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Supporting Army Aviation in OIF / OEF

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Army Aviation in OIF / OEF

- Indispensable to Combat Operations
- Extremely High OPTEMPO
- Extremely Harsh Operational Environment
- Continued MANPADS Threat



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Requirements to Support Army Aviation OIF / OEF Operations

- Reconstitute the Fleet
 - Replace Attrited Aircraft
 - Repair Crash/Battle Damage
 - Conduct Reset (Return Aircraft to Predeployment Condition)
 - Complete Recapitalization Program
- Improve Readiness
 - Maintain Focus on Spares
 - Preset the Fleet - Implement “Desert Kits” Designed to Reduce Environmental Effects
 - Barrier Filters
 - Aircraft Covers
 - Implement Enhanced Desert Maintenance (EDM)
(Maintenance Tailored for Sustain Desert Operations)
- Improve Aircraft Survivability
 - Revised Tactics, Techniques, & Procedures
 - Fix Current & Field Future ASE

Maintenance Spectrum

	Structure to Maximize Near Term Aircraft Availability Normal/Routine	Tailored for Sustained Desert Operations Enhanced Desert Maintenance	Structured to Prepare Aircraft for World-wide Deployment Full Reset
Phase	Scheduled Segment	Scheduled Segment	All Segments
Black Boxes		Detailed Inspection/Test	Open & Clean/Repair
Engines	↑ IROAN* ↓	<ul style="list-style-type: none"> Open All But OH-58D Increased Cleaning Frequency 	Open All
Wiring Harnesses		Detailed Inspection	Remove & Clean/Replace
Fuel Cells		Inspect	Remove & Repair/Replace
MWOS	Critical	Critical & Desert Kit	All

Structure to Maximize Near Term Aircraft Availability

Tailored for Sustained Desert Operations

Structured to Prepare Aircraft for World-wide Deployment

In Theater

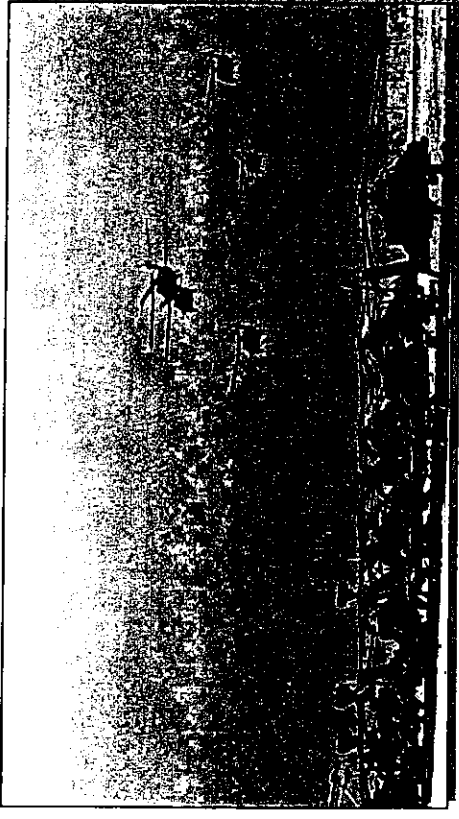
Upon Rotation - Ongoing -

* Inspect Repair Only As Necessary

Aircraft Survivability

- **Objectives**
 - Avoid the Hit
 - Minimize Hit Impacts
 - Survive the Crash

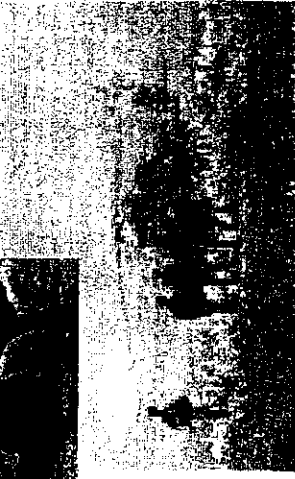
- **Path Ahead**
 - Revised Tactics, Techniques, and Procedures
 - Improved Aviation Survivability Equipment (ASE)



OEF/OIF ASE Issues

- Current Capabilities vs Projected Threats
- High False Alarm Rates
- High System Failure Rates

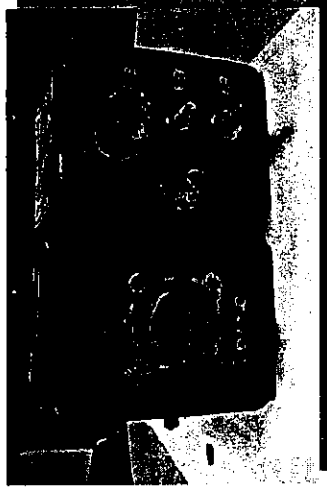
ASE Must Be Integrated & Automatic



OIF ASE Systems Readiness

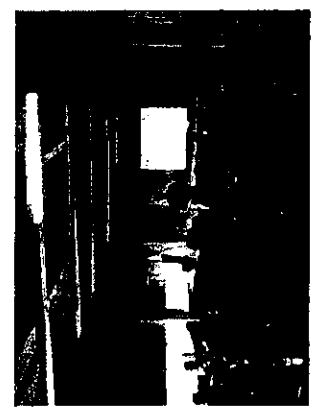
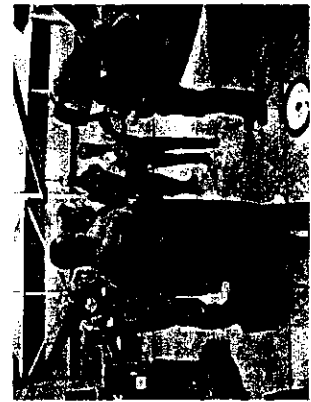
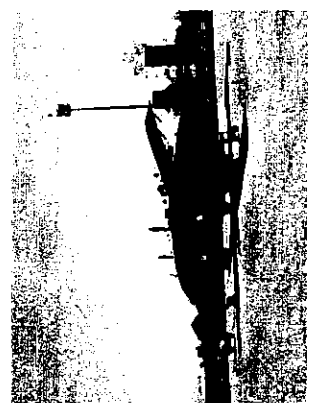
- **Readiness Problems Experienced in FY03**
 - Sand and Dust Intrusion
 - Vibration
 - Rigid Cabling
 - Corrosion (Exposed Connectors)
 - Maintenance Training

- **Reported Readiness Dramatically Improved During FY04**
 - Improved Filtration Systems (Sand, Dust)
 - Improved Shock Mounts
 - Improved Cabling And Connectors
 - More Experienced Maintenance Personnel
 - Field Assistance Support and Training (FAST) Team Visits to Deploying/Deployed Units



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Field Assistance Support & Training (FAST) Team Visits



Balad, Iraq, Jun 04

Ft. Lewis, WA, Aug 04

- **FAST Support Provided to Reserve, NG, and Active Army Units**
 - Over 45 Units Visited (CONUS and SWA) By PM AES
 - Additional Units Scheduled for Visits Through Nov 04

- **Routine Forward Area Assistance**
 - EWO/Aircrew Training
 - ASE Repairs
 - Operator/Maintenance Training
 - Spare Parts Deliverables

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Summary

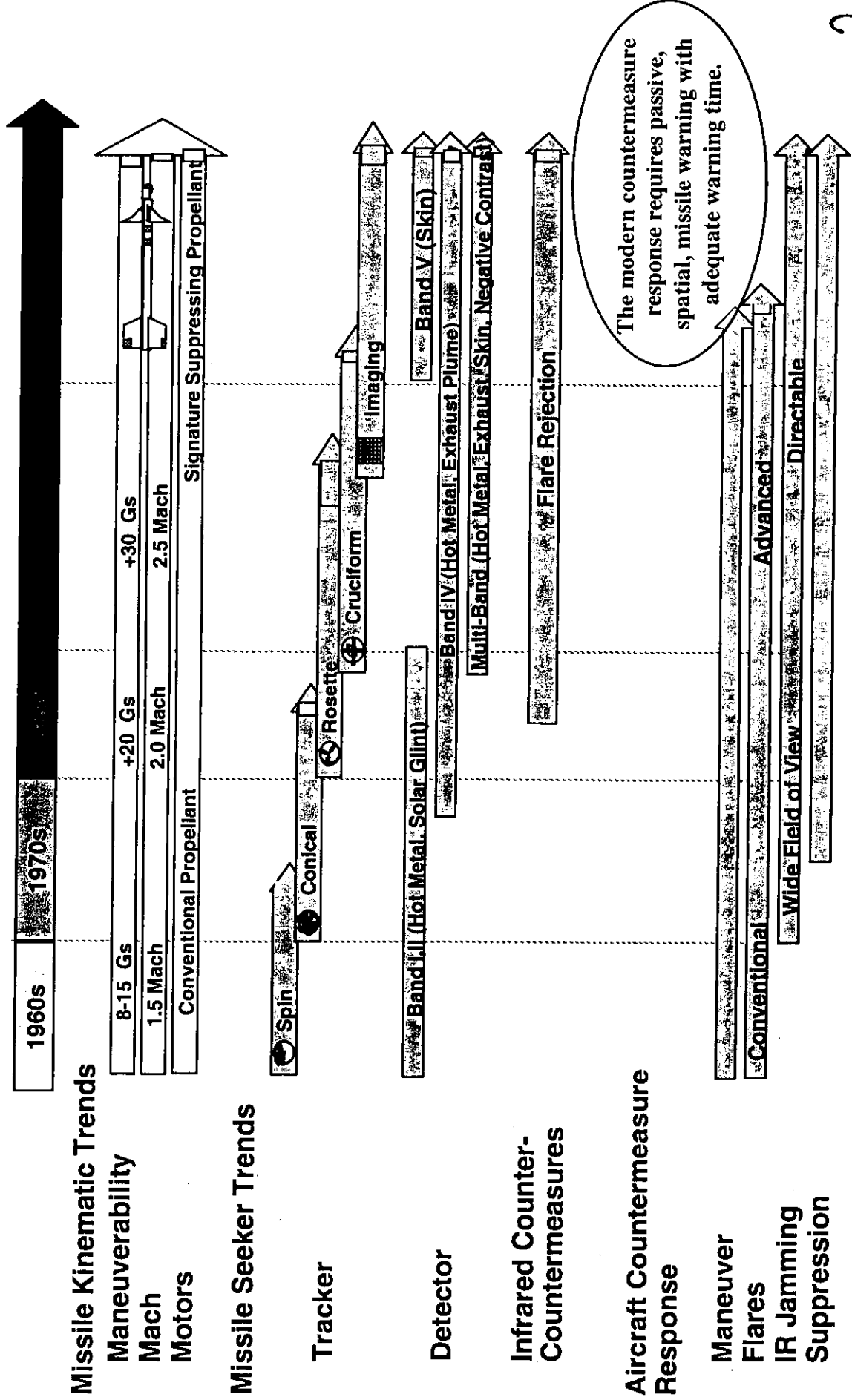
- **Aviation Operations Continue to Be Indispensable in OIF / OEF**
- **Actions Have Been Taken and Are Being Taken to Improve System Readiness**
 - Reset
 - Desert Kits
 - Enhanced Desert Maintenance
- **Actions Have Been Taken and Are Being Taken to Improve Aircraft Survivability**
 - Revised TTP
 - ASE Training, Modifications, Modernization

Our Army at War: Relevant and Ready



***ATIREM/CMWS Update
For
MANPADS Conference 3-4 Nov 04***

The Infrared Missile Continues to Evolve as the Primary Threat Driver for Missile Warning



Threat List

Tier 1

Tier 2

Tier 3

IR SAMS

RF SAMS, AAMS, ATGMS

Laser Guided,
Command Guided,
Imaging, and Emerging
Electro-Optical Missiles

- T11-1 _____
- T11-2 _____
- T11-3 _____
- T11-4 _____
- T11-5 _____
- T11-6 _____
- T11-7 _____
- T11-8 _____
- T11-9 _____

IRCM Systems vs. Threat Comparison

		ASE Systems	
		AN/ALQ-144A(V)1/3	AN/ALQ-212 ATIRCM/CMWS (SIIRCM) (per spec.)
		CMWS/ICMD/ AIRCMM (per spec.)	
	Fielded	Upgrade	Upgrade
T1-1/T-1V	(Y)* (R)*	(G)	(G)
T1-4	(G)	(G)	(G)
T1-5	(G)	(G)	(G)
T1-6	(Y)	(G)	(G)
T1-7	(Y)	(G)	(G)
T1-8	(Y)	(G)	(G)
T1-9	(R)	(G)	(G)
Future Threats	(R)	(R)	(G)
	UH-60, AH-64A/D, OH-58D	AH-64D, UH-60M, CH-47	SOA & SEMA

< 50% Probability of Countermeasure
 50-75% Probability of Countermeasure
 75-100% Probability of Countermeasure

* Aircraft & Aspect Dependent
 ** Flare Trajectory Dependent

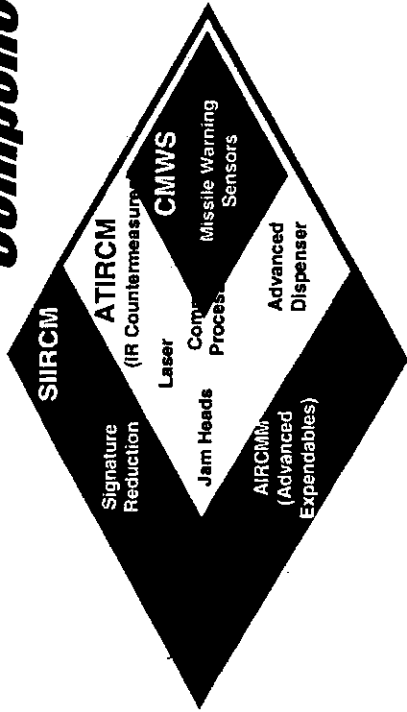
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ALQ-156 Missile Warner Limitations on CH-47

- **FAR**
- **Pd**
- **TTG**
- **Active System**
- **Diminishing Manufacturing Sources**
- **Hand off to Jammer**

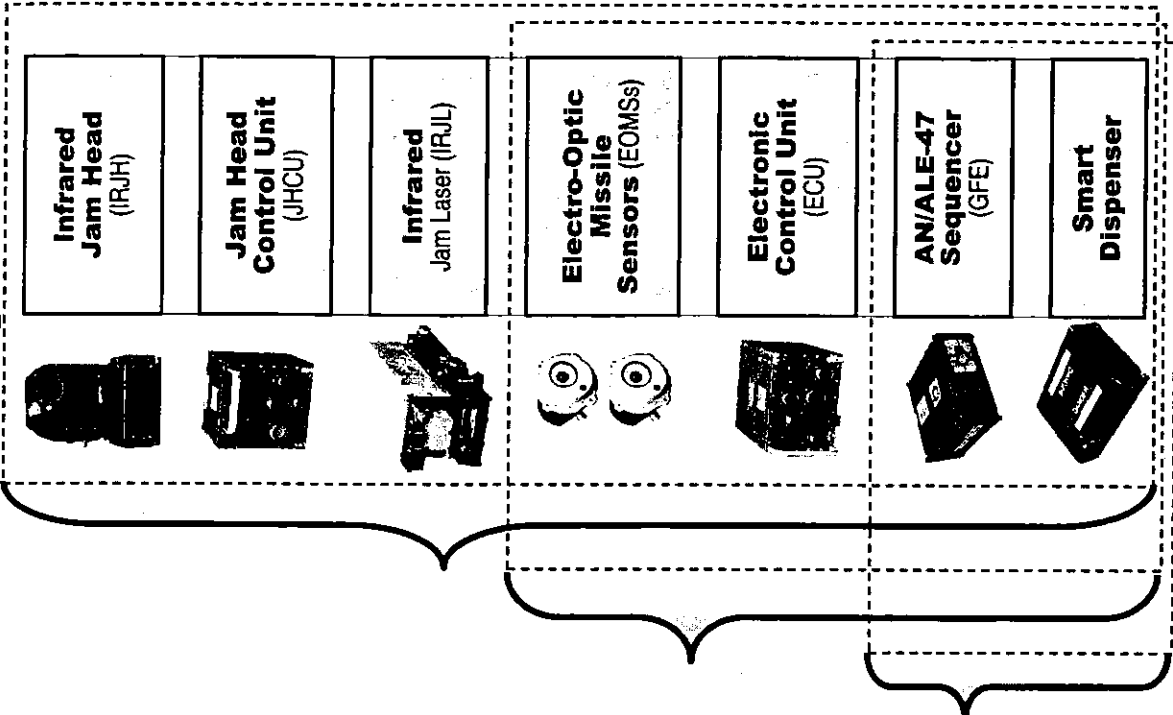
SIIRCM, ATIRCM, CMWS Component Relationships



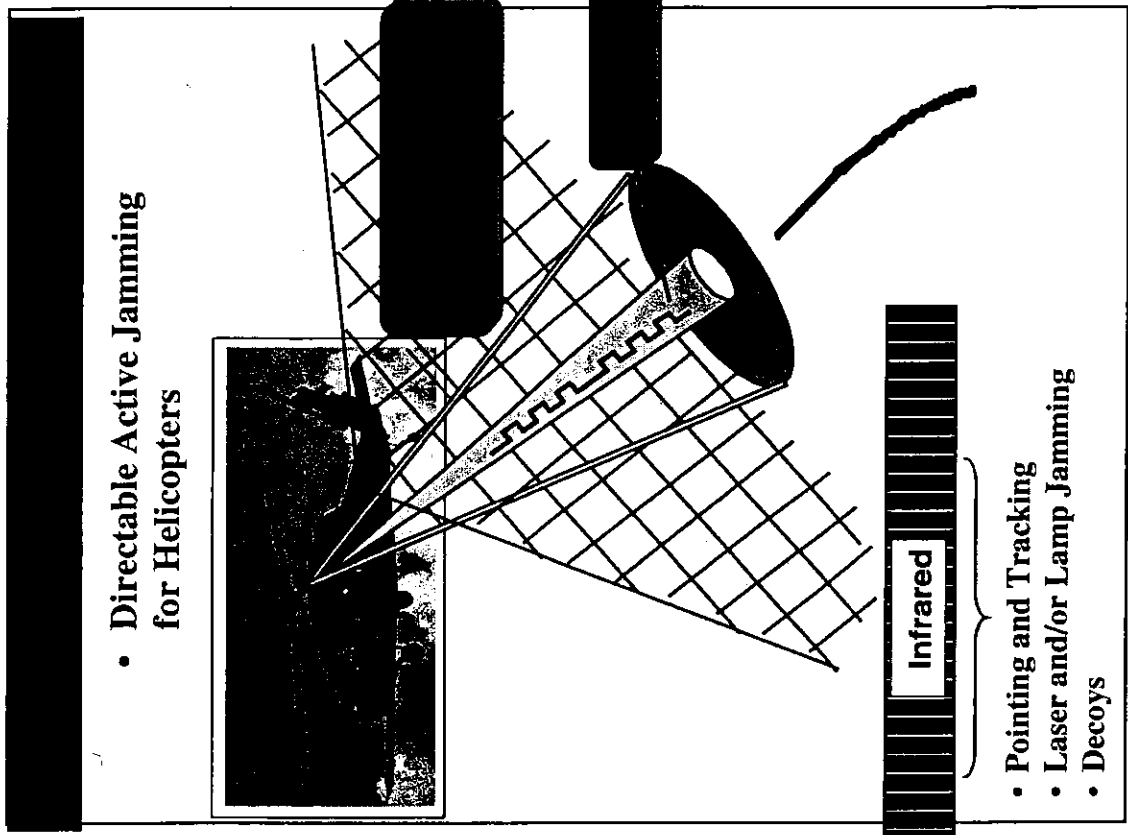
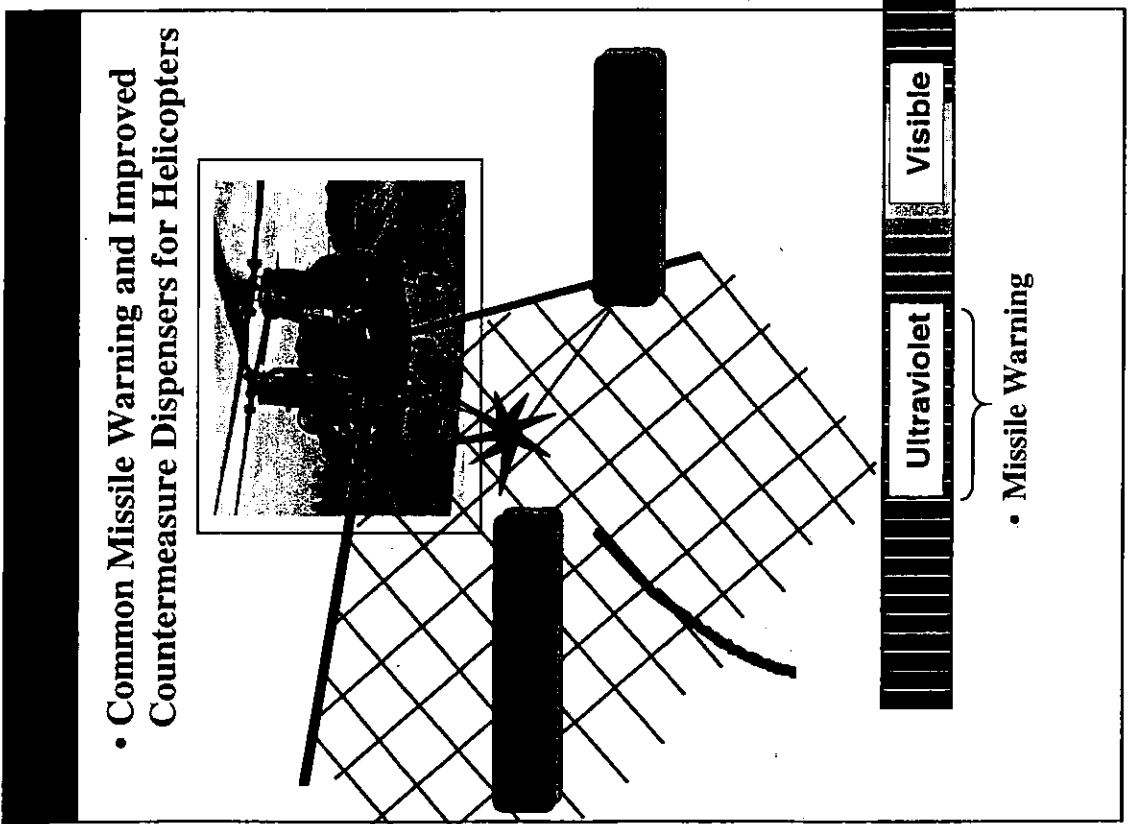
AN/ALQ-212 Advanced Threat Infrared Countermeasures (ATIRCM)

AAR-57(V)3/5 Common Missile Warning System (CMWS)/ICMD

Improved Countermeasures Dispenser (ICMD)

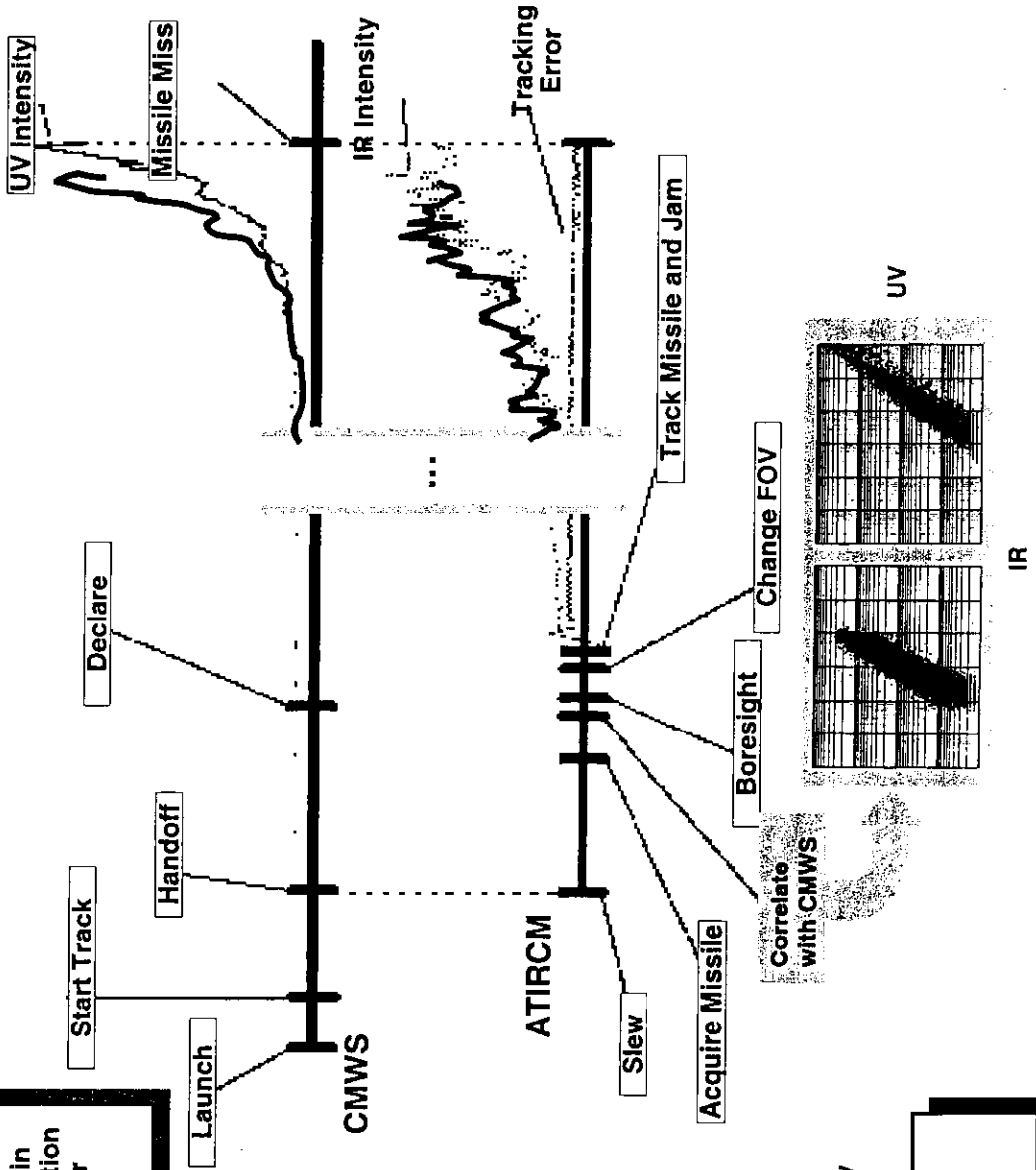


CMWS and ATIRCM Operational Concept

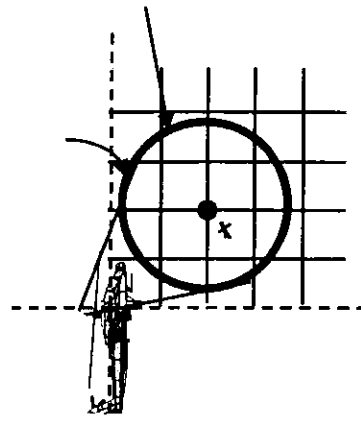


HOW ATIRCM WORKS

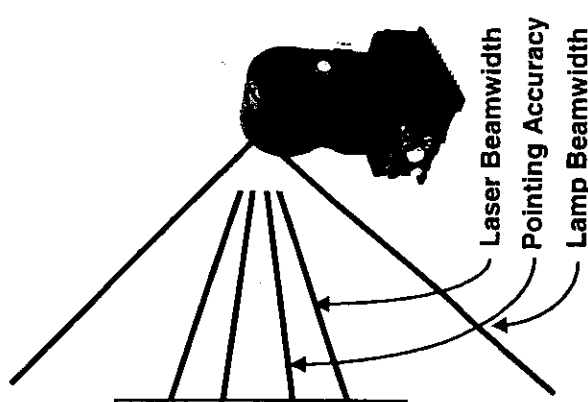
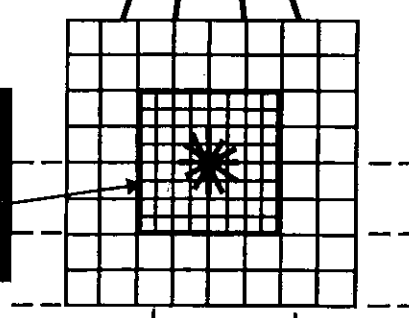
Rapid Response Timeline



Acquisition FOV Sized for High Probability of Acquisition within airframe integration tolerances/under aircraft flexure



Tracker FOV Sized for Post Burnout Sensitivity



Laser Beamwidth
Pointing Accuracy
Lamp Beamwidth

Architecture Meets Probability of Countermeasure (P_{CM}) Requirement

Purpose

1. Respond to Acting SecArmy Directive
2. Provide current ASE status for OIF / OEF
3. Request approval of proposed acceleration strategy

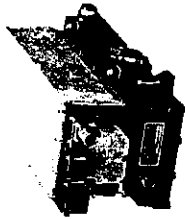
"I want to see, as soon as possible, a plan to equip all our helicopters in Iraq and Afghanistan with the most effective defensive systems we have in development or procurement. Affordability is not the constraint for such a plan-- only what is doable considering technology, production, acquisition, and application."

Hon RL Brownlee, Acting Secretary of the Army – 7 Nov 03

SIIRCM System Components



Infrared Jam/Laser (IRJL)



Infrared Jam Head (IRJH)



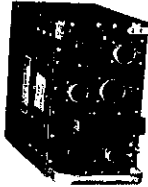
Improved Countermeasures Dispenser (ICMD)

AN/ALE-47 Sequencer (GFE)

Smart Dispensers

Jam Head Control Unit (JHCU)

Electronic Control Unit (ECU)



Electro-Optic Missile Sensors (EOMSS)



ATIRCM / CMWS U.S. Host Aircraft Platforms		
Army	Navy	
MH-47E	AH-64A/D	MH-60R
MH-60L	UH-60A/L	Intn'l
MH-47D	CH-47D	UK Apache
	C-12R/T	UK RMPA
	RC-12	ASTOR
	UC-35	



Potential IRCM Component Configuration Options

1 Standard IRCM A-Kit Only

2 CMWS / ICMD* - CH-47 & Fixed Wing

3 CMWS / ICMD / ALQ-144 IRCM Set – UH-60 / AH-64

4 CMWS / ICMD / ATIRCM** Post FY07

* ICMD = Improved Countermeasures Dispenser

** Upgraded Multi-band Laser, with Integrated Jam Head and Control Unit

CMWS with ICMD and ALQ-144 (Option 3)

• Common Missile Warning System (CMWS)

– Same as Option 2

• ICMD – 2 ALE-47 + 3 Dispensers

– Same as Option 2

• ALQ-144A(A)3

– Maintain / upgrade existing Jammer

– Compatible with advanced flares

• For UH-60 & AH-64

CMWS with ICMD (Option 2)

• Common Missile Warning System (CMWS)

– Four sensors and one ECU

– Currently in production

• Improved Countermeasures Dispenser (ICMD)

– ALE-47 Sequencers and eight Dispensers

– ICMD in production

– Compatible with advanced flares

• For CH-47D

CMWS with ICMD and New ATIRCM (Option 4)

• Common Missile Warning System (CMWS)

– Same as Option 2

• ICMD

– Same as Option 2

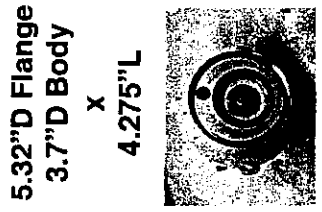
• Multi-band Laser, Jam Head and Control Unit

– Compatible with advanced flares and CMWS Sensors

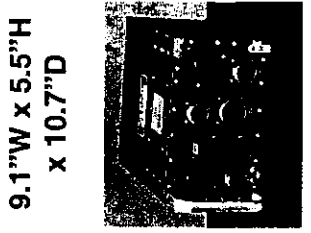
• Upgrade to Option 2 & 3

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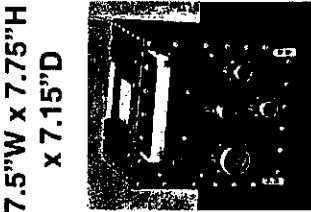
ATIRCM Size, Weight, and Power



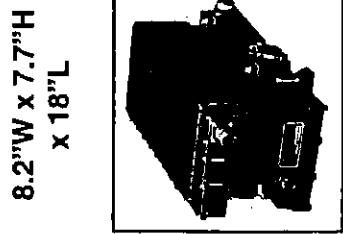
EOMS



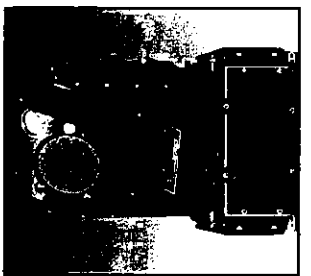
ECU



JHCU



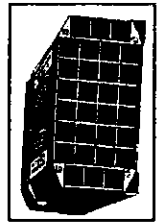
IRJL



IRJH



Sequencer



Smart
Dispenser

	AH-64/ H-60 config.	Weight (each)***	Power
ECU	1	16 lbs	400 Hz 175W
EOMS	4	2.8 lbs	28 VDC Powered by ECU
JHCU	1	11.6 lbs	300W 5.6W
IRJH	1	41.3 lbs	1028W** 65W
IRJL	1	23.3 lbs	250W** N/A
SEQ	2	3.8 lbs	N/A 4*
SD	3	7 lbs	Powered by SEQ

No External Cooling Required

* 616W for 50 msec when firing 4 squibs

** when jamming

*** As Measured - 5/21/03

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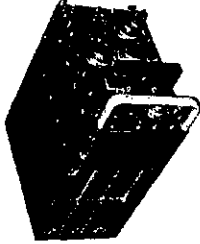
Apache Missile Warning and Dispensing Weight/Power Changes to Baseline

5.32"D Flange
3.7"D Body
X
4.25"L



EOMS

9.1"W x 5.5"H
x 10.7"D



ECU

ALE-47/AAR-47
Cockpit Display Units



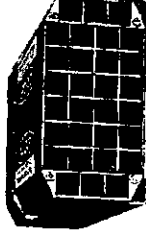
Dispensing Control



Missile Warning Control



AN/ALE-47 Sequencer (GFE)



Smart Dispensers

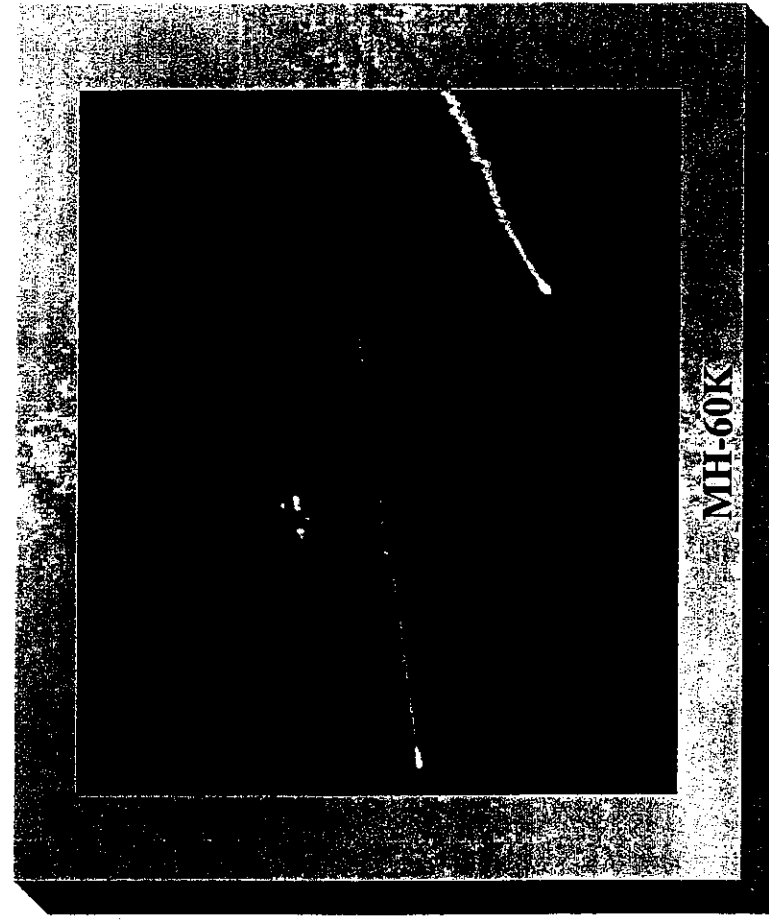
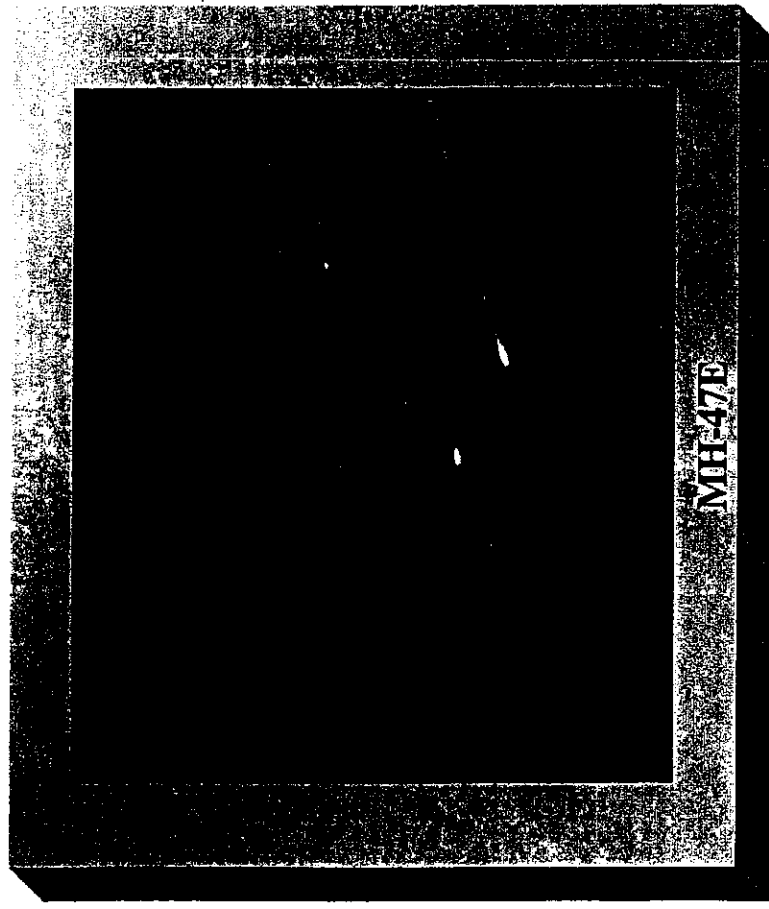
	AAR-57 AH-64 Configuration	Weight (Each)	Total Weight	Power	
				400 Hz	28 VDC
ECU	1	16.0 lbs	16.0 lbs	175W	103W
EOMS	4	2.8 lbs	11.2 lbs	Powered by ECU	
Sequencer	2	3.8 lbs	7.6 lbs	N/A	N/A*
Smart Dispenser	3 (1 chaff, 2 flare)	7.0 lbs	21.0 lbs	Powered by SEQ	
Missile Warning Control	1	2.0 lbs	2.0 lbs		
Dispenser Control	1	2.6 lbs	2.6 lbs		
A-Kit Mechanical	1	~19.0 lbs**	~19.0 lbs		
A-Kit Electrical	1	~15.0 lbs**	~15.0 lbs		
Existing Weight Removed	Chaff dispenser, wiring, switch, sequencer, programmer	~ (25 lbs)	~ (25 lbs)		

Total Estimated Weight Impact 69.4 lbs

*616W for 50 msec when firing 4 squibs
**estimate based on MH-60K/CMWS only

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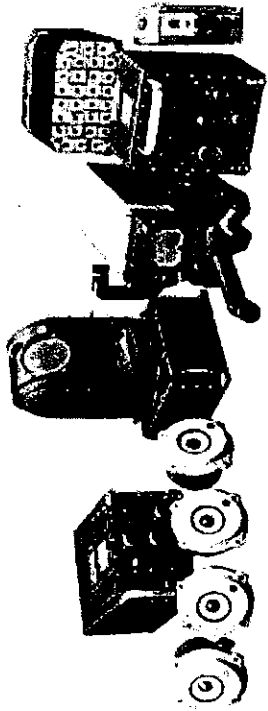
AIRCMM Summary Status



- AIRCMM Flares in operational use since 01
- Vendor Production Rates increasing to meet demand
- AIRCMM Flares Shipped to support OIF/OEF
- PEO Ammo manages AIRCMM buys for the services

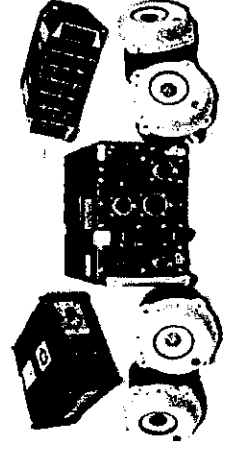
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Our Army at War: Relevant and Ready



ATIRCM

ATIRCM/CMWS Test Efforts



CMWS

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Previous Test Events Summary

TEST	DATES	THREATS	LAUNCH RANGE(S)	ALT(S)	SPEED
DT PFAS	JAN-FEB 01	N/A	N/A	100<500FT	HOVER
CTMF (ACR) 1	MAR-APR 01	T1-4/8/9	1.5-4 KM	<500FT	0-80KTS
CAPTIVE SEEKER	MAY 01	T1-1/2/4/6/8/9	1-5 KM	100-1000FT	0-100KTS
SLED TEST	JUL 01	AIM9*	1.5+KM	<200FT	HOVER
PDU PFAS	AUG 01	N/A	N/A	100<500FT	0-80KTS
DTMF	FEB-MAR 03	T1-4/7/8	3+KM	3000FT	400KTS
M&S (ARMY SPT)	OCT 03	T1-1/4/7/8	750M-5KM	150/300FT	1-120KTS

* Standard Sled Track motor. System was used in test mode for the test – threat type not relevant

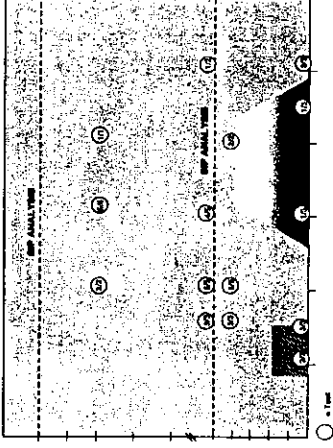
Recent / Upcoming Test Events

- BIT Validation in progress (TFT)
- CFT (Contractor Flight Test)
- Eglin Live Fire Test
- Dry-Run RDT to be preformed at BAE (Risk Reduction)
- RDT (Reliability Demonstration Test)
- ACR #2 (Aerial Cable Range)
- Operational Testing
- Captive Seeker #2 (SOAR)

Eglin CMWS Missile Signature Test (MST)

- **The test objectives of the CMWS MST are:**
 - Collect missile signature data to build confidence in the modeling and simulation tools for cases below 500 ft.
 - Collect CMWS system data to verify improved P_D performance with updated V4.02 algorithm
- **Method**
 - The test objectives will be met by firing a number of different threats from various ranges at a single heat source
 - Three (3) CMWS Test Instrumentation Equipment (TIEs) will be deployed at various altitudes in order to collect performance data
 - An EOMS Data Acquisition Units (DAU) will be deployed to collect UV Imagery Data to increase current missile signature database
 - UV/IR Radiometric Instrumentation will be deployed for model comparison and verification

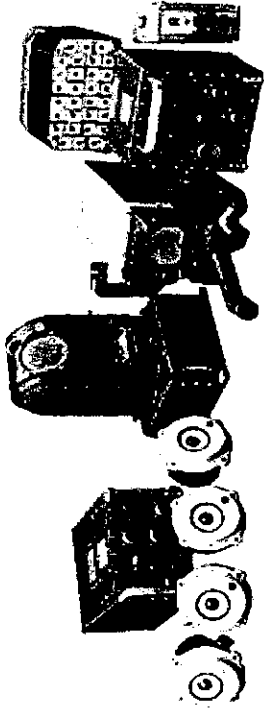
Eglin Test Results



- **Concerns**
 - Low altitude performance
 - LRU malfunctions
- **Response**
 - Additional live fire testing at altitudes of concern
 - Software / hardware revisions to accommodate harsh aircraft environment
- **Results**
 - **Live fire tests:** excellent low altitude (below xxx ft.) performance – successfully responded to 23 of 24 (96%) threat opportunities (exceeding ORD requirements)
 - **CMWS performance:** over 212 cumulative operating hrs on 6 production systems with zero failures to date; includes 84.4 hrs on operating aircraft

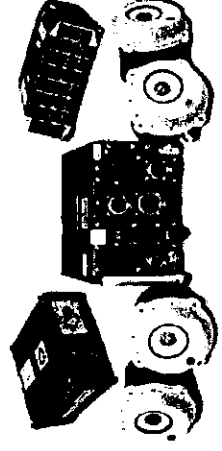
Excellent CMWS / ICMD low altitude performance

Our Army at War: Relevant and Ready



ATIRCM

CMWS Integration Efforts



CMWS

Platform Integration Efforts

- **PM AES working aircraft integration for 15 platform configurations**
- **Each QRC effort has been compressed from 2 years to 6-9 months**
- **Efforts support multiple platforms and users**
- **First Aircraft to Field – Nov 04**
- **Each integration effort similar to a “Mini-Program”**

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Platform Types Under CMWS QRC Development Integration

Platform	Effort	Status	Fielding AWR
UH-60L	QRC	Awaiting fielding airworthiness release	Oct 04
UH-60A	QRC	Awaiting fielding airworthiness release	Oct 04
CH-47D	QRC	Awaiting Fielding Airworthiness Release	Oct 04
AH-64A	QRC	Kick Off Meeting scheduled 28 Sep 04	Aug 05
AH-64D	QRC	Kick Off Meeting scheduled 28 Sep 04	Aug 05
C-12T	QRC	Aircraft scheduled for Mod-Install	Dec 05
C-12R	QRC	Aircraft Undergoing Testing	Nov 04
RC-12	QRC	Integration and Development underway	Aug 05
C-37	QRC	RFP TO Gulf Stream, Preliminary Evaluations, MIPR to USAF	Aug 05
UC-35	QRC	Kick Off Meeting 21 Oct 04	Apr 05

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Platform Types Under ASE Development Integration (Cont)

Platform	Effort	Status	Fielding Date
AH-64D, BLK III	Regular Army	Software Development Efforts to Begin in Nov 04, ICD developed	Feb 07
CH-47F	Regular Army Total Integration	TIMs underway with PM	Mar 06
UH-60M	Regular Army Total Integration	TIMs underway with PM	Mar 06

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ATIRCM/CMWS Evolutionary Acquisition Roadmap

