



## **APPLICATION NOTE:** Submersible Smart Turbine Flow Meter Meets Defense Contractor Request for Accurate Fuel Flow Measurement in Unmanned Aircraft

Fuel measurement in unmanned aircraft is one of the best applications for smart turbine flow meters. The turbine offers one of the most accurate flow meter technologies in a compact, lightweight form factor with exceptional response time and resolution.

A major defense contractor approached Flow Technology with a request for a submersible turbine flow meter for use in an unmanned aircraft. The flow meter would be incorporated into the aircraft fuel bladder to utilize that available volume in order to maintain the aircraft's compact form factor. The specification also included a wide operating temperature range of -40°F to 200°F for the fuel. The flow meter was also required to include Wiggins-type end fitting ferrules.

The Flow Technology line of turbine flow meters are used in many submerged sub-sea oil & gas applications throughout the world, so FTI has expertise in these types of applications.

In this application, the challenge was to provide the turbine flow meter with a submersible microLink smart pickoff for the best possible accuracy over the wide operating temperature range. The microLink smart pickoff incorporates an RTD temperature sensor to resolve the fuel temperature during operation. The microLink uses the temperature data to determine fuel viscosity, and advanced Universal Viscosity Curve (UVC) processing detects the fuel flow rate very accurately. Output is provided as a scalable frequency, analog 4-20mA, or digital CANbus.

The microLink standard packaging includes a 316 SS housing that threads into the turbine flow meter pickoff. Standard output connections include either an MS connector or a potted cable terminated in flying leads. The potted flying lead cable option did not meet the customer's specification due to the possibility of fluid penetrating the cable jacket and migrating into the microLink housing.

In response, FTI proposed an overmolded cable assembly to be incorporated on the microLink smart pickoff and Wiggins-type end fitting ferrules on the flow meter housing to meet the customer's specifications.

### **HIGHLIGHTS**

**Industry:** Aerospace  
**Service:** Fuel flow rate  
**Fluid:** Jet fuel

#### **Application**

Accurate fuel flow measurement to engine

#### **Problems**

- Flow meter submersed inside of aircraft fuel bladder
- Wide operating temperature range resulting in large fuel viscosity changes
- Wiggins end fitting ferrules

#### **Solution**

- FTI turbine flow meter with modified microLink smart pickoff and Wiggins-type end fitting ferrules

**Flow Technology, Inc.**

8930 S. Beck Ave., Suite 107, Tempe, AZ, 85284 USA

Tel: (480) 240-3400 • Fax: (480) 240-3401

[ftimarket@ftimeters.com](mailto:ftimarket@ftimeters.com) • [www.ftimeters.com](http://www.ftimeters.com)

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