LTU Prognostics
Summary

Demonstrated Capabilities:

- CBM Is Achievable for Electronic Components
- Prognostics Developed Using Existing Buss Data
- Fault Isolation Enabled By Bit Mapping

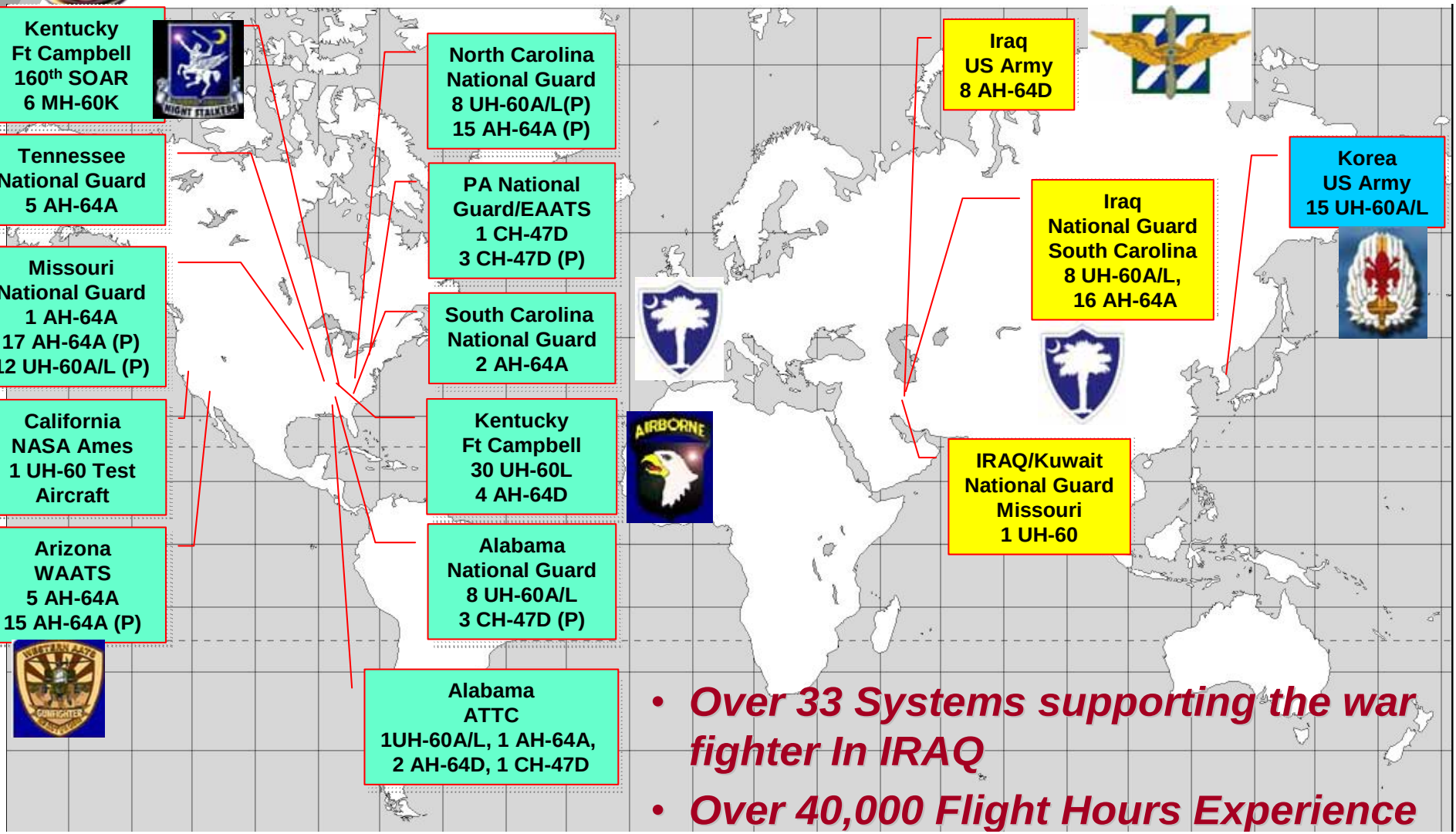
Benefits to the Warfighter:

- Enhanced Diagnostics and Troubleshooting
- Prediction of Remaining Useful Life (Prognostics)
- Reduction of Unscheduled Maintenance

Proof of Principle Results

- Validated Feasibility of Condition Based Maintenance for Aviation
- Demonstrated Benefits
  - Reduced Maintenance Manhours
  - Increased Readiness
  - Potential for Savings and Cost Avoidance
- Sufficient Enabling Technologies Exist to Begin Implementation
- Supporting Processes Can Be Transparent to Soldiers
- Prognostics Are Feasible on Both Dynamic Components and Electronic Components
- Identified Four Data Classifications to Enable Prognostics
  - Field Normal
  - Field Abnormal
  - Field Maintenance
  - Seeded Fault/Bench Testing

CBM Enabled Aircraft



- ***Over 33 Systems supporting the war fighter In IRAQ***
- ***Over 40,000 Flight Hours Experience***

Testimony From the Field

"I feel more confident in the reliability of my aircraft."

SFC, AH-64 Maintenance NCO

"CBM is a great tool used to decrease … schedule & unscheduled maintenance."

SGM, Ft Rucker, AL

"[Vibration monitoring] provides early warning of pending failure"

CW4, AH-64 Maintenance Test Pilot

"…allows time to order and to select a convenient time for repair or replace."

CW5, Maintenance Test Pilot

"…recommend we adopt CBM ASAP."

CSM, Ft Hood, TX

Potential Benefit to Warfighters

- **AH64 Block III Fleet, Conservative Analysis**
  - **10 Parts**
  - **Reviewed By AMC G-8, DA G-8, and DASA CE**
  - **Readiness +4.9%**
  - **41,000 Maintenance Manhours (MMHs) Saved**
  - **Equates to an additional AH64 Battalion**
- **UH60 M Model Fleet, Conservative Analysis**
  - **9 Parts**
  - **Readiness +3.4%**
  - **26,000 MMHs Saved**
- **Spiral Development of Benefits Analysis**

CBM Implementation Phases

IOC 2011 FOC 2015

FY 05-07	FY 08-15	FY 16+
Phase 1 – Concept Development • Proof of Principle • Develop Data Warehouse • Develop Prognostics • Assess Impacts to DOTMLPF • Assure Interoperability With: – GCSS-A – CLOE – LMP – PLM+	**Phase 2 - Implementation** • MFAB Fielding • Continuous Data Analysis • Refinement of Prognostics • Changes to DOTMLPF • Examine New Technologies	**Phase 3 - Operations** • Sustain CBM • Continuous Data Analysis • Refine Prognostics • DOTMLPF Improvements

Summary

Challenges:

- Transition From Proof of Principle to Implementation
- Prognostic Algorithm Development
- Integrating With the Automation Architecture (CLOE, LMP, PLM+, GCSS-A)
- Digital Source Collectors Fielded on Aircraft
- **Long-term Commitment to CBM Transformation By OSD/DA**