



Civil Aerospace: Hazardous & Extreme?

RAI 'End User' Workshop – March 2019

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Steve Jobs - 1989

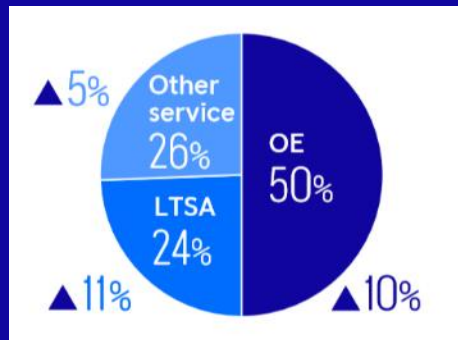
You can't just ask customers what they want and then try to give that to them. By the time you get it built, they'll want something new.





Business Driver

- 50% revenue from aftermarket



Long Term Service Agreements

- Ensure powerplant remains in service for scheduled life
- Any unplanned engine removals incur **\$M** penalties
- Quick route to market for in-situ maintenance technologies



In-field servicing emphasis



Service data analysis and recommendation



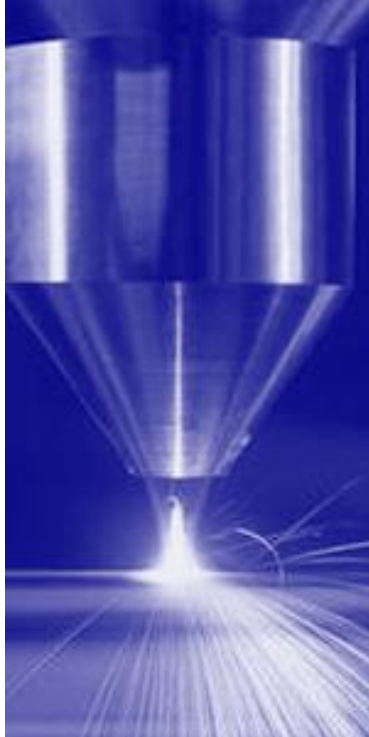
Inspection

NDE or visual



Material Removal

Mechanically or high energy beam



Material Addition

Coatings and component



Remote Operation

Better utilisation of specialist resource



Automation

Removing mundane tasks

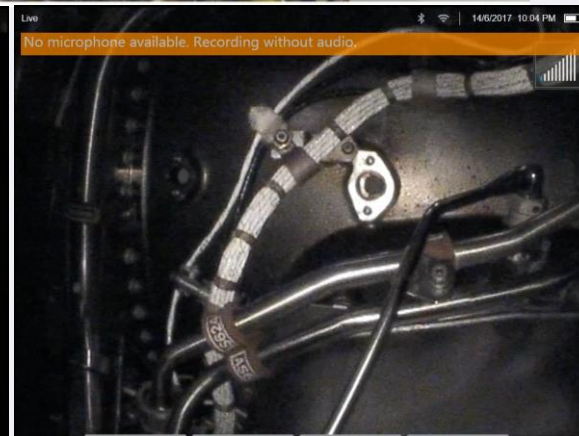
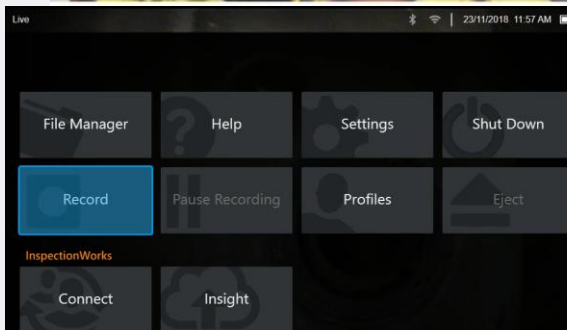
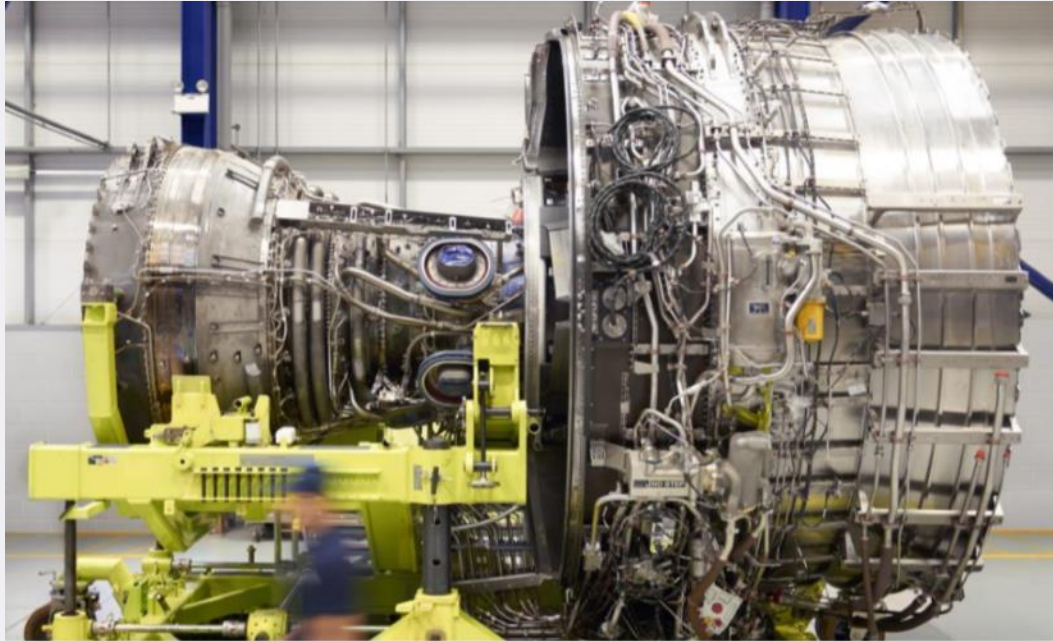


Example videoscope inspections

Access port range:

- $\varnothing 4\text{mm}$ - $\varnothing 13\text{mm}$

Probes are smaller than a pencil; longer than a car





Current project examples

- Remote Boreblending
- FLARE
- INSPECT
- SWARM



UTC in Manufacturing and On-Wing Technology



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You've seen what we know we want...

...what don't we know we want?

