

**Report for OAI Phase I**  
**Collaborative Core Research**  
**Project on**

**“Data Mining and  
Knowledge Discovery”**

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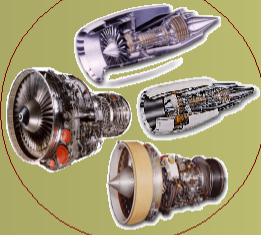
Michael Bailey  
Dion Duckett  
Kristy Gau  
Stephen Mitchell  
General Electric Aircraft Engines

**RESEARCH GOAL**

- **Life time prediction of aircraft engines by mining in engine performance data**

# WHEN ? WHY ?

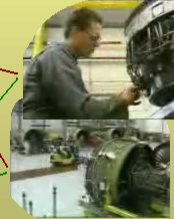
COMMERCIAL  
 JET ENGINES



39.7	11.3	0.491	4800
41	11.7	0.599	5470
41.7	11.4	0.412	5200
42.1	11.9	0.583	2200
42.1	11.9	0.383	4040
42.7	11.9	0.382	4040
138.4	12.4	0.592	11100
138.4	12.4	0.592	11155
138.5	12.4	0.383	11555
138.5	12.4	0.383	11100
138.4	12.4	0.592	11555
138.2	12.1	0.590	11555
134.4	12.9	0.592	11045
127.9	12.1	0.594	11840
134.3	12.9	0.587	11840
138.2	12.1	0.594	11550



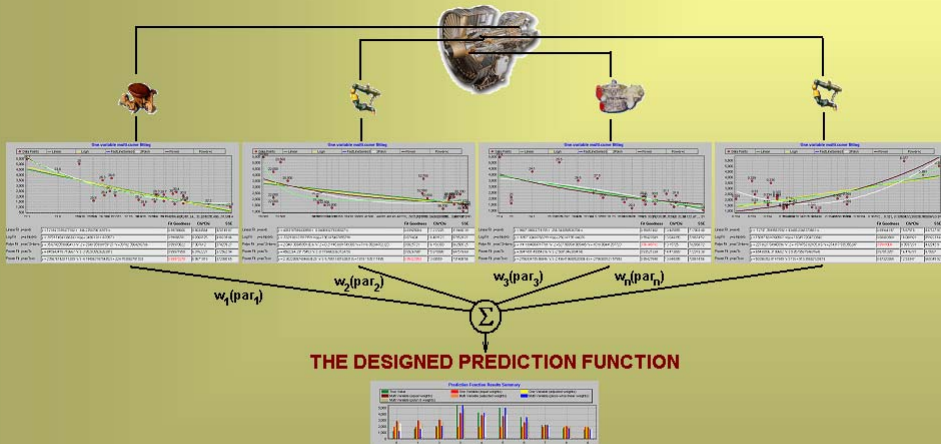
performance  
 prediction  
 and maintenance  
 scheduling



we can help...



# PREDICTION FUNCTION DESIGN

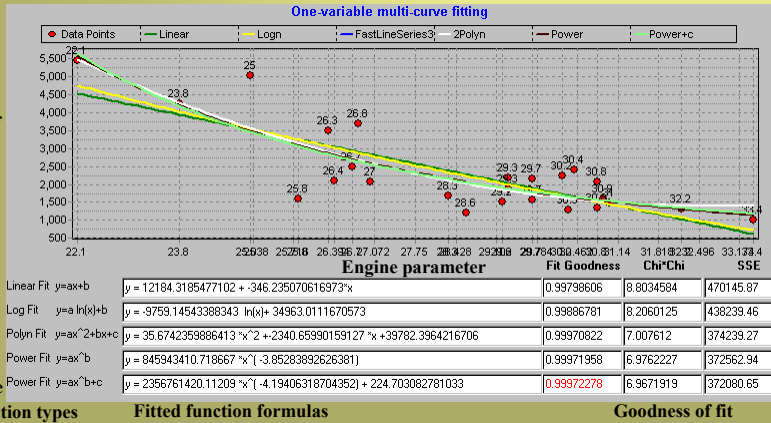


# PREDICTION FUNCTION DESIGN

## Curve fitting using modified Levenberg-Marquard method

- One-variable
- Nonlinear
- Multi-base-functions

Value of  
ECSV  
across  
engines



# PREDICTION FUNCTION DESIGN

