Overview of VMEP (Vibration Management Enhancement Program)

CBA (Cost Benefit Analysis)

To verify whether the method of HUMS below will save SC Army NG money over the lifetime of the aircraft. The RITA (Rotorcraft Industry Technology Association) CBAM program will be implemented to determine cost savings. Using high dollar cost items on the AH-64 Apache and UH-60 Blackhawk a report will be generated to substantiate the cost benefit of the VMEP project.

Summary
1. To verify the cost implications when installing Health Usage Monitoring Systems (HUMS) on SC Army NG aircraft.
2. Develop on-board vibration monitoring and rotor smoothing (track and balance) hardware and algorithms for the AH-64 and UH-60 aircraft.

Method and approach
- Measure and record in-flight vibrations
- Process vibration data, apply signal analysis
- Methods and identify “hot-spots”
- Fine-tune track and balance to reduce vibrations
- Address incipient failures by repair or replace

Goals and Objectives
- Reduce rotor track and balance maintenance test
- Flights by 50%
- Reduce aircraft operation costs by 10%
- Increase aircraft availability by 5%
- Increase aircraft safety

Description of VMU (Vibration Management Unit)
The on board systems is a simple light weight acquisition and processing unit based on the PC-104 industry standard bus. Open architecture hardware and software standards provide a low cost easily upgradeable core HUMS system that can meet a variety of on board system needs including:

- Rotor Track and Balance
- Low Frequency Vibration Monitoring
- Gear Box Vibration Monitoring
- Engine Performance Monitoring
- Exceedance Monitoring
- Interface to Flight Data Recorders
- Structural Usage Monitoring