

## Non-Interference Stress Measurement System Chart

1980

**Gen 1** Flutter Monitor - Deflection Only, Analog Signal, Single Probe, No Algorithms for Stess.

1984

**Gen 2** Multi-Probe Capability, Frequency and Amplitude of Non-Integral Order Modes, 1st Computer Based NSMS, Algorithms for Frequency and Modes.

1988

**Gen 3** Frequency and Amplitude of Single Mode Integral Orders, Decoupling of 2 Integral Order Modes, Algorithms for Stess. Typical 4 to 5 sensors/ stage.

1992

1996

**Gen 3+** Engine Co. Proprietary Gen 4 software with Gen 3+ hardware (5 lens line probes). On line monitoring of Multit-Mode Integral Orders. Measurement threshold 2 to 3 mil. p-p with additional analysis capability. Larger Probe Qty's (up to 16 per stage).

1999

2000

**Gen 4** \***Industry Standard Gen 4 Hardware and Software.** Measurement threshold <1 mil.p-p. Meas's along span of blade with minimal penetration of gas path.

2002

\* Hardware Dev: PRDA (PIWG)  
Software: USAF/AEDC