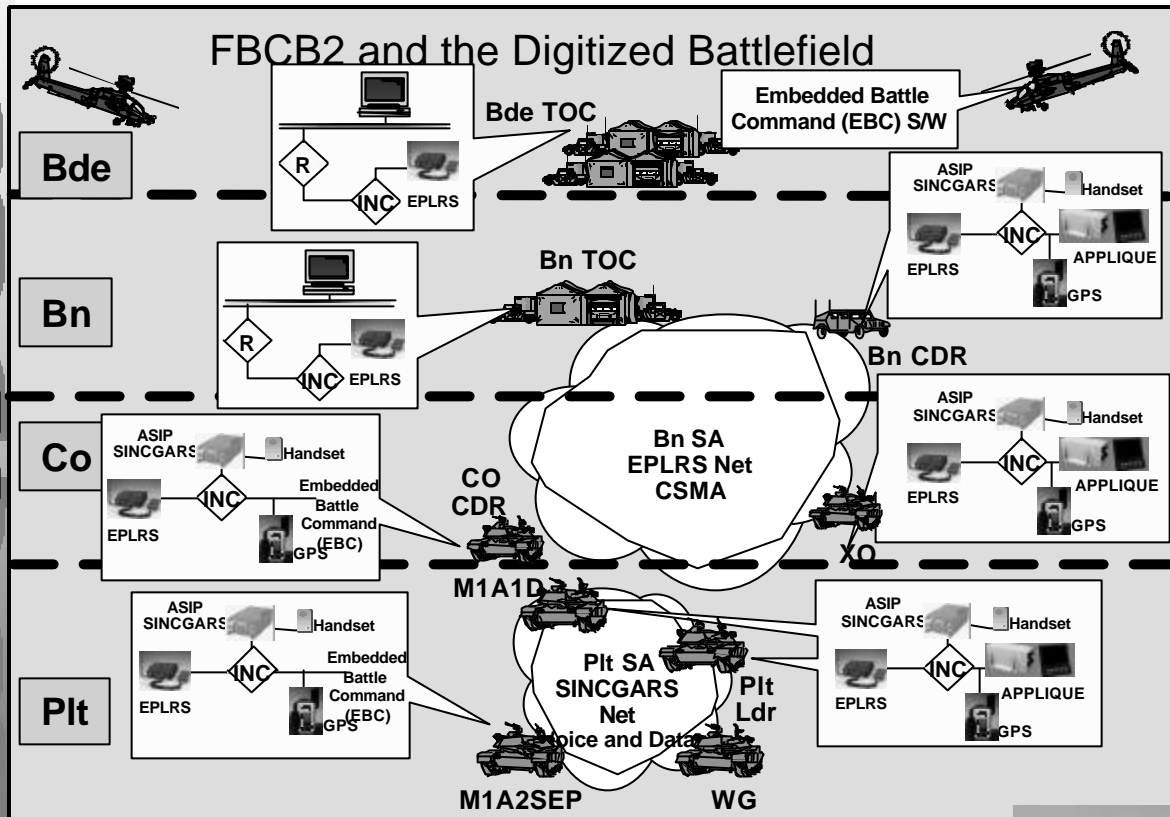




# Firepower 2000 - Artillery Symposium

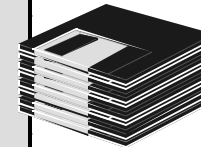
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**LTC John Bullington**  
**APM, Software**  
**PM FBCB2**



Applique



**21 June 2000**



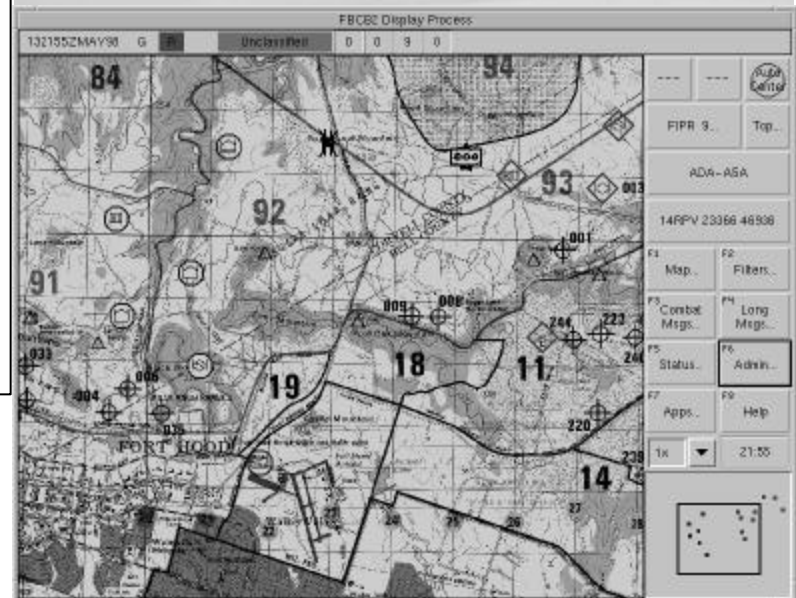


# Force XXI Battle Command Brigade and Below (FBCB2)

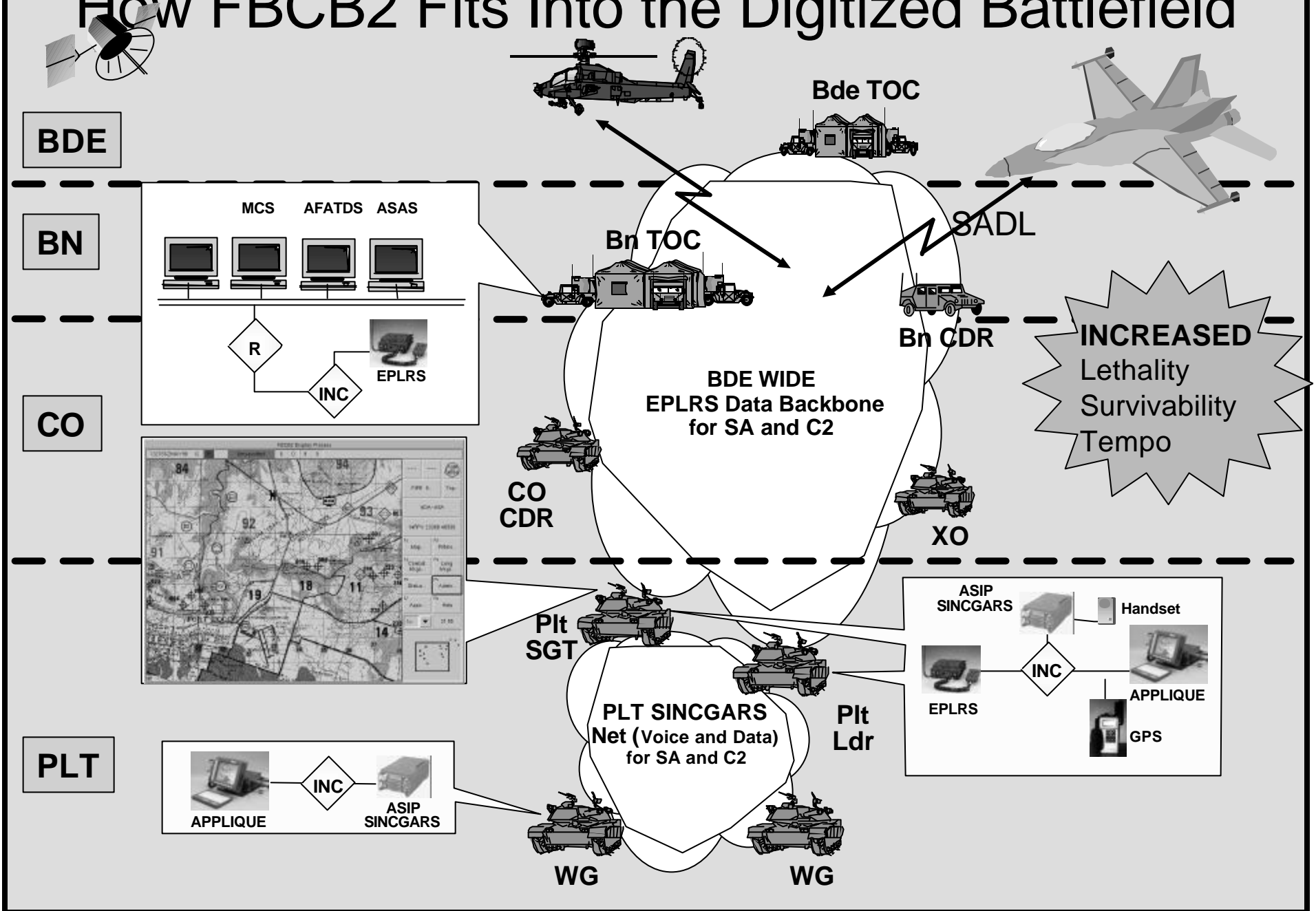
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- The principal Digital Command and Control System for the Army at Brigade and Below
- Consists of Applique hardware, software and EBC software integrated into the various platforms at Brigade and below, as well as appropriate Division and Corps slices necessary to support Brigade operations
- Interconnects platforms through a communications infrastructure called the Tactical Internet made up of existing EPLRS and SINCGARS radios to pass Situational Awareness (SA) data and Command and Control (C2) messages

**Situational Awareness is Life**



# How FBCB2 Fits Into the Digitized Battlefield





FBCB2

# Situational Awareness

- Where am I?
- Where are my buddies?
- Where is the enemy?

Geo-reference data including

- Bridges
- Minefields
- Hazard areas etc

- Own position and navigation
- Friendly platforms
- Blue SA is 'hands free'

Enemy platforms

Pan box shows platforms outside map area

Auto  
ter

SZ LOC 1/4 ID

14RPV 22489 55207

F1 Map...	F2 Filters...
F3 Combat Msgs...	F4 Messages...
F5 Status...	F6 Admin...
F7 Apps...	F8 Help

1x ▼ 18:34



# C2 Messages

Warnings/Alerts scroll and alarm

## Create Message

- Long Form messages
- Combat messages

- JVMF Messages only
- Address to person, group or everyone
- FIPR precedence
- Machine Ack, Operator Ack, Operator Response
- C2 messages auto-generate geo-reference SA

! FIPR 5... Top...

S2 TOC 1/4 ID

14RPV 22489 55207

F1  
Map...

F2  
Filters...

F3  
Combat  
Msgs...

F4  
Messages...

F5  
Status...

F6  
Admin...

F7  
Apps...

F8  
Help

1x

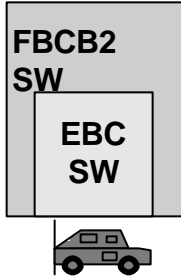


18:34

**"Soldiers On Point for the Nation"**

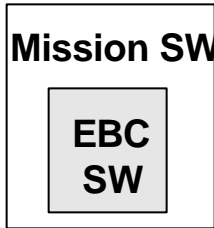
FORCE XXI

**Appliqué**



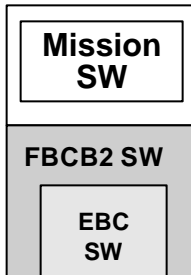
<ul style="list-style-type: none"> <li>• M1A1D</li> <li>• M2A2 ODS</li> <li>• HMMWV</li> <li>• HEMTT/PLS</li> <li>• Grizzly</li> <li>• FA Ammo Carrier</li> <li>• Light &amp; Medium Trucks</li> <li>• M577/M113/M88A2</li> <li>• EH-60</li> <li>• AVLB/ASV</li> <li>• ACE</li> <li>• FOX.....</li> </ul>	In progress	<b>85%</b>

**Embedded**



<ul style="list-style-type: none"> <li>• ATCCS Systems</li> <li>• M1A2 SEP</li> <li>• M2A3</li> <li>• M3A3</li> </ul>	In progress	<b>14%</b>
<ul style="list-style-type: none"> <li>• Kiowa Warrior</li> <li>• Wolverine (Considering Applique)</li> <li>• Crusader</li> <li>• Future Scout Cavalry System</li> <li>• RAH 66</li> <li>• Longbow Apache</li> <li>• MLRS</li> <li>• Mortar Systems (MFCS)</li> <li>• Land Warrior</li> <li>• C2V</li> </ul>	Planned	

**Co-Hosted**



<ul style="list-style-type: none"> <li>• AVENGER- FAAD C2I</li> <li>• Linebacker</li> <li>• M109A6 Paladin</li> </ul>	In progress	<b>Planned</b>
<ul style="list-style-type: none"> <li>• Bradley Fist-V..</li> <li>• Wolverine (tentative)</li> </ul>		

**FBCB2 - Where is it?**

**42 Platform Variants**  
**~40% are HMMMV**

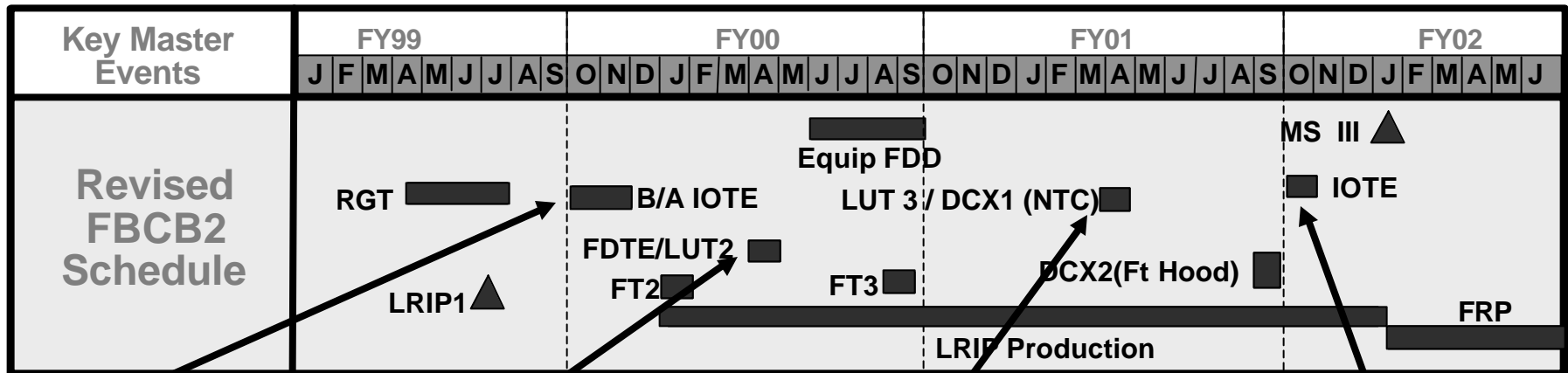






# Test Objectives, Scope and Functionality

FBCB2



**Brad/Abrams IOTE**

**OBJECTIVE:**  
Test EBC

**SCOPE/HW:**  
- 14 EBC M2A3  
- 4 EBC M1A2 SEP  
- 8 Applique+ (LUT vers.)

**SW FUNCTIONALITY:**  
FBCB2 and EBC vers. 3.1  
Initial Security  
Improved C2 Messaging  
- Reliability and Speed  
Enhanced Map/Overlay/SA  
- Red SA Management  
- Fire Mission Icons  
- Line of Sight Tool  
- Range Fan Tool  
- Select Units from UTO tab in Overlay  
Improved Waypoint Navigation  
LRF Functions  
Bradley ODS Integration  
- LRF and TacNav Computer  
Preplanned UTO Support

**FDTE/LUT 2**

**OBJECTIVE:**  
TTP Development  
18 Month Phase Check  
Further LRIP Authority

**SCOPE/HW:**  
~ 350 FBCB2  
- 100 V2E  
- 100 Applique+ (LUT vers)  
- 150 Applique + (FDTE vers)

**SW FUNCTIONALITY:**  
FBCB2 vers 3.2  
Improved Security  
Initial Mission Data Loader  
Improved C2 Messaging  
- Reliability and Speed  
- Distribution Mechanisms  
- Multicast Large Messages  
Initial System Heartbeat  
On Screen Pop Up Keyboard  
Georef SA Enhancements  
Initial TOC Server  
- Full SA Support for TOCs  
- FBCB2/MCS/ASAS/AFATDS Interface  
Initial Network Management  
Dynamic UTO Changes (within BDE)  
Reduced System Start Up Time

**LUT 3/DCX 1**

**OBJECTIVE:**  
Force Effectiveness  
Phase Check  
RAM (Gunnery)  
Live EW/IW  
Test LRIP Applique+

**SCOPE/HW:**  
650-900 systems  
(All LRIP Applique+)

**SW FUNCTIONALITY**  
FBCB2 vers 3.3  
Full Security (-)  
Improved Mission Data Loader  
Improved C2 Message Reliability  
Full System Heartbeat  
Georef SA Enhancements  
Full TOC Server  
FBCB2/CSSCS/AMDWS Interface  
Improved Network Management  
Full Dynamic UTO Changes  
CSS Functionality  
Embedded Training  
INC Softload  
SA SMI Enhancements  
Abrams LRF Integration  
Quick Fire and On Call Fire Mission

**IOTE**

**OBJECTIVE:**  
Systems of Systems Evaluation  
Prompts FBCB2 Production Decision  
Simulated EW  
Live EW










**SCOPE/HW:**  
650-900 systems  
(All Production Applique +)

**SW FUNCTIONALITY:**  
FBCB2 vers 3.4  
Full Network Management (-)  
Graphical Commander's Intent Tool  
Map Display for Night Ops  
UAV Interfaces  
Stop Own SA after MILES Kill  
Improved Overlay Interface  
- MCS and ASAS



# Hardware Evolution

FBCB2

<b>TF XXI</b> Mar 97	<b>LUT I</b> Aug 98	<b>FDT&amp;E/LUT II</b> Apr 00	<b>LUT 3/DCX1/IOTE</b> FY01
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">  <p>V1 (Commercial)</p> </div> <div style="margin-bottom: 10px;">  <p>V2 (Ruggedized)</p> </div> <div>  <p>V3 (MIL SPEC)</p> </div> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">  <p>Current Hardware</p> </div> <div>  <p>V2 Enhanced (Ruggedized)</p> </div> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">  <p>Current Hardware</p> </div> <div>  <p>V2 Enhanced (Ruggedized)</p> </div> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">  </div> <div style="margin-bottom: 10px;">  </div> <p>LRIP Hardware                      Exterior Dimensions the Same                      Upgraded Technology and                      Design Inside                      Two manufacturers selected</p> </div>
<p>Combination of COTS Ruggedized and Military Computers</p>	<p>Sunlight Readable Display                      Touch Screen</p>	<p>Same Box With Reliability and Design Improvements                      Fixed Power Supply design and other reliability problems</p>	<p>Same Footprint                      Improved Reliability                      Reduced Power/ Heat                      Increased processing performance                      HEMP protection                      Built in Test                      Designed for Tech Insertion</p>
<p><b>Software Version</b>                      Mar 97</p>	<p><b>V2.1</b>                      Aug 98</p>	<p><b>V3.2</b>                      May 00</p>	<p><b>V3.3</b>                      Apr 01</p>





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# LRIP Computers (Appliqué+ V4) Provided By Litton Data Systems and PARAVANT Inc.

Pentium processor

Sunlight readable display

Wide viewing angle



Commercial hard disk drive in  
removable package

Standard interfaces

Meets environmental conditions  
for combat platforms (ruggedized,  
not “militarized”)

Touch screen

- Universal Serial Bus (USB) for sensor, loader, ... plug and play
- Increased processor speed and disk capacity
- Lower power chips
- LRU interchangeability = Processor's, display's, and keyboard's
- Identical form factor to protect IK investments

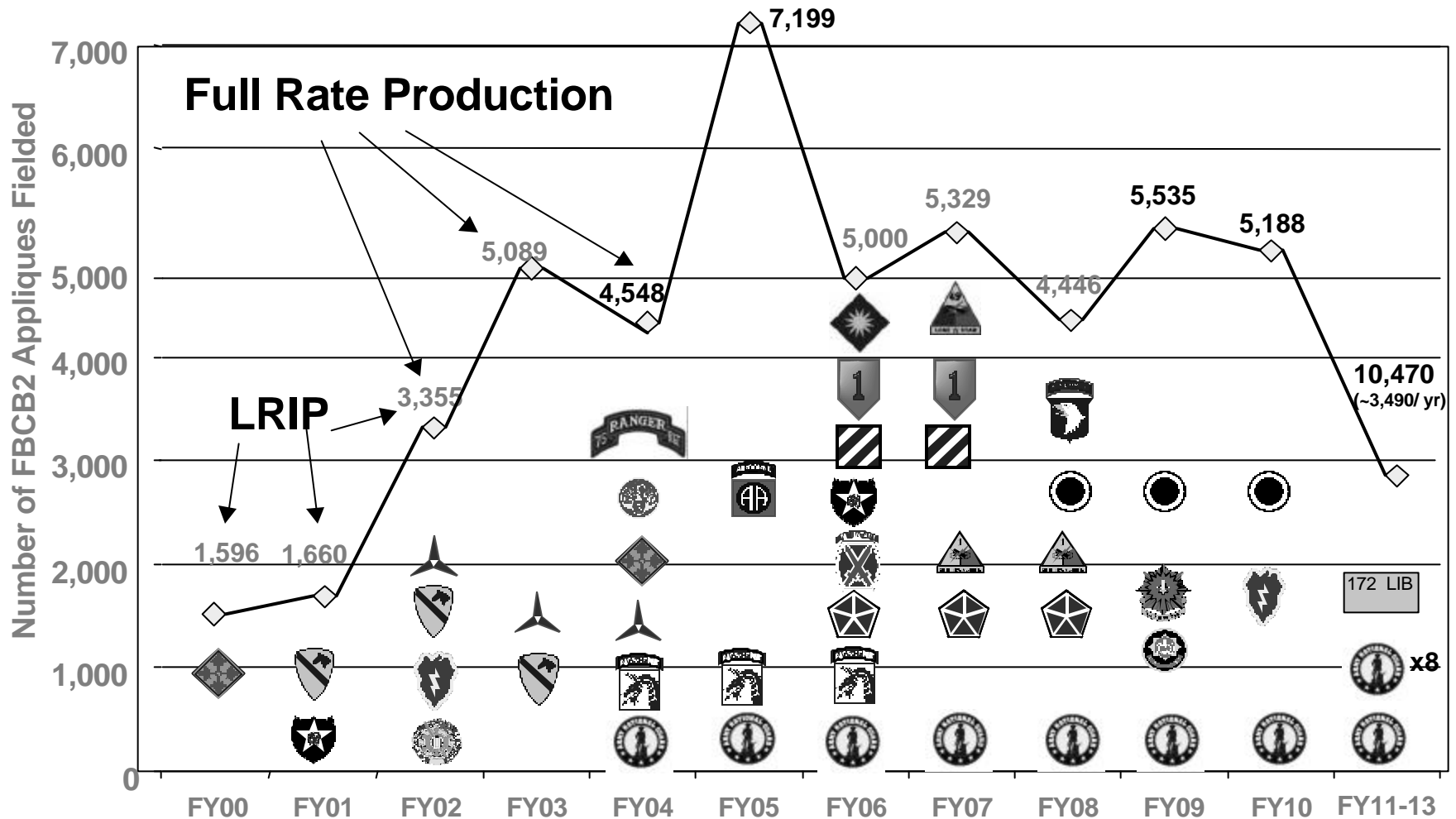
***Both hardware & contract designed to facilitate technology insertion***



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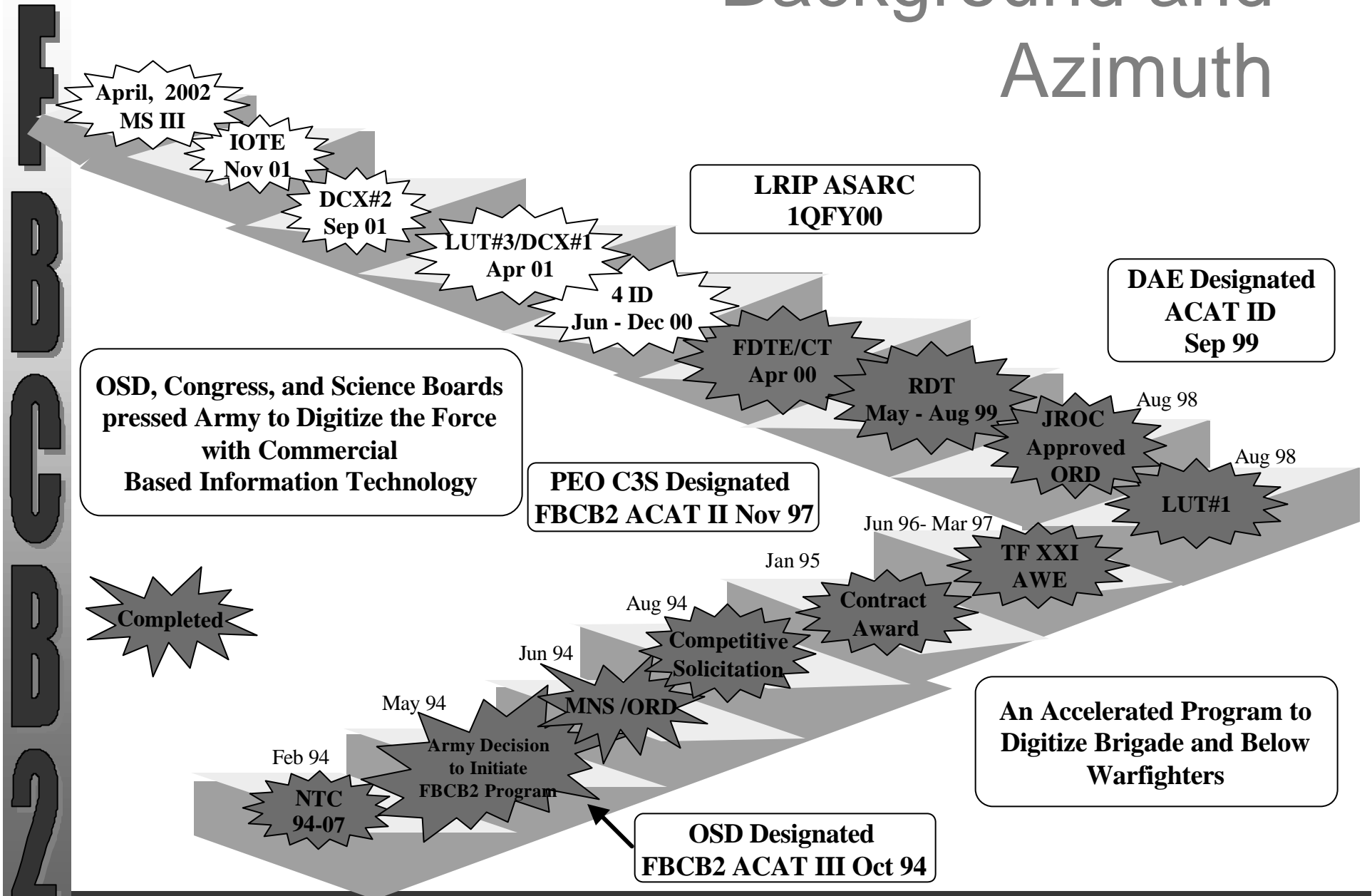
# Production & Fielding Plan

## Army Acquisition Objective is 59,522





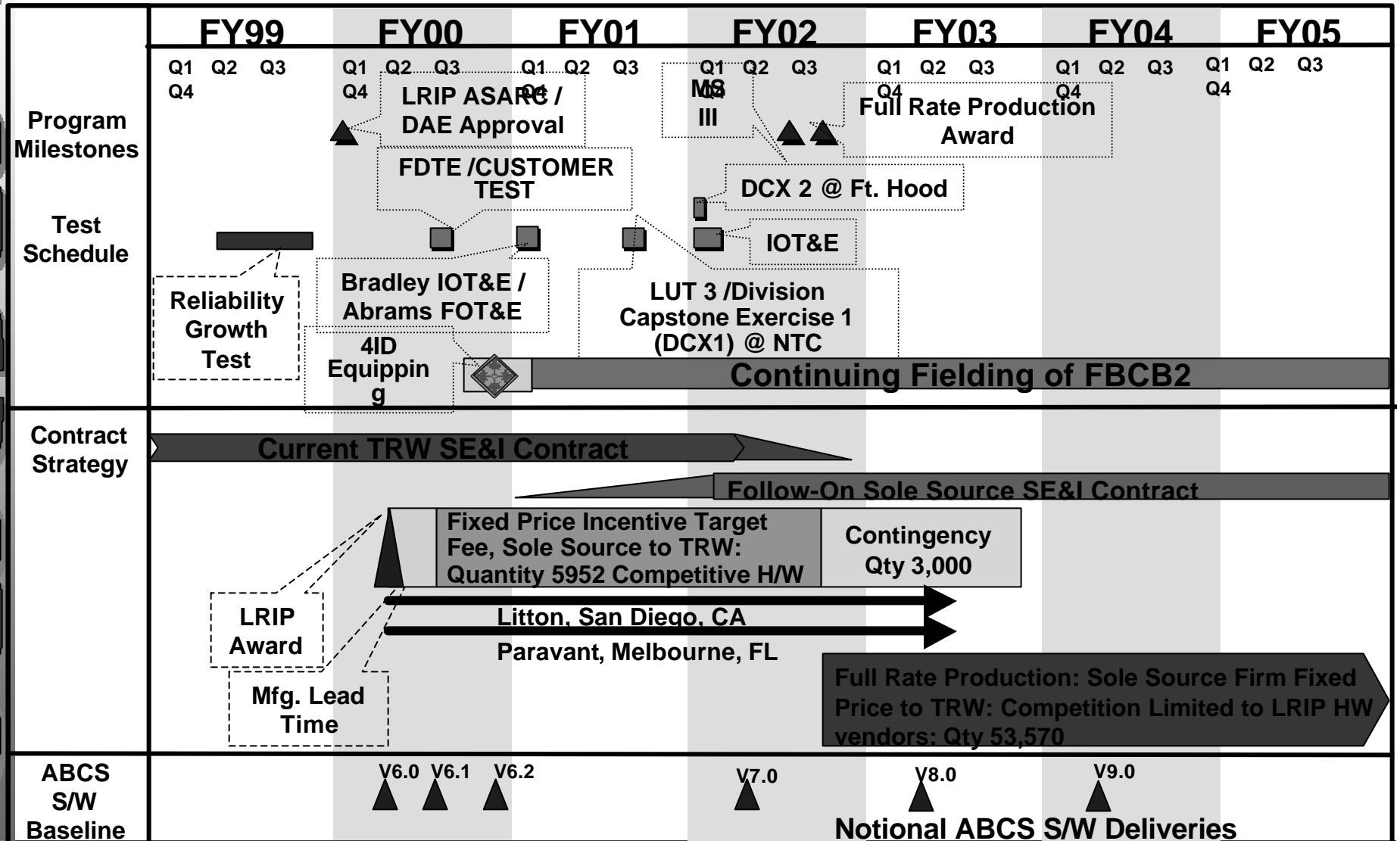
# Background and Azimuth





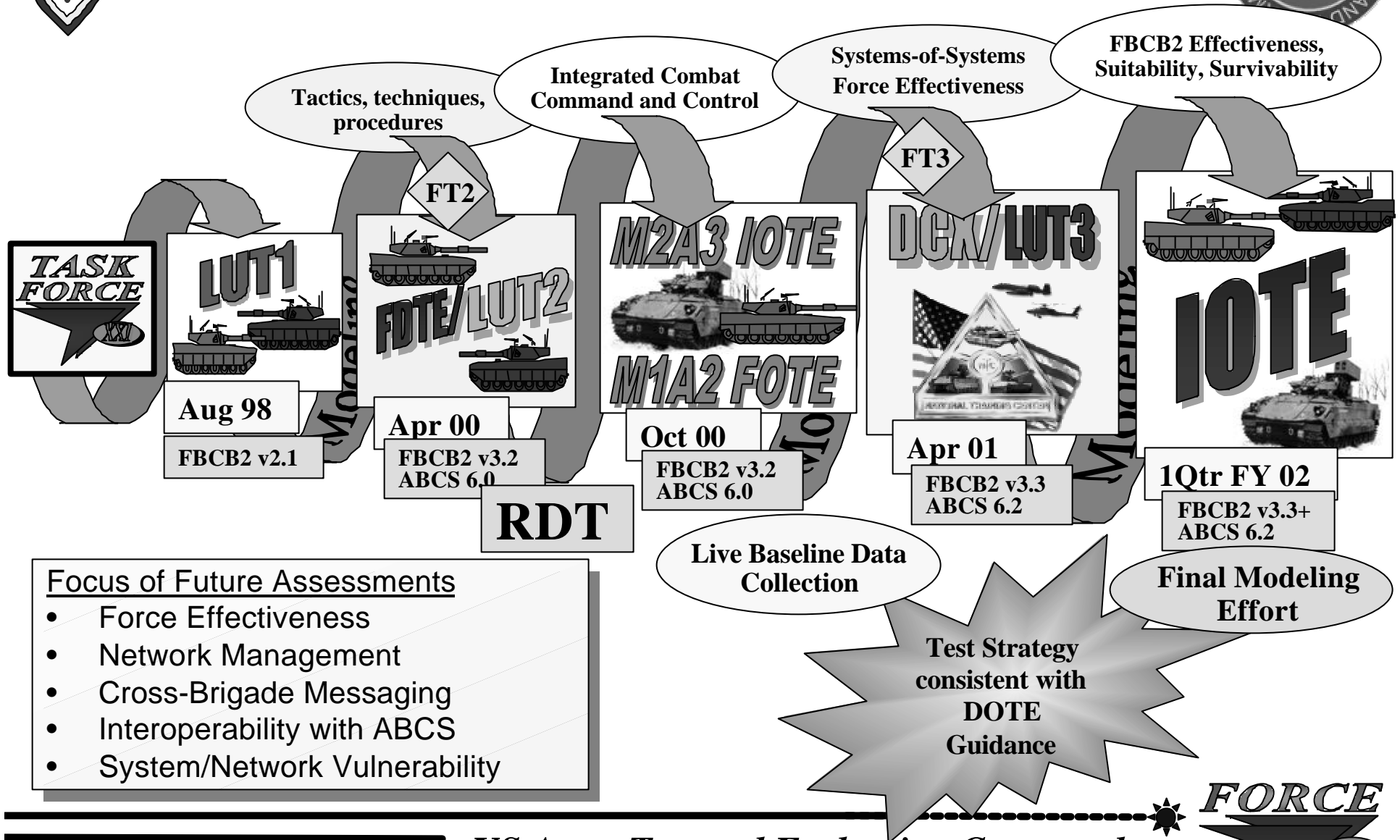
# Program Schedule

FBCB2





# Summary of Key Test Events



US Army Test and Evaluation Command





# FBCB2 and the Artillery Community

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## *Crusader*

Embedded  
FBCB2 (eFBCB2)  
Card.

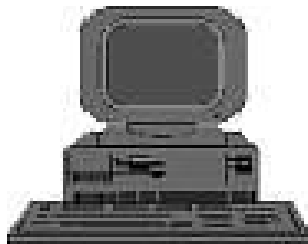
FUE in FY 05.



## *Paladin*

FBCB2 V4 processor  
Integrated with on-  
board Fire Control  
Computer, sharing  
enhanced display.

To be fielded to 4ID for FDD.



## *AFATDS*

Embedded Battle  
Command (TOC  
Server).

To be embedded for DCX.



## *FIST-V*

Integration of FBCB2  
with Forward  
Observer System  
(FOS) to eliminate Air Gap.

Demo in Nov 00. Fielding to 4ID for FDD.



## *B-FIST*

No integration  
efforts planned.



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# Paladin Digitization With FBCB2 Software And Hardware

- **TRW has contract to develop an Enhanced Display Unit (EDU) for Paladin to support FDD**
  - Delivery order to start received in October 1999
- **Applique+ V4 will be used for the processor**
  - New console and display being developed
- **Standard FBCB2 Version 3.3 software will be used for FDD**
  - Small software tailoring to be completed to support interaction with Fire Control computer

**Paladin's approach exploits FBCB2 standards and investment; it also greatly facilitates synchronization of technology insertion.**





# Paladin EDS Overview

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- Objective: add FBCB2, integrated with existing Fire Control
  - Replace obsolescent FC Display/Keypad
  - Mission-critical design
- Customer: USA, PM FBCB2 & PM Paladin
  - Schedule: Nov '99 – Dec '00
- TRW Role: Prime Contractor, turnkey responsibility
  - Modify Fire Control & FBCB2 software
  - Develop new Fire Control Keypad
  - Design, integrate, install, test, train





# Block Diagram

