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Atlantic City NJ

Counter-Rocket, Artillery, Mortar (C-RAM) Delivers on Promises and Saves Lives

Jim Bloodsworth
PD C–RAM
Test Branch Chief
Jim.Bloodsworth@us.army.mil
256-774-6899

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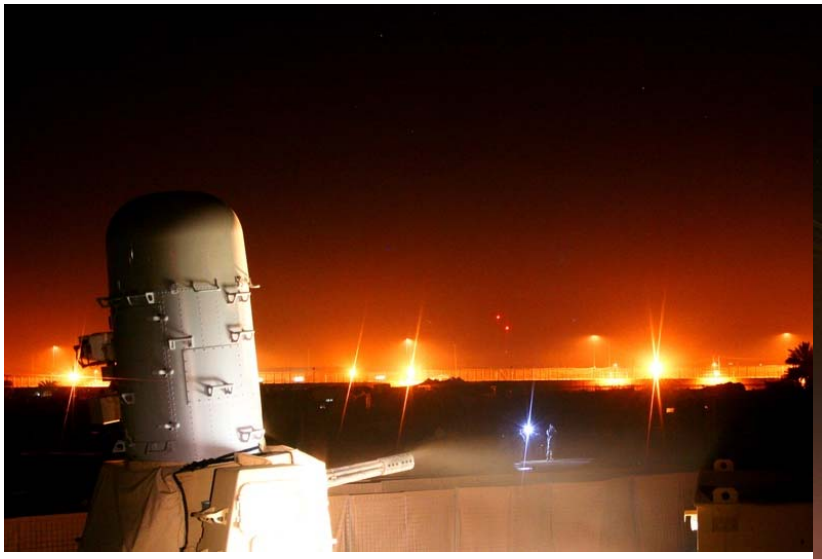

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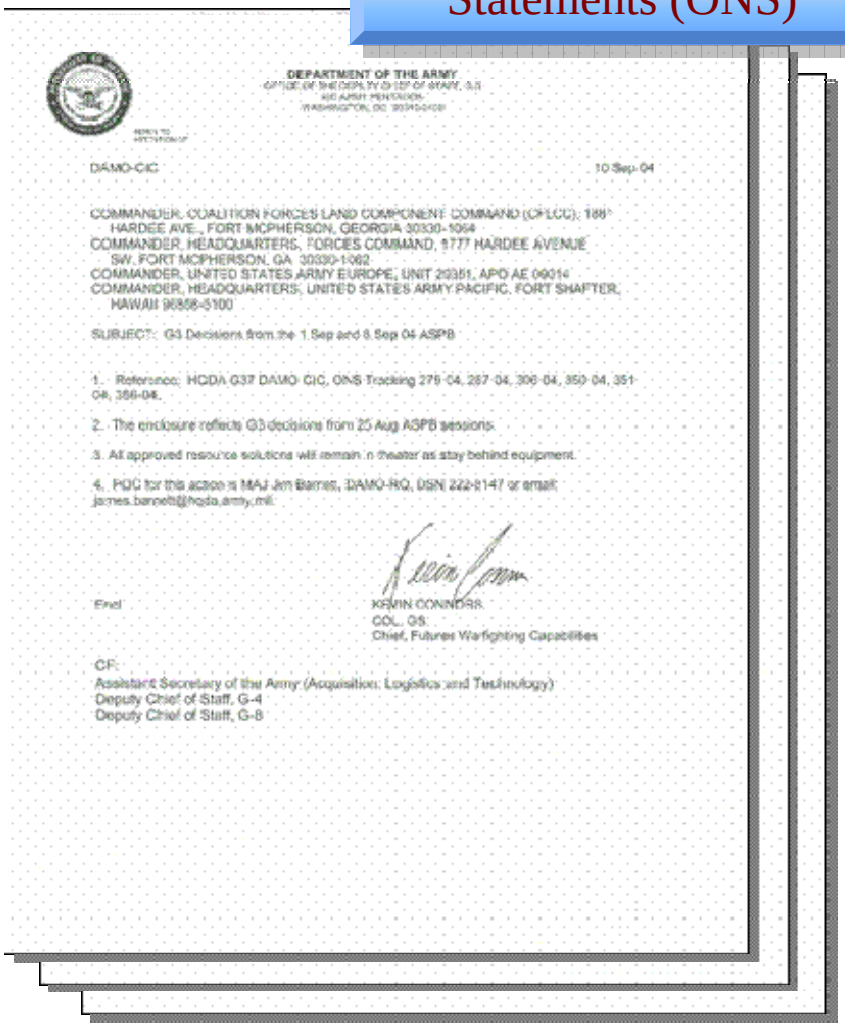
Operational Environment

- **Indirect fire is and will remain a staple of combat**
- **Weapons of choice for conventional & irregular foes, worldwide:**
  - **Mortars**
    - Rapidly employed and used, acceptably accurate, difficult to locate
  - **Rockets (all calibers and types)**
    - Remote or delayed firing options, difficult to locate
  - **Some possible use of lighter artillery (75mm-105mm)**
    - More accurate, easier to move, easier to locate
- **Present and future threats will exploit vulnerabilities of US/Coalition fixed sites, especially large bases, by indirect fire attacks**

Current Operational Requirement

HQDA Validated OIF Operational Needs Statements (ONS)



DEPARTMENT OF THE ARMY

DAMO-CIC 10 Sep 04

COMMANDER, COALITION FORCES LAND COMPONENT COMMAND (CFLCC), 1881 HARDEE AVE., FORT MCPHERSON, GEORGIA 30330-1064
COMMANDER, HEADQUARTERS, FORCES COMMAND, 1777 HARDEE AVENUE SW, FORT MCPHERSON, GA 30330-1062
COMMANDER, UNITED STATES ARMY EUROPE, UNIT 29351, APO AE 09014
COMMANDER, HEADQUARTERS, UNITED STATES ARMY PACIFIC, FORT SHAFTER, HAWAII 96858-5100

SUBJECT: G3 Decisions from the 1 Sep and 8 Sep 04 ASPB

1. Reference: HQDA G37 DAMO- CIC, ONS Tracking 279-04, 287-04, 306-04, 350-04, 351-04, 356-04.

2. The enclosure reflects G3 decisions from 25 Aug ASPB sessions.

3. All approved resource solutions will remain in theater as stay behind equipment.

4. POC for this action is MAJ Jim Barnes, DAMO-RQ, DSN 222-8147 or email: james.barnes6@hqda.army.mil.

Encl

KEVIN CONNOR
COL, GS
Chief, Futures Warfighting Capabilities

CF:
Assistant Secretary of the Army (Acquisition, Logistics and Technology)
Deputy Chief of Staff, G-4
Deputy Chief of Staff, G-8

Operational requirement for Integrated Force Protection based on Theater needs:

✓ 10 Sep 04 Army Strategic Planning Board Validated Theater ONS 306-04 for a Counter Rocket and Mortar Intercept and Destroy Capability

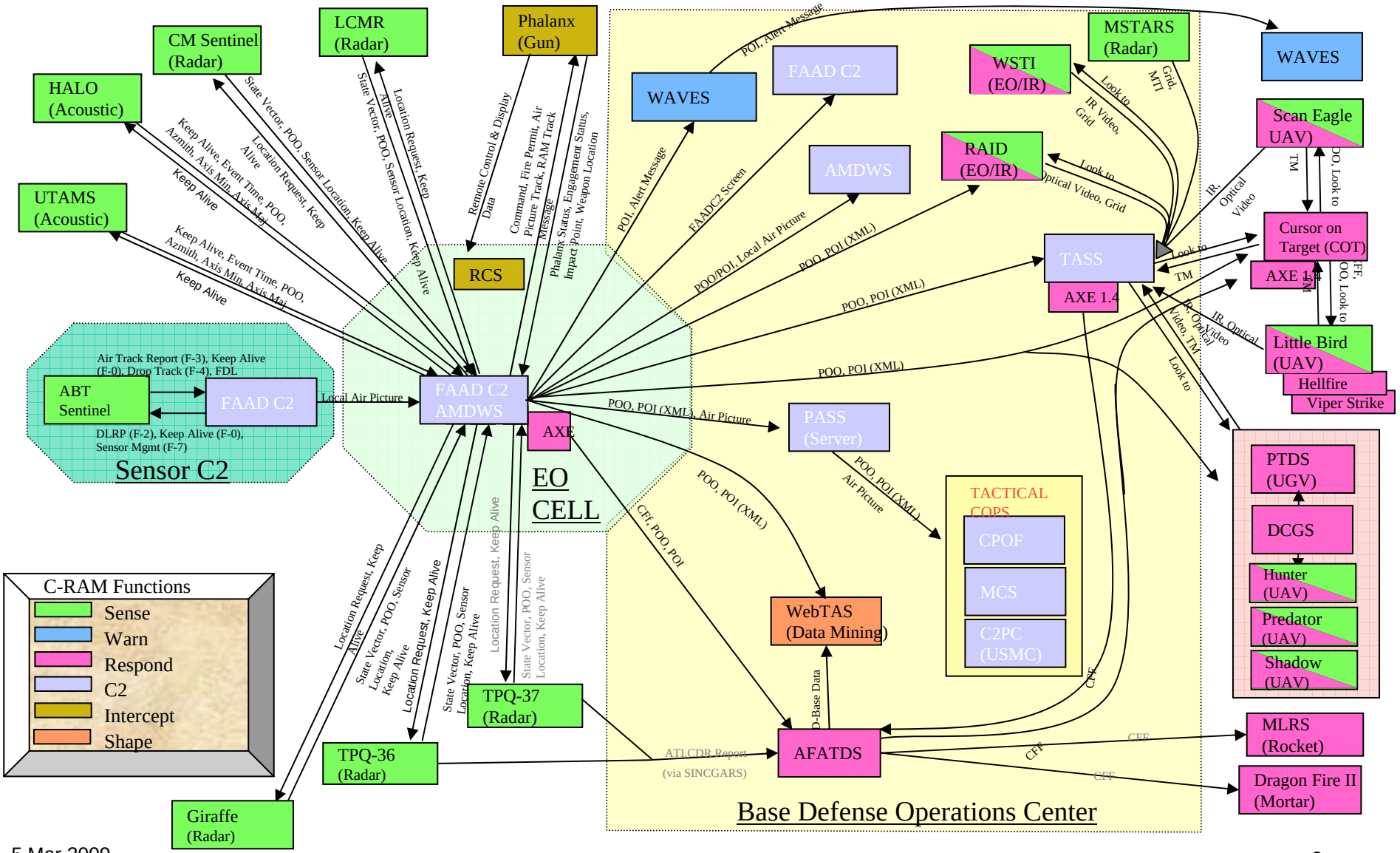
- Supports a Mar 05 HQDA G3-validated Theater ONS (260-4) for Sensor Interoperability to Digital Battle Command Systems
- Supports a Aug 05 HQDA G3-validated Theater ONS (05-466) for an Integrated Base Defense Security System capability

C-RAM Requirement / Background

- **C-RAM Requirement**
  - **Jun 2004 – Theater submitted Operational Need Statement (ONS 306-04) for a system to destroy Mortar rounds**
  - **Sep 2004 – The ASPB validated theater ONS and directed ABO fund C-RAM Proof-of-Principle Test**
  - **Jan 2005 – Results of C-RAM POP test briefed to VCSA, SecNav, and Dep SecDef**
- **C-RAM Capability**
  - **Feb 2005 – Sense and Warn capability validated and initial fielding begins**
  - **Apr 2005 – Intercept capability validated and initial fielding begins**
  - **Jul 2005 – IOC of Sense, Warn, and Respond capability at FOB 1**
  - **Sep 05 – C-RAM supported successful attack of 2 insurgent mortar teams – 11 KIA, 5 captured**
  - **Mar 06 – FOC declared at FOB 1 and first combat intercept (first ever for a Phalanx system)**
- **FMS and Lease Cases approved 2QFY06**
  - **May 06 – First Coalition FOB fielded**
- **IBDSoS funded 2QFY06 and fieldings begin in support of C-RAM Enhanced Response capabilities and ONS 05-466**

C-RAM Sense and Warn capability fielded to 15 FOBs, 3 of which have Intercept capability, and IBDSoS is installed at 10 FOBs

C-RAM / Unit Protection Architecture



Lessons Learned
System-of-Systems Integration

- **Lesson Learned: System-of-Systems (SoS) PM must retain and execute integration responsibility for the SoS**
  - **SoS PM must conduct all trades in selection of component systems**
    - Avoids corporate biases
  - **All DoD Program of Record (POR) systems should be assessed**
    - Avoids service biases
  - **SoS PM must ensure support of the component system's PM for any necessary modifications**
    - SoS PM must assess risk and cost for these modifications
  - **When a suitable system is not available, selection of an S&T initiative or a COTS item may be appropriate**
    - SoS PM must ensure any S&T or COTS item has been adequately tested and is supportable

The Government Stakeholders Must be Bound to "Specified Time" to Avoid Schedule Slips and Cost Increases

Lessons Learned
SoS Capability Development

- **Lesson Learned: To ensure requirements are met, work with independent test agency throughout system development**
  - **C-RAM Program Office successfully integrated Army, Air Force, USMC, and Navy Program of Record (POR) systems into the C-RAM SoS and <u>fielded a SoS that meets requirement just 6 months after funding</u>**
    - Required working closely with Army Test and Evaluation Command (ATEC) in all tests, beginning with the very first proof-of-principle test in Nov 04
      - ATEC has been a partner in the C-RAM program
        - » They supported development of all test and data collection plans to ensure adequate data would be available to prepare a Capabilities and Limitations report
        - » No modifications were fielded without an ATEC Capabilities and Limitations Report

C-RAM SoS Capability Development Approach Enabled Accelerated Fielding and Continuous Improvement of a Force Multiplier in a Combat Zone

Lessons Learned
SoS Capability Development

- **Lesson Learned: To reduce risk and ensure supportability, fund component system PORs to implement all changes to their systems.**
  - **Multiple changes were required in the C-RAM's POR component systems**
    - All such changes were agreed to between the C-RAM and POR PMs; developed by the POR PMs; funded by C-RAM; and then jointly tested
    - When there were conflicts between the POR system's requirements and C-RAM requirements, the Combat Developer helped define courses of action

C-RAM SoS Capability Development Approach Enabled Accelerated Fielding and Continuous Improvement of a Force Multiplier in a Combat Zone

Lessons Learned
Training

- **Lesson Learned. SoS PMs need to focus on Collective Training**
  - **Development of CONOPs, TTPs, and crew drills**
    - PM C-RAM provided Fires Center of Excellence (COE) tactical equipment to enable development of these essential operational procedures
  - **Individual Training**
    - Provided equipment to Fires COE and trained-the-trainers to enable individual training
    - Supported annual Mobile Training Team visits to theater to assess training and identify requirements for changes in both training and CONOPS/TTP
  - **Collective Training**
    - Provided Fires COE tactical suite of equipment to support collective training of deploying C-RAM units and supported conduct of their Mission Readiness Exercises
    - Fielded C-RAM equipment to Army and USMC Combat Training Centers (CTCs) to enable training of units rotating to theater
    - Developed stimulation capability to support on-site unit training to maintain proficiency and to train for new threats
  - **Warfighter Feedback**
    - PM C-RAM conducts weekly Secure VTCs with theater to provide Warfighter a direct link to C-RAM staff, the combat developer, and PMs of other component systems

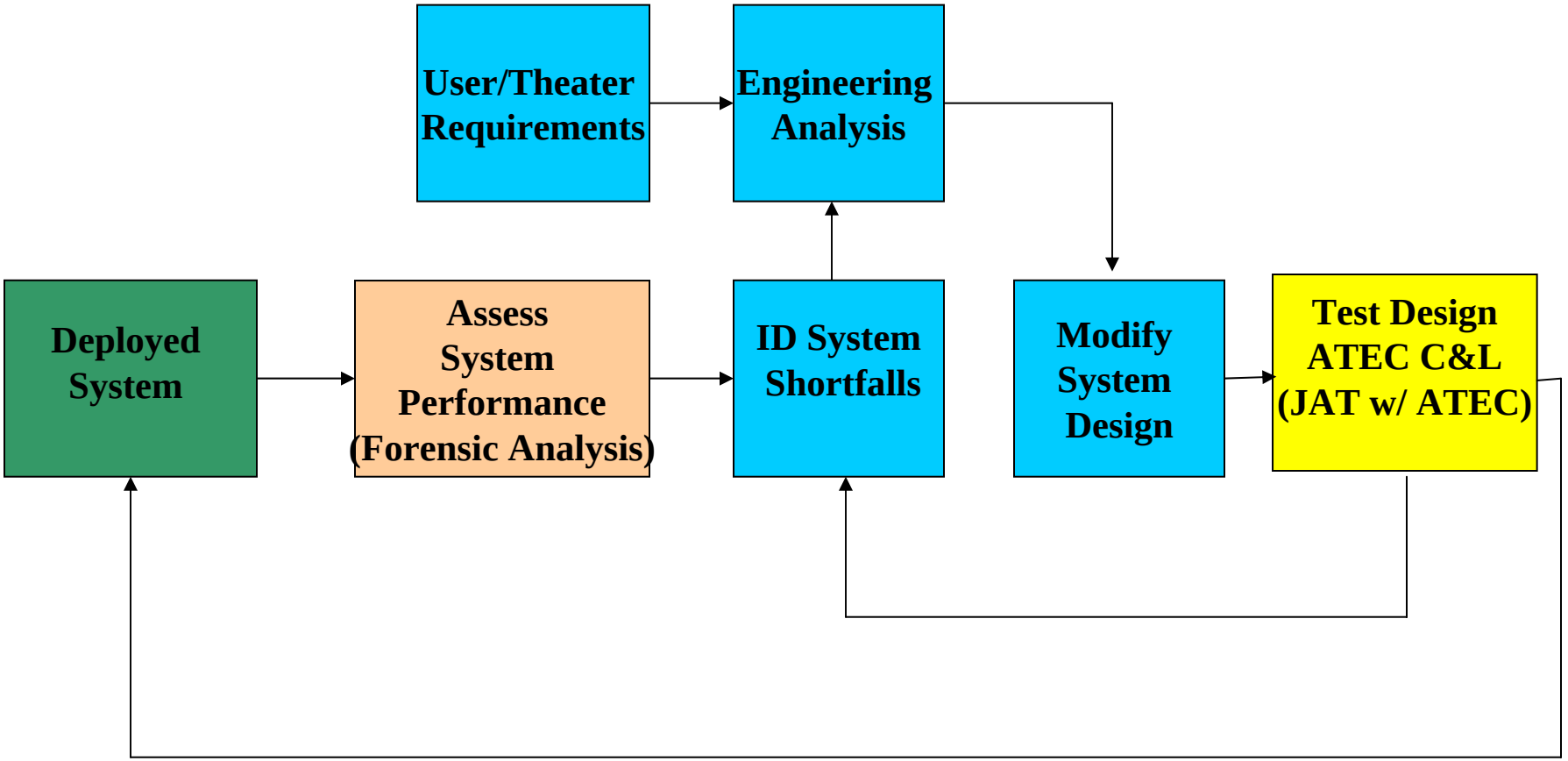
Close Coordination with Combat Developer Has Ensured C-RAM Units are Prepared for Combat, and Identified Additional Changes Required in C-RAM

Lessons Learned
Responsive Support for the Warfighter

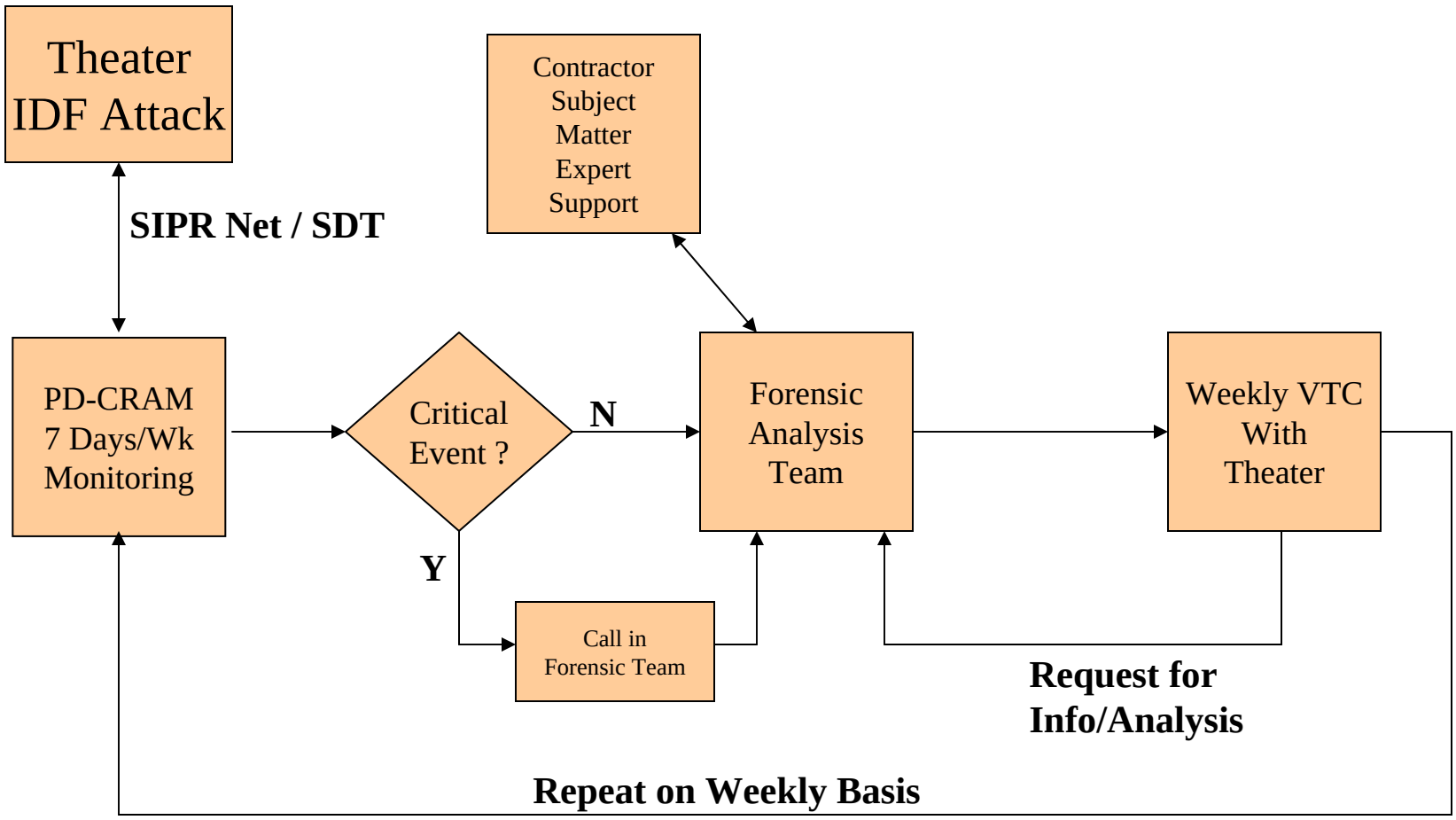
- **Lesson Learned. PMs must plan for and be prepared to support urgent Warfighter changes**
  - **"No plan survives first contact"**
  - **C-RAM provides a personal PM representative on MNC-I staff to coordinate and respond to:**
    - Multiple changes in fielding locations and priorities
    - Requirement to relocate / reinstall C-RAM capability from one FOB to another
    - Changes in threat tactics
    - Expansion of capabilities to support tracking of insurgent crews by integration and cuing of EO/IR sensors
    - Additional available sensors at FOBs by integrating them (UTAMS, Shadow)
- **Lesson Learned. PMs need to include collection and analysis of data on system performance concurrent with their fielding to enable rapid identification and localization of performance issues**
  - **C-RAM provides Warfighter:**
    - 24/7 forensics analysis team to analyze ALL events - successes and failures
      - Analysis is normally completed within 24 hours for major events
    - Secure commercial SATCOM links back to C-RAM Program Office in Huntsville to enable immediate transmission of all classified forensics data

PM's and TRADOC Should be Funded to do this in Peace-Time

Systems Engineering with Embedded Forensics Process (U)



Forensic Data Process (U)



SUMMARY

- **Through judicious out-of-the-box thinking from the gitgo, PD C-RAM has taken a real-time, current warfighter threat and turned it into a long-term solution that addresses not only today's tactical theater of operations, but many diverse ones in the future.**

- **The Counter-Rocket, Artillery, Mortar Program: continuing to deliver on its promises and saving warfighter lives TODAY.**