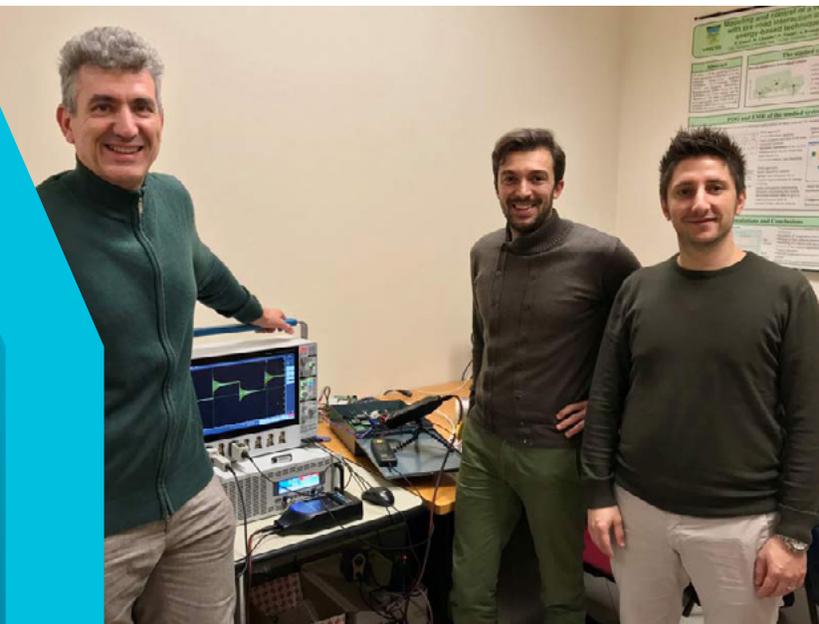


# Case Study

Investing in education is the key to the future of innovation. Tektronix is committed to helping university engineering programs around the world give their students and faculty the tools they need to own the future.

## Engineering Cleaner Skies RAISE



### THE CUSTOMER CHALLENGE

The Reliable Aircraft electrical Insulation System sElection project — better known as RAISE — is a 30-month long endeavour to support innovation in electrical insulation for electrical machine windings.

Professor Giovanni Franceschini, member of MEItng Lab from the University of Modena and Reggio Emilia (UniMoRe), is part of the engineering consortium leading the project.

Harsh conditions and the need for increasing power densities make insulation system integrity in aircraft designs a growing challenge for engineers like Professor Franceschini.

As new aircraft designs adopt wide bandgap devices, RAISE began focusing its research on the impact of increasing slew rates on the partial discharge and breakdown behavior of typical components. They soon found their testing equipment simply wasn't capable of making the measurements they needed.

### THE SOLUTION

Tektronix recommended that RAISE match our [IsoVu probes](#) with our [5 Series Mixed Signal Oscilloscope](#) — allowing Professor Franceschini to use Spectrum View for frequency domain evaluation with high accuracy while monitoring the behavior of a specific transition.

This enabled a better understanding of the impact of fast transitions on the insulation degradation mechanism. It also made it easier to assess whether state-of-the-art insulation materials in machines and power electronic components are suitable for future applications using higher supply voltages and higher switching gradients coming from the adoption of wide bandgap devices.



**“If you’re using a traditional differential probe, you might not realize the trade-offs and limitations when measuring in an environment with common mode voltage or interference. Only the Tektronix equipment we used could give us visibility of fast gradient signal impact on insulation.”**

## MORE ABOUT RAISE

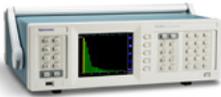
The Reliable Aircraft electrical Insulation System sElection project's goal is to investigate and assess partial discharge and breakdown behavior of electric insulation in electrical machines windings. It's supported by Clean Sky, one of the largest European research programs focused on reducing CO2 emissions and noise levels from aircraft.

Replacing an aircraft's hydraulic/mechanical actuators with electrical drives yields an improvement in efficiency and power density, resulting in a reduction in weight, fuel consumption and noise/pollutants emission. But, in the presence of higher voltage gradients, these types of electric drives can quickly face reliability issues.

RAISE is working to propose models that assess the voltage gradients and magnitudes observed for typical converter/cabling machine systems, along with the voltage distribution within typical electrical machine windings, and its dependency on the machine's key parameters, such as the number of turns, the winding method used and the stator length.

Their goal is to offer solutions to improve the reliability of electrical machines and drives in aircraft without compromising the overall performance and efficiency. The results will permit developing design, qualification and verification guidelines supporting the design of machines operating with wide bandgap switches in aerospace environmental conditions.

## PRODUCTS, SOFTWARE, AND SERVICES PROVIDED

Hardware	Description
	<p><b>5 Series Mixed Signal Oscilloscope</b> » <a href="#">View On Tek.com</a>                      Innovative oscilloscope with touch-screen interface and 4, 6 or 8 FlexChannel™ inputs.</p>
	<p><b>3 Series Mixed Domain Oscilloscope</b> » <a href="#">View On Tek.com</a>                      Large, HD display in a compact, portable oscilloscope.</p>
	<p><b>TCP 0150 Current Probe</b> » <a href="#">View On Tek.com</a>                      High accuracy probe with measurement accuracy from uAs to 2000 A.</p>
	<p><b>IsoVu probe</b> » <a href="#">View On Tek.com</a>                      High-accuracy probe with industry-leading 1GHz Bandwidth.</p>
	<p><b>RSA306B USB Spectrum Analyzer</b> » <a href="#">View On Tek.com</a>                      High fidelity, low noise and compact spectrum analyzer.</p>
	<p><b>PA3000 Power Analyzer</b> » <a href="#">View On Tek.com</a>                      1-3 phase power analyzer for testing high-efficiency power supplies.</p>

If you want to learn more about solutions for the education lab visit [tek.com/education](http://tek.com/education) or give our team a call at 1-800-833-9200.

