

Installation / Operation Manual

iS CANaerospace Logger (iSCL)



Contents

1.	Preface	3
1.1	Limited Warranty	3
1.2	Overview Software Versions	3
2.	System Description	4
3.	Technical Specifications	5
4.	Mechanical Installation	6
4.1	Drawings iS CANaerospace Logger.....	7
4.2	Accelerometer Orientation	8
5.	Electrical Installation	9
5.1	LANE A Connector	10
5.2	GPS Receiver Connector.....	11
5.3	Available Accessories	11
6.	Operation.....	12
6.1	Startup.....	12
6.2	Flight Data Recording	12
6.3	Software Update	15
7.	Abbreviations and Terms.....	17

1. Preface

Thank you for purchasing an RS Flight Systems iS CANaerospace Logger (iSCL). We are pleased that you have chosen our product and are confident that it will meet all your expectations. In case of questions or problems with the unit, feel free to contact us:

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1.1 Limited Warranty

This RS Flight Systems product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within this period, RS Flight Systems will, at their sole discretion, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failure due to abuse, misuse, accident, or unauthorized alterations or repairs.

1.2 Overview Software Versions

Version	Change Overview	Release date
0.1	Initial Version	31.03.2022

Table 1-1: Software Versions iSCL

2. System Description

The iSCL comprises one data logging unit, a wiring harness and a postprocessing analysis software called EMDS. Its functionality is as follows:

- Data recording of one CANaerospace bus
- GPS Receiver for time stamp and geo reference
- Simple data transfer and software update via an integrated memory card slot
- Sophisticated visualization and processing tool for recorded data (Windows, Linux, MacOS)
- Suitable for 14 V and 28 V aircraft electrical systems
- Optional Wiring harness kit available for third party devices like primary flight displays (PFD) and multi-function displays (MFD)
- High level of manufacturing and quality control
- Engineering and production exclusively done in Germany



Figure 2-1: iS CANaerospace Logger with optional accessories

3. Technical Specifications

	iS CANaerospace Logger
Dimensions (width, height, depth)	71 x 66 x 41 mm 2.80 x 2.60 x 1.61 in
Mounting Depth excl. connectors	45 mm 1.77 in
Mounting	-
Total Mass	0.25 kg 0.55 lbs
Housing	Machined Aluminum, surface black anodized
Supply Voltage	9 to 32 Volts DC, according to EN2282
Power Consumption	typ. 1.2 W (0.1 A at 14 V, 0.08 A at 28 V)
Positioning	Combined GPS/Galileo Sensor (Navilock NL-603P), 4 Hz update rate
Electronics	Xilinx Spartan-6 FPGA with dual Microblaze processors, 3-axis acceleration sensor
Firmware Update	microSD card, up to 128 GB, FAT32 formatted
Storage	Single front mounted SD/SDHC-Card, up to 128 GB, FAT32 formatted
Operating Temperature Range	-20 to +70 °C -4 to +158 °F
Operating Altitude	< 7,620 m < 25,000 ft
Humidity	< 95 %, non-condensing

Table 3-1: Technical Specification

4. Mechanical Installation

Upon delivery, undertake visual inspection of the package contents for signs of transport damage and verify the information on the type plate sticker against your order. Do not open the device housing.

For longer storage of the device, select a dry and clean environment. Make sure that the device is not stored near strong heat sources and that no metal chippings or other dirt can get into the device or its connectors.

As waste heat is dissipated via free convection, leave at least a 5 mm gap from the aluminum surfaces to any other object. Forced cooling is not necessary.

The installation must be in accordance with the appropriate guidelines approved by the respective aviation authority. The person installing the device is responsible for compliance with all applicable legislation.

4.1 Drawings iS CANaerospace Logger

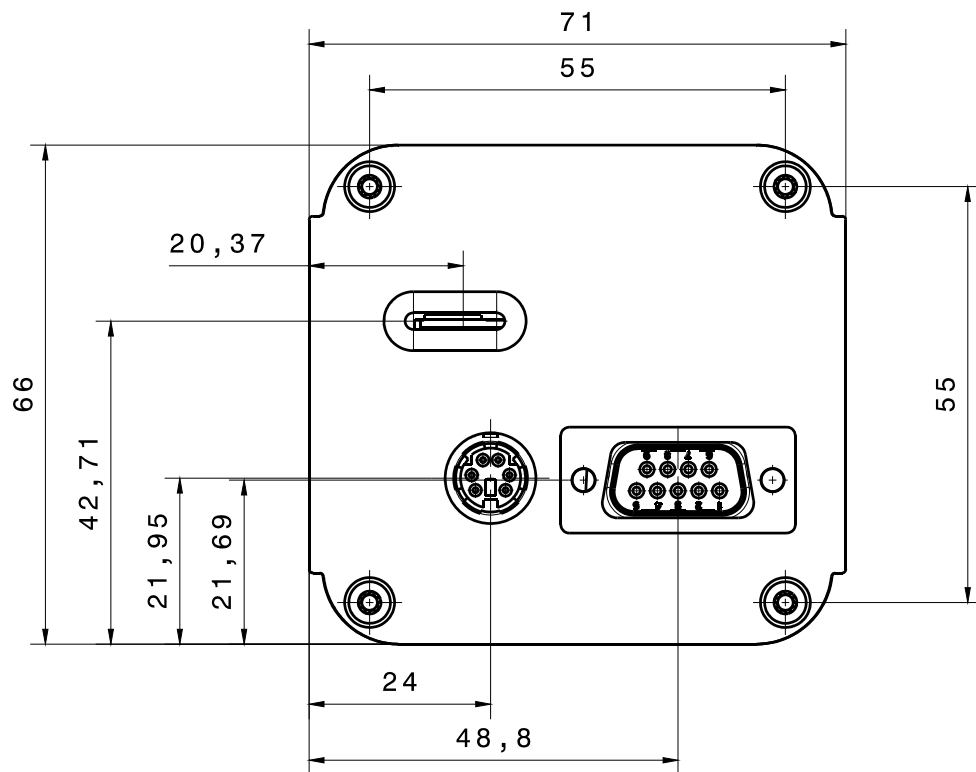


Figure 4-1: iS CANaerospace Logger (front view)

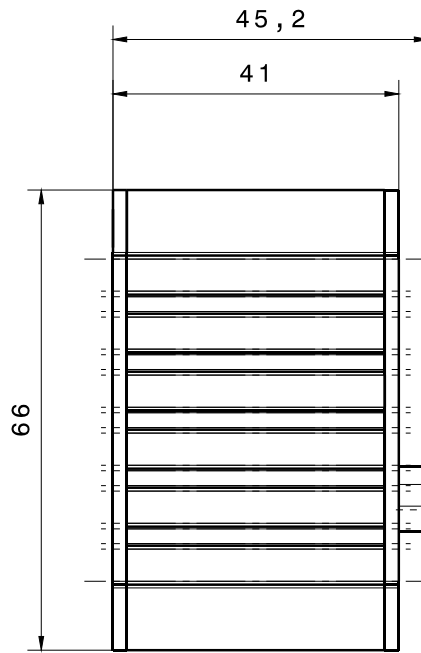


Figure 4-2: iS CANaerospace Logger (side view)

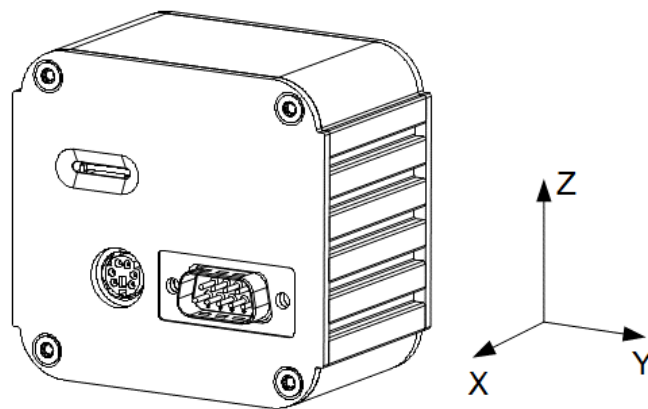


Figure 4-3: iS CANaerospace Logger (isometric view)

4.2 Accelerometer Orientation

The iS CANaerospace Logger is equipped with a 3-axis accelerometer. Acceleration data is logged with 100 Hz. For a good data quality, the iS CANaerospace Logger must be mounted to a stiff aircraft body part. Orientation of the sensor can be seen in Figure 4-3.

5. Electrical Installation

The iSCL has three connectors on the rear side, shown in Figure 4-1. Label, type of connector and usage are listed in Table 5-1. Before powering up the unit for the first time, carefully check your wiring. The wiring diagram is shown in Figure 5-2.

There is one microSD slot to update the firmware and store data. One DIN-style connector for the external GPS receiver to import GPS data. And a D-SUB connector which functions as the main connector to power up iSCL and transmit data. The pinout is seen in Table 5-2.

Place the GNSS antenna in a spot where it has maximum optical visibility of the sky, e.g., the glare shield on top of the instrument panel. Poor GPS reception has no adverse impact on the operation of the unit yet may impair recordings of position, ground speed and UTC data.

Label	Connector Type	Usage
"LANE A"	DE9P (male 9-pin D-Sub)	Power Supply + Data Transmission
"MICRO SD"	MICRO SD	Firmware Upgrade + Data Storage
"GPS"	Female Mini-DIN 6	GPS Antenna

Table 5-1: Connector overview

The legend of the wiring diagram is shown in Figure 5-1.

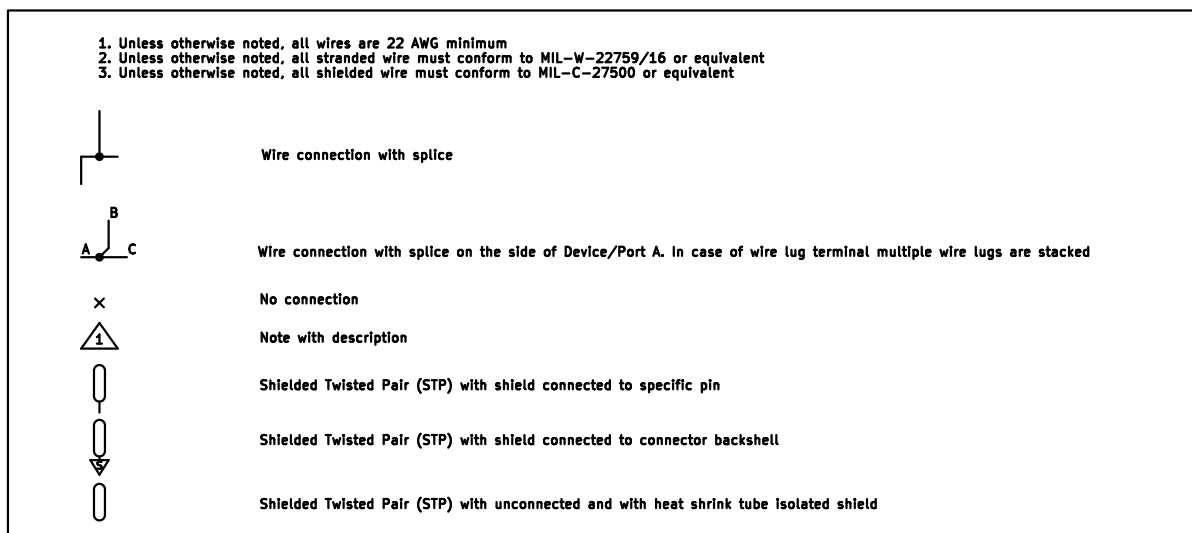


Figure 5-1: Legend of the iSCL Wiring Diagram

5.1 LANE A Connector

The iSCL uses a standard D-SUB 9 connector. Pin 1 is supplied with +9 - 36 VDC, Pin 5 is ground. The power wire must be fused either with a 1.0 A circuit breaker. The P/N of a suitable circuit breaker is listed in Table 5-3. See Figure 5-2 for an exemplary wiring. Interconnect CAN termination Pin 3 and Pin 8 only, if not other CAN device is connected to CAN Lane A. Pin 4 and 8 can be used to connect further devices to the CAN bus. Pin 2 and Pin 4 are internally connected in the iSCL. Pin 7 and Pin 8 are internally connected in the iSCL.

The extended pin allocation is shown in Table 5-2.

Pin Number	Signal Name	Function
1	PWR_IN	Positive Power Supply, +9 - 36 VDC
2	CANL	CAN Low A
3	TERM	CAN termination
4	CANL	CAN Low A
5	AC_GND	Aircraft Ground
6	PWR_OUT	Positive Power Supply, +9 - 36 VDC
7	CANH	CAN High A
8	CANH	CAN High A
9	AC_GND	Aircraft Ground

Table 5-2: Pin out Lane A Connector

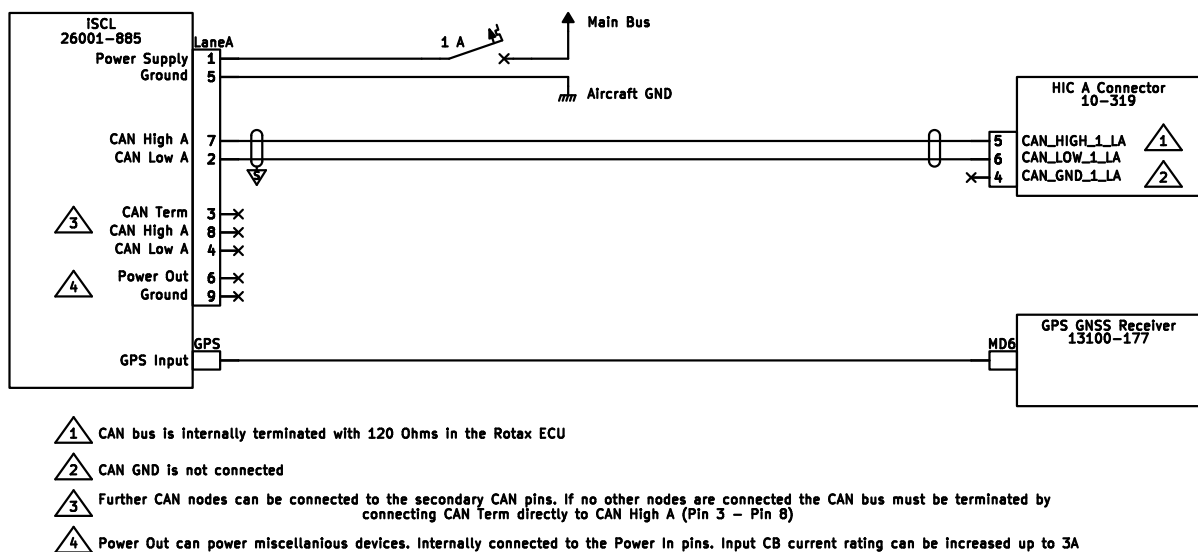


Figure 5-2: iSCL Wiring Diagram

5.2 GPS Receiver Connector

The provided GPS receiver has a mating connector for the GPS port, see Figure 5-2.



Figure 5-3: GPS receiver

5.3 Available Accessories

Part No.	Name	Description
10-850	Wiring Harness Kit Garmin GEA24	Prewired shielded harness for Lane A and B connectors Includes power supply wires
10-851	Wiring Harness Kit Kanardia miniDAQU	Prewired shielded harness for Lane A and B connectors Includes power supply wires
10-852	Wiring Harness Kit Dynon EMS 221	Prewired shielded harness for Lane A and B connectors Includes power supply wires
13100-177	GPS Receiver	High precision GPS receiver Sensitivity max. -162 dBm, IPX6 protection class
10-875	Klixon Circuit Breaker 7277-2-1	Small and light automatic circuit breaker Rated value: 1 A
10-330	Crimp Tool D-SUB Contacts	DMC Crimp Tool. Kit consisting of basic crimp tool and specific crimp head Fits for all contacts of D-SUB 9, 15 and 25 connectors Fits for male (plugs) and female (sockets) contacts
10-562	Connector Kit CAN	CAN Connector for the EMU / SCU Including connector shell, contact insert and 9 milled crimp contacts Metal back shell
10-572	Extraction Tool D-SUB	Contact Extraction and Insertion Tool Fits for D-SUB connectors
10-193	Power Supply Unit	Power Supply Unit for the EMU and SCU Electromagnetic shielding

Table 5-3: Connectors, Harnesses and Accessories

6. Operation

In this chapter operational procedures for the iSCL are described.

6.1 Startup

The iSCL starts up as soon as sufficient supply voltage is provided.

6.2 Flight Data Recording

The iSCL records all data transmitted by the ECU over Lane A and the respective CANaerospace interface. This function is only active as long as an SD card is inserted. For each restart of the iSCL or every 6 minutes (0.1 recording hours) of runtime, a new file is created and the previous one is closed. The file naming convention is:

DAT00001.CAN

with 00001 being the decimal number, which is incremented by one for each new file and allows for 99999 different files to be created, named and stored. The number of the last file which has been closed and written to the SD card is stored as a 5-character ASCII string in the file "TOPDAT.CFG", which is also written to the card. Most of the data is transmitted 10 times per second and a typical data rate is 12 kilobytes per second. Using a 128 GB SDHC memory card, this results in a maximum recording time of 3,000 hours.

A powerful Engine Management Debriefing Station (EMDS) software for the Microsoft Windows, SuSE Linux and Apple MacOS X operating systems is delivered with the iSCL. This tool (see Figure 6-1 to Figure 6-5) allows for visualization and post-processing of the recorded data as well as a three-dimensionally georeferenced data conversion to Google Earth compatible files.

The EMDS software is available on the following server:

<https://www.rs-flightsystems.com/product-page/emu-912xis>

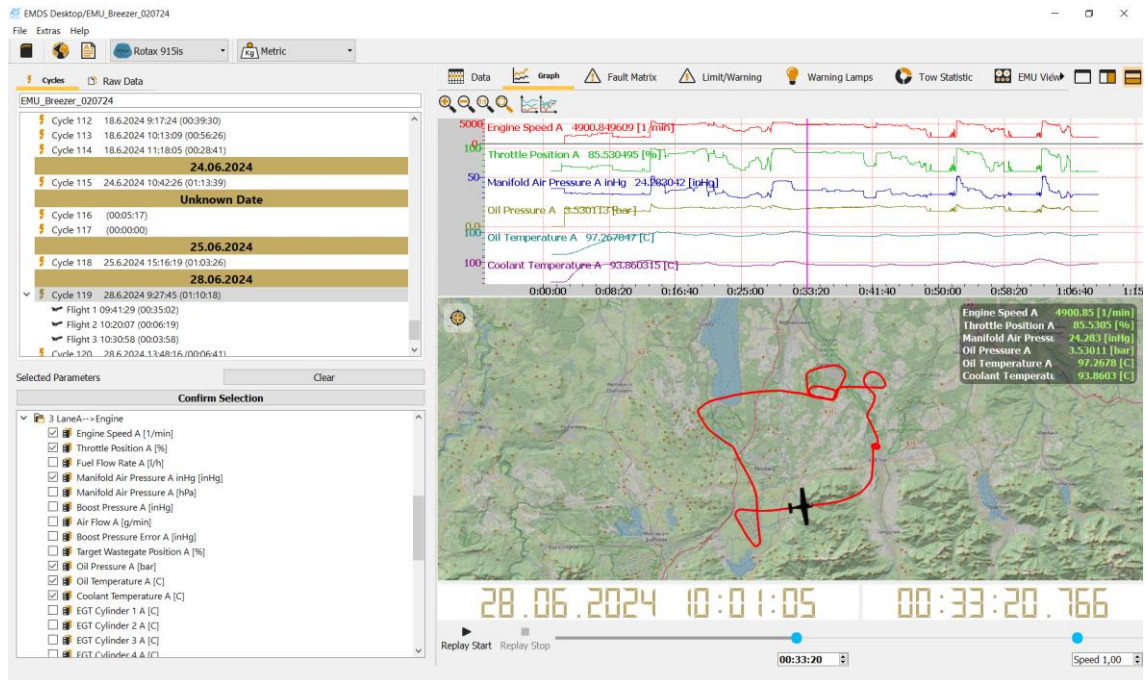


Figure 6-1: Engine Management Debriefing Station (EMDS) Software

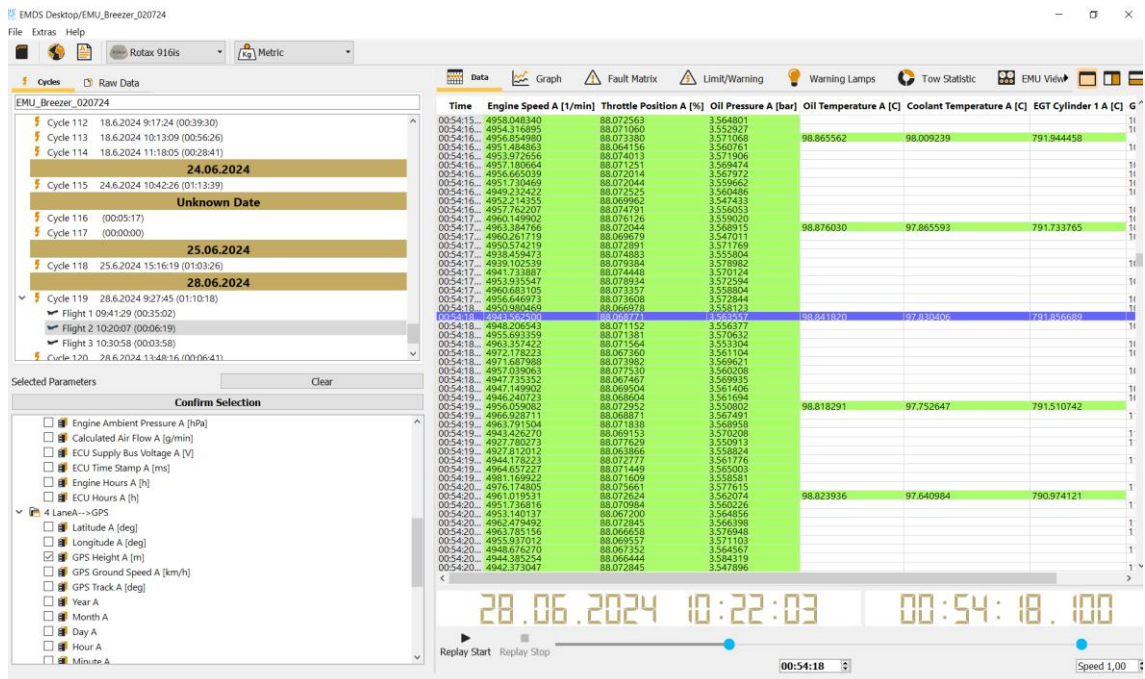


Figure 6-2: EMDS Data Screen

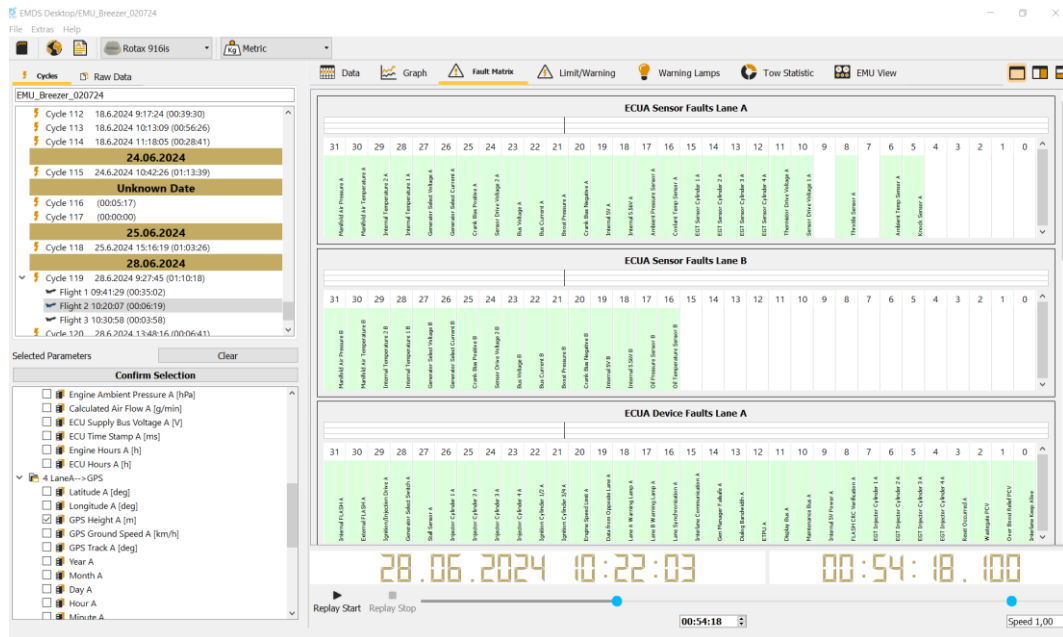


Figure 6-3: EMDS Fault Matrix Screen

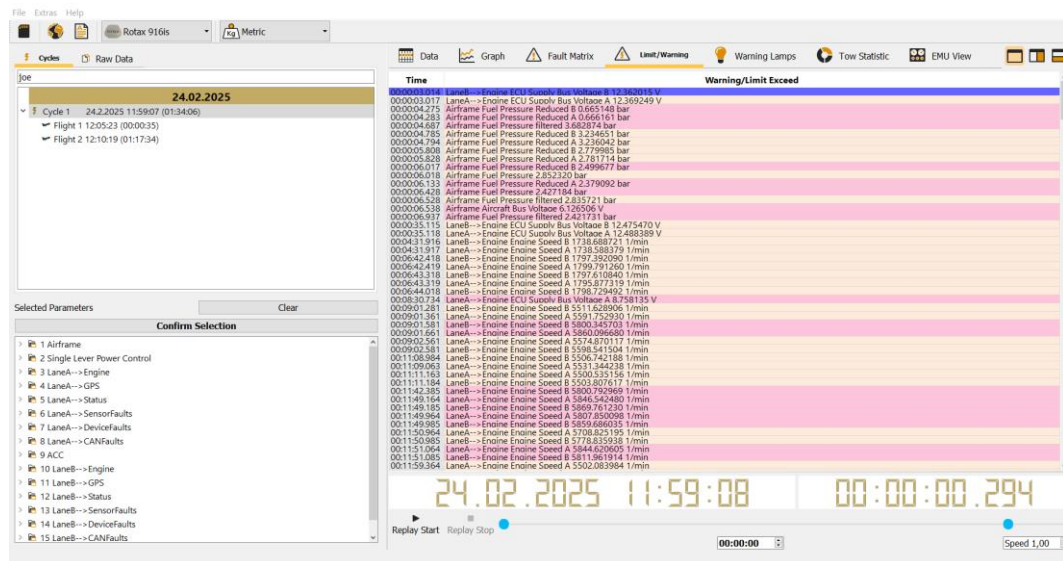


Figure 6-4: EMDS Limits Screen



Figure 6-5: EMDS generated Google Earth View

6.3 Software Update

The iSCL allows for easy conduction of software updates through the SD memory card interface. The software is delivered in compressed .zip-files with the following exemplary structure:

iSCL_SW_iSCL0.1.zip -> iSCL_SW_iSCL0.1-> mb0.srd, mb1.srd

The binary software upgrade files (mb0.srd, mb1.srd) must be stored on an SD memory card which is then inserted (contacts up) in the slot in the main unit. The binary files are recognized by the EMU each time power is applied and the device boots up. When update files are detected, the content is automatically programmed into flash memory and the device starts up using the new software. An installation logfile ("INSTALL.LOG") is created and stored on the memory card and the update files are deleted.

Please ensure every step before flashing.

- Use a microSD card with max. 256 GB
- Make sure to format the microSD card in FAT32 format (exFAT/NTFS is not supported!)
- Ensure the microSD card is empty
- Download the latest firmware from the RS Flight Systems website (<https://www.rs-flightsystems.com/product-page/is-canaerospace-logger>)
- Do not rename the firmware file

Flashing mechanism:

- Power off the iSCL
- Copy the downloaded binary file: mb0.srd & mb1.srd in the root directory of the microSD card
- Insert the microSD card in the slot
- Power on the iSCL

7. Abbreviations and Terms

Abbreviation	Description
ACV	Aircraft Voltage
AUX	Auxiliary
CAD	Computer Aided Design
CAN	Controller Area Network
DC	Direct (non-alternating) Current
ECU	Engine Control Unit
EMDS	Engine Management Debriefing Station
EMU	Engine Management Unit
EN	European Norm
GND	Ground
GNSS	Global Navigation Satellite System (e.g., GPS, Galileo, GLONASS)
HIC	Harness Interface Connector
iSCL	iS CANaerospace Logger
ISO	International Organization for Standardization
I/O	Input/Output
MFD	Multi-function display
PFD	Primary flight display
SAE	Society of Automotive Engineers
SD	Secure Digital (type of memory card)
SDHC	Secure Digital – High Capacity (type of SD card)
STP	Shielded Twisted Pair
UTC	Coordinated Universal Time



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