

# Health Monitoring for Aerospace Applications

**David Clifton**  
Oxford BioSignals

**Hamburg 2006**



**Company introduction**

**Technology overview**

**The QUICK process**

# Oxford BioSignals (OBS)



Application of AI

Statistical Pattern Recognition

Signal Processing

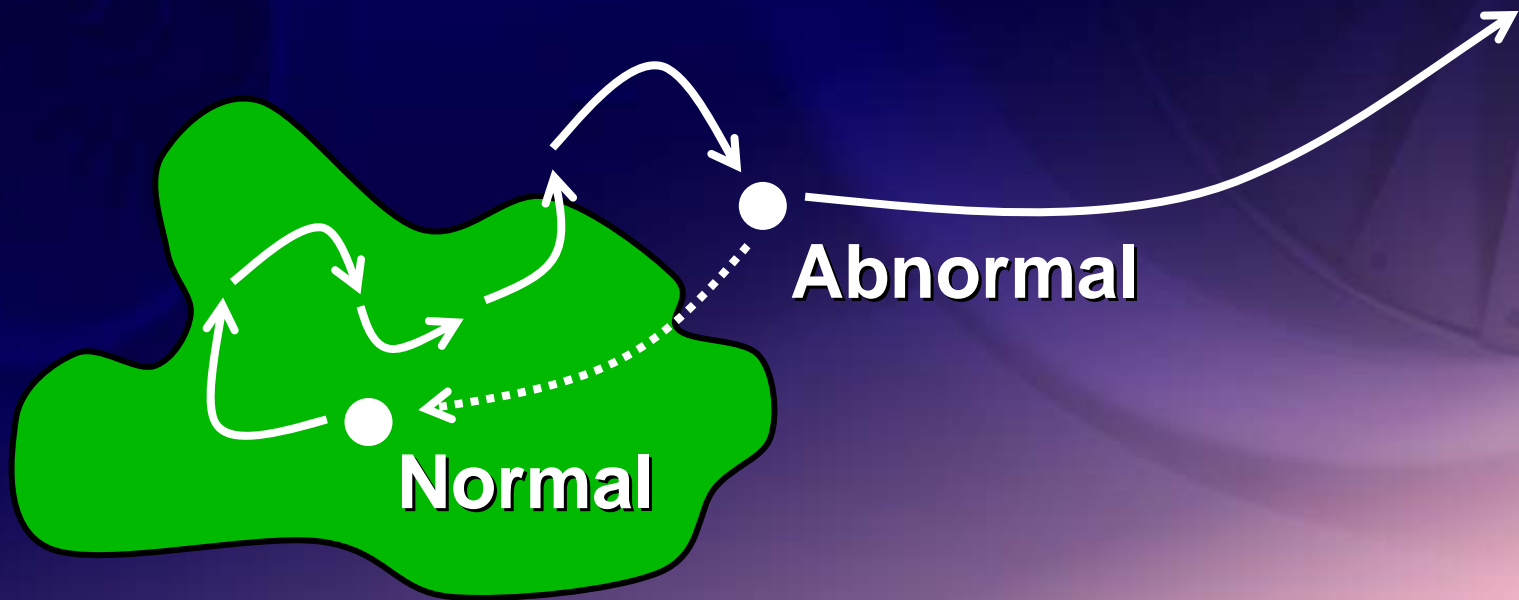
**QUICK**  
Technology

# High-Integrity Systems



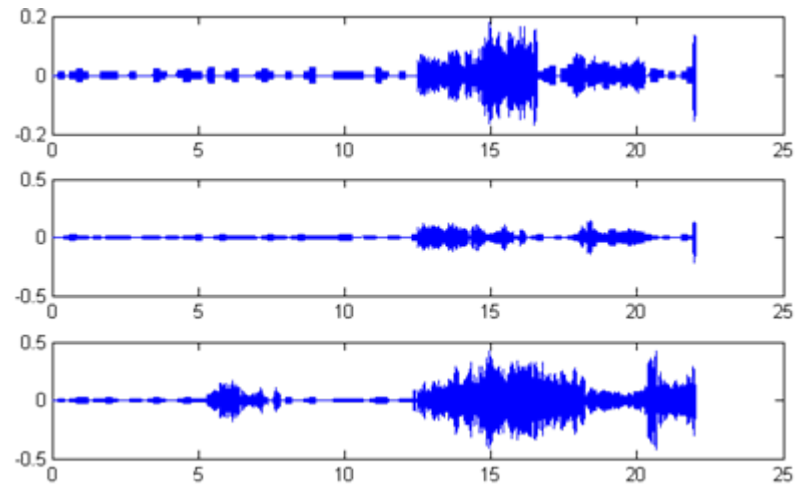
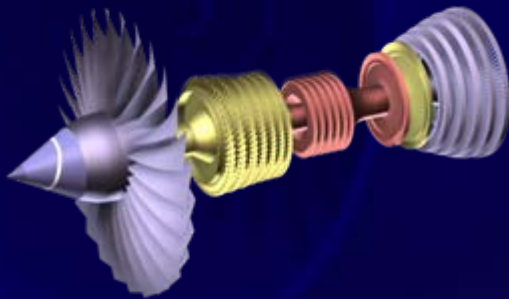
# Novelty Detection

- i. Model *normality*
- ii. Detect *deviations from normality*



# AI, Statistical Pattern Recognition

Data driven:



Vibration

Temperatures

Pressures

# Automated learning

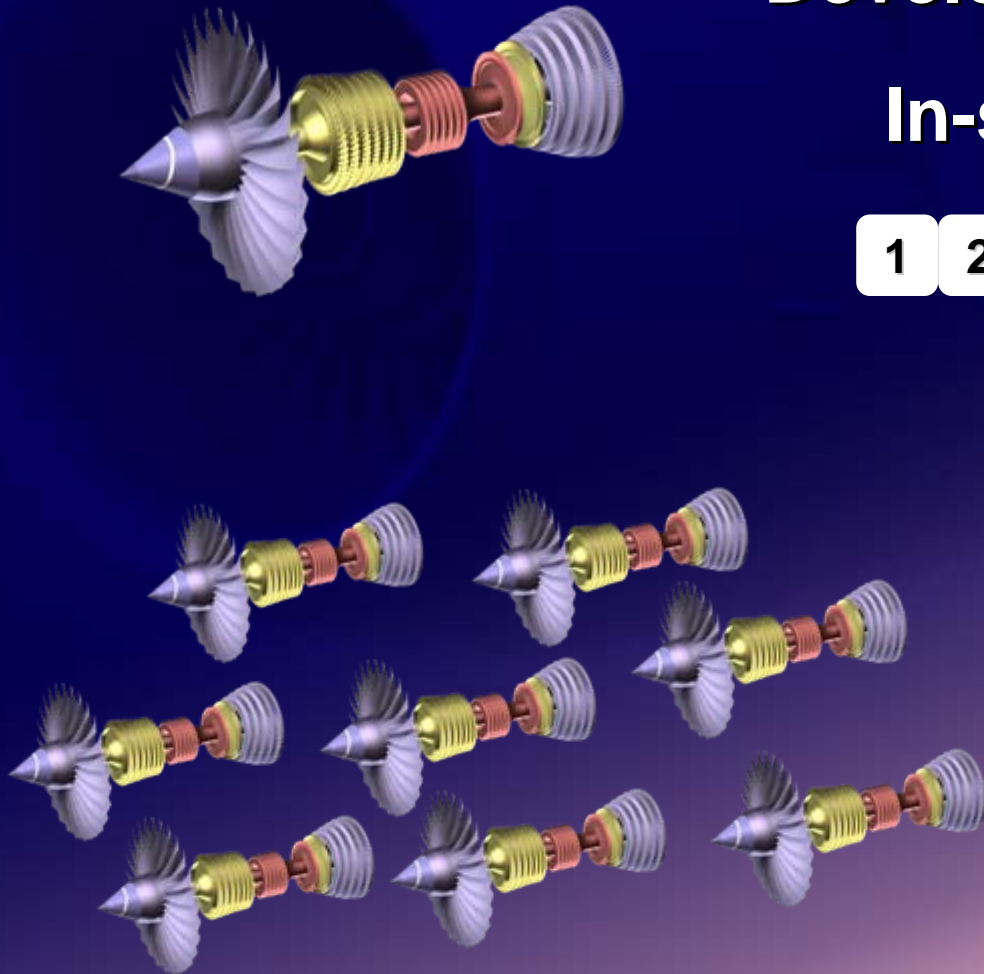
Development / ground-runs

In-service / flights

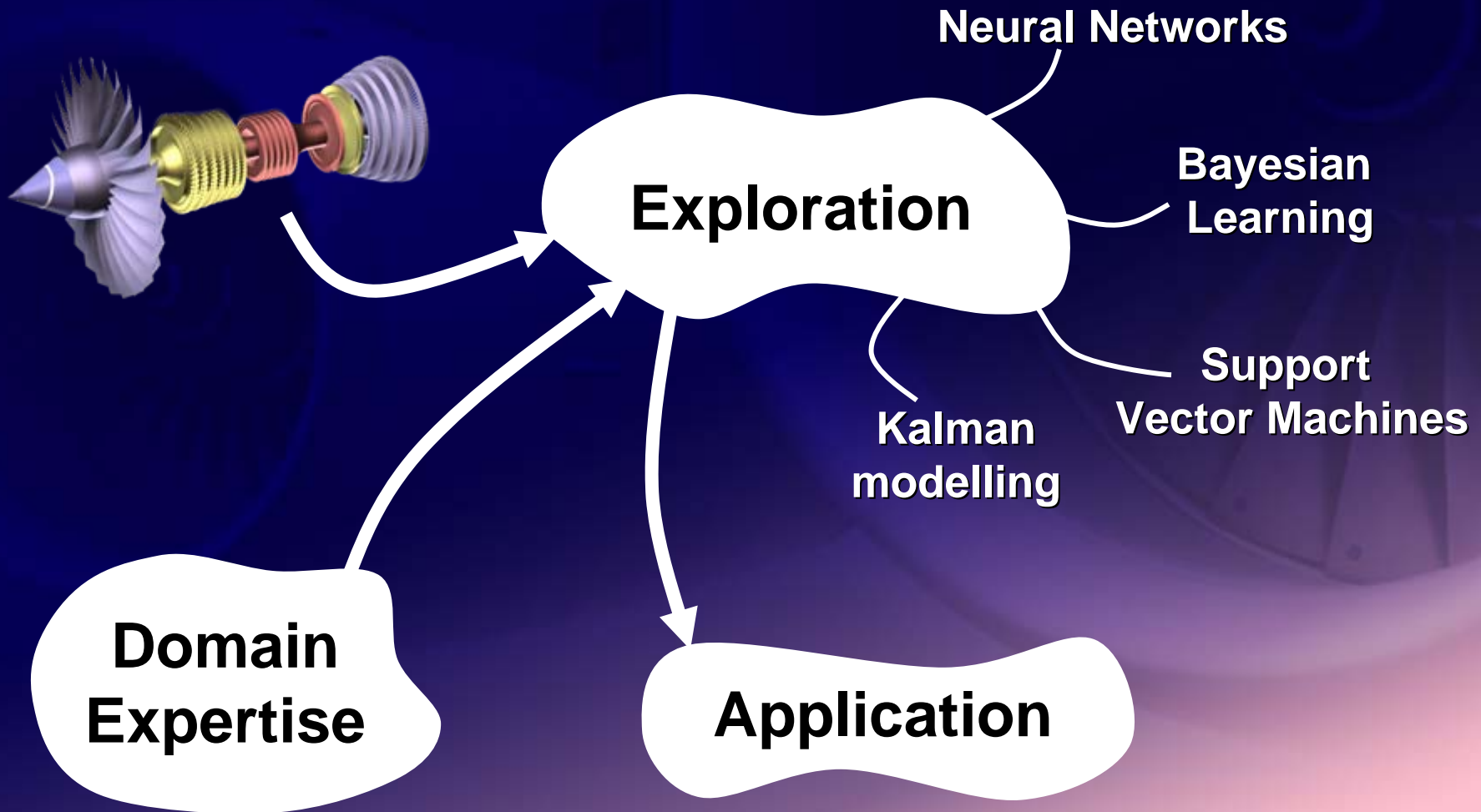
1 2 3 4 5 6 7 8 9

Fleet analysis

Fleetwide models



# QUICK Process



# Case study – Military Engines



**QUICK  
EVM-620M**

**Milspec laptop  
Vibration acquisition  
Novelty detection**



# Outcomes

**Early warning**

Prognosis

Avoidance of hazard

Total maintenance strategy

Maximum value from data

**Interpretation**

Explanation

Visualise high-dimensional system data

# Applications of QUICK Technology

**Trent  
500, 900, 1000**

**Marine  
gas-turbines**

**Military  
gas-turbines**

**Large-scale  
turbochargers**

**Automotive  
  
Human  
vital-signs**

**Gas-turbine  
manufacturing  
processes**

**Wind  
turbines**

# **QUICK Technology for Aerospace Applications**

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