

HUMAN FACTORS IN AVIATION MAINTENANCE SYMPOSIUM (HFIAM)

SAFETY MANAGEMENT AT P&WC

RONALD F. TRUMPER

CHIEF ENGINEER

PRATT & WHITNEY CANADA

AGENDA

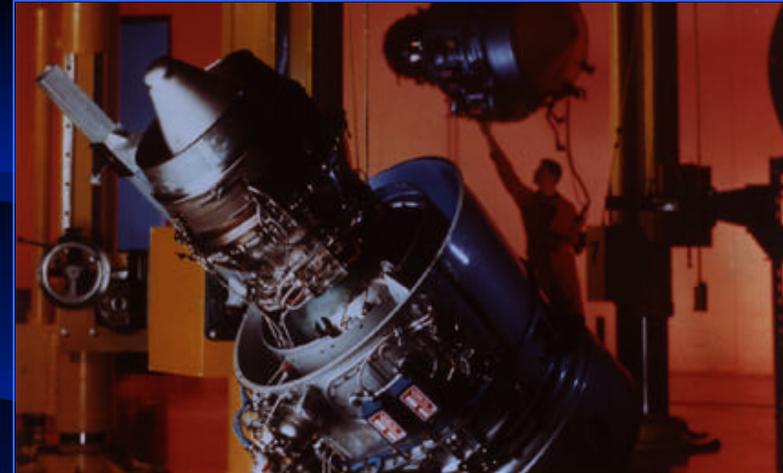
- **PWC OVERVIEW**
- **DATA COLLECTION SYSTEM**
- **PWC DRIVE TO REDUCE I.F.S.D.**
- **ASSEMBLY HAZARD ANALYSIS**

UNITED TECHNOLOGIES

AEROSPACE / DEFENCE



Pratt & Whitney



Pratt & Whitney Canada



Hamilton Sundstrand



Sikorsky

PWC PROFILE 1999

MILLION \$ CDN

Sales _____ **\$2,105**

Employment _____ **8572**

Facilities _____ **2.7 million sq. ft.**

R&D investment _____ **\$320**

Capital investment _____ **\$106**

PRODUCT LINE

- **Turboprops**
- **Turboshafts**
- **Turbofans (to 16,000 lbs)**
- **Auxiliary Power Units (APU's)**

PRODUCT LINE



PRODUCT LINE



PW900

1500

SHP

1800



PW300

4500

THRUST (LB)

8000



PW200

500

SHP

900



PW500

3000

THRUST (LB)

4500

1990

1995

2000

PWC GLOBAL ACTIVITY

1999

Airlines _____ **768**

Operators _____ **7,337**

Countries _____ **183**

Aircraft _____ **19,255**

Engines _____ **48,194**

Operating hours _____ **341,510,000**

PWC DATA COLLECTION SYSTEM

- **All events involving PWC products are collected & processed and the data is stored in the company Database**
- **Sources:**
 - **FAA, NTSB,CTSB**
 - **FSR (OVER 100 WORLDWIDE)**
 - **OEM, Customers**

PWC DATA COLLECTION SYSTEM

- **A 24 Hours Customer Help Desk (CHD)**
- **A dedicated Service Investigation (SI) Department**
- **CHD and SI are notified of all Level 1 (crash,hazardous) and Level 2 (IFSD) events**

PWC DATA COLLECTION SYSTEM

- **SI retains ownership of all Level 1 events until final investigation report is issued**
- **Technical Support Manager retains ownership of all Level 2 events until closure**

PWC DATA COLLECTION SYSTEM

- **All IFSD, unscheduled engine removals, technical and quality matters are forwarded to a Screening Team**
- **The Screening Team determines the severity of the event and identifies an owner for tracking and follow-up until closure**

PWC DRIVE TO REDUCE I.F.S.D.'s

- **I.F.S.D. is an Overall indicator of the Engine Reliability**
- **Loss of Power is critical for all Single Engine Installation**
- **4500 PWC Engine are Singles out of 48,000 total**
- **All engines will benefit from the changes made on Singles**

PWC DRIVE TO REDUCE I.F.S.D.'s

Engine basic



**Total powerplant IFSD rate .0084 per 1000 hours.
Engine basic IFSD rate .0024 per 1000 hours.
In 1999 49 IFSD, ALL CAUSES in 2.5 Million hours**

PWC DRIVE TO REDUCE I.F.S.D.'s

- **PWC set an Y2K Objective to drive IFSD rate to ZERO for all Single Engine application**
- **Two category of issues were identified:**
 - **Issues at Assembly and Test (A&T)**
 - **Field issues**

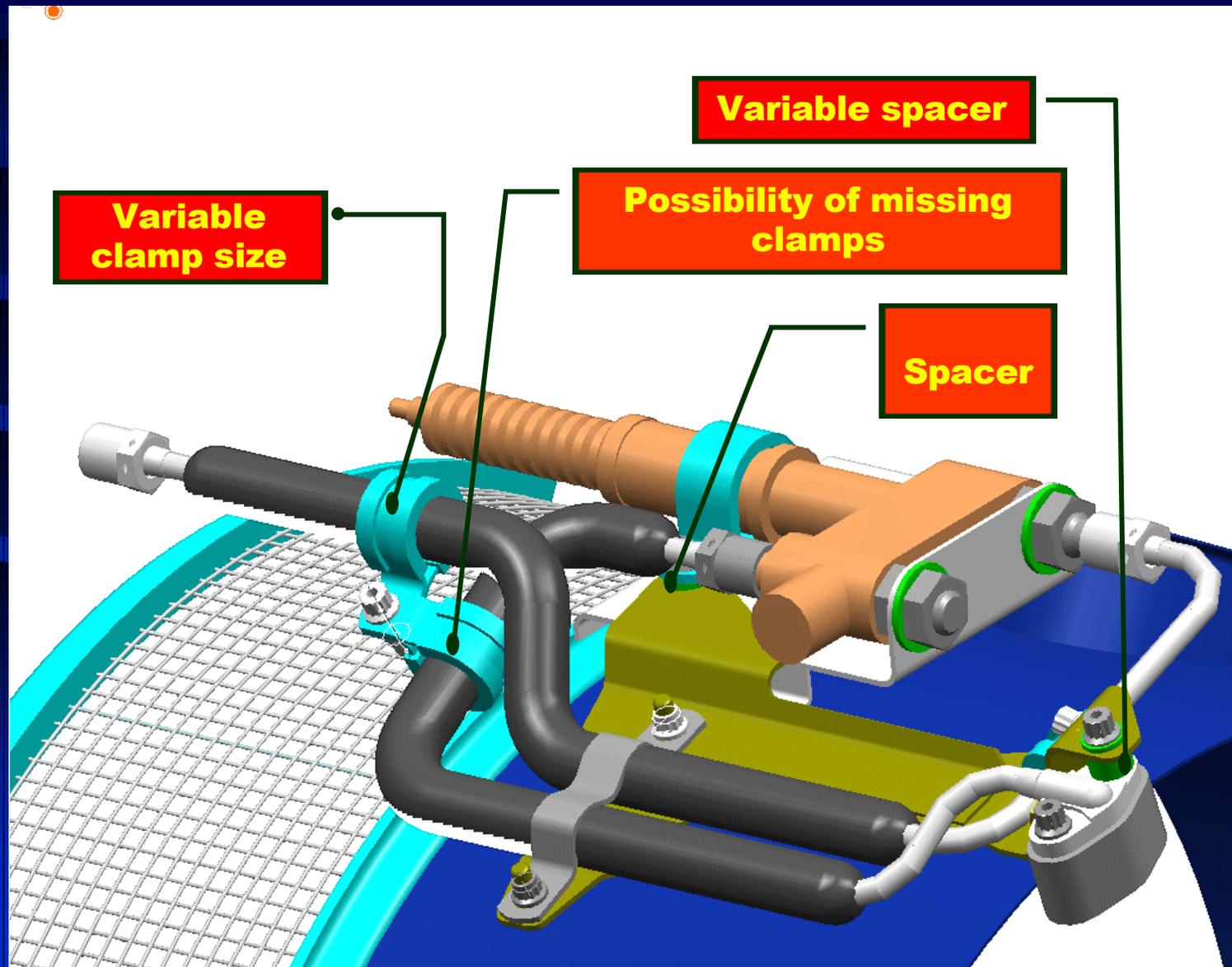
PWC DRIVE TO REDUCE I.F.S.D.'s

- **A dedicated Integrated Product Team (IPT) addresses the field issues with VP Product Integrity assuming the overall ownership**
- **Some of the field issues have been successfully addressed by:**
 - **periodic inspections**
 - **SB incorporation**
 - **limitation in use of Manual Mode**

ASSEMBLY HAZARD ANALYSIS AND MISTAKE PROOFING

- **Assembly Hazard Analysis (AHA) and Mistake Proofing are carried out to address issues at OEM and A&T**
- **All changes in assembly procedures are incorporated into Overhaul and Maintenance Manuals**

BEFORE MISTAKE PROOFING



AFTER MISTAKE PROOFING

