Comanche's Approach to Simulation Based Acquisition

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MODELING and SIMULATION REQUIREMENTS

- Engineering Development
- Pilot Vehicle Interface Analysis
- Test and Evaluation
- Tactics, Techniques and Procedures (TTP) Development
- AWE Support
- Individual Training
- Collective Training
- Support Requirements Determination
- Digital Interoperability (System Development)
- Demonstrations

And Capability for Data Reduction and Analysis!
SIMULATION TOOLSET

- Tactics, Techniques & Procedures
- Doctrinal Insights
- Individual & Collective Training
- Technical & Tactical Digital Force Integration
- Technical & Operational Testing
SOFTWARE DROP SCHEDULE  As of 25 Jan 99

EVENTS DEVELOPED IN EDS

CPC/CVC Software Drops

EDS & CPC

MCR-A/C SOFTWARE
Central Technical Support Facility
Fort Hood, Texas

"Brings Together in one Place"
- Soldiers
- Combat Developer
- Industry
  -Software Programmers
  -Technicians
- Test Community
- Trainers
- Warfighter Systems

Iteratively -
- Train
- Test
- Exercise
- Evaluate
- Improve & Enhance

Refined and Enhanced
Warfighter Tools
(Every 3-4 Months)

Iterative Modernization

Confirm Digital Interoperability with the Digitized Force
- Hardware
- Software
- Digital Tactics, Techniques & Procedures
INTEGRATED TRAINING PROGRAM (ITP) REQUIREMENTS

- Developed by the Contractor Concurrently With the Aircraft
- Developed IAW TRADOC Systems Approach to Training (SAT) Process
- Base Types, Quantities, Mix and Fidelity of Training Media on Results of SAT Process Analysis
- Include All Hardware, Software, Courseware, Documentation, Consumables and Facilities to Train Active and Reserve Components
- Train 100% of Critical Operator, Maintainer, and Support Tasks
- Tested, Validated, Verified and Ready for Training in the Training Base Prior to Initial Operational Capability

RAH-66 Comanche
User Requirement: Optimize the Use of Embedded Training

On Aircraft
- Operational Test, Training & Instrumentation System
- Aviation Survivability Equipment / Electronic Warfare (ASE/EW) Equipment Sensor Stimulation

Off Aircraft
- Portable Maintenance Aid (PMA)
- Aviation Mission Planning Station (AMPS)
  - Full Mission Rehearsal Capability

**Portable Maintenance Aid (PMA)**
- Primary Media for Maintainer Sustainment Training
- Training Faults Embedded in PMA not Aircraft
- Combines with PMA Instrumentation Pack (PIP) for Full Embedded Maintainer Training Capability
COMANCHE MAINTAINER TRAINING DEVICES

Proposed

Rotor/Transmission/Weapons Bays/Engine/MEP/SPU/ECU Module

Cockpit/Sensor Turret/Gun Module

Module A

Module B/C

Module D

FANTAIL/Antenna Module

Module E

Landing Gear/Pneudraulic/Fuel Systems Module

Integrated Composite Maintenance Trainer

RAH-66 Comanche
PROPOSED OPERATOR TRAINING DEVICES

TRAINING BASE

- Comanche Virtual Cockpit (CVC)
- Computer Aided Instruction
- Cockpit Procedures Trainer (CPT)
- Comanche Mission Simulator (Hi-Fidelity Cockpit Simulation)
  - Motion / Non-Motion?
  - HLA Compliant
- Comanche Aircraft (Embedded Training)

USING INSTALLATION

- Computer Aided Instruction
- Comanche Virtual Cockpit (CVC)
- Comanche Mission Simulator (Mobile Variant)
  - Fidelity?
  - Multiple Cockpits
  - Transportable
  - HLA Compliant

AVCATT / ARMS
CVC DESKTOP SIMULATOR ELEMENTS

Stealth Viewer for out-the-window view

ATCOM model for the tactical environment

Comanche VAPS for Pilot Interface

FlyBox

SGI Computer

BG Systems
Joystick Control Box

Two or more processors
POTENTIAL UPGRADES

Sound Enhancements
- Instructions
- Error advisement
- Simulation realism

Flat-Panel Displays

IR or TV imagery for EOTADS manual scan/stare

Eliminate the need for ATCOM display

Octane with two graphic output devices

Upgrade as required

Touch-Screen interaction

Actual Grips with functional switches

FlyBox

RAH-66 Comanche
Advanced Tactical Combat Model

Graphical Display

Stealth Viewer

MaK Technologies VR-Link

Player Interactive Force-on-Force Model
- Stochastic
- Up to Brigade-Level Combat Interactions
- DIS Compliant

High Resolution for Rotorcraft Systems
- Validated Detection Modules
- Validated Radar Clutter & Propagation Modules
- 6-DOF Aerodynamics

RAH-66 Comanche
ADDITIONAL RAH-66 MODELS

- Modified S-76 Aircraft
- Demonstrate Fantail Requirements

- Modified S-76 Aircraft
- Flight Control Laws
- MEP
- NVPS

- CH-47 & Tower
- TAS

- Transportability
- MANPRINT/Human Factors

- Planned as Maintenance Trainers after Completing Test Flight

- Propulsion System Test Bed

- Demonstrate 20mm Gun Feed System

- Full Scale Model
  - Low Observable Tech
  - Radar Reflection
  - Low Observable Material
COMANCHE IS A SUCCESS STORY

T801
Builds on T800 Success
17% Power Increase

2.0G Pull-Up @
100 Kts
2.15G Pull-Up @
120 Kts

PSTB
200 Completed
of 200 Hours MQ
669 Hours Total

Demonstrated
Integrated
Architecture

TSM
Representatives
in Plant

Radar Signature
Model Testing
Successful

Combined Test Team
Operational

Force XXI Activities
Global 97
SIMEX - Sep 97
DIV XXI - Nov 97

RAH-66 Comanche

171 Kts Forward
204 Kts TAS (Dive)
75 Kts Left Sideward
65 Kts Right Sideward
70 Kts Rearward Flight

First Flight
January 4, 1996

112 Flights
24.8 Hours to Date

PMA
In Use

Dual Mode
"Eye Safe" Laser
Demonstrated

T800
Easily Maintained
Lightweight
High Power
Low Fuel Consumption
Military & Civilian
Qualified

Digital Flight
Control System
Minimizes Pilot
Workload
SUMMARY

Put the **INTELLECTUAL** before the **PHYSICAL** -

*Simulation Based Acquisition*

... From Concept Exploration
Through Operation and Support
Provides -

- Capability Leap Ahead
  - Tactics, Techniques & Procedures Development
  - Doctrinal Insights
  - Technical and Tactical Digital Force Interoperability and Integration
  - Individual & Collective Training
  - Demonstrate Early Operational Capability Through Simulation
- Technical and Operational Testing
- Reduced Lifecycle Cost

RAH-66 Comanche

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