



**EXTREME ENVIRONMENT MONITORING NEEDS FOR  
JET AND ROCKET ENGINE TEST AND OPERATIONS**

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# Who I am?

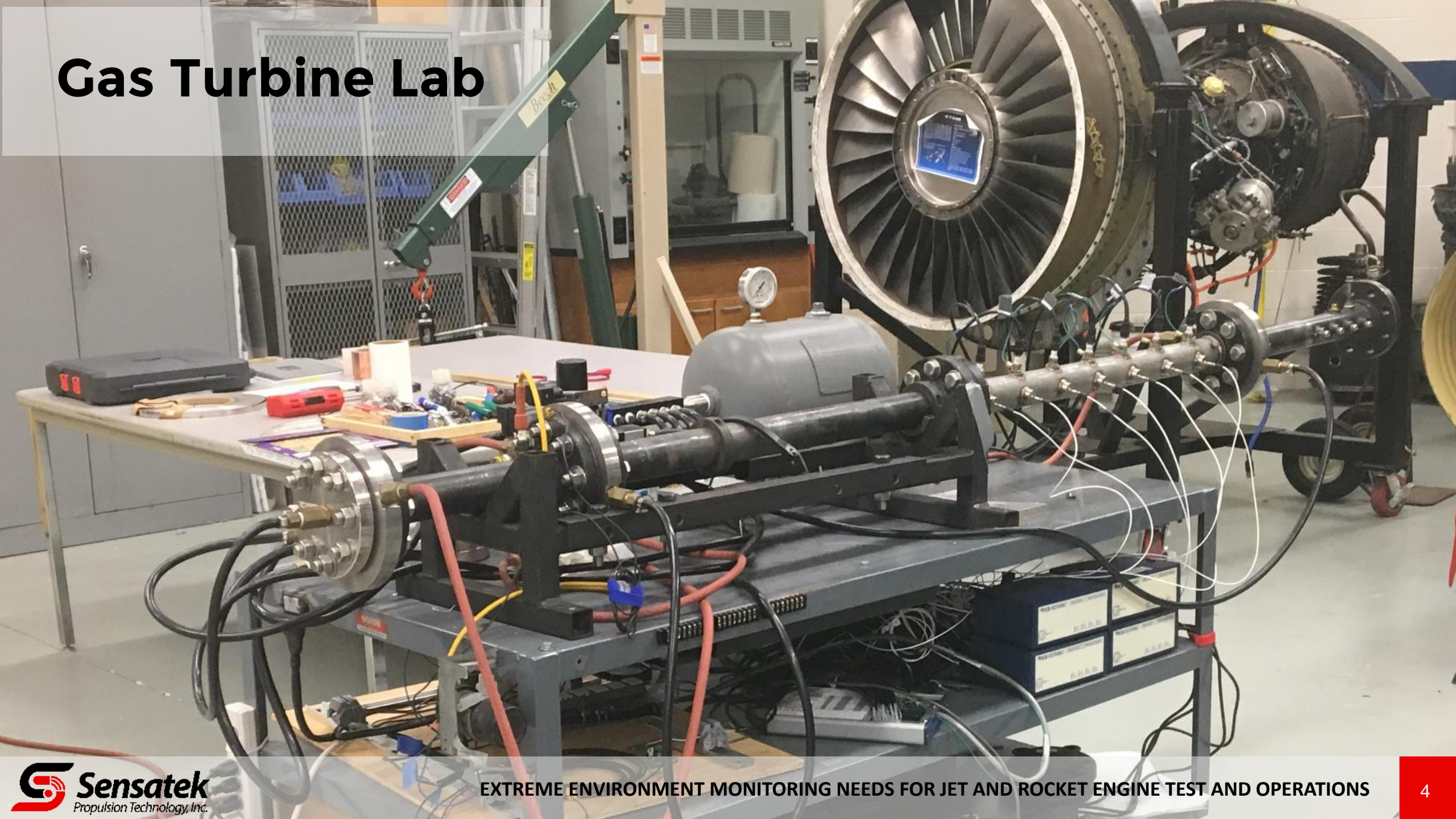








# Gas Turbine Lab





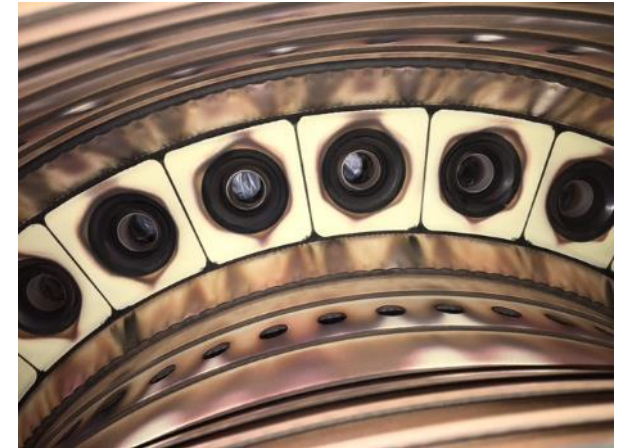
# Overheated Components



PDE Rings

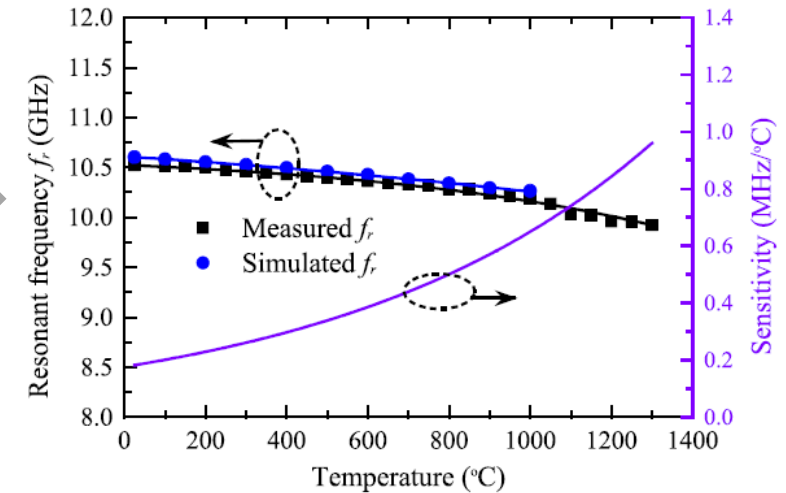
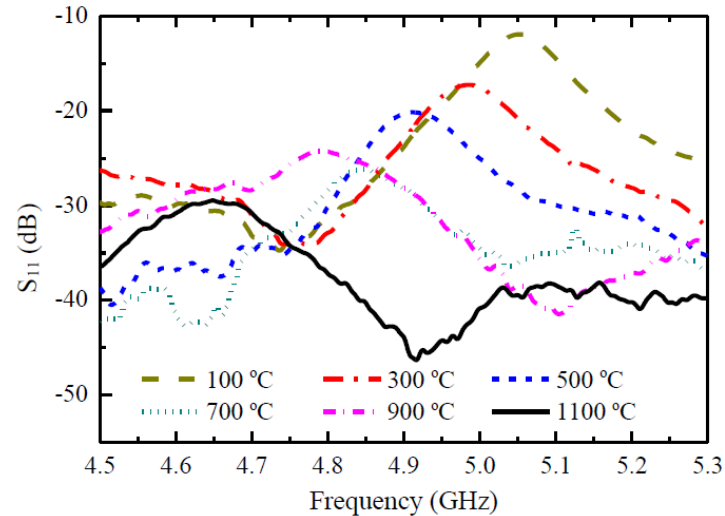
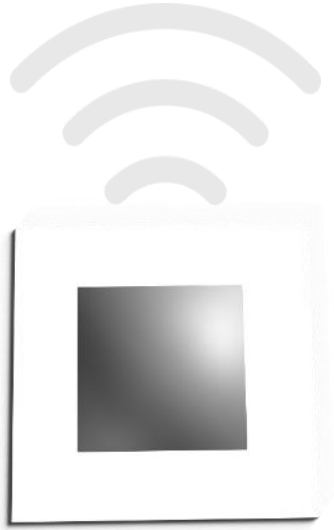


Blades



Combustion Chamber

# Wireless High Temperature Sensors for Extreme Environments



## STEP 1

Passive Sensor Interrogated

## STEP 2

Detects Resonant Frequency

## STEP 3

Determines Temperature

$$f_{TM010} = \frac{cp_{01}}{2\pi a \sqrt{\epsilon_r}}$$



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**NEAREST RECRUITING STATION**

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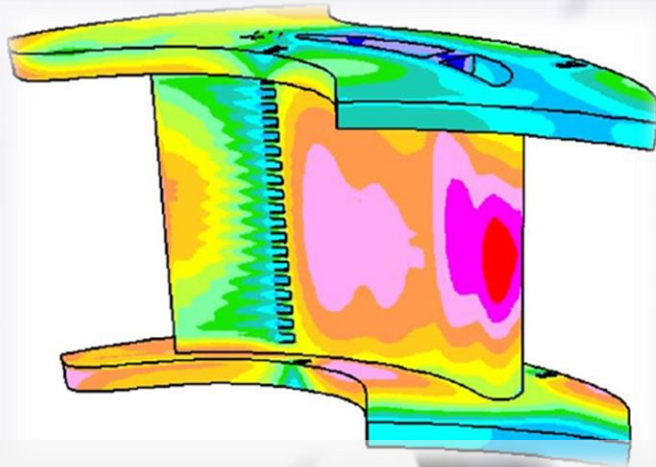
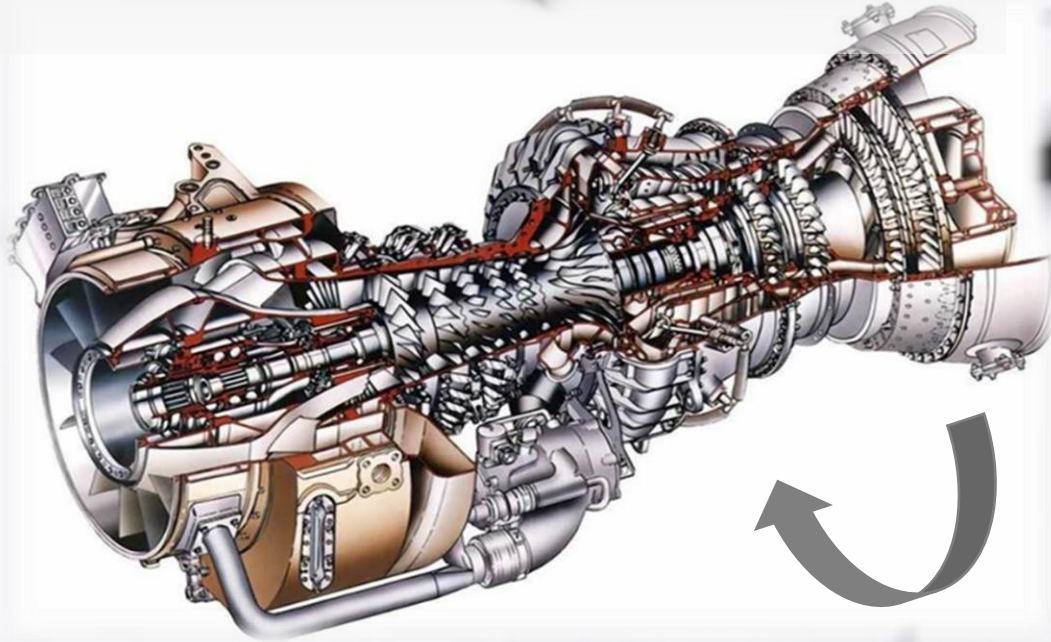


# Get out of the building!





# Life Cycle Costs



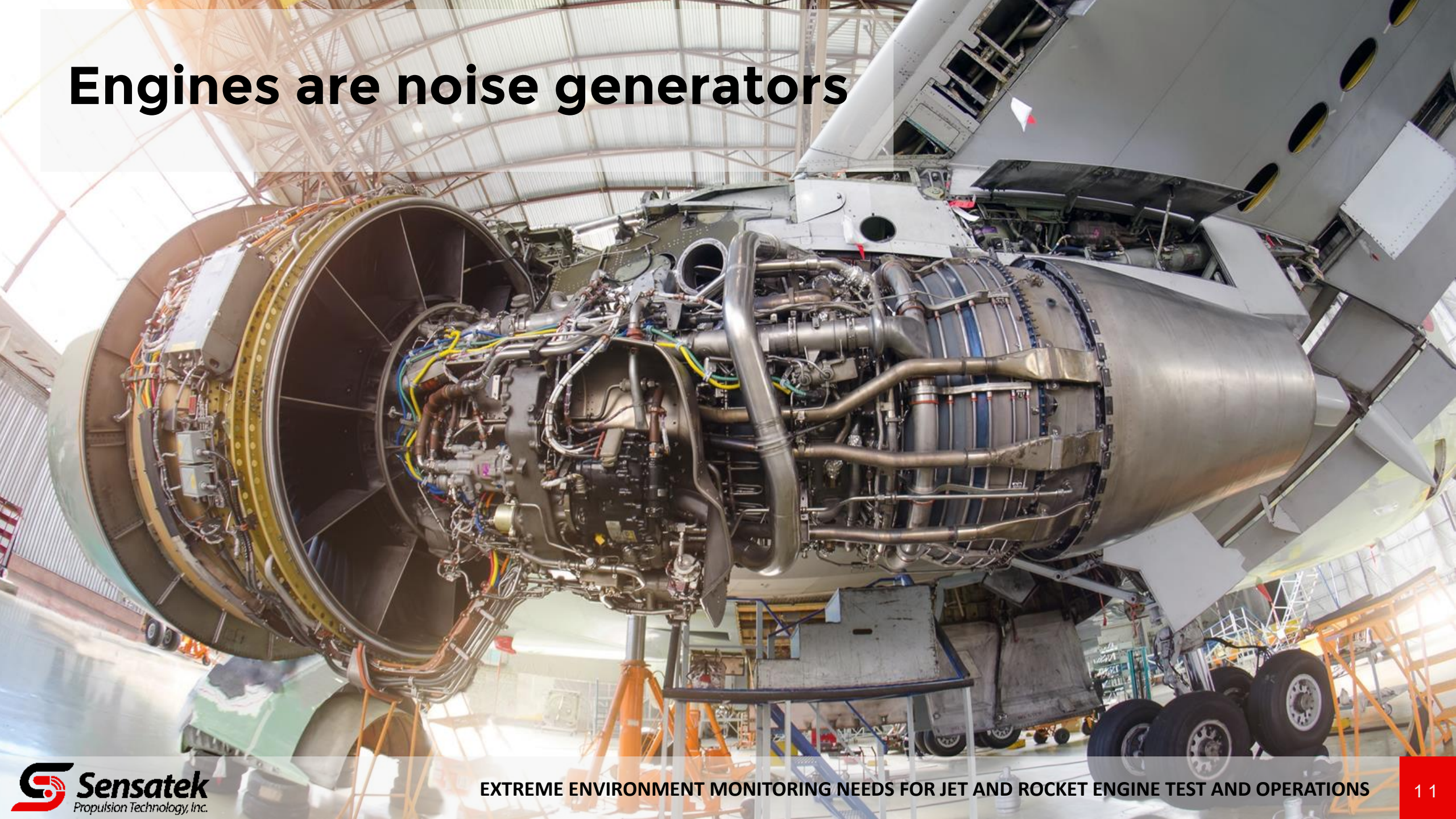


# Lengthy Lead Times





# Engines are noise generators





# Airline Performance





# Engines are shrinking





# Weight of Instrumentation





# Roadblock!





# Rocket Test Stand





# Build on capabilities



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# Focus on core competencies





# Wireless sensor use case





# What's next?





