



**Digital Data Download**  
*Flight Information Recorder*



## DATA CENTRIC PROCESSING AND RECORDING

The D3 FIR is the next generation in intelligent processing and recording. The D3 FIR collects data from various aircraft buses and other interfaces and processes the data into information and knowledge for recording. The D3 FIR provides a user programmable “Rules” engine for the intelligent collection, management, processing, and recording of data. Using an English-like language, the user can select the data from among redundant sources, process, fuse, and record information, and infer knowledge.

## MUCH MORE THAN A RECORDER

With Data Centric acquisition and recording capabilities, the D3 FIR acquires audio, video (option), analog (option), data bus (MIL-STD-1553 with FireWire and Fibre Channel options). Access to this data allows the D3 FIR to be used as an information and knowledge repository. MSI’s C-Rules engine, hosted on the D3 FIR, provides real-time data acquisition, real time information extraction, and mission time knowledge fusion and inferencing. The C-Rules engine incorporates MSI’s advanced artificial intelligence real time processing algorithms. This obviates the necessity of post flight processing with answers coming after the problem has manifested itself. With the D3 FIR processing the data in mission time, the answer is available, before landing, for effective maintenance or other corrective action. Data off-load now provides multi-platform learning and optimization across squadron, wing, or fleet.

## D3 FIR REAL-TIMELY INTELLIGENCE

The D3 FIR provides three reference frames for processing: real-time, real-timely, and mission time. Real-time processing allows predictive data acquisition and collection and provides for the management of this data. Real-timely processing provides data fusion to information and inferring of non-observable states. Mission time processing allows for higher level knowledge fusion, inferencing and learning. Generally speaking, real-timely is within one or two seconds, while mission time is a continual process providing the best available estimate at any time but a useful answer by the time it is needed.

Features	Advantages	Benefits
Data Centricity	Common repository of data	Reduces operations and logistics costs
Full Mission Capability	No lost/overwritten data	Complete mission data available
Digital Data Downlink	Ground access to high priority data	Network Centric Portal for new data Improved operational readiness and turn-around time (TAT)
User Programmable Rules	Smart recording adaptable to warfighter needs	Configurable to multiple recording formats and applications
Real Time Artificial Intelligence	Minimizes need for post processing of data	Knowledge available for optimized maintenance, corrective action and logistics.
Coordinated recording of data	Time-and space correlated information recording	Improved playback for debrief, safety, and operational data

### D3 FIR APPLICATIONS INCLUDE:

- Safety recording
- MFOQA
- Mission data
- Video recording
- Maintenance
- Structural
- Health and Usage monitoring
- Prognostic Health Management
- Interactive Training

### FEATURING:

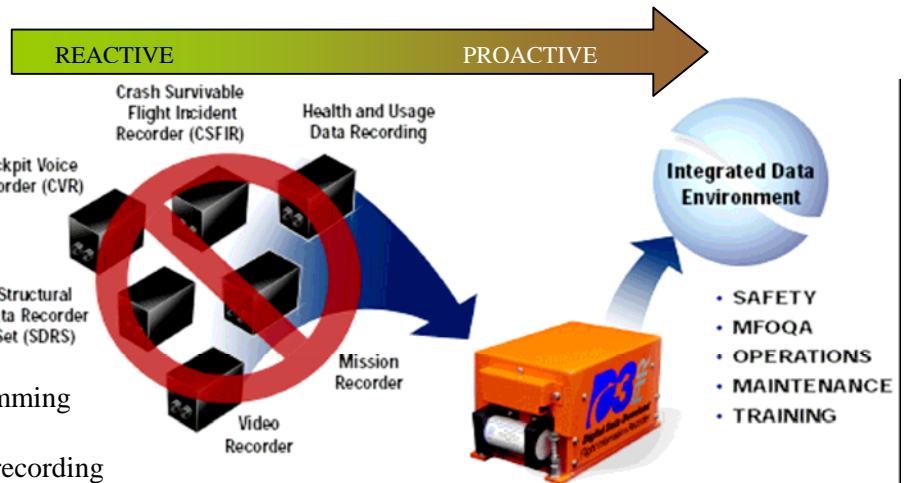
- C-Rules engine for User Programming in an English like syntax
- Real-Time data acquisition and recording
- Up-link and Down-link data management, message formatting, and link management options (controlled by Rules)
- Information and Knowledge processing with classification, inferencing, and learning  
AI algorithms include: Bayesian Classifiers, Static and Dynamic Bayesian Networks, Hidden Markov Models (including Hierarchical and Sequential) and Probabilistic Logic with Recursion (PLR)
- High-speed download (Ethernet, Serial, or WiFi option) using standard PC

### BENEFITS INCLUDE:

- Data Centric Repository of Data, Information, and Knowledge
- Network Centric portal for downlink or query
- Timely knowledge of system state (diagnostic and prognostic) without post processing of mission data
- Optimized decision support for improved operations, maintenance, training, and logistics

### ADAPTABLE SYSTEM:

- Reconfigurable and modular hardware and software architecture
- Two spare board slots
- MIL-STD-1553 data buses (six) or growth to FireWire, FibreChannel, etc.
- Special one and two box configurations available for unique requirements



### D3 FIR SPECIFICATIONS

#### Electrical Specs:

- Input Power +28VDC
- 4 audio channels -120 minutes each
- 6 dual redundant MIL-STD-1553 bus
- 5 EIA-422 input/output channels
- 2 EIA-170A video channels (option)
- 1 Ethernet (10/100) bus
- Control Panel Interface
- 10 to 30 Watts power dissipation

#### Compliance with:

- DO-160D Hardware requirements
- MIL-STD-704(A-E) +28VDC
- DO-178 Level D Software
- Passive Convection Cooling
- TSO C-123a/C-124a
- EUROCAE ED-55/ED-56a
- EUROCAE ED-112 (Video, Ethernet)

### Management Sciences, Inc.