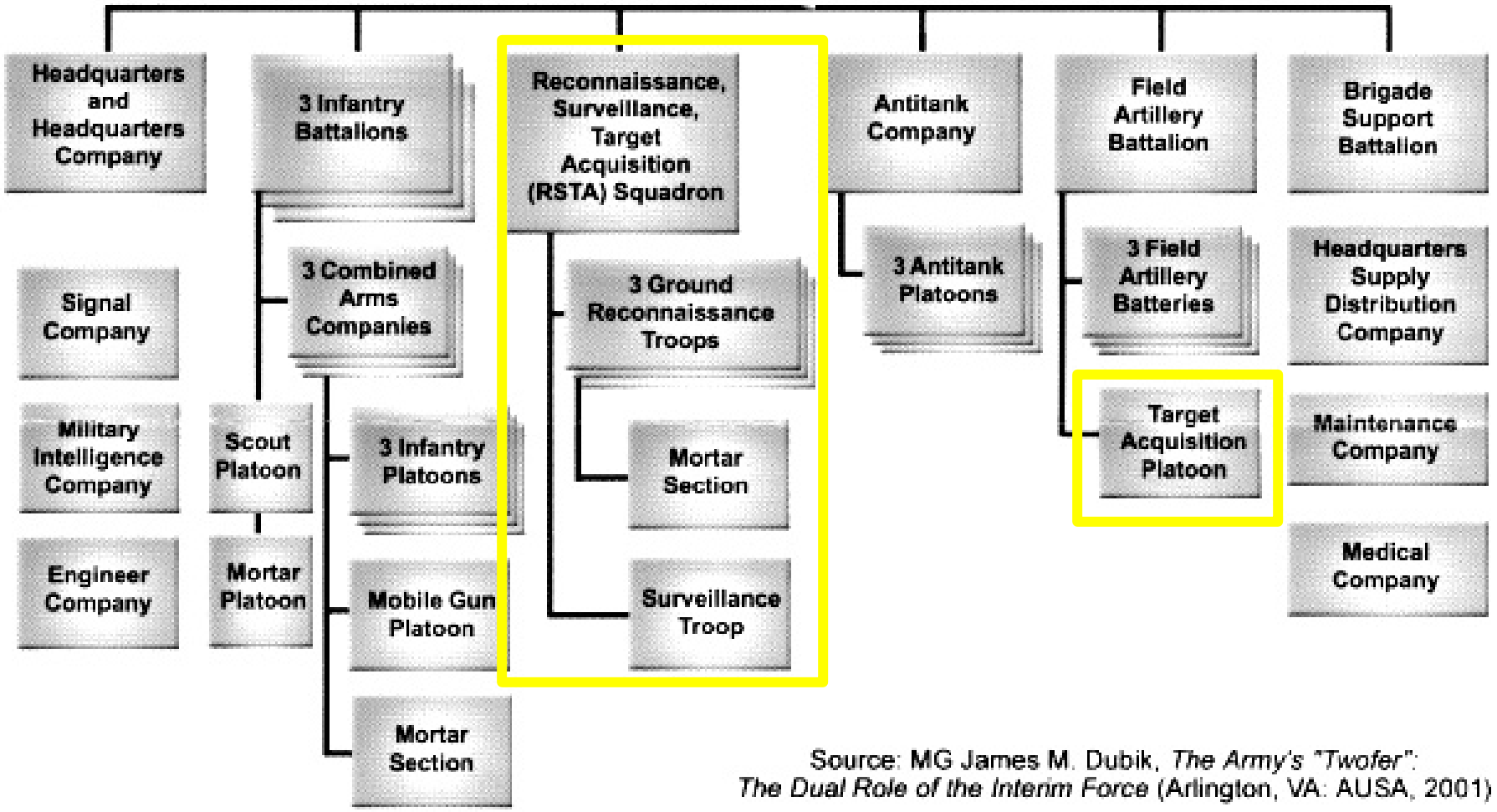
Sensors for Future Combat Systems (FCS)

NDIA

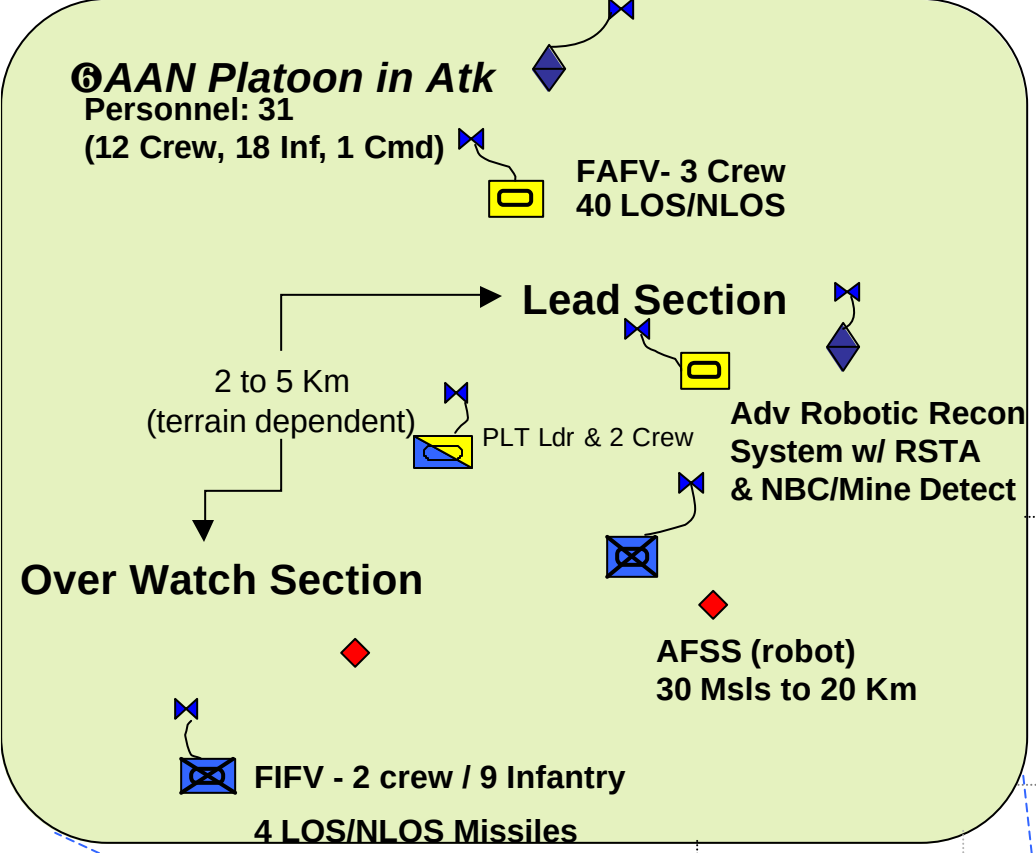
12 March 2002

Interim Brigade Combat Team



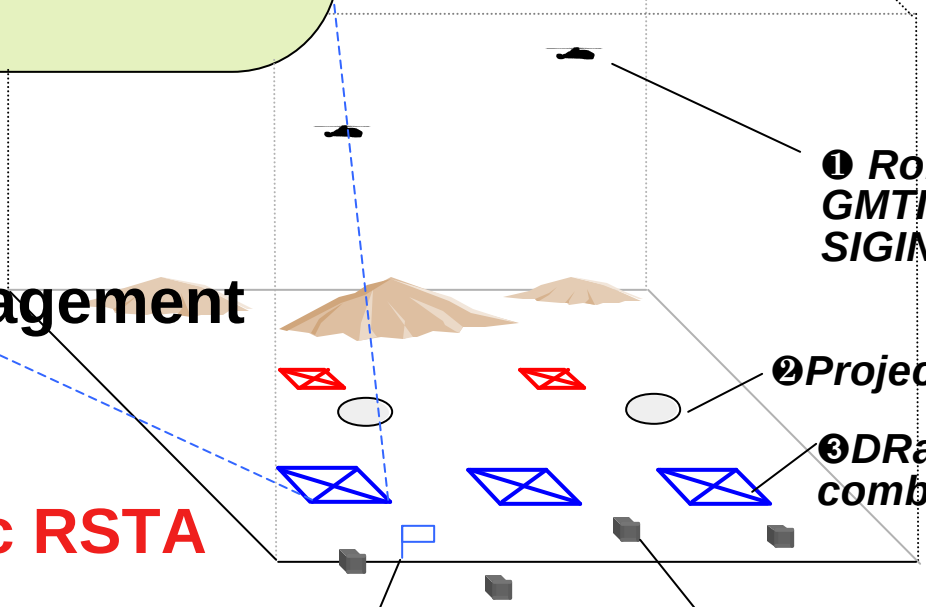
Source: MG James M. Dubik, *The Army's "Twofer": The Dual Role of the Interim Force* (Arlington, VA: AUSA, 2001)

Multi-Mission Combined Arms Teams



- **See First**
- **Understand First**
- **Act First**

- **Strat/tac air mobility**
- **Extended range engagement**
- **Integrated robotics**
- **Collaboration-centric RSTA**



❶ *Robot Helos w/ GMTI, SAR, IFSAR, SIGINT mapper*

❷*Projectable IUGS*

❸*DRaFT on all Blue combatants & IUGS*

❹*Integrated C4*

❺*Robot missile batteries*

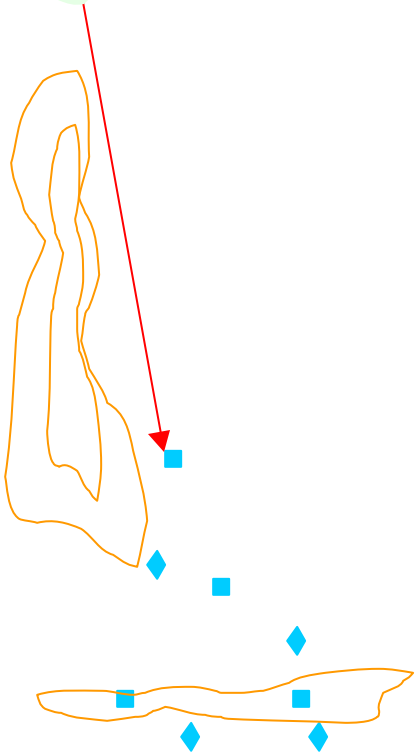
Sensing Platforms/Sensors for FCS

- **Enablers**
  - **NetFires LAM**
  - **A-160**
  - **OAV**
  - **FOPEN radar**
  - **DRaFT**
  - **ESA**
  - **Ladar**
  - **Uncooled IR**
- **Gaps**
  - **Fusion and decision-aiding**
    - **Commander's interactive display**
    - **Processing on sensor-platform**
  - **Bistatic radar designs**
  - **Acoustics**
    - **Dismounted warrior array**
    - **Anti-personnel IUGS**
  - **IUG positioning and comms**
  - **Collaborative targeting**
    - **FCV commander's associate**
    - **Robotic weapon carrier**
      - **Follower**
      - **Scout**

Functions of FCS Sensors

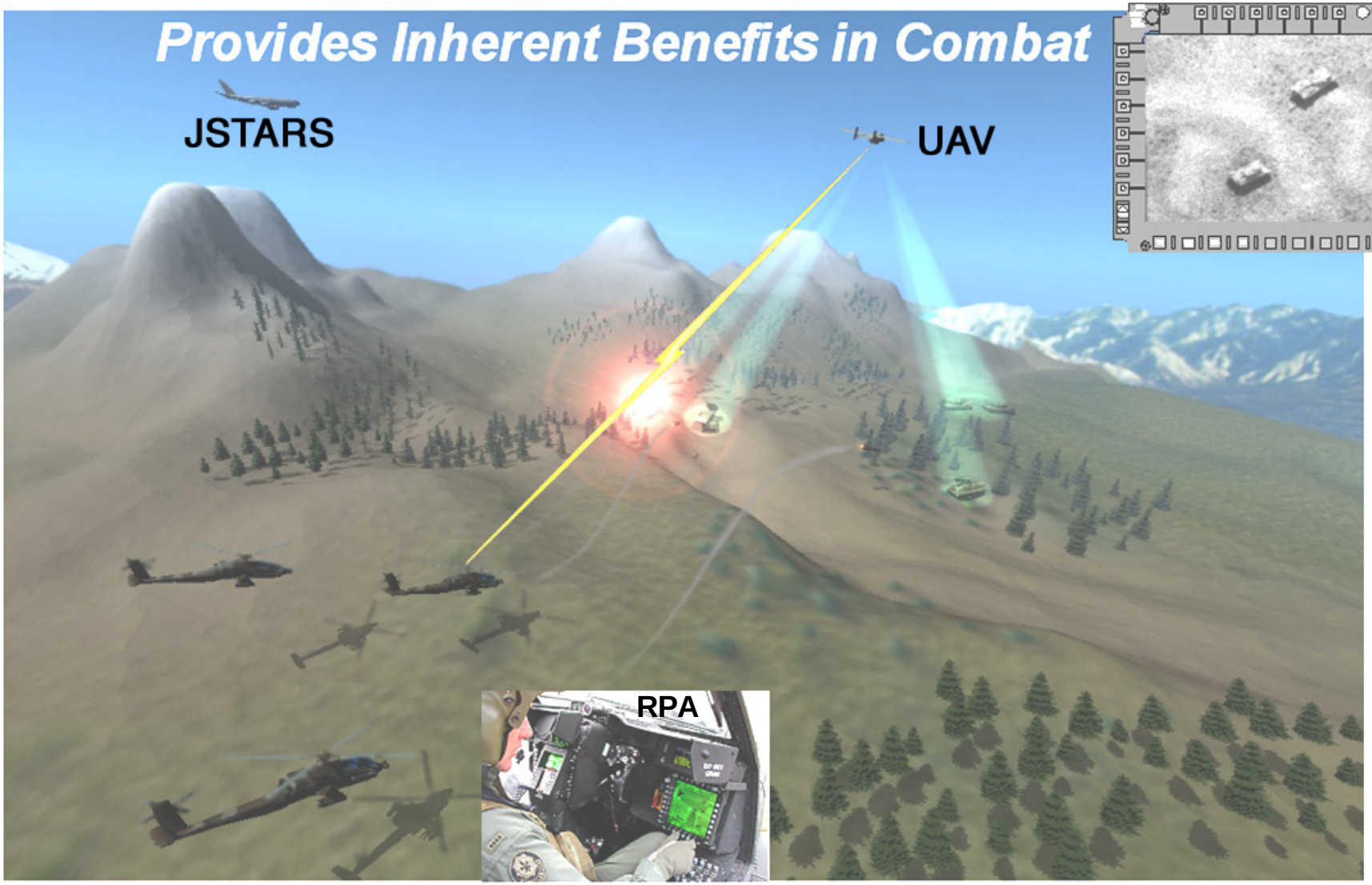
- **Survivability**
  - **Blue SA (track, locus, ID)**
  - **Active Protection (AP)**
    - **Preempt hostile action**
    - **Locate and destroy attacker**
    - **Foil attack**
  - **Engage BLOS**
  - **COMSEC**
- **Lethality**
  - **Target tracking, IFF**
  - **Collaborative engagement**
    - **Geo-registration**
    - **Optimized weapon choices**
  - **Low-latency strike**
  - **Post strike assessment**
- **Mobility**
  - **DTED on demand**
  - **Air/ground routing and de-confliction**
  - **Robust networking**
- **Sustainability**
  - **TAV**
  - **JIT re-supply**

An Unexpected LOS Engagement

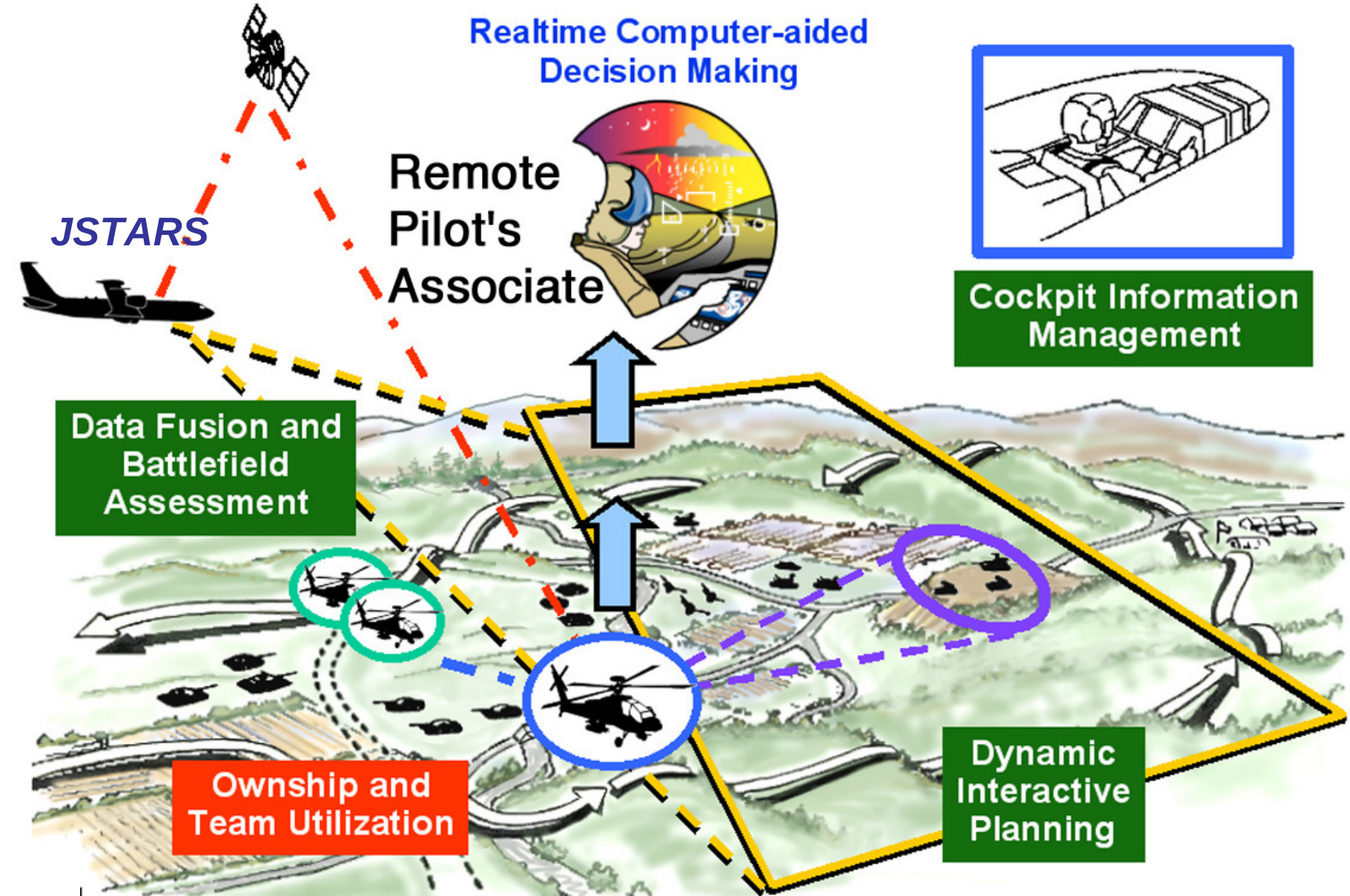


- Despite all our Organic Aerial Vehicles, and all our other overhead sensors, we must be ready for close combat.
- In the view of the FCS SAG, our CONOPS should include (1) **preemption**, (2) **networking** the location of enemy targets, and (3) their prompt **destruction**.
- If the US develops the appropriate mix of sensors, processors, wireless communications, and weapons, the whole will have a fourth effect: **deterrence**.
- N.B., this is an example of the "quality of Firsts" stressed by TRADOC : <u>latencies beyond micro-seconds will be fatal</u>.

Collaborative Engagement

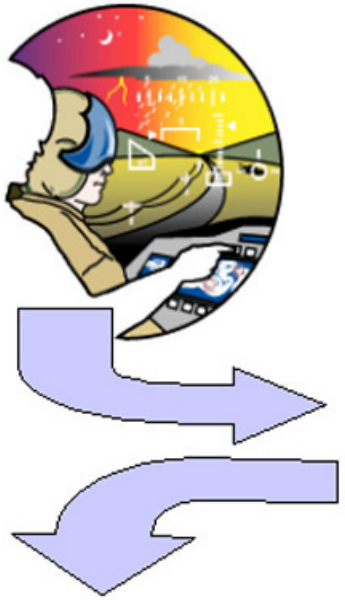


A Possible Precursor for FCS C4ISR



Leveraging Human Performance

Rotorcraft Pilot's Associate



RPA Results

Increase in Loss exchange ratio - 96%

Reduction in losses - 78%

Increase in targets destroyed - 42%

Decrease in exposure to threat - 21%

Reduction in mission planning - 32%

Sample Functionality

- Plan Flyable Route for Ownship
- Plan Flyable Routes for Team
- Determine Threat LOS
- Assign Targets to Team based on Ordnance, Position
- Fuse Data from Multiple Sources and Sensors
- Shade Digital Map to Show Sensor Coverage
- Shade Digital Map to Show Threat Intervisibility
- Monitor Team Expendables
- Fill out Call For Fire Template
- Fill out Spot Reports
- Ensure Digital Reports Reach Destination
- Select Weapon
- Arm Weapon

frees the human to do what humans do best

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- **Mobility**
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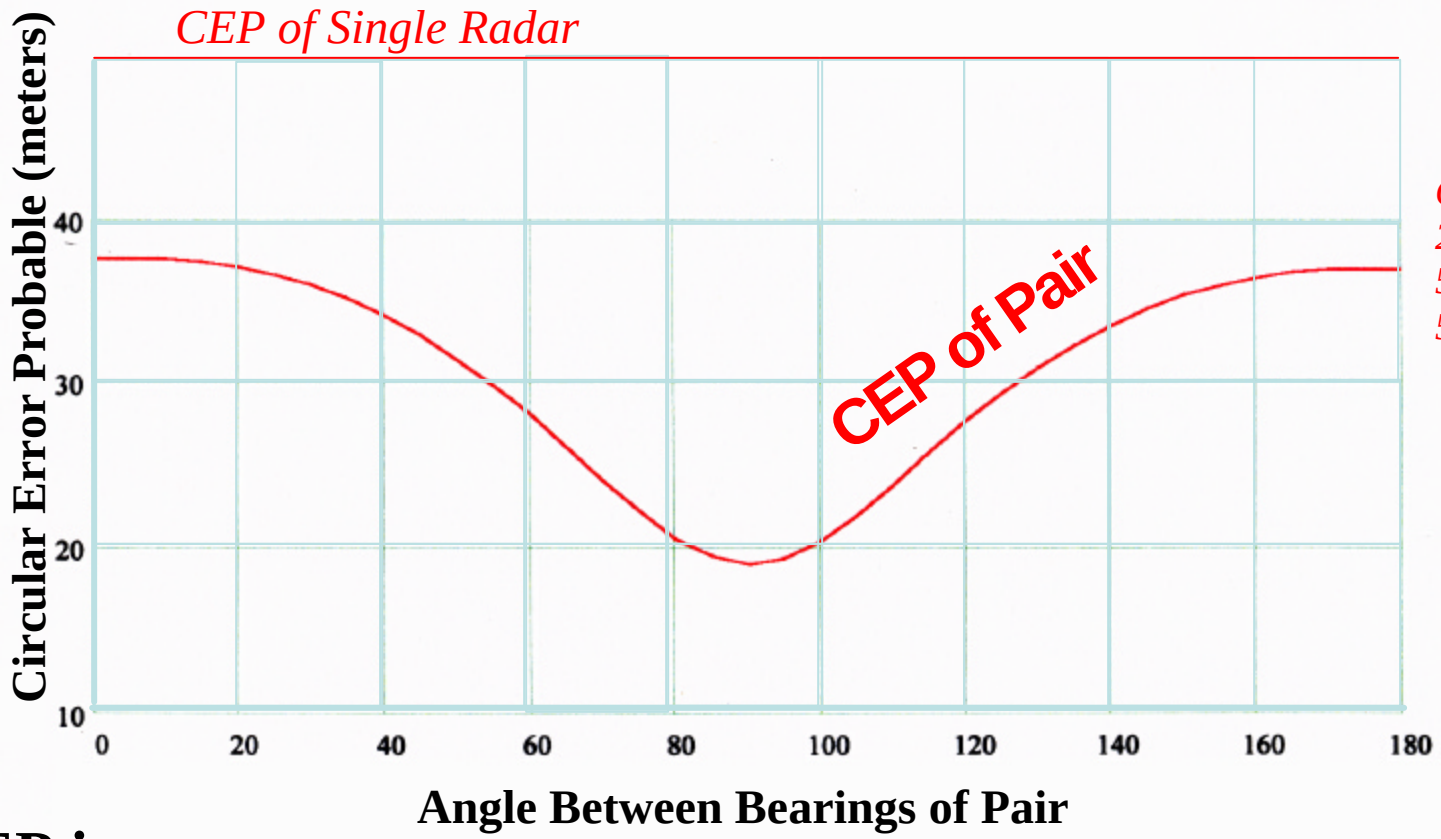
  - Robust networking

- **Sustainability**
  - TAV
  - JIT re-supply

Target Tracking and Recognition

- **Is contextual: the more SA, the lower the interpretive error; hence, direct feed of processed sensor data to commander**
- **Improves with DTED**
- **Is facilitated by staring sensors and automated change-detection**
- **Warrants multiple platforms with redundant GMTI/SAR/IFSAR/SIGINT to maintain persistent RSTA for the FCS unit**

Accuracy of Collaborating Pair of MTI



- **CEP is:**
  - **a. independent of altitude; ⌞ at max range < 25 meters**
  - **b. reduced ~ .7 by flying pairs in parallel**
  - **c. reduced ~.5 to ~.25 as ∠ bearings approaches 90°**
  - **d. less if GPS/INS error is offset by benchmark DRaFT**

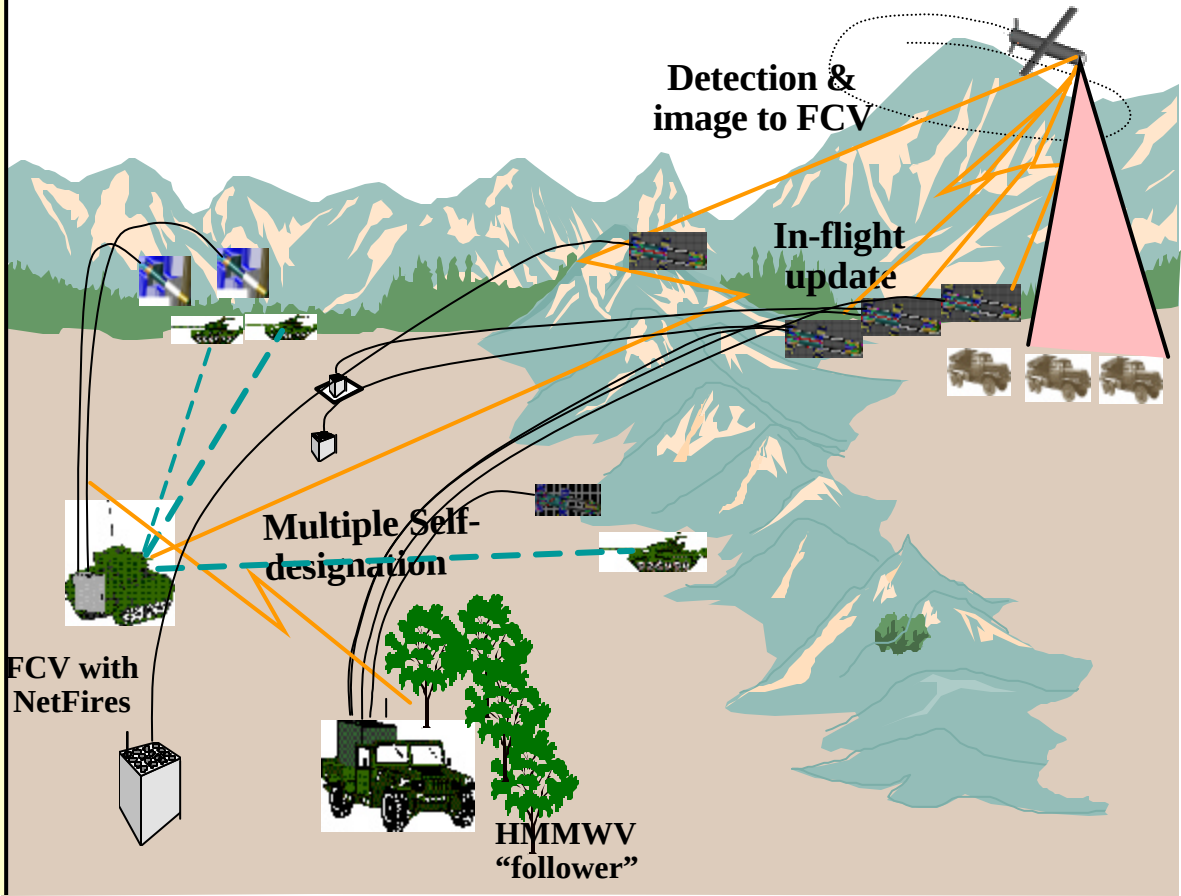
What NetFires will provide for FCS

NetFires goals for FCS

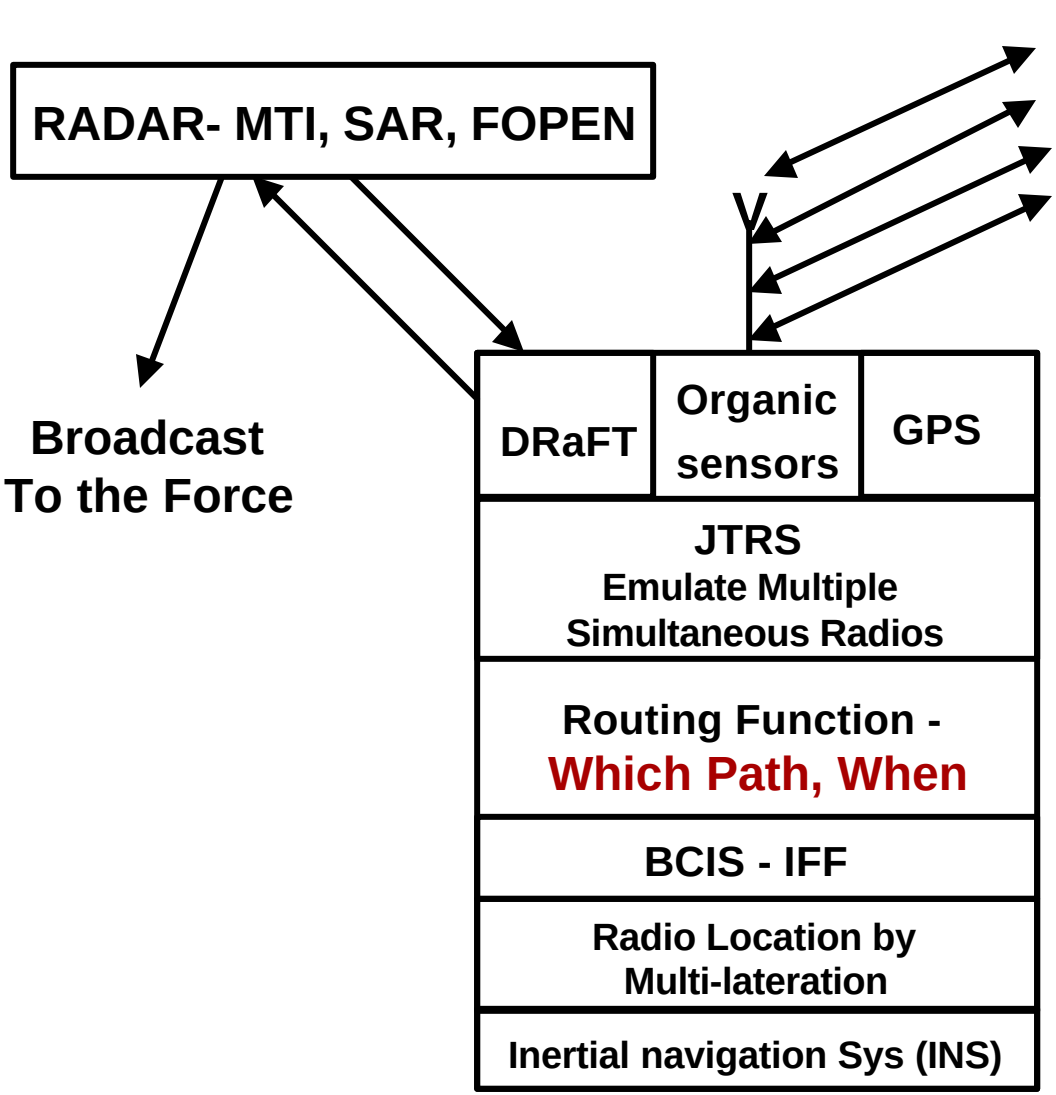
Demonstrate two LOS/NLOS weapons prior to FY2005

- **Rapid Response PAM**
  - **Short time of flight (100s/25km)**
  - **Multimode terminal guidance**
  - **Low cost configuration**
- **Hunter Killer LAM**
  - **3-D ladar seeker w/ATR, TERCOM**
  - **Significant loiter**
  - **Multi-mission including BDA**
- **PAM/LAM**
  - **GPS/INS guidance**
  - **Variable propulsion**
  - **Terminal guidance (end game)**
  - **Midcourse update through networked 2-way data link**
- **Platform independent launcher**
- **Wireless command and control**

Collaborative engagement fundamentally "reengineers close combat."



The Elements of FCS C4ISR



Can network:

- **Ground to Ground via:**
  - -- SINCGARS, EPLRS
  - -- JTRS, WIN-T
  - -- HI Frequency, HI BW, ESA
  - -- BCIS - IFF
- **Through UAVs, ACN**
- **DRaFT - Using Radar**
- **Receive only on:**
  - Global Broadcast System

Sensors can be comm devices, and radios can be sensors