



# ZoloEFS

*Embedded Flight Sensor*

The Zolo Technologies ZoloEFS™ is an innovative laser-based sensor which requires only a line of sight to measure temperature and species in ultra-harsh environments.



The ZoloEFS is a flight-weight sensor that can measure in ultra-harsh environments including the super-sonic flows of the the F-35 Joint Strike Fighter after-burner section.

## Flight-weight sensor

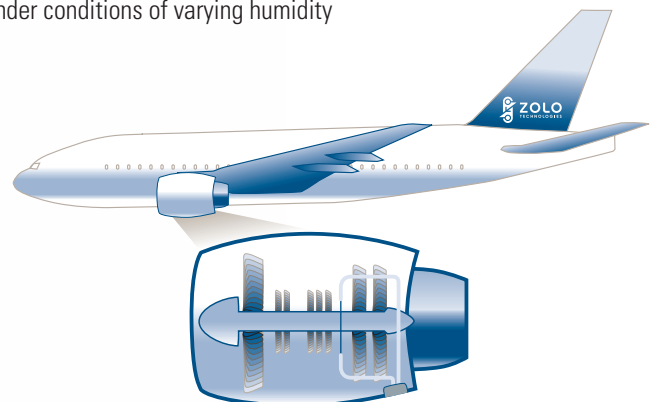
Imagine what you can do with a flight-weight, 1 kHz update rate, accurate ( $\pm 10$  °F), non-contact gas temperature sensor with the potential for spatial resolution in the hot section of the engine and no parasitic aerodynamic losses.

- ▶ Reduce pattern factor
- ▶ Improve health monitoring
- ▶ Increase turbine blade lifetime
- ▶ Decrease reliance on model-based sensing
- ▶ Increase hot section temperature (and efficiency)

## Simultaneous measurements

There are additional applications for simultaneous measurements of temperature and humidity at the engine inlet.

- ▶ Determine if dangerous ice buildup is likely
- ▶ Calculate the potential for contrail formation
- ▶ Determine achievable thrust under conditions of varying humidity



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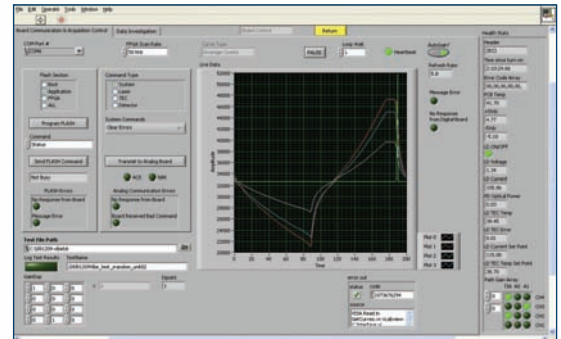
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## Augmentor Measurements

The ZoloEFS measures temperature and water concentration at kHz update rates in the afterburner section enabling the user to detect precursors to screech and other combustion dynamic phenomena. With this unprecedented data, engineers and designers can improve performance by design.

- ▶ Improve afterburner efficiency
- ▶ Employ feedback control to suppress screech
- ▶ Avoid sections of the flight envelope that cause screech

Zolo Technologies, is currently ground and flight testing a sensor capable of realizing all of these long-sought goals in a single flight-weight package. The ZoloEFS defines the third generation of tunable diode laser sensing technology. It is small and light-weight but also sufficiently robust to operate in the harsh environment of aero-propulsion systems.



Integrated software enables users to see absorption spectra and temperatures in real-time.



The entire TDLAS system including both digital and analog electronics fit into this 58 x 182 x 118 mm box.

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