

# Augmenting BIT

## *Exploiting Test Technology in the Field Test Environment*

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# Introduction

- How Operational Equipment is Supported in the Field
- The use of Built-in Test
- Combining BIT with External Test Equipment
- Advances in First Line Test Systems

# Operational Scenario

- Little scope for *Extensive* equipment testing in the field
- Equipment must remain operationally available
- Failures must be quickly isolated
- Growing complexity can make this difficult and expensive

# Operational Scenario

- Advances in test technology can accommodate greater complexity
  - Reduced Size
  - Reduced Time
  - Reduced Cost
- Expensive Business – Paramount that Solutions Provide Value for Money

# Dependence on Built-in-Test (BIT)

- Trend for Base Workshop Repair rather than field repair
- BIT facilities diagnose failures to easily replaceable items
  - Immediate on-line check at start-up
  - Continuous health monitoring
  - Failure Identification and Location
- Heavy Reliance on BIT

# BIT Technical Boundaries

- Interface Testing, between LRUs
- Closed Loop Testing
- Stimulus & Measurement

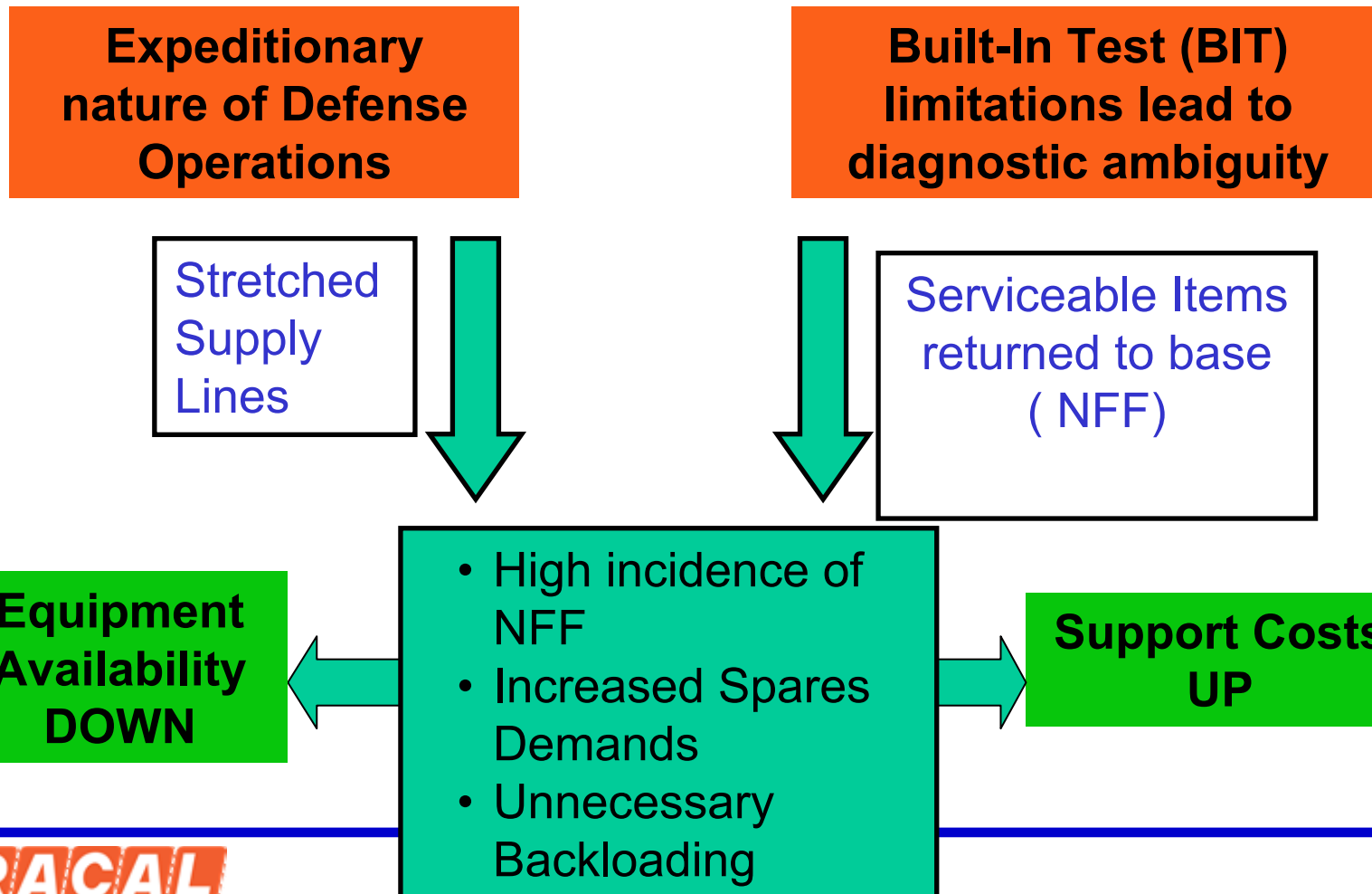
# BIT Targets and Achievements

	<i>Target</i>	<i>Commonly Achieved</i>
<i>Failure Detection</i>	99%	95%
<i>Failure Location</i>	90%	80%
<i>False Alarm Rate</i>	1%	5%
<i>Diagnostic Error Rate</i>	5%	10%

## BIT Performance

TARGET										
		Detected	Not detected	Diagnosed	Not diagnosed	Diagnosed correctly	Diagnosed incorrectly	False Alarms	Action on BIT failure	NFFs
Failures	100	99.00		89.10		84.65				
Detect %	99%		1.00						Return item group.	1.00
Diagnose%	90%				9.90				Return item group.	9.90
Diagnostic error%	5%						4.46		Return item group.	4.46
False Alarm %	1%							1.00	Return serviceable item	1.00
										<b>16.36</b>
REAL										
		Detected	Not detected	Diagnosed	Not diagnosed	Diagnosed correctly	Diagnosed incorrectly	False Alarms	Action on BIT failure	NFFs
Failures	100	95.00		76.00		68.40				
Detect %	95%		5.00						Return item group.	5.00
Diagnose%	80%				19.00				Return item group.	19.00
Diagnostic error%	10%						7.60		Return item group.	7.60
False Alarm %	5%							5.00	Return serviceable item	5.00
										<b>36.60</b>

## The 1st-4th Line Maintenance Dilemma



# BIT Improvement

- Economics
- BIT + External Test Equipment
- Mobile Workshops
- First Line Test Sets
- Special-to-type Test equipment

# Rationilaztion

- Multi-Purpose / General Purpose Facilities
- PC-Based Systems
- HUMS
- The Maintenance Data Network

# Maintenance Data Network

- Feed-back of collated serial BIT & HUMS Data



**Improved Prediction and Planning at All levels**

- Cross-feed of casualty experience



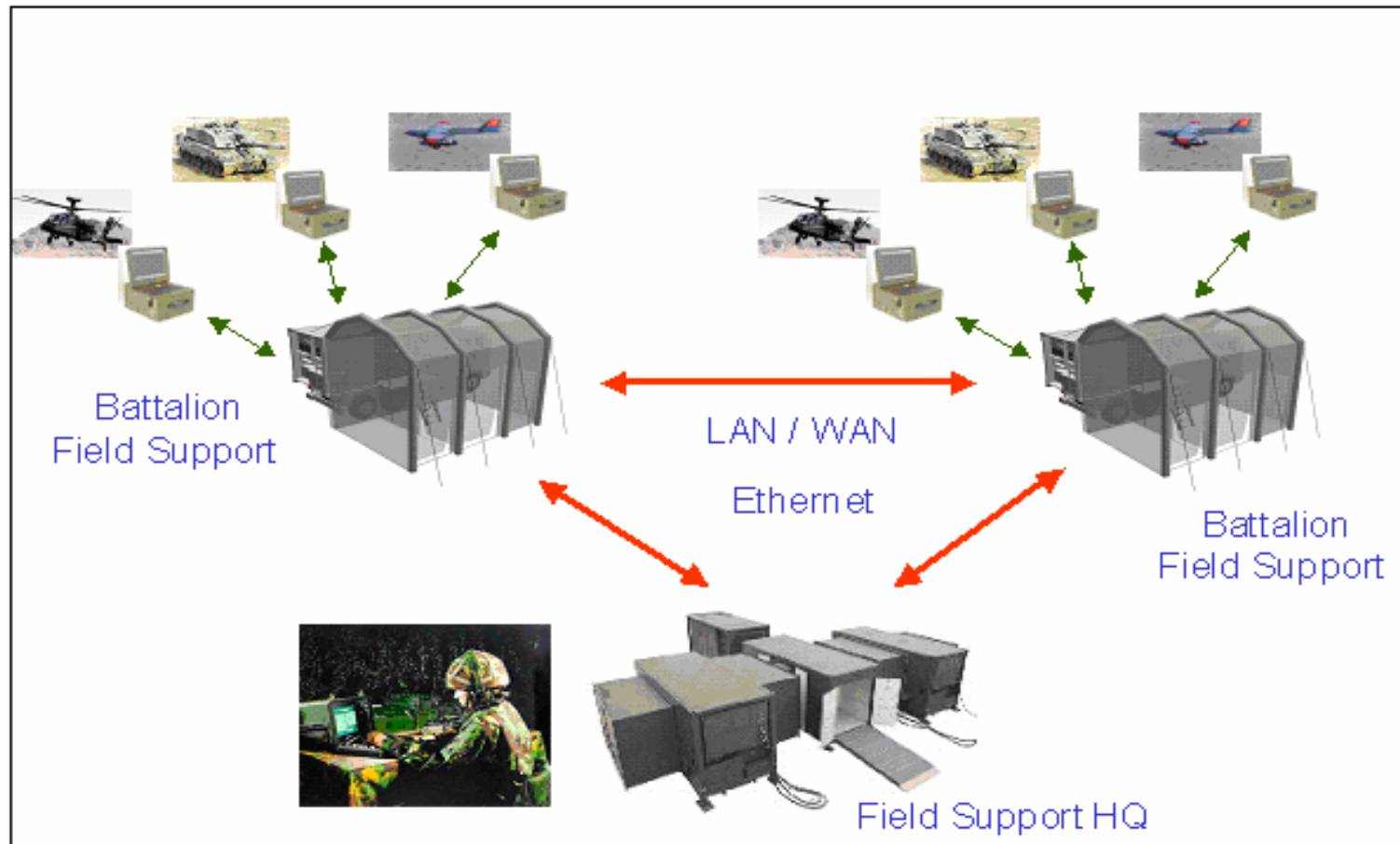
**Rapid Local Assessment**

- Feed-forward of instructions and software executable modifications

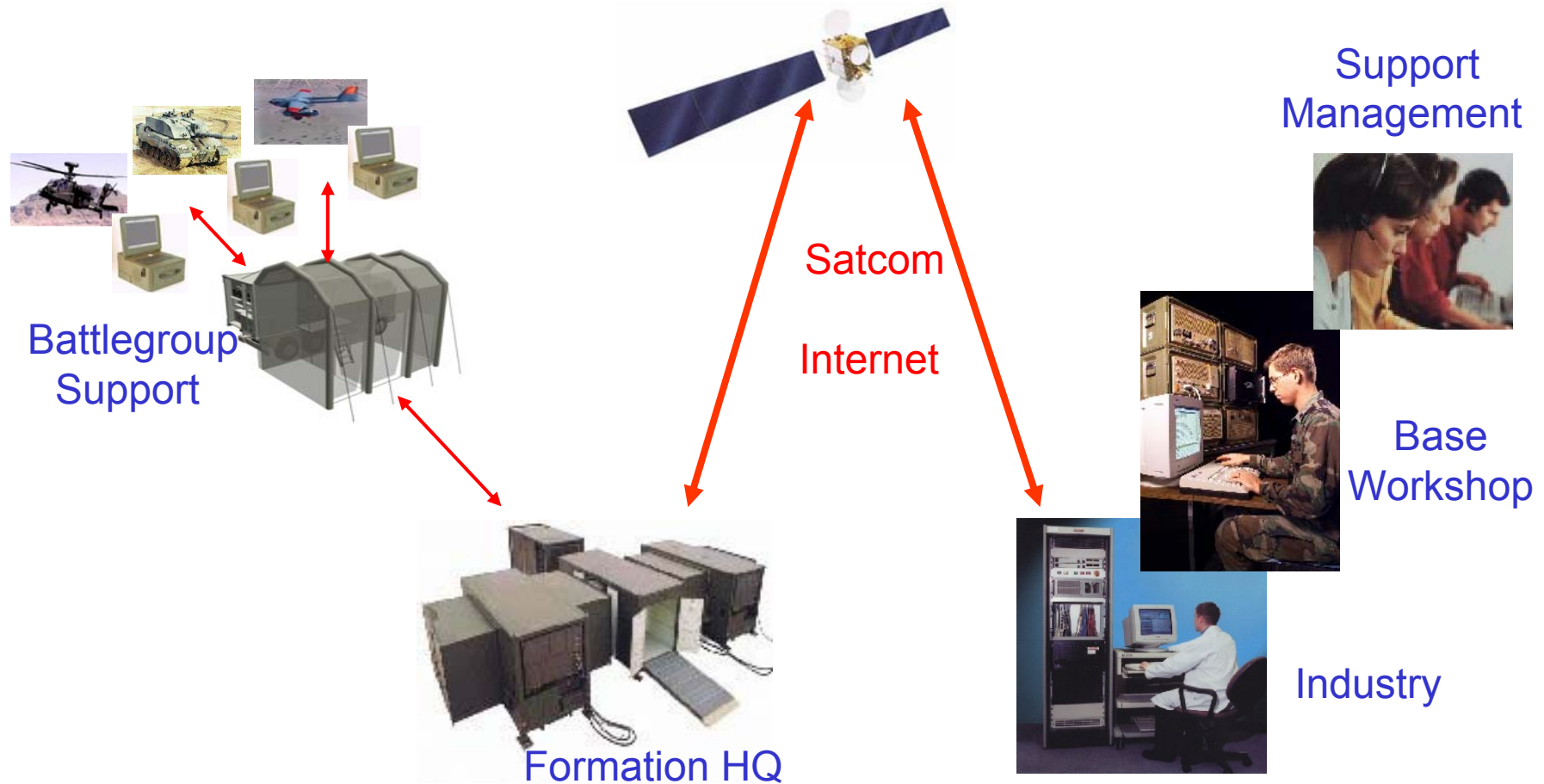


**Improved Accuracy and Speed of Field response**

# Support Capability



# Global Maintenance Data Communications



# First Line Functions

- BIT Monitor/Interrogator
- Closed Loop Test
- Stimulus and Measurement
- IETM Platform
- HUMS Download

# Racal Instruments' FLITS

## Front Line Integrated Test System

- Rugged PC to First Line/Flight Line Requirements
- General Purpose, Configurable
- Test Program Development / Execution Software

# Racal Instruments' FLITS

## Front Line Integrated Test System

- Test Instrument Suite of Resources
- Monitor, Test, Diagnose
- IETM Platform, HUMS Download
- Scalability

# FLITS Family



# Summary

- Interaction between BIT, FLTS, GPATE and Depot ATE
- HUMS Download
- IETM Platform
- Generic Integrated Test Scenario
- “GITS”