ENGINE PERFORMANCE
DETERIORATION
ENGINE performance deterioration

66%

AIRCRAFT performance deterioration

➡ EGT MARGIN
➡ FUEL BURN
THE POWER OF FLIGHT

ENGINE performance deterioration

THERMAL Loads

PRESSURE & AERODYNAMIC Loads

CENTRIFUGAL Loads
ENGINE performance deterioration

CYCLE FATIGUE

ROTTATING PARTS

- HPT Blades and Disks
- LPT Blades and Disks

Load

High Load Value

Cycle Frequency

Time
THE POWER OF FLIGHT

ENGINE performance deterioration

STEADY FATIGUE

FIX PARTS
- Combustion Chamber
- Nozzles, Vanes, Valves

Time

Load

Time At a Given Load

04/02/2006
RXCF
ENGINE performance deterioration

BLADES / CASING CLEARANCES

EXCESSIVE

+ 10° EGT = + 0.7% SFC

• Possible EGT over-temperature
• Fuel over-consumption
HPT BLADE CLEARANCE
TIP WEAR NOTCHES

1 NOTCH
= 10° EGT margin loss
The power of flight

ENGINE performance deterioration

BLEED AIR

AIR LEAKAGES

- 1% leakage, 9Th stage HPTCC bleed
  → + 0.5% SFC
- 1% leakage, 9Th stage CUSTOMER bleed
  → + 1.6% SFC
- VBV leakage, open 10°
  → + 0.7% SFC

- Bleed Valves
- VBV
CREW POINT OF VIEW

- ENGINE START UP MONITORING
- DERATE TAKE OFF
- BLEED OFF TAKE OFF
- ROLLING TAKE OFF
- PROGRESSIVE POWER SETTING
- AVOID SLAM ACCELERATION & DECELERATION
- AWARENESS OF WARM UP & COOL DOWN PERIODS
TAKE CARE OF YOUR ENGINES...

YOU WILL SAVE MONEY ...

AND KEEP YOUR AIRCRAFT SAFE !!!
THE POWER OF FLIGHT

THE END

THANKS FOR YOUR ATTENTION!