

The Analytic Challenges of the Army's Network-enabled Future Combat Systems

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Army Chief of Staff GEN Shinseki's Vision of the Future Force

- The vision is encompassed in the transformation to a future Objective Force.
 - Primary instrument is the yet-to-be-developed Future Combat System.
 - FCS will be networked to allow real-time situational awareness
 - It will be able to operate more effectively in joint operations.
- This Objective Force will be more deployable than current heavy divisions, yet have more lethal firepower than today's light and heavy divisions.
- Our current operations in Central Asia reinforce the need for Objective Force.
 - Balance this global war against the asymmetries of international terrorism with the regional Threats that demand our attention and a need for conventional warfighting process.

Units of Action

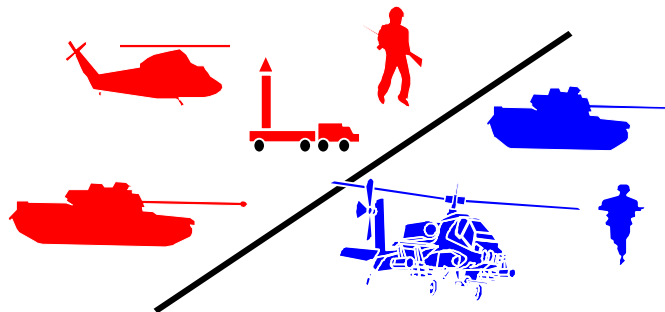
- **Combined Arms Organizations, by Design**
- **Sufficient Tactical Autonomy for Close Combat Engagements**
 - ✓ **Fight for Three Days of Continuous Combat Without Resupply**
 - ✓ **Decentralized Operations Enabled by Mutual Support / Virtual Teaming at Standoff**
- **Embedded and Networked C4ISR to *See First, Understand First, Act First, and Finish Decisively***
- **Agility of Hasty Attack With Precision of Deliberate Attack**
- **Decisive Close Combat by Fire and Maneuver and Assault:**
 - ✓ **Mounted, Enabled by Dismounted**
 - ✓ **Dismounted, Enabled by Mounted**
 - ✓ **Mounted - When Possible**
 - ✓ **Dismounted - When Necessary**
- **Small Unit Excellence**

See First

OPERATIONAL OVERVIEW – QUALITY OF FIRSTS

See the parts:

- Detect
- Identify
- Track

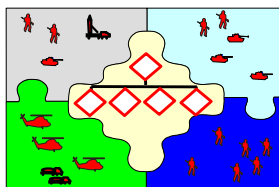


Key Enablers:

- Combat ID Systems (Soldier/sys)
- Reconnaissance
- Organic Sensors (Robotic, Multi-spectral, Disposable)
- UAV (Organic, All – Source)
- Embedded Platform C4ISR

See the Whole (Recognize):

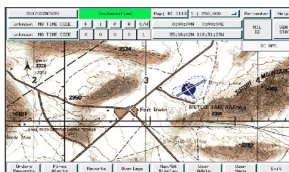
- Aggregate
- Fuse



- Sensor Fusion Systems
- Global Information Grid
- Joint C4ISR Network
- Leader Training

See Environment:

- Terrain
- Weather
- Population



- Real- Time Terrain Mapping
- Dynamic Urban Mapping
- Inter-agency Coordination

Force enemy to see last

Blind the enemy through:

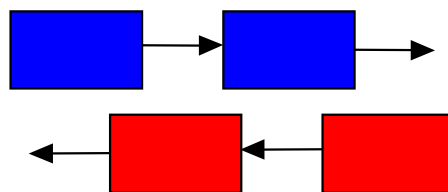
- Obscurants
- Deception
- Jamming/counter-sensor
- Pattern avoidance
- Signature reduction

Understand First

OPERATIONAL OVERVIEW – QUALITY OF FIRSTS

See the Pattern (Understand)

- Concept of Operations
- Scheme of Maneuver
- Centers of Gravity
- Decisive Points
- Vulnerabilities

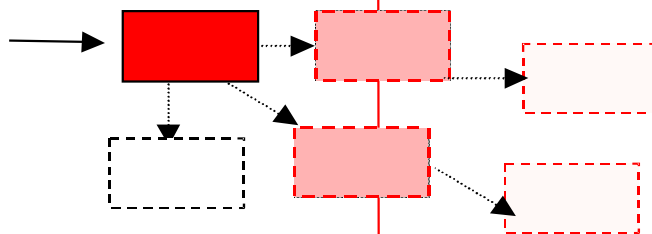


Key Enablers:

- Pattern Analysis & Recognition
- Experience-based Judgment
- Knowledge Focused
- On Demand Collaboration
- Layered, Redundant Sensors
- Recon by Action-compel Response
- Force Enemy to Reveal Intent

See the Next Several Moves (Anticipate)

- Ours / Enemy Intent
- Where Enemy Will Go
- ID Likely Methods
- Action / Reaction and Counteraction



Force Enemy to Understand Last

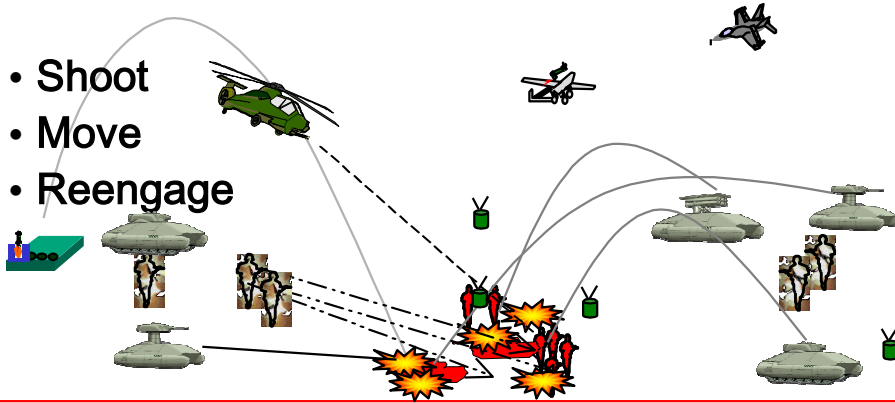
- Deception
- Pattern Avoidance
- Irregular Battlefield Geometry

Act First

OPERATIONAL OVERVIEW – QUALITY OF FIRSTS

Platform

- Shoot
- Move
- Reengage



- Unit:**
- Determine Options
 - Decide First
 - Act to Force Reaction / Skip a Cycle
 - Transition Between Actions
 - Establish Objective Area
 - Execute Shape Action
 - Transition to Objective Area
 - Synch Fires and Maneuver
 - Transition to Assault

Key Enablers:

- Situational Understanding Red / Blue
- Embedded Organization C4ISR
- Enhanced Clearance of Fires
- Sensor - Decider - Shooter Links
- Advanced Weapons Control
- Enhanced Communications
- Organizational Survivability
- Battle Command/Leadership/C2
- Intent-centric Operations (Vs. Plan-centric)
- Execution-centric C2 System
- Global Info Grid and Joint C4ISR Network
- Organic LOS/BLOS/NLOS Fires
- Organic M/CM – In Stride Obstacle Detection
- Integration of Joint/army Fires and Effects
- Autonomy

Force Enemy to Act Last or Wrong

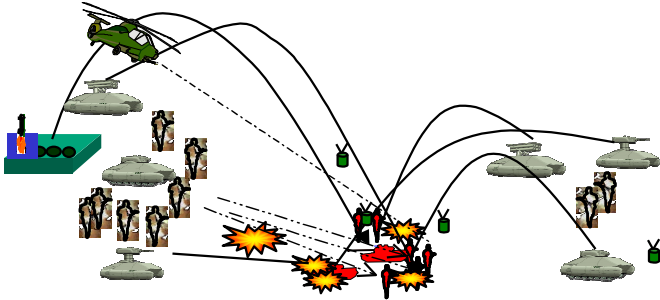
Deny Enemy Action

- Remotely Emplace Obstacles
- Preemptive & Immediate Counterfire
- Jam Computers & Weapons Control
 - Deceive

Finish Decisively

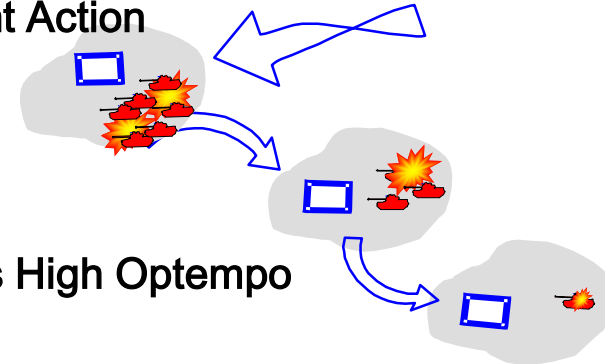
OPERATIONAL OVERVIEW – QUALITY OF FIRSTS

- Destroy Enemy Ability to Fight
- Eliminate Enemy Freedom of Action
- Exploit Success
- Conduct Close Combat-transition To Assault
- Follow Through to Enemy Destruction



Key Enablers:

- Tactical Overmatch
- Organic LOS/BLOS/NLOS Fires
- Organic Non -Lethal Fires
- Situational Understanding – Red and Blue
- Global Information Grid and Joint C4ISR Network
- Scalable Integrated Joint Fires and Effects
- Capable of Independent Action
- Vertical Maneuver
- All Forms of Offense
 - Exploitation
 - Pursuit
- Sustainment for 3 Days High Optempo
- Campaign Qualities
- Mobility
- Assault: Mounted, Dismounted, Mounted Sptd by Dismounted, Dismounted Sptd by Mounted



- No Tactical Pause
- Focus on “Profitable Fight”
- Block Moves to Sanctuary

- Mission Staging of Maneuver Sustainment
- Disrupt Communications
- Remotely Placed Obstacles
- Logistics Efficiency

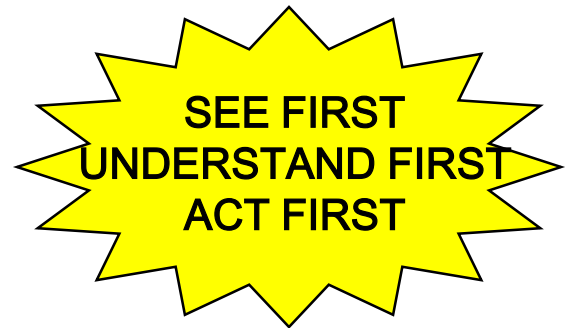
Employment

Unit of Action in Decisive Tactical Combat

HOW to FIGHT

Before Contact

- | Develop Situation Out of Contact
- | Decide, When / Where to Fight
- | Set Conditions
- | Maneuver to Position of Advantage



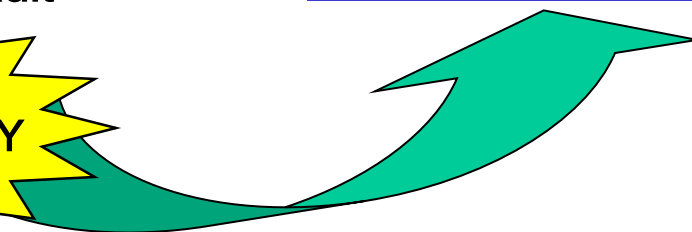
During Contact

- | Initiate Decisive Combat at Chosen Time / Place
- | Continue to Develop the Situation in Contact
- | Continue to Integrate RSTA, Maneuver, and Fires and the Network

Tactical Assault

- | Finish the Enemy Through Assault

Transition to next
engagement



Required Capabilities for Tactical Concepts

- **Lethality**

- ✓ **Assured First Round Kill / or 4 X 8 Hole**
- ✓ **LOS/BLOS KE Rapid Fire Kill on the Move**
- ✓ **Precision Long Range Destructive Fires, Close Fire Support on Demand**
- ✓ **Non-Lethal Effects Create Dilemmas for the Enemy**

- **Survivability**

- ✓ **Situational Understanding, Slew to Cue Avenge Kill**
- ✓ **Active and Passive Protection Against KE / CE**
- ✓ **Detect Mines and Booby Traps at Standoff**
- ✓ **Ground and Vertical Sensors That Are Acoustic, Seismic, Magnetic, Thermal, Chemical, LADAR, and Radar Detectors**

- **Mobility**

- ✓ **C130 Crucible**
- ✓ **Assured Mobility, over Varied Terrain, with Speed and Precision**
- ✓ **Thermobaric Munitions to Destroy Mines at Standoff**

Required Capabilities for Tactical Concepts

- **Leadership**
 - ✓ **Battle Command on the Move, Over Greater Distances**
 - ✓ **Decentralized Small Unit Actions**
 - ✓ **Cognitive and Adaptive, Maintain Initiative**
 - ✓ **Teaming/virtual Teaming**
- **Knowledge**
 - ✓ **Uninterrupted C2 Network**
 - ✓ **Access to SOF, Army, Joint, Coalition, and Home Station Ops Center**
 - ✓ **En-route Mission Planning and Rehearsal**
 - ✓ **Sensor to Shooter, and Cueing**
- **Sustain**
 - ✓ **Crew Chief With Embedded TMDE**
 - ✓ **Commonality of Parts**
 - ✓ **Medical Evacuation**
 - ✓ **Self and Like Recovery**

Battle Command

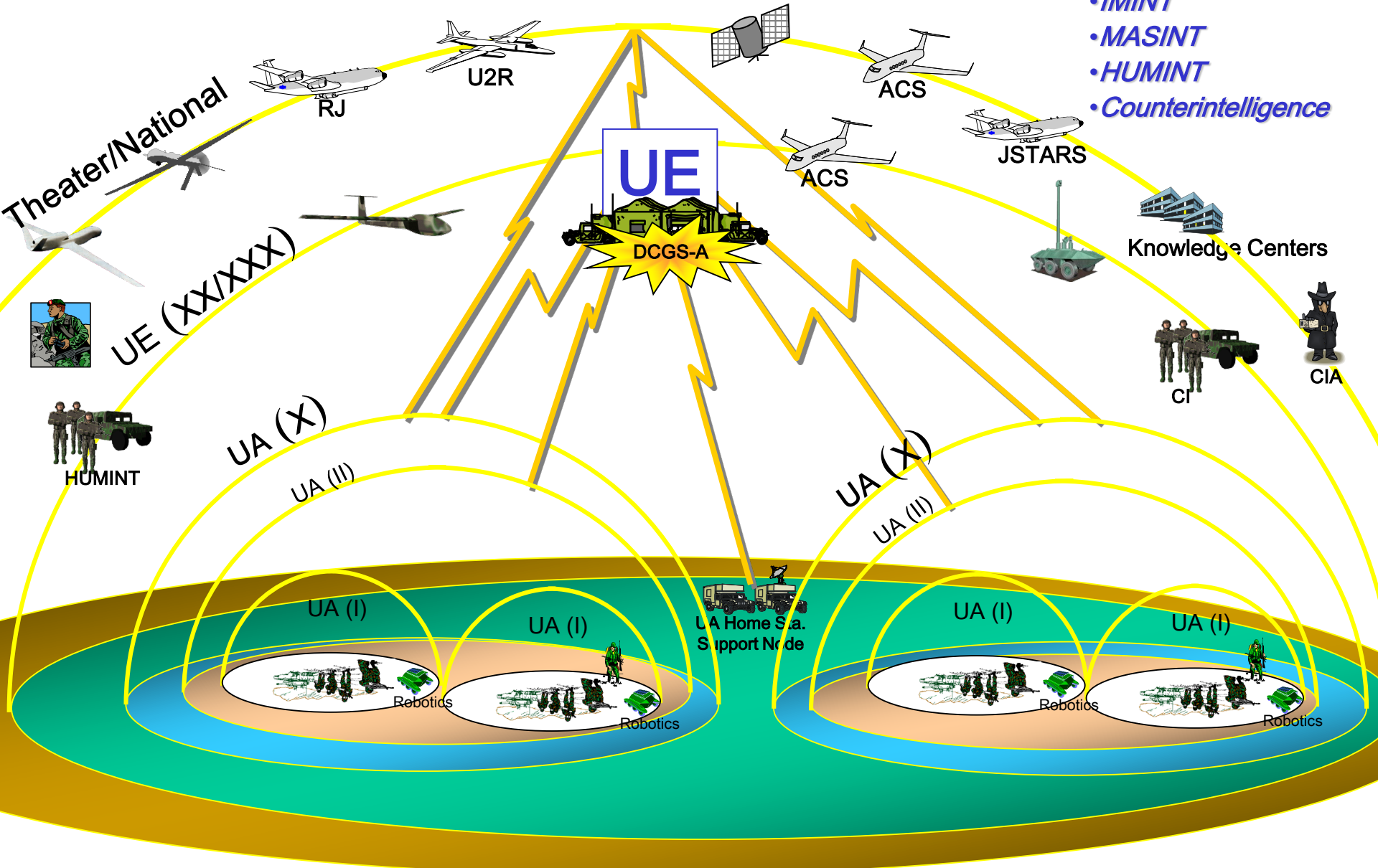
- **The Art and Science of Applying Leadership and Decision Making to Achieve Mission Success**
- **Leadership**
 - ✓ **Commander Driven – Purpose Oriented – Knowledge Focused – Mission Orders**
 - ✓ **Command and Control Over Greater Distances**
 - ✓ **Rapidly Transition From Stand-off to Close Assault**
 - ✓ **Rapidly Decide When to Remain Mounted for Tactical Stand-off, and When to Dismount to Support Mounted Maneuver and for Close Assault**
 - ✓ **Decentralized Actions**
 - ✓ **Small Unit Initiative**

Battle Command

- **Network Systems**
 - ✓ **Robust, persistent, ubiquitous**
 - ✓ **Mobile, scalable, self healing**
 - ✓ **Information assurance**
 - ✓ **Reach**
 - ✓ **On demand collaborative environment**

Sensors & Processors

- SIGINT
- IMINT
- MASINT
- HUMINT
- Counterintelligence



UE

DCGS-A

ACS

ACS

JSTARS

Knowledge Centers

CI

CIA

UA (X)

UA (II)

UA (X)

UA (II)

UA (I)

UA (I)

UA (I)

UA (I)

Robotics

Robotics

Robotics

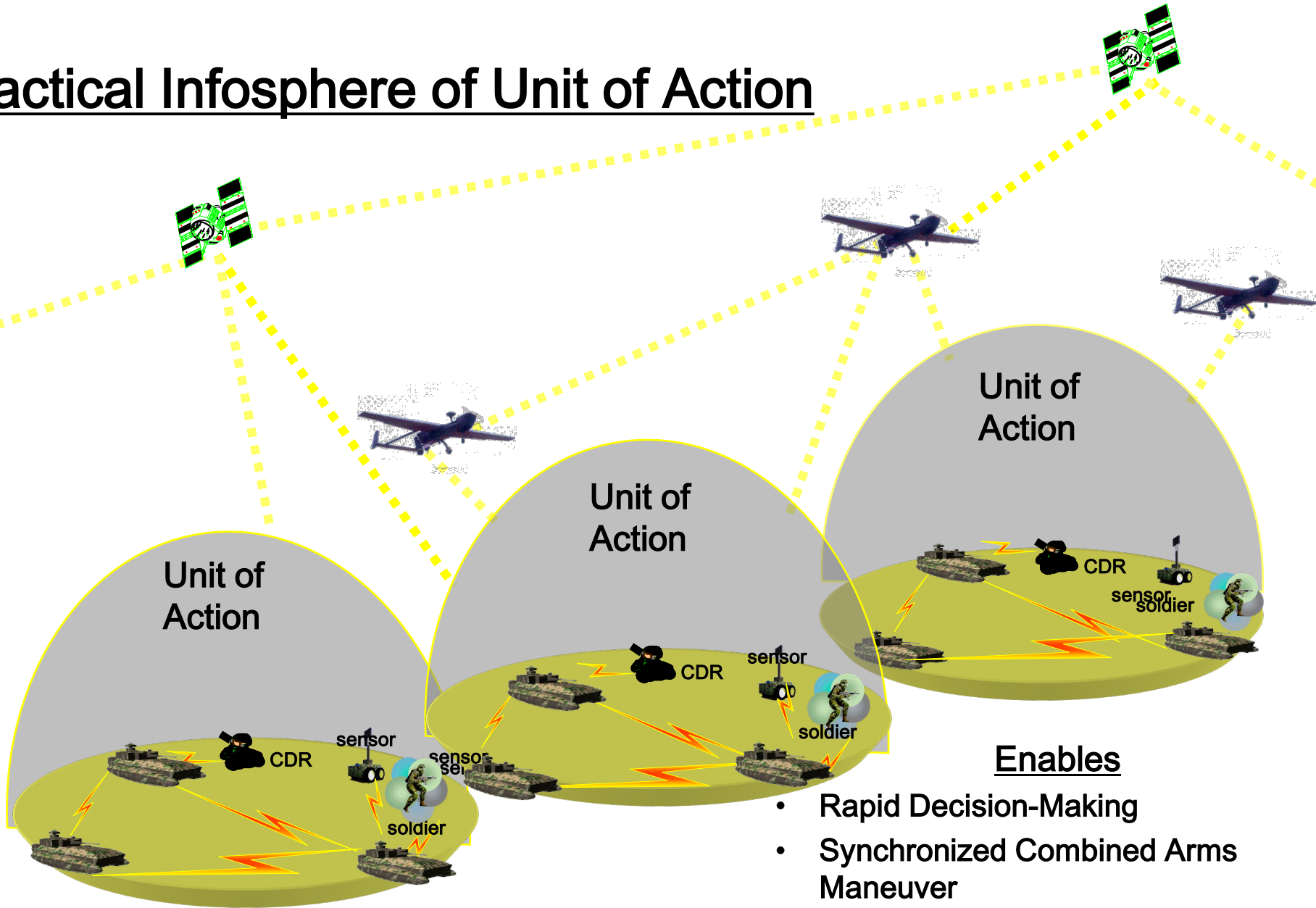
Robotics

UA Home Sta. Support Node

HUMINT

UE (XXIXXX)

Tactical Infosphere of Unit of Action



Enables

- Rapid Decision-Making
- Synchronized Combined Arms Maneuver
- Selecting When / Where to Fight
- Maximum Lethality / Survivability

Intelligence, Surveillance and Reconnaissance (ISR)

- **UA Leverages National, Joint, and Theater Sensors and Collection Assets That Have Access to the Operational Area**
- **Collect and Displays a Seamless, Fully Integrated, Multidimensional, and Tailorable Common Operating Picture**
- **Embedded ISR Enables Commanders to Effectively Lead During Dynamically Changing Operations Anywhere in the Battlespace**
- **Sensor to Shooter**
- **Sensor to Decider**
- **Sensor to Database**

DTLOMS IMPLICATIONS

Doctrine:

- **Continuous Running Commander's Estimate**
- **Terrain Clearance Procedures**
- **Assured Mobility Regardless of Obstacles (Predict, Detect, Prevent, Avoid, Neutralize)**
- **Effective Integration of On-board Sensors With Robotic Sensors**
- **Anticipate Enemy Action Through Pattern Analysis and Establish Engagement Criteria**
- **Rapidly Adjustable Sensor to Shooter Relationships**
- **Integrated Sensor Management Procedures**

DTLOMS IMPLICATIONS

Training:

- **Multifunctional Soldiers Trained to Perform a Greater Range of Tasks**
- **Collective Training With Two or More Platforms/units to Develop Synchronization Skills**
- **Training to Reflect the Increased Speed, Quantity, and Quality of Available Operational Information Provided**
- **System / Platform - Embedded Training System**

DTLOMS IMPLICATIONS

Leader Development:

- Identify and Develop Company Grade Leaders Capable of Decentralized / Independent Ops**
- Required Multi-functional Skills Must Be Introduced at Earliest Stages**
- Accelerated Junior Leader Development to Function in an Information Environment Using Emerging Tactics, Doctrine, and Organizations**
- Ability to Manage Multiple Sensory Inputs/outputs**
- Develop Leaders Ability to Rapidly Synthesize Information**

DTLOMS IMPLICATIONS

Organization:

- **Correct Mix Between Manned and Unmanned Systems**
- **Ability to Exercise C2 From Any Location**
- **Integrated Effects Management Structure**
- **LOS/BLOS/NLOS Availability at Every Echelon**
- **UGS and UAVs to Support Maneuver at Every Echelon**
- **Capability to Sustain Mobility and Momentum, Neutralize Obstacles in Stride**

DTLOMS IMPLICATIONS

Materiel:

- **Establish/maintain COP With All Elements of the Joint Air Ground Maneuver Team**
- **Transmit/receive Combined Arms Mission Orders and Graphics Throughout All Echelons**
- **Dynamically Task Joint and Organic Sensors to Acquire/engage Targets With Organic and Joint Fires, Receive BDA and Ensure BCID**
- **Enable Real Time Combat Simulation Modeling, Collaborative Mission Planning and Interactive Rehearsal**
- **Provide Real Time Threat Target Management, Cognitive Decision Aids and Course of Action Development Tools**
- **Provide Automated Obstacle, Mine and Booby-trap Detection on the Move**
- **Provide Robotics (Air/ground) for High Risk and Burdensome Tasks**
- **Ensure Adaptive Platform Signature Management/reduction Mechanisms**

DTLOMS IMPLICATIONS

Materiel:

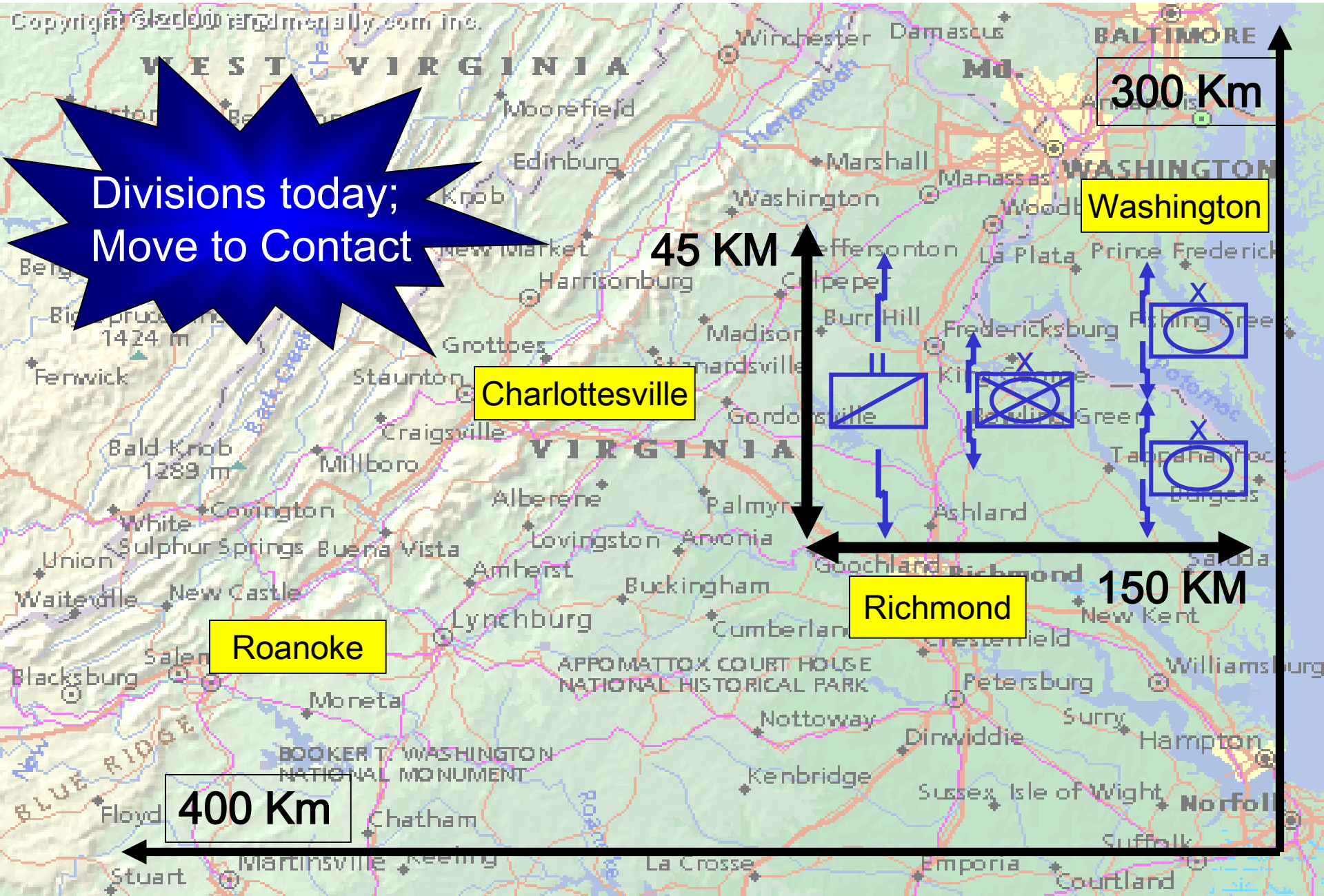
- **Provide Multi-spectral Aided Target Detection, Classification, Recognition and Identification Sensing Capability With Fratricide Prevention Characteristics**
- **Ensure Automated Battle Space Management for Netted Fires, Manned-unmanned Aviation and Fires Support Coordination**
- **Multi-function Precision Munitions and Sensors With Loiter Attributes Capable of Employment in Complex, Urban and Sub-terrainian Environments**

DTLOMS IMPLICATIONS

Soldiers:

- **Multiple Skill Sets**
- **Adaptive Soldiers & Multifunctional Crews That Blend Skills**
- **Increased Stamina and Endurance**
- **Filtered COP for Small Units and Soldiers**

Movement to Contact



Divisions today;
Move to Contact

300 Km

Washington

45 KM

Charlottesville

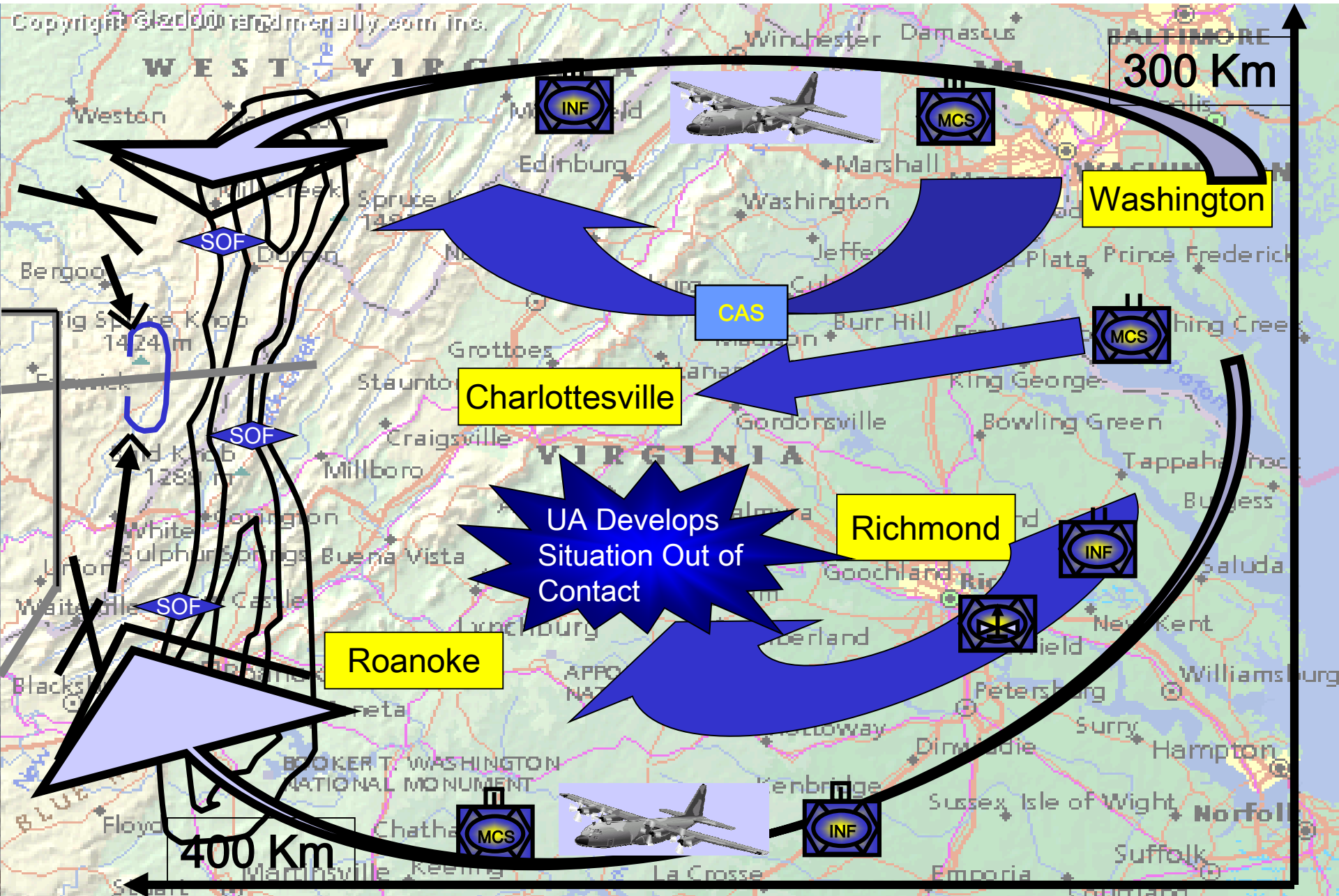
Roanoke

Richmond

150 KM

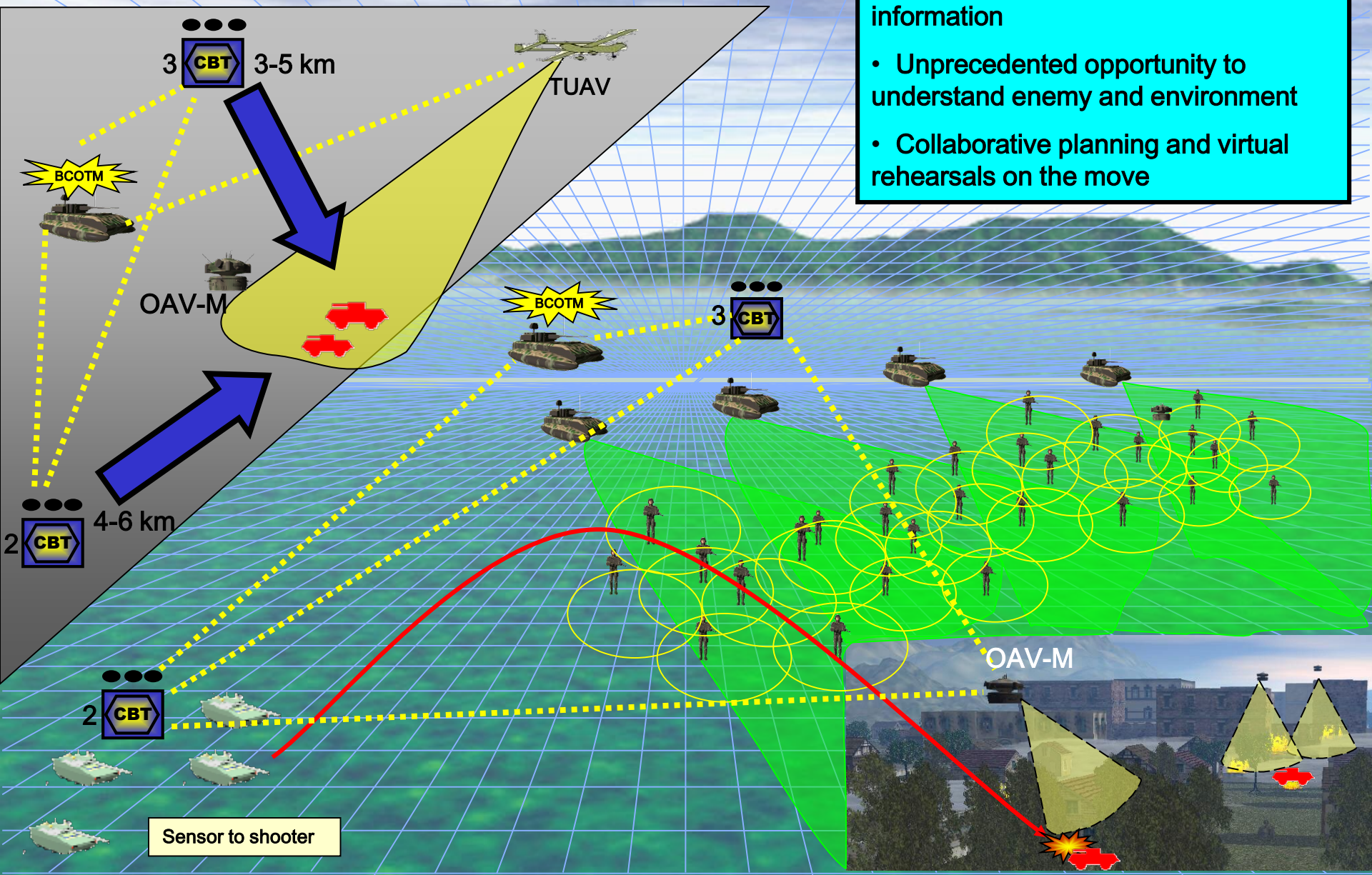
400 Km

Attack on the Move with Deliberate Information



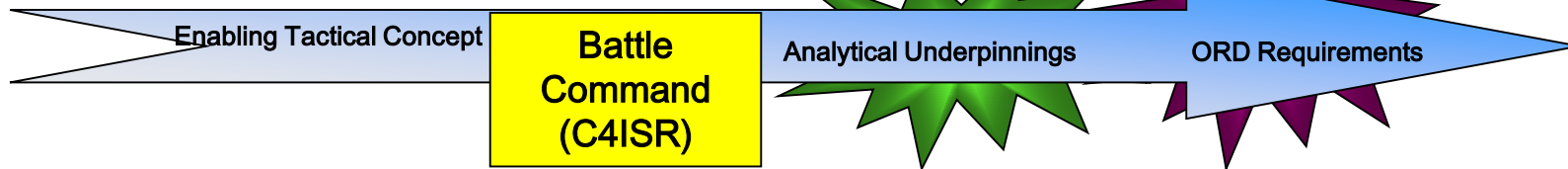
Battle Command on the Move

- Battle command with actionable information
- Unprecedented opportunity to understand enemy and environment
- Collaborative planning and virtual rehearsals on the move

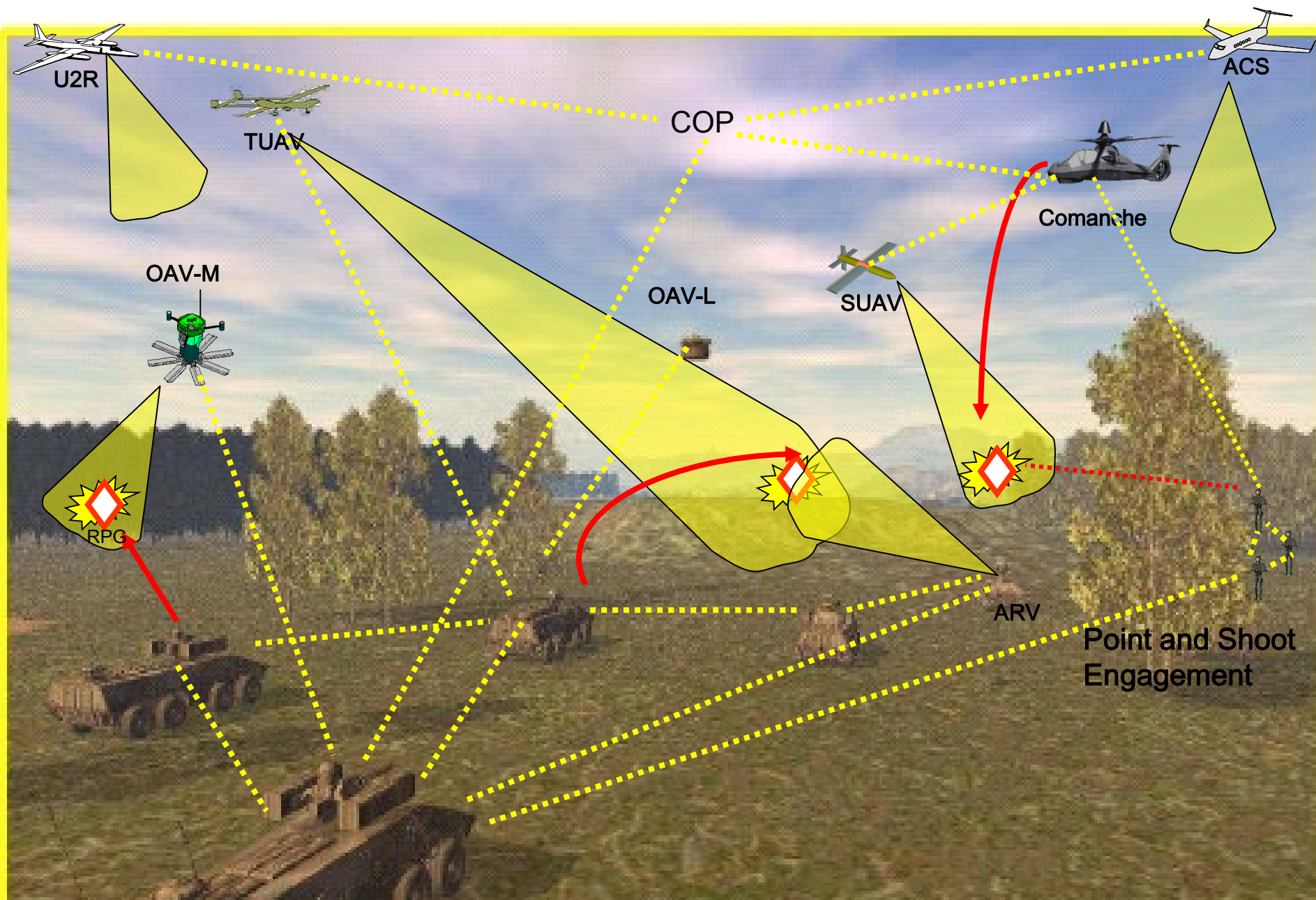


Battle Command (C4ISR)

ANALYSIS	ORD REQUIREMENT (Objective)
<ul style="list-style-type: none"> • A UA Core mission task is to develop the situation with external and organic ISR, Army and Joint. (3450) • Communication relay assets - <u>terrestrial, airborne, space</u> - necessary to ensure full battlefield connectivity. (FCS Communications Program System Study Team Issues Report, May 2001) • IFOR (Bosnia) line of sight comms and single points of failure (SENs and LENSs) required 240 TACSATs. (2401) • DCGS-A MAPEX determined the requirement to perform sensor fusion at all levels (3153) 	<p>3450: FCS FoS platforms will use WIN-T and JTRS as the integrating information network standard for information transport, network management and information assurance.</p> <p>2401: The FCS C4ISR network will exploit terrestrial, airborne and space-based network layers to enable battle command on the move and continuous network connectivity at all echelons, in all terrain, at extended ranges across the battle space, and globally from home station to deployed theater.</p>
<ul style="list-style-type: none"> • Enables battle command with relevant, actionable information with TOC-like capability, anywhere on the battlefield • Unprecedented opportunity to understand enemy and environment • Accelerates collaboration • Commander-centric versus plan -centric • Enables understanding where and when we must transition between actions 	<p>3153: FCS FoS must be capable of automatically organizing, identifying, correlating and aggregating sensor produced data into the running estimate that enables a decision maker to achieve situational understanding and make tactical decisions.</p>



Sensor Enabled Information Dominance



Cooperative Engagement



- OAV-L Identifies Enemy Armor Closing on a UA Squad Beyond LOS of the Squad

Point and Shoot



New overwatch techniques: overwatch is now three dimensional; small units can overwatch at greater distances and while moving.

Cooperative engagements between multiple lines of operation

NLOS and BLOS systems permit mutual support between small units operating on dispersed axes



Operational Maneuver to Intercept an Enemy

