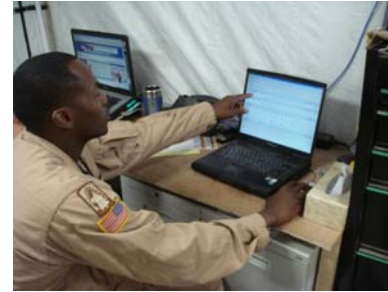
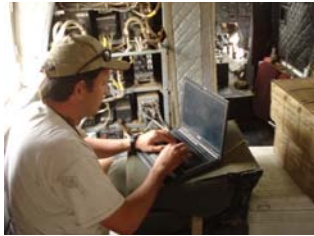




3ID COMBAT AVIATION BRIGADE CONDITION BASED MAINTENANCE



"We Fight from Above"



CW5 ART GRIBENSK

UNCLASSIFIED



3D CAB CBM TEAM

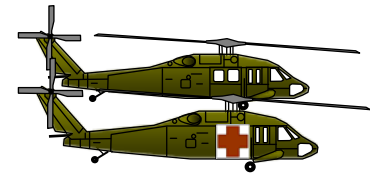


"We Fight from Above"

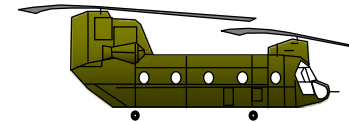
AH-64D APACHE PM MSPU, BOEING, WESTAR



UH60A/L UTILITY PM IVHMS, GOODRICH, SIKORSKY



CH-47D CARGO PM IVHMS, GOODRICH, BOEING



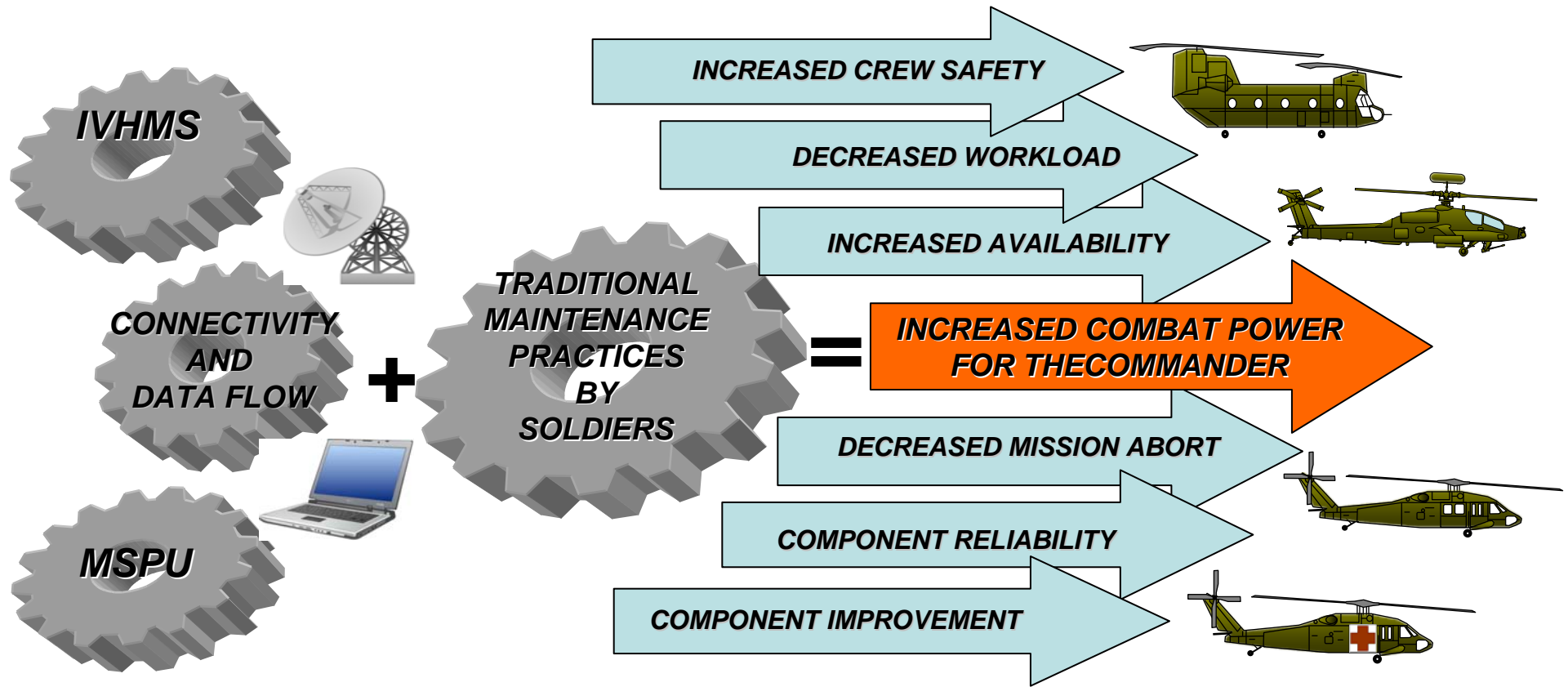
"One Team, One Fight"





3D CAB CBM PROGRAM

"We Fight from Above"



ANOTHER TOOL IN THE MAINTAINERS TOOLBOX!



WE HAVE ALWAYS USED CBM!



"We Fight from Above"

- ***ARMY OIL ANALYSIS PROGRAM***
- ***SCHEDULED MAINTENANCE PROGRAMS (PMS, PPM, PHASE)***
- ***C/W SYSTEMS CHIP DETECTION AND SUBSYSTEM MONITORING***
- ***VIBE LIGHTS BASED UPON FIXED IPS THRESHOLDS, NO TREND ANALYSIS***
- ***DMS/CBITS, IBITS, SELF TESTS***
- ***IMPENDING FAILURE INDICATIONS/OIL BYPASS BUTTONS***
- ***NON-DESTRUCTIVE TESTING***
- ***TBO (RC, TC) BASED ON STATIC FAILURE DATA***
- ***REQUIRED MAINTENANCE DUE TO EXCEEDING AIRCRAFT LIMITATIONS***
- ***COMPONENT FAILURE, UNSCHEDULED MAINTENANCE WHEN ITS BROKEN, REPLACE IT!***
- ***AVA SPECTRUM ANALYSIS WITH MANUALLY INSTALLED ACCELEROMETERS***



MAJOR DEPLOYMENT ISSUES



"We Fight from Above"

- ***NEW SYSTEM FIELDING***
- ***SYSTEM DATA COLLECTION, MOVEMENT AND HARDWARE INTEGRATION PROCEDURES***
 - ***AIRCRAFT TO THE WAREHOUSE***
- ***SYSTEM DATA PRESENTATION AND INTERPRETATION PROCEDURES***
 - ***UNIT LEVEL PROCEDURES BOTH MAINTENANCE AND PILOT***
- ***SYSTEM DATA APPLICATION (CBM HANDBOOKS)***
 - ***UNIT LEVEL MAINTENANCE DECISION MAKING PROCESS (MDMP)***
 - ***AED***
- ***SYSTEM SUSTAINMENT***
 - ***GARRISON AND DEPLOYED***



CBM FIELDING CHALLENGES



"We Fight from Above"

CONNECTIVITY, GARRISON AND IN COMBAT, NOT SUPPORTED BY FIELDDED EQUIPMENT (CLOE)

- LACK OF ONE ELECTRONIC NOTEBOOK FOR THE CREWCHIEF INTEGRATING ALL SYSTEMS***
- FIELDDED STAMIS (ULLS-A(E) DID NOT SUPPORT IVHMS INTEGRATION***
- INTEGRATING COMSAT TECHNOLOGY INTO MILITARY SYSTEMS***
- SIZE OF DATA FLOW, AND HOW IT GETS FROM THE AIRCRAFT TO THE CBM WAREHOUSE***
- CAPTURING GOODNESS VALUE; WHEN DO YOU QUANTIFY A POTENTIAL LOSS?***



CBM FIELDING CHALLENGES



"We Fight from Above"

- **OVERALL FOOTPRINT OF HUMS SYSTEMS INCLUDING SUPPORTABILITY PACKAGE**
- **NOT REPORTABLE IAW AR 700-138, NOT REQUIRED TO BE OPERATIONAL IF INSTALLED**
- **NOT FULLY INCORPORATED INTO AIRCRAFT MAINTENANCE MANUALS (UNDER DEVELOPMENT)**
- **DIFFICULTY OF DATA FLOW FOR THE CREW CHIEF BOTH IN GARRISON AND IN COMBAT**
- **NON-STANDARDIZED COLLECTION PROCEDURES AND PROGRAMS ON DIFFERENT MDS**
- **NO ONGOING SUSTAINMENT TRAINING FOR OPERATORS, CREWCHIEF'S AND TEST PILOT'S**



MINIMUM REQUIREMENTS IN 3D CAB FOR MOVING ULLS-AE AND CONDITION BASED MAINTENANCE DATA



"We Fight from Above"



Civilian Bridge Modules

*3D CAB is purchasing wireless Bridges/Access Points to be installed at strategic locations around airfield using solar power to extend range of logbook connectivity

Range: covers 500 foot print



Dell 620 Laptops and Panasonic CF-19s

*Upgraded wireless cards to 802.11g
RAM upgraded to 2 GB ram
HD capacity increased to 100 GB to facilitate ULLS-AE, IVHMS and JDIT software.
IVHMS downloads still unable to migrate wirelessly from logbook to server due to size.

ALL ADDITIONAL HARDWARE NOT FIELDIED BY THE ARMY WAS PROVIDED BY THE CARGO, UTILITY AND APACHE PMs OR PURCHASED BY 3D CAB IDENTIFIED BY RED ASTERISK



(1 for each COMSAT)
*Virtual Private Network (VPN)
Provides Network Security
Total needed 3

1 ea AVUM and 1 AVIM

CAISI

Client Access to Integrated Services Information
Provides access points into ULLS-AE Server

*NOTE: 3CAB upgraded fielded systems to 802.11g radios to support wireless effort.



Total needed 5

1 ea AVUM and 1 AVIM

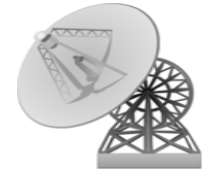
*VSAT or CLOE

Very Small Aperture Transmitter
Provides access to SARRS1 and XMITS
AH-64D CBM data to Redstone
512Kb up, 256Kb down



Total needed 5

*COMSAT
1.8M dish each FOB
XMITS data from FOBs to
IVHMS Server and
2MB up, 1MB down
1 at each FOB and BASE



Total needed 3



**CBM WAREHOUSE
REDSTONE ARSENAL**

"We Fight from Above"



HOMESTATION

VSAT



COMSAT

OUTLYING FOBS X 2



COMSAT

**ULLS-AE AND
MSPU DATA**

**ULLS-AE AND
IVHMS DATA**

**ULLS-AE AND
IVHMS DATA**



**ULLS-A
SERVER**



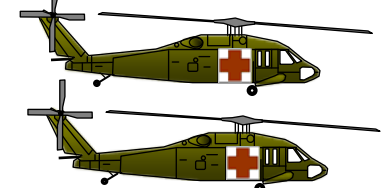
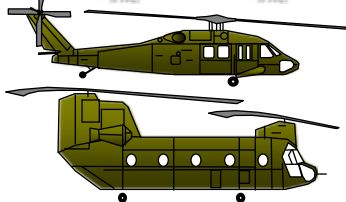
**IVHMS
SERVER**

**ULLS-A
SERVER**



**DEPLOYED
ULLS-AE
SERVER**

**CIVILIAN OR MILITARY
BRIDGE MODULES**



**WIRELESS
CAPABLE**

**WIRE
CAPABILITY**



CBM IMMEDIATE ADVANTAGES



“We Fight from Above”

- ***IMPROVES THE AIRWORTHINESS OF OUR FLEET***
- ***INCREASES OUR AIRCREW CONFIDENCE IN THEIR AIRCRAFT***
- ***DECREASES MTBMA AND MTBF, REDUCES OVERALL COST DRIVERS***
- ***INVALUABLE FOR TROUBLESHOOTING, GETTING AIRCRAFT BACK IN THE FIGHT FASTER!***
- ***GREATLY IMPROVES TRACK AND BALANCE, FASTER BETTER=LONGER COMPONENT LIFE***
- ***RE-FOCUSES PRECIOUS MAINTAINER MAN-HOURS***
- ***DETECTS IMPENDING COMPONENT FAILURE ELIMINATES GUESS WORK AND IMPROVES PREDICTABILITY***
- ***INCREASES COMPONENT TIME ON THE WING. STRETCHES LIMITED RESOURCES, REDUCES COMPONENT CHANGE FREQUENCY***
- ***IMPROVES AND ENCOURAGES PROACTIVE MAINTENANCE VS. REACTIVE MAINTENANCE***
- ***IMPROVES OVERALL MAINTENANCE DECISION MAKING PROCESS (MDMP)***

A “SIXTH SENSE” FOR THE MAINTAINER TO MAKE DECISIONS!



CBM LONGTERM ADVANTAGES



"We Fight from Above"

- FUTURE PRODUCT IMPROVEMENT BY IDENTIFYING AND IMPROVING FAILING SUB-COMPONENTS***
- EXCELLENT TOOL FOR ACCIDENT INVESTIGATION/ASSISTS IN DETERMINING CAUSATION AND ASSISTS TRAINING***
- ASSISTS AED AND CCAD ENGINEERING WITH MAINTENANCE ENGINEERING CALLS (MEC), REAL TIME CONDITIONS***
- EXTENDS COMPONENT PROJECTIONS BASED ON TREND ANALYSIS, NOT FAILURE MODE ANALYSIS-MORE PREDICTABILITY***
- CORRELATES SYSTEMS FAILURE ANALYSIS AND TREND ANALYSIS WITHIN DIFFERENT FLIGHT REGIMES AND ENVIRONMENTS-***
- MAY INCREASE PILOT LEVEL OPERATING LIMIT THRESHOLDS***

***IMPROVES MAINTENANCE MANAGEMENT AND EFFICIENCIES
IMPROVES THE QUALITY OF LIFE FOR THE MAINTAINER
OPERATING AND SUSTAINMENT COST REDUCTIONS-LONG TERM RESULT***



THE WAY FORWARD



"We Fight from Above"

- ***CONTINUE TO CAPTURE CBM RELATED UNIT MAINTENANCE ACTIONS***
- ***MANDATORY CAT 1 QDR SUBMISSIONS FOR ALL COMPONENTS REMOVED DUE TO CBM MONITORING-PUBLISH ASAM REQUIRING THIS ACTION!***
- ***CONTINUE TO DEVELOP REVISED EXCEEDANCE CRITERIA BASED ON MATURE DATA***
- ***REQUIRE MANDATORY EXCEEDANCE RECOGNITION BY CREWS IN ALL -10 OPERATOR'S CL***
- ***CONTINUE TO INTEGRATE INTO ULLS-A(E) SO IT'S SEEMLESS TO THE CREWCHIEF USING ONLY ONE ELECTRONIC LOGBOOK AND SERVER***
- ***STANDARIZED CBM PROGRAMS THROUGHOUT THE FLEET. DO NOT BURDEN THE UNITS WITH COMPETEING PROGRAMS!***
- ***DEVELOP 1 CBM HANDBOOK FOR ALL SYSTEMS, DIFFERENT CHAPTERS FOR DIFFERENT AIRCRAFT***
- ***CONTINUE TO EMPHASIZE THE SAFETY, AIRWORTHINESS AND AIRCREW CONFIDENCE BENEFIT***



THE WAY FORWARD

CONT'D

"We Fight from Above"

- ***CONTINUE TO REDUCE THE FOOTPRINT AND IMPROVE SUSTAINABILITY***
- ***CONTINUE TO IMPROVE EASE OF INTERPRETATION FOR THE MAINTAINER***
- ***DEVELOP TRAINING DURING AIT AND MTP COURSE PHASE 1 AND 2 (LONG POLE)***
- ***FIELD INFORMATION DATA FLOW EQUIPMENT USING COMMON LOGISTICS OPERATING ENVIRONMENT (CLOE)***
- ***ENSURE ALL SYSTEMS HAVE A WIRELESS CAPABILITY-THE FIELD NEEDS AN OPTION BASED UPON THE OPERATING ENVIRONMENT***
- ***CONTINUE TO DEVELOP COCKPIT INDICATIONS-USABILITY FOR THE PILOTS***
- ***MAKE ANY CBM SYSTEM A REQUIREMENT AND REPORTABLE IAW AR 700-138***

***CENTRALIZE DATA MANAGEMENT AND DATA MOVEMENT EFFORTS
PM-LIS, PM EIS, PM CAISI, PM VSAT PM AVIATION SYSTEMS***

CONSOLIDATE CBM EFFORTS ACROSS THE FLEET



WHAT WE SHOULD AVOID



"We Fight from Above"

- **DO NOT SELL CBM AS A REPLACEMENT FOR TRADITIONAL MAINTENANCE PRACTICES**
- **DO NOT FOCUS ON MAN-HOUR SAVINGS ONLY. WILL LEAD TO REDUCTION IN MTOEs IF OTHER REQUIREMENTS ARE NOT CAPTURED**
- **DO NOT RELY ON HUMs DATA SOLEY FOR MDMP (MAINTENANCE DECISION MAKING PROCESS) THE TECHNICAL MANUAL WILL ALWAYS BE OUR FIRST LINE OF SAFETY**
- **DO NOT FOCUS SOLEY ON COMPONENT LIFE EXTENSION=PUSHING THE ENVELOPE. MUST CONTINUE TO HAVE TBOs TO ANALYZE LONGTERM TOTAL COMPONENT LIFE.**
- **DO NOT FOCUS ON SOLEY ELIMINATING INSPECTIONS. THE FOCUS SHOULD BE ON ENHANCING THE INSPECTION PROCESS.**
- **DO NOT FOCUS ON DOLLARS SAVINGS ONLY. THIS IS A LONG TERM GOAL. HOWEVER, IF THE SYSTEM ONLY PAID FOR ITSELF, IT WOULD BE WORTH THE ADVANTAGES TO THE COMMANDER AND FUTURE RELIABILITY IMPROVEMENTS!**

**NEVER BURDEN THE CREW CHIEF WITH MORE REQUIREMENTS!
AUTOMATION SHOULD REDUCE REQUIREMENTS, NOT INCREASE THEM!**