

S3DR-EMU

SES Engine
Monitoring Unit



Product Design Hardware Design Software Design Mechanical Design Electronic Design

Hardware Design Software Design Mechanical Design Electronic Design Product Design

Software Design Mechanical Design Electronic Design Product Design Hardware Design

S3DR-EMU



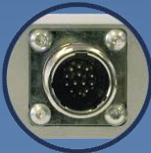
SES Solid State Data Recorder
Engine Monitoring Unit

SES Engine Monitoring Unit

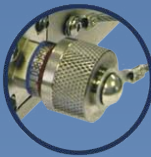
The S3DR product family is a low cost, high performance, rugged solution to the processing and data recording needs of an environmentally challenging embedded system, such as those found in aerospace, defence, naval and safety-related or high performance industrial applications.

The S3DR product family is designed with flexibility and expandability in mind. S3DR-EMU (Engine Monitoring Unit) is a specialisation of the more generic product family providing a data recording solution certified by the FAA for use with the Rolls-Royce Corporation Model 250-C300 gas turbine engine.

SES Engine Monitoring Unit



Main Connector
(Electrically isolated speed, pressure and temperature sensors, aircraft power and discrete status output)



Download Connector
(High Speed USB II data download interface)



Status Indicator



Compact Package
(120.6mm x 38.4mm x 176.5mm)



Built in Solid State Memory



Battery Backed Internal Time Source



Temperature
(Operation -46 to +72°C,
Storage -54 to +122°C)



Environmentally qualified to RTCA/DO-160D1



The S3DR-EMU records power turbine and gas generator shaft speeds, engine torque and gas temperature from engine sensors and also its own internal temperature. The unit stores additional parameters such as number of engine starts and accumulated engine run time. It also detects excursions of recorded parameters outside programmable limits and records data during such events, at a higher than normal sample rate. Recording duration is in excess of 2,000 hours.

The S3DR-EMU provides a high speed USB II data download interface, to allow data to be extracted from the unit using SES developed Data Download Software.

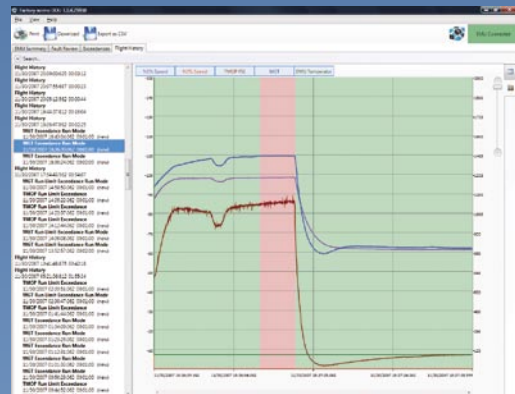
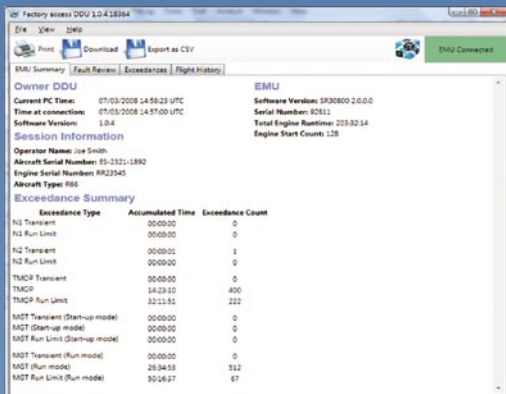
A key feature of the S3DR-EMU is the electrical isolation offered by its input circuit design. The software and hardware design architecture is scaleable to allow the number of recorded interfaces to be expanded, if required.

Data Download Software

The EMU Data Download Software (DDU) is a specialization of the SES standard Reveal product. The DDU provides differing levels of access depending on user type.

At its simplest level it provides a quick look facility for engine statistics, faults and incidents.

At its most complex, it provides engine data download facilities, graphical and tabular data displays, complex search facilities and the ability to modify incident detection threshold levels in the EMU itself.



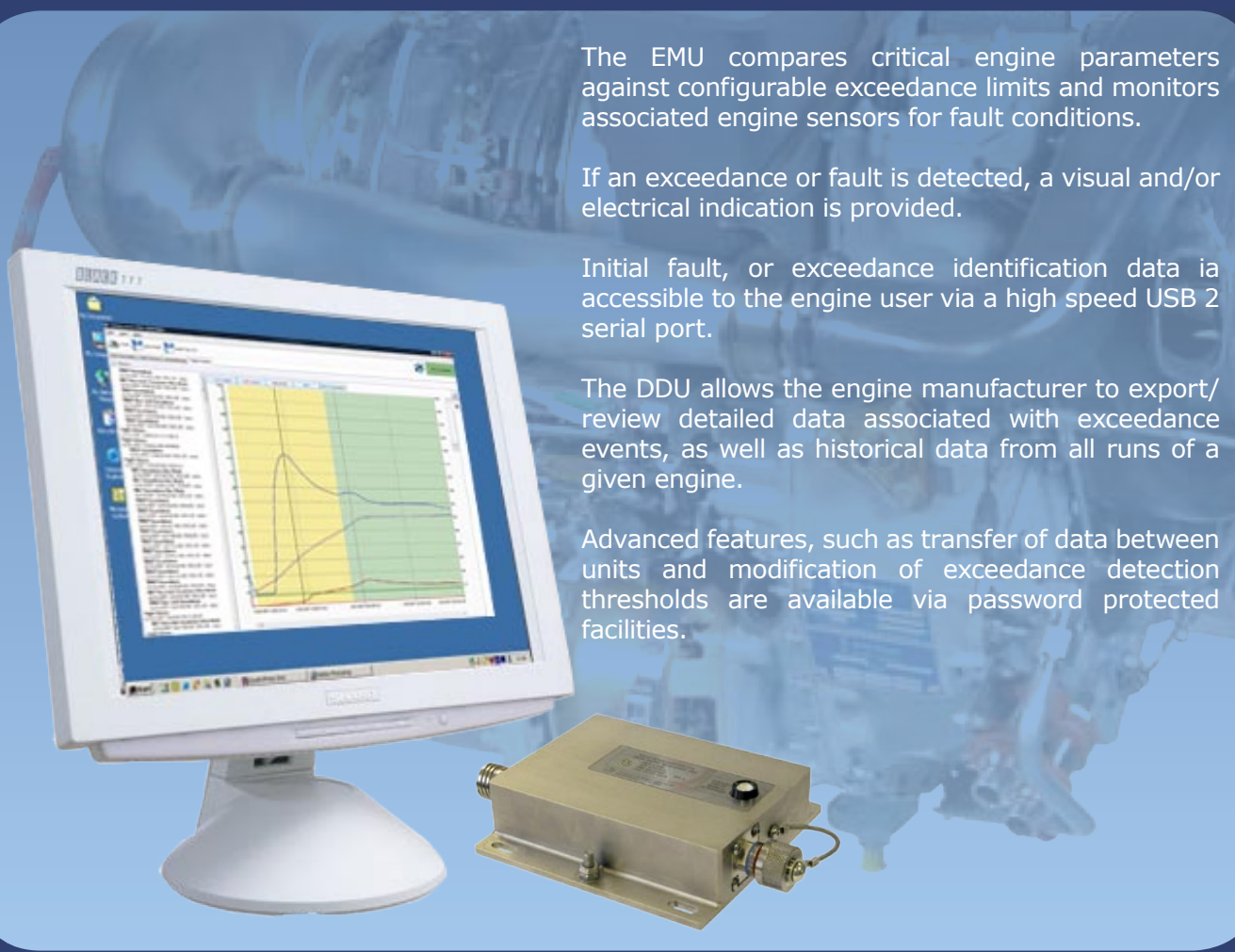
The EMU compares critical engine parameters against configurable exceedance limits and monitors associated engine sensors for fault conditions.

If an exceedance or fault is detected, a visual and/or electrical indication is provided.

Initial fault, or exceedance identification data is accessible to the engine user via a high speed USB 2 serial port.

The DDU allows the engine manufacturer to export/review detailed data associated with exceedance events, as well as historical data from all runs of a given engine.

Advanced features, such as transfer of data between units and modification of exceedance detection thresholds are available via password protected facilities.



S3DR-EMU Specification



Dimensions:	120.6mm x 38.4mm x 176.5mm
Weight:	< 750g
Case Construction:	Aluminium Alloy with Electroless Nickel plating
Standard Data Interfaces:	2 x Variable Reluctance Speed Sensor 1 x k-type thermocouple 1 x pressure sensor
Recording Memory Media:	Internal solid state memory
Data Sample Rate:	1 sample per second during normal operation 16 samples per second during incidents
Power Requirements:	< 5 Watts

Environmental Specification

OPERATING TEMPERATURE:	-46 to +72°C	FUNGUS:	Specified to RTCA/DO-160D, section 13, Category F
STORAGE TEMPERATURE:	-54 to +122°C	SALT SPRAY:	Specified to RTCA/DO-160D, section 14, category S
TEMPERATURE VARIATION:	Tested to RTCA/DO-160D, section 5, Category B	ICING:	Tested to RTCA/DO-160D, section 24, Category A
ALTITUDE:	Tested to RTCA/DO-160D, section 4.6.1, Category B3 From -2,000 to +25,000 ft	MAGNETIC EFFECT:	Tested to RTCA/DO-160D, section 15, Category Z
HUMIDITY:	Tested to RTCA/DO-160D, section 6, Category B	POWER INPUT:	Tested to RTCA/DO-160D, section 16, Category B
SUSTAINED ACCELERATION:	Tested to RTCA/DO-160D, section 7.3.2, Category B	VOLTAGE SPIKE:	Tested to RTCA/DO-160D, section 17, Category B
SHOCK:	Tested to RTCA/DO-160D, section 7.2, Category B, 20g for 11ms in each of three axes	AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY:	Tested to RTCA/DO-160D, section 18, Category B
VIBRATION:	Tested to RTCA/DO-160D, section 8, Category R	INDUCED SIGNAL SUSCEPTIBILITY:	Tested to RTCA/DO-160D, section 19, Category B
EXPLOSION PROOF:	Specified to RTCA/DO-160D, section 9, Category E	RF SUSCEPTIBILITY:	Tested to RTCA/DO-160D, section 20, Category V
RAIN:	Tested to RTCA/DO-160D, section 10, Category R	EMISSION OF RF ENERGY:	Tested to RTCA/DO-160D, section 21, Category L
FLUID SUSCEPTIBILITY:	Specified to RTCA/DO-160D, section 11, category F	LIGHTNING INDUCED TRANSIENTS:	Tested to RTCA/DO-160D, section 22, Category XXE2
SAND AND DUST:	Tested to RTCA/DO-160D, section 12, Category D	ELECTROSTATIC DISCHARGE:	Tested to RTCA/DO-160D, section 23, Category A

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