolio of customer-focused solutions. CGI can offer the service globally through existing aviation data service providers, making it a cost-effective foundation of a Safety Management System.

Built on CGI TrustedFabric, the UVFDR provides a secure, authenticated, and impartial trusted truth that can be validated globally.

CGI TrustedFabric is a proprietary blockchain solution for the secure, authenticated, and provenance-controlled storage of data hosted on the cloud. Built on CGI TrustedFabric, the UVFDR has the scalable framework needed to offer a global multi-jurisdictional commercial service. The technology also offers the potential to support additional services, such as improved technical support for aircraft in flight, automated near-real-time ride reports, and integrated flight recording solutions for remotely piloted and advanced air mobility (RPAS and AAM) vehicle systems, including their remote pilot stations and future traffic management systems.

CGI is working together with industry partners SatAuth, Code Magus Ltd, Cranfield University, and Amazon Web Services (AWS), along with other stakeholders, towards a global UVFDR service. The development and operational demonstration are supported by the UK Space Agency and the European Space Agency (ESA) through the ARTES Space for Aviation Safety programme.

About CGI

Insights you can act on

About CGI Founded in 1976, CGI is among the largest IT and business consulting services firms in the world.

We are an IT Systems Integrator working to advise, build and operate bespoke, technically complex, mission-critical information systems. Bringing innovation to our clients using proven and emerging technologies, agile delivery processes and our expertise across space, defence, intelligence, aerospace and maritime, all underpinned by our end-to-end cyber capability.

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