

The most reliable and compact on-asset corrosion monitor for improved asset and fleet management.

For corrosion management programs in need of more proactive and effective maintenance practices, the Acuity LS from Luna improves corrosion prevention and control through continuous asset monitoring of environmental severity and corrosivity. This long lasting, compact, lightweight, and installation-ready unit autonomously measures environmental and corrosion parameters, providing critical measurements required to enhance asset reliability and reduce life cycle costs.

Overview

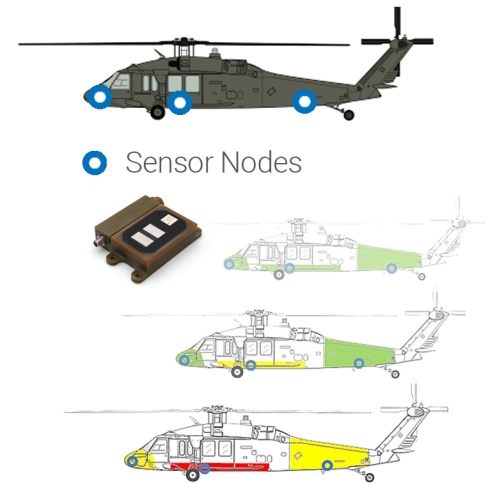
The Acuity LS corrosion monitoring system for onboard monitoring provides long duration, autonomous measurements of environmental and corrosion parameters. Acuity LS continuously collects and records air temperature, relative humidity (RH), surface contaminants, free corrosion of alloys and galvanic corrosion of dissimilar materials. The sensor node is small in size, battery-powered, lightweight, and mounts directly onto structures and subsystems.

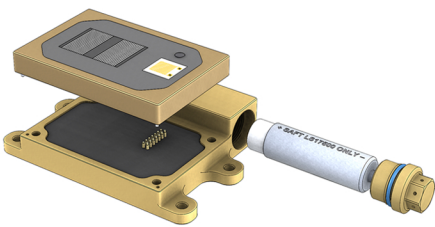
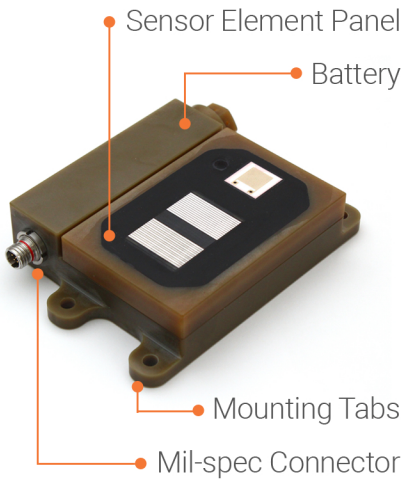
Acuity LS provides five years of monitoring between battery replacements (assuming 60 min measurement intervals). The commercially available battery is easily exchanged by the user.

Acuity LS corrosion sensor elements are replaceable if they become degraded after prolonged operation in severe environments. Replacement Acuity LS sensor element panels are available from Luna and are easily exchanged in the field by the user using simple tools.

Features

- Full suite of corrosion and environmental measurements
- Compact and lightweight sensor node, 1.05" x 4.7" x 3.5" and 0.75 lbs
- Harsh environment design featuring fully potted electronics, o-ring sealed enclosures, and durable military grade connector
- Low self-discharge battery with remaining life indicator
- Qualified for flight safety
- Operates independent of aircraft electrical and power systems
- Service temperature range -40 to +85 °C
- Option for coating corrosion sensor elements to monitor protective properties in service environments
- Direct comparison with CorRES™ measurements to standardize measure of severity between accelerated tests, outdoor exposures, and service environments





Standard engineering alloys for Acuity LS sensor element panels:

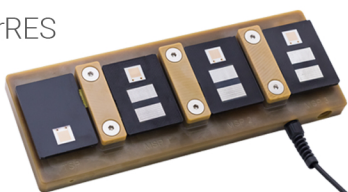
Free Corrosion + Galvanic Corrosion

- 7075 7075 / 316
- 7075 7075 / A286
- 2024 2024 / A286
- 1008 1008 / 316

Other alloys available upon request, please consult Luna.

Measurements of contaminants, free corrosion, and galvanic corrosion are compliant with ANSI/NACE Standard TM0416-2016 "Test Method for Monitoring Atmospheric Corrosion Rate by Electrochemical Measurements".

CorRES



Components

Sensor Element Panel: Equipped with corrosion sensing elements, contaminant sensing element, air temperature, and RH sensors. Alloy sensor elements are designed to actively corrode over time and may require replacement after prolonged use. The sensor panel can be easily replaced by the user. Replacement sensor panels are available from Luna.

Battery: Lithium Thionyl Chloride primary cell optimized for long-duration remote applications. At 60 minute sampling intervals, expected battery life is approximately five years. Battery replacement can be quickly performed in the field by the user.

PC Connection: PC connection required for setup and data retrieval. Durable military grade connector (SWAMP, MIL-DTL-38999) for reliable connection. Acuity LS RS485-USB Communications Adapter Cable connects the sensor node to a PC via standard USB 2.0 port.

Measurement of Contaminants

The loading of salt contaminants on the surface is determined by measuring electrolyte conductance using a gold interdigitated electrode (IDE). The gold IDE measures high frequency solution impedance.

Measurement of Corrosion Rates

Acuity LS monitoring system measures the free corrosion and galvanic corrosion rates for standard engineering alloys. The free corrosion measurement is made using a low frequency polarization technique that is highly correlated ($R^2 \geq 0.95$) to mass loss measurements in accelerated tests. The galvanic corrosion current is directly measured using a built in zero resistance ammeter and both corrosion rates are reported in engineering units. The corrosion rate sensors are fabricated from composite laminated sheets of metals and engineering alloys to achieve long lasting performance in the harshest environments.

Sensor Element	Parameter
Air Temperature	Temperature, °C ±0.3 @ -40 to 85 °C
RH	Relative humidity, % ±2 @ 0 to 100%
Contaminants	Conductance, Siemens
Free Corrosion	Free corrosion current, µA Cumulative free corrosion, µC
Galvanic Corrosion	Galvanic corrosion current, µA Cumulative galvanic corrosion, µC
Surface Temperature	Temperature, °C ±0.3 @ -40 to 85 °C

The CorRES™ Coatings and Corrosion Evaluation System from Luna offers high throughput measurements in accelerated test chambers and at outdoor exposure sites. Acuity LS and CorRES combine to provide a standardized measure of severity and corrosion between test and service environments.