

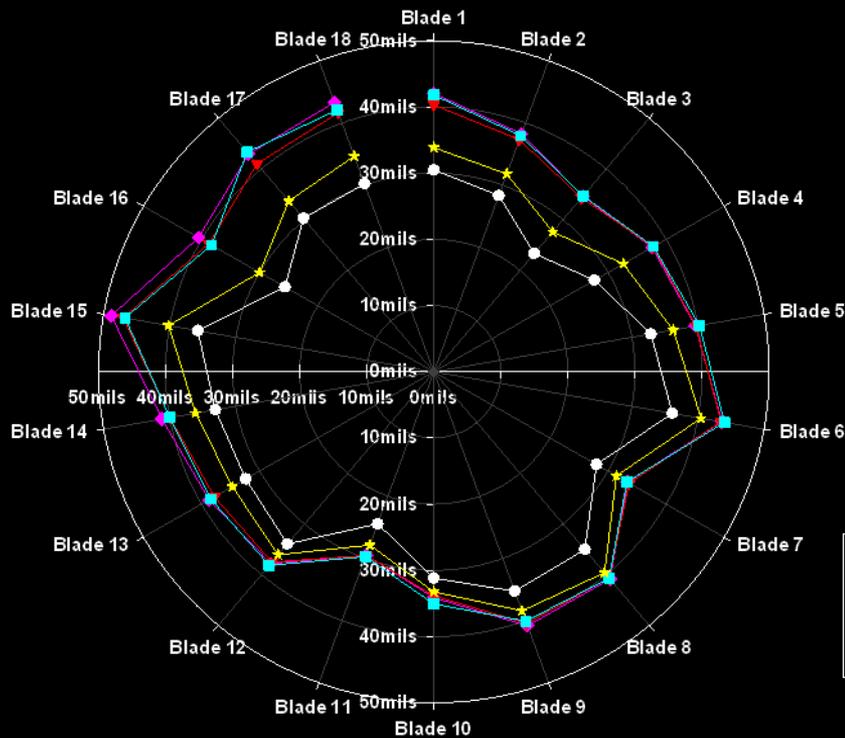
Microwave Tip Clearance Sensor: Ultra High Bypass Turbofan

Testing in the 9x15 Wind Tunnel

Tip clearances measured over the speed range of the fan were consistent with data acquired with capacitive probes in a previous test entry .

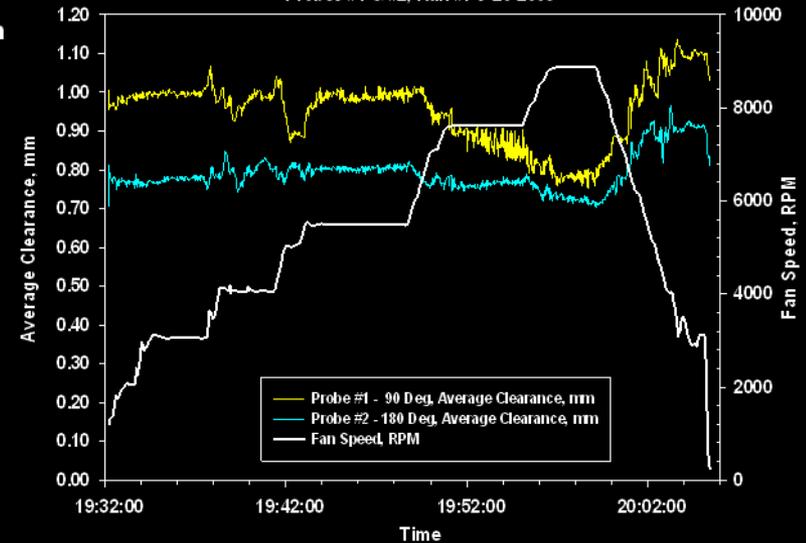
We successfully demonstrated the ability to make measurements on smaller "aero" engine sized hardware and composite nickel tipped blades.

Polar Plot, Clearance vs Speed
Blade Tip Clearances in Mils, Probe #1, 90 Degree Position
Run #7 9-25-2008



- ◆ Clearance (mils) at 3060 RPM
- ▲ Clearance (mils) at 4060 RPM
- Clearance (mils) at 5500 RPM
- ★ Clearance (mils) at 7630 RPM
- Clearance (mils) at 8875 RPM

Average Blade Tip Clearances (mm) and Fan Speed versus Time,
Probes #1 & #2, Run #7 9-23-2008



22" Diameter UHBT

18 Composite Blades, ~.22" thick

2 clearance probes (90 and 180 deg)