

Method for Improving Accuracy of Temperature Measurement

Track Code: 2022-ALCA-69680

Categories:

(No categories found)

Keywords:

- aerospace
- conduction
- Gas Turbine
- Heat Transfer
- jet propulsion
- Mechanical Engineering
- Power
- TC
- thermocouples
- thermodynamics

Researchers at Purdue University have developed an improved temperature measurement method that eliminates conduction errors within thermocouple probes. The conduction error arises from the temperature difference between the thermocouple junction, the measurement location, and the probe support. In current systems, conduction effects can account for up to 5 K of error. This is a major limitation within industries using gas turbines, where it is essential that temperature measurements be within tenths of a degree Kelvin to determine the propulsion system efficiency accurately. The newly developed technology consists of two-wire thermocouple probes with different thermocouple diameters. The two thermocouple readings combined with conjugate heat transfer simulations correct the temperature readings and deliver the actual temperature free of conduction error.

Advantages

- Vç & V6VFVçFVB 67W& 0y in temperature measurements
- ”V 6–Ç’ –× ÆVÖVçFVB –çFò Gpo-wire thermocouple probes

Applications

- @emperature measurements
- ”v 2 Turbines
- ” W&÷7 6P
- ðwer generation

Technology Validation:

This technology has been validated experimentally and using high-fidelity aero-heat transfer computational simulations. Prototypes have also been built.

People:

- Nares Alcalá, Roberto Felix (Project leader)
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Intellectual Property:

Application Date: October 26, 2023

Type: Utility Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Application Date: October 27, 2022

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

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