



Trusted Solutions for Corrosion  
Control and Prevention

# About Acuity Systems

## Our Company

The Acuity product suite was developed at Luna Labs. Luna Labs was founded in 1990 as an applied research division of Luna Innovations Inc. In 2022, Luna Labs became its own independent, privately held business headquartered in Charlottesville, Virginia. Our company is composed of approximately 90 scientists and engineers generating multi-disciplinary solutions. Luna Labs is a development partner to industry and defense organizations around the globe, holding 80 US and international patents.

## Trusted Solution

The Acuity systems are an Atmospheric Corrosion Monitoring product, initially developed on US Navy and Air Force supported Small Business Innovation Research (SBIR) projects. Our team of researchers and engineers have 15 years of corrosion applied research and continuously iterate, incorporating customer and partner feedback to optimize the Acuity product suite.

## Modernize Corrosion Prevention and Control in Your Organization

Determining corrosion risk and preventing damage is better managed through continuous, quantified measurements. Acuity systems monitor corrosion rates and environment conditions in real-time.

Instead of subjective visual inspections or periodic measurements of mass loss, maintainers and engineers are empowered to confidently and quickly make decisions using reliable and standardized data.

Acuity systems deliver real-time, autonomous monitoring of corrosivity in harsh environments. The systems continuously collect and store measurements of:

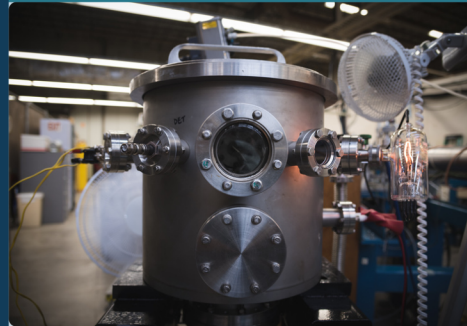
- ✓ Single-alloy corrosion (free corrosion)
- ✓ Mixed materials corrosion (galvanic corrosion)
- ✓ Surface contaminants (salts)
- ✓ Air temperature
- ✓ Relative humidity

For maintainers, our systems monitor structures and subsystems of aircraft, automobiles, ships, or other assets operating in corrosive environments.

For test and evaluation engineers, Acuity systems accelerate testing time and increase confidence in predicted performance. Our systems operate inside laboratory test chambers, at outdoor exposure sites, and on assets in operation.

# Acuity Solutions

## By Market



### Materials & Processes

- ✓ Optimize accelerated test conditions
- ✓ Assess materials performance during test
- ✓ For use on outdoor test fixtures, inside laboratory test chambers, and on assets in service



### Maintenance

- ✓ For condition-based maintenance applications
- ✓ Monitor local corrosivity through lifetime of an asset
- ✓ For use on structures and subsystems assets in service

## By Industry



### Aerospace

- ✓ Justify the need for inspections and maintenance actions
- ✓ Prevent unnecessary time-based inspections
- ✓ Detect early onset of corrosive conditions within an airframe



### Automotive

- ✓ Assess risk for new vehicle design
- ✓ Measure the performance of new materials introduced in corrosive environments and rigorous terrains



### Other

- ✓ Industrial, civil engineering, and marine
- ✓ Track the rate of corrosion in structures, marine vessels, and offshore platforms

# Why Acuity?

## For Maintenance Programs



### Data-driven Maintenance

Justify the need for visual corrosion inspections based on actual environmental exposure



### Early Detection

Detect corrosive conditions throughout an airframe to identify early onset corrosion



### Aircraft Tracking

Analyze how sorties or operations drive corrosive conditions in the aircraft



### Full Suite of Corrosion Parameters

Isolate environmental factors which are causing corrosion and degradation of aircraft systems

## For Materials & Processes



### Environmental Monitoring

Continuously record the environmental conditions that drive corrosion during accelerated and outdoor tests to enhance confidence when interpreting results



### Severity Classification

Determine the cumulative severity of any environmental exposure using a common metric



### In Situ Coatings Testing

Accelerate testing times and reduce the burden of panel preparation and analysis using continuous and quantified measurements of performance



### Continuous Corrosion Rates

Improve assessments of corrosion performance through continuous measurements of damage while monitoring the conditions driving corrosion



### Confidence in Materials Selection

Enhance understanding of risk and performance when two dissimilar materials are paired in a corrosive environment

# What Makes Acuity Different?



## Novel Sensor Design

Durable hardware and sensors that withstand harsh conditions



## Consolidated Data Collection

Environmental, conductance, and multiple corrosion sensors all in one device



## Relevant Engineering Materials

High resolution, long-lasting measurements of corrosion rates for aluminum, steel, stainless, zinc, CFRP, titanium, and other engineering materials; single-material (free) corrosion and mixed-material (galvanic) corrosion



## Simple Operation

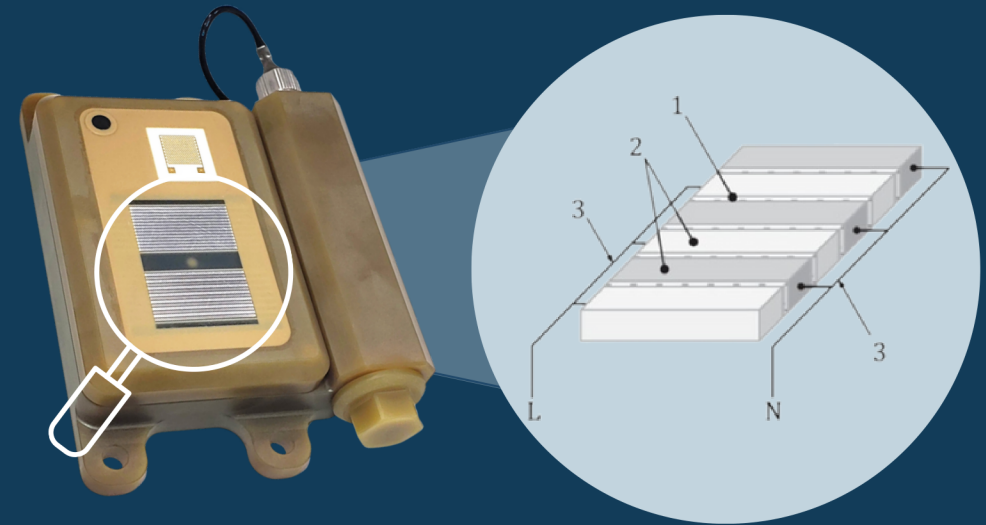
User-friendly interface for setup and data retrieval, devices are easily mounted onto structures, test stands, assets, and test chamber racks



## Analysis & Modeling Expertise

Leverage our expertise in analysis and modeling of corrosion data, utilizing sensor data along with local weather, maintenance, operations, and other relevant inputs

## Durable Corrosion Sensor Technology



### Two-electrode electrochemical sensors

1. Dielectric insulating material
2. Electrode digits (Al, steel, Ti, CFRP, zinc), several millimeters thick
3. Working electrode leads

L/N are the excitation signals

## Compliance

Acuity systems are compliant with the following standards:

### ISO 22858: 2020

Corrosion of metals and alloys –  
Electrochemical measurements –  
Test method for monitoring  
atmospheric corrosion

### ANSI/NACE TM0416-2023:

Test Method for Monitoring  
Atmospheric Corrosion

### AMPP TM21449-2021:

Continuous Measurements for Determination  
of Coating Protective Properties

### SAE AIR6970:

Atmospheric Corrosion Monitoring  
Information Report

# Acuity Product Overview

Which product is right for you?



## Acuity LS

- ✓ Environmental Monitoring
- ✓ Severity Classification
- ✓ In Situ Coatings Testing
- ✓ Continuous Corrosion Rates
- ✓ Materials Performance
- ✓ Data-driven Maintenance
- ✓ Early Detection
- ✓ Aircraft Tracking
- ✓ Full Suite of Corrosion Parameters

*Optimal Environments:*



Outdoor Exposures



Automobiles



Aircraft



Marine Vessels



Infrastructure

## Acuity ES



- ✓ Environmental Monitoring
- ✓ Severity Classification
- ✓ Data-driven Maintenance
- ✓ Early Detection
- ✓ Aircraft Tracking

*Optimal Environments:*



Test Chambers



Automobiles



Aircraft



Outdoor Exposures

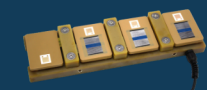


Marine Vessels



Infrastructure

## Acuity CR



- ✓ Environmental Monitoring
- ✓ Severity Classification
- ✓ In Situ Coatings Testing
- ✓ Continuous Corrosion Rates
- ✓ Materials Performance

*Optimal Environments:*


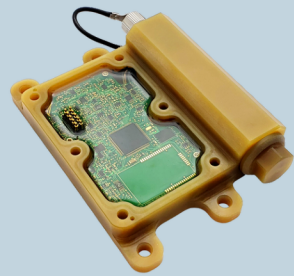
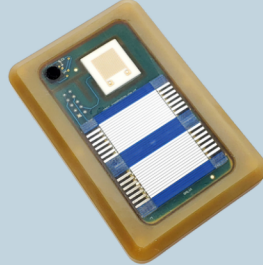


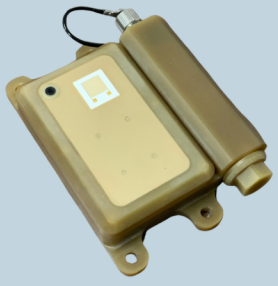
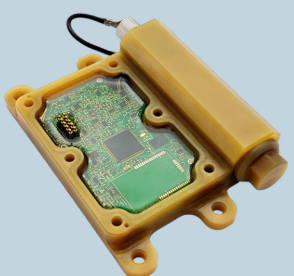



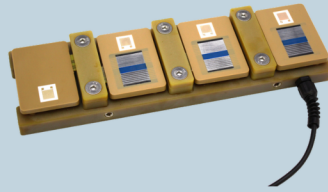
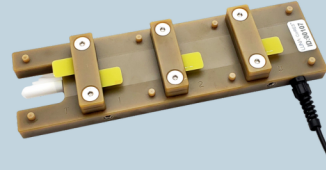

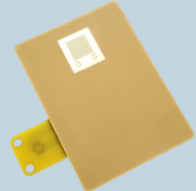




Test Chambers

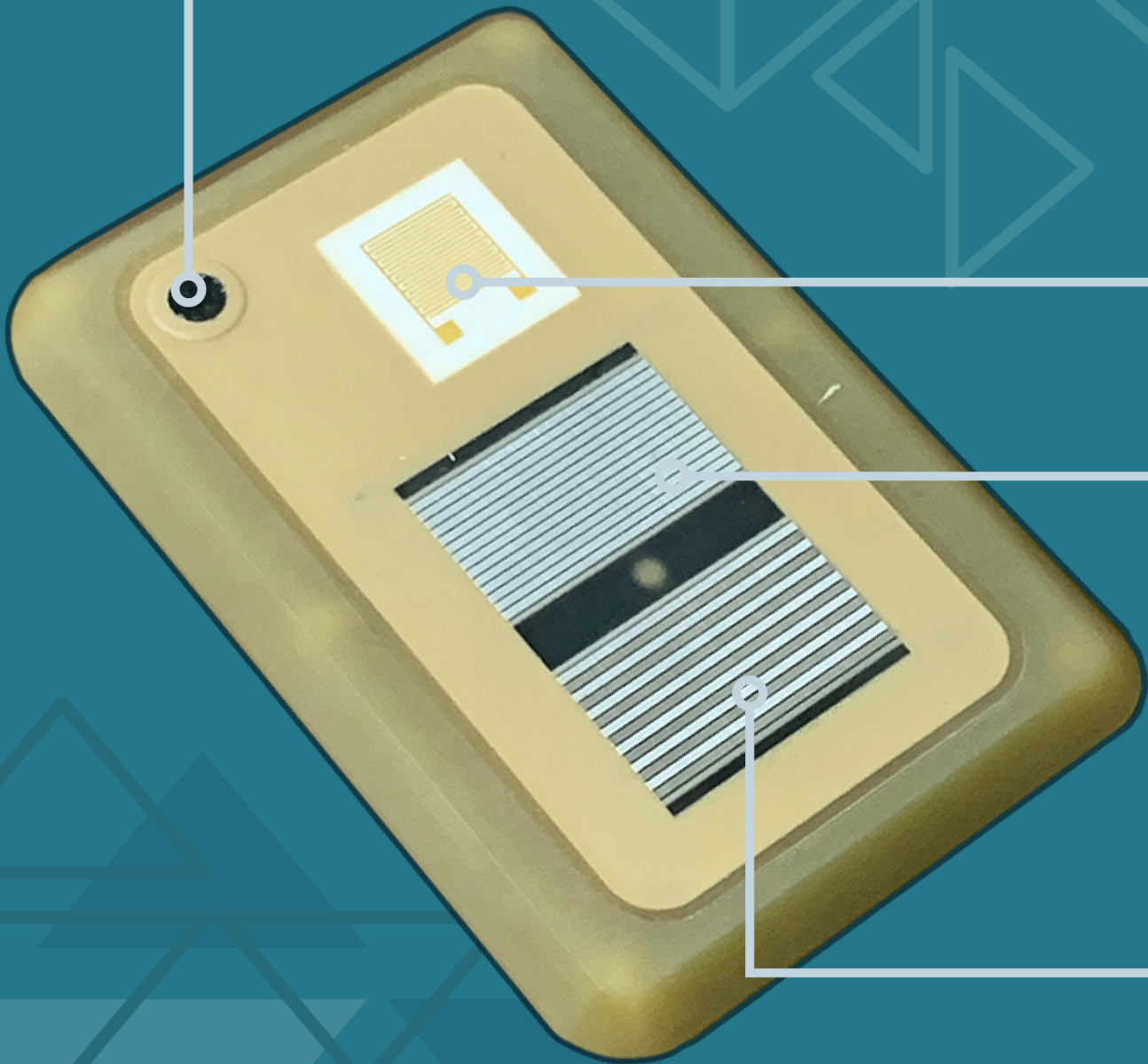


Outdoor Exposures

# Parts & Components

<b>Acuity LS</b>	 <b>Assembled Device</b>	 <b>Base</b>	 <b>Sensor Panels</b>		 <b>Battery</b>	 <b>JSB Comm Cable</b>
<b>Acuity ES</b>	 <b>Assembled Device</b>	 <b>Base</b>	 <b>Sensor Panels</b>		 <b>Battery</b>	 <b>JSB Comm Cable</b>
<b>Acuity CR</b>	 <b>Assembled Device</b>	 <b>Docking Platform</b>	 <b>Multi-Sensor Panels</b>	 <b>Temp Sensor Panel</b>	 <b>Battery Module</b>	 <b>Charging Cable</b>

# Continuous, Quantitative Measurements



Acuity LS Lid Sensor Panel (LSP)

Air temperature & relative humidity

Contaminants loading (salts)

- Gold
- 20 mV peak-to-peak
- 10 Hz and 25 kHz
- Conductance ( $\mu\text{S}$ ) & cumulative (C/V)

Free corrosion rate

- Single engineering alloy
- Linear polarization resistance
- 20 mV peak-to-peak, 0.5 Hz
- Current ( $\mu\text{A}$ ) & cumulative (C)

Galvanic corrosion rate

- Two dissimilar materials
- Zero resistance ammeter
- Current ( $\mu\text{A}$ ) & cumulative (C)



# Measurement Overview

	<b>Acuity CR</b>	<b>Acuity LS</b>	<b>Acuity ES</b>
	number of measurements per system		
<b>Environment Severity</b>			
<b>Contaminants (salts)</b>	<b>up to 4</b>	<b>1</b>	<b>1</b>
<ul style="list-style-type: none"> <li>Instantaneous rate, uS</li> <li>Total accumulation, C/V</li> </ul>			
<b>Relative humidity, %</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Air temperature, F</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>Corrosion of Materials</b>			
<b>Free corrosion of a single material</b>	<b>up to 3</b>	<b>1</b>	
<ul style="list-style-type: none"> <li>Rate, uA</li> <li>Cumulative, C</li> </ul>			
<b>Galvanic corrosion of dissimilar materials</b>	<b>up to 3</b>	<b>1</b>	
<ul style="list-style-type: none"> <li>Rate, uA</li> <li>Cumulative, C</li> </ul>			
<b>Coatings Testing</b>			
<b>Coating impedance / barrier properties</b>	<b>up to 3</b>	<b>1</b>	
<ul style="list-style-type: none"> <li>Instantaneous, uS</li> <li>Cumulative change, C/V</li> </ul>			
<b>Corrosion protection of a substrate</b>	<b>up to 3</b>	<b>1</b>	
<ul style="list-style-type: none"> <li>Rate, uA</li> <li>Cumulative, C</li> </ul>			
<b>Test panel temperature, F</b>	<b>1</b>		
<b>Battery Estimate</b>			
<b>At 30 minute measurement intervals</b>	<b>1 year</b>	<b>2 years</b>	<b>7 years</b>
<b>At 60 minute measurement intervals</b>	<b>2 years</b>	<b>4 years</b>	<b>11 years</b>
<b>Option for line power</b>	<b>Yes</b>	<b>No</b>	<b>No</b>

## Questions?

To request product information, inquire about partnership opportunities, or request other information, reach out to the email below and we will respond to your inquiry as soon as possible.



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