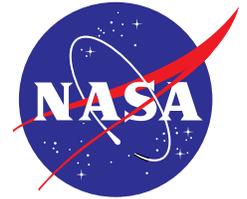




*Army / NASA Rotorcraft Division*



# Human Systems UAV Efforts

Jay Shively

AMRDEC Human Systems Tech Area lead

[jshively@mail.arc.nasa.gov](mailto:jshively@mail.arc.nasa.gov)

(650) 604-6249



—“UAVS-Protecting the Point”



*COL John D. Burke*

*Project Manager*

*UAV Systems Project Office*

*August 2002*



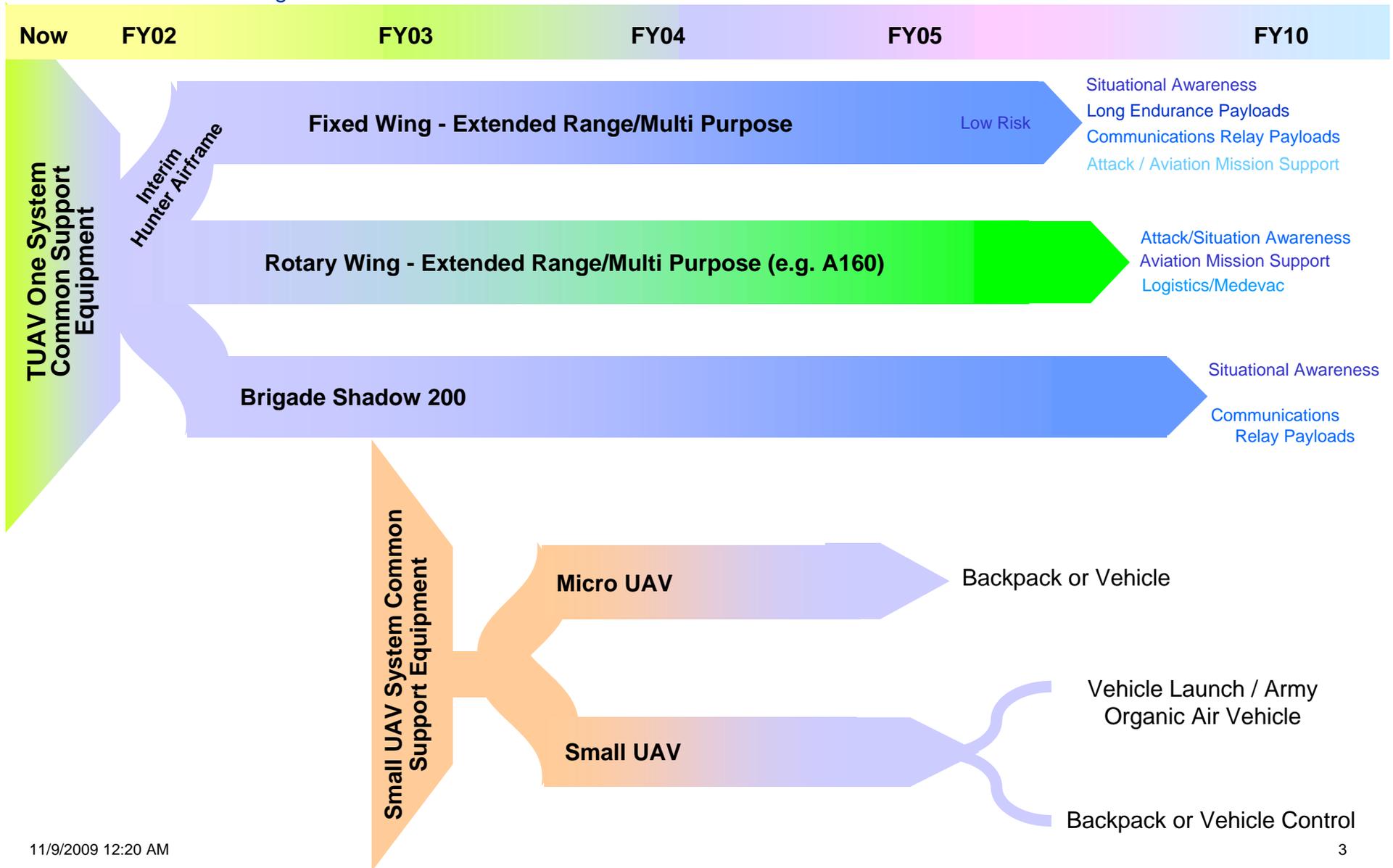
# *Program Update: Army Unmanned Aerial Vehicle Systems*



# An Army UAV Path



—“UAVS-Protecting the Point”



# One Army UAV System Approach

The system is much more than an airframe

Ground Data Terminal



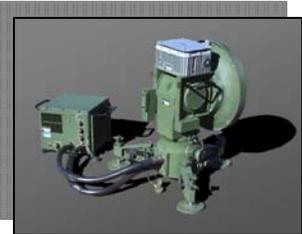
Launcher



Air Vehicles



TALS



Payloads



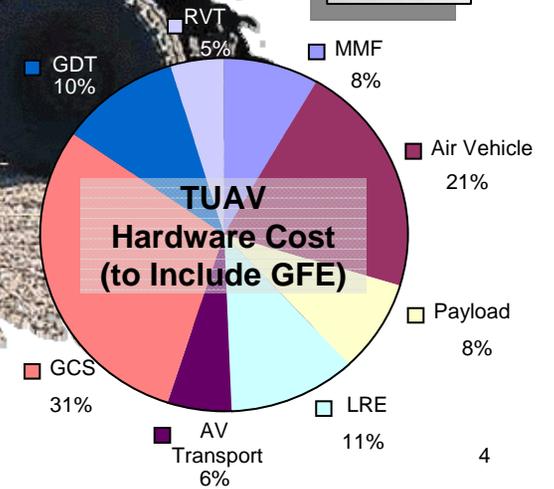
Portable Ground Control Station & Data Terminal



Personnel



Contact Teams





# Shadow 200 System



—“UAVS-Protecting the Point”



Ground Data Terminal x 2

Ground Control Stations x 2



Remote Video Terminal & Antenna x 4



Portable Ground Control Station & Data Terminal

## Maintenance Section



Air Vehicle



Personnel/Equipment Transport



Equipment Trailer



Maintenance Section Multifunctional

## System

Air Vehicles with Payloads x 3



Arresting Net

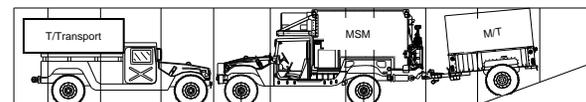
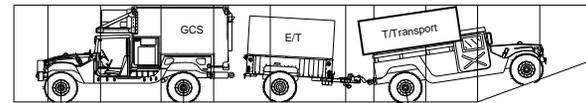
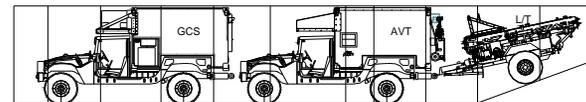


TALS



Air Vehicle Transport & Launcher Trailer

## Deployability / Transportability C130 Transportable



Equipment Trailer



Personnel/Equipment Transport



### Personnel

- 1 x 35D (Platoon Leader)
- 1 x 350U (UAV Warrant Officer)
- 1 x 96U (Platoon Sergeant)
- 12 x 96 U (Air Vehicle Operators)

### Personnel

- 4 x 33W (EW System Repairer)
- 3 x 52D (Engine Mechanic)



# Shadow 200 System Update



—“UAVS-Protecting the Point”



- Many minor improvements to airframe and training/procedures since last spring
- Concluded several highly successful OPTEMPO exercises with troops during winter
- Cold weather, C4I, mobility and lift demonstrations/tests successfully accomplished
- LRIP '02 of 5 systems awarded in March
- IOT&E – 23 April – 03 May 2002
  - ✓ 53 missions conducted
  - ✓ Average flight duration 4.5 hours
  - ✓ Average daily flight hours 17.5
  - ✓ Exceeded operational tempo
  - ✓ Anticipated positive report

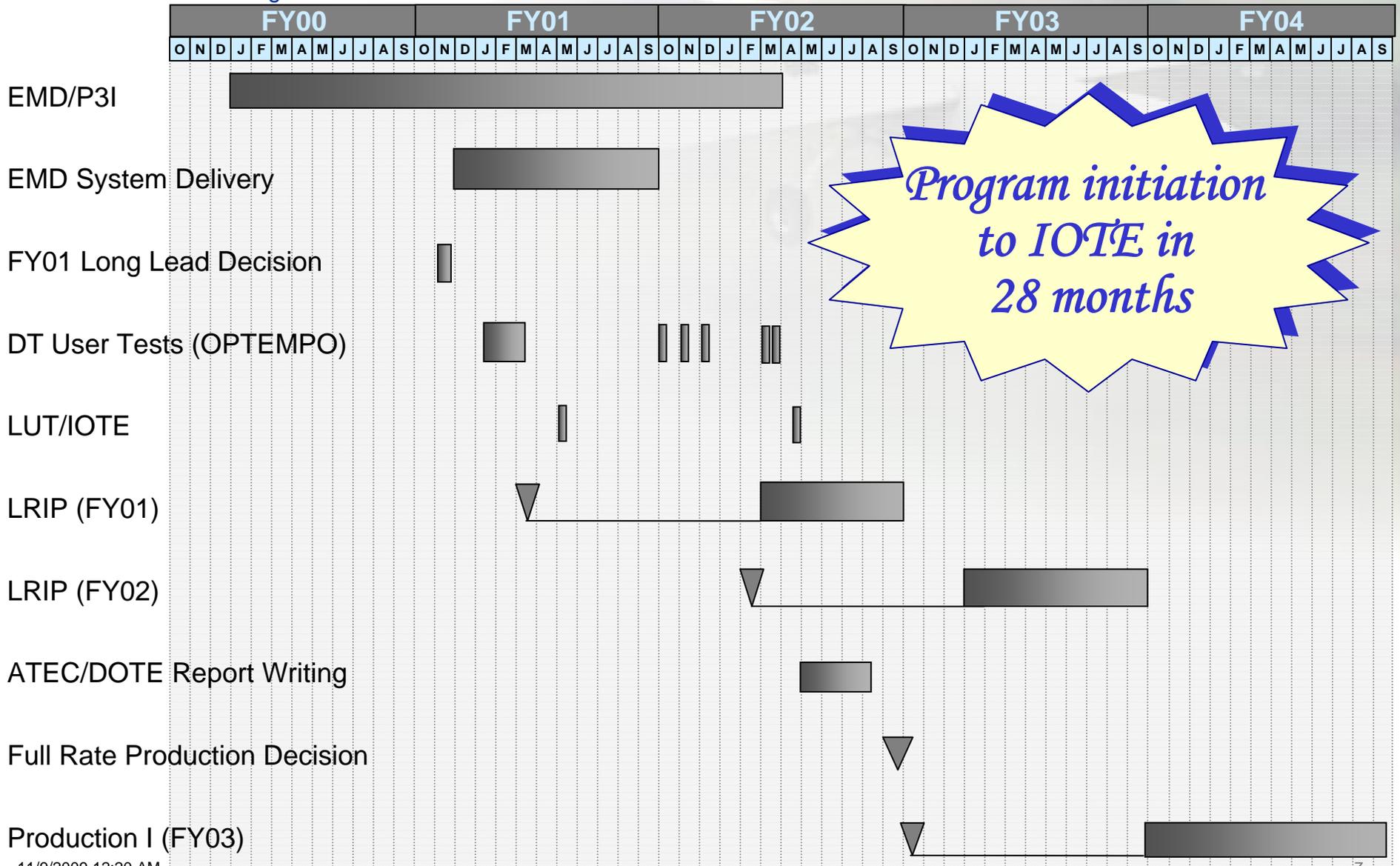
Shadow 200	
Flights	1070
Hours	1888.3

Prime Contractor: AAI Corporation



—“UAVS-Protecting the Point”

# Shadow 200 Schedule



*Program initiation to IOTE in 28 months*



—“UAVS-Protecting the Point”

# Hunter System Update



- Hunter has supported III Corps since 1996
  - ✓ Operational deployments in support of KFOR in 99, 00, 01, 02
- Warning order in early FY02 to determine feasibility and unit size for additional Corps fieldings
- Emerging Corps structure is platoon (+)/company (-) size unit
- Systems in place at III CORPS (Fort Hood), Training Base (Fort Huachuca), Joint Readiness Training Center (Fort Polk), Training Base (Fort Huachuca)
- 21 Payload/Sensor Demonstrations
- 4 Operational Deployments to Macedonia
- 18 Joint Readiness Training Center Exercises (JRTC)
- Lowest mishap rate of any U.S. owned UAV

Hunter	
Flights	6313
Hours	22,424

Prime Contractor: TRW



—“UAVS-Protecting the Point”

# Upcoming Events



## • Shadow

- Full Rate Production (FRP) Milestone Decision
- FRP Contract Award
- Fielding
  - ✓ 2<sup>nd</sup> Infantry Division (SBCT)
  - ✓ 4 Infantry Division
  - ✓ 25 Infantry Division (SBCT)
  - ✓ 1<sup>st</sup> Cavalry Division

## • Hunter

- Hunter Air Vehicle and Payload Control into Shadow Ground Control Station
- SAR/MTI Military Utility Assessment
- Fielding
  - ✓ XVIII Airborne Corps
  - ✓ V Corps



“UAVS-Proto

# Future Army UAVs



Army has committed to Hunter UAV as the ER/MP Surrogate through '07

## Extended Range/Multi-Purpose

- Hunter Replacement
- ER/MP **Draft** Requirements include:
  - Division/Corps UAV
  - Multiple Payloads
  - 200-300km Range
  - 10-14 hours flight time
  - Heavy Fuel Engine
- Acquisition Strategy:
  - Competition for an ER/MP airframe only
  - Utilize Common Components of Shadow Ground Station and Ground Equipment
- Potential Timelines:
  - FY03-04 – RFP, Downselect to two Airframes, Integrate on Shadow Ground equipment, Fly-off
  - FY04 –05 - Final Integration, System Design, Test, Provision
  - FY06 Initial Fielding

## Small UAV Concept

- SUAV **Draft** Requirements include:
  - BN and Below UAV
  - O-20km Range
  - 60-90 min flight time
  - Very low cost/easy to operate
- Acquisition Strategy
  - One system concept
  - Ground station capable of control
  - Multiple small UAVs
- Potential Timelines:
  - FY05 transfer of MAV ACTD management to PM TUAV
  - FY05 initial fielding





—“UAVS-Protecting the Point”

# Evolving TUAV Capabilities Include ...



## Manned/Unmanned Teaming



### Airborne Manned-Unmanned System Technology (AMUST):

Demonstrate teamed interoperability of manned and unmanned platforms using AH-64 Apache and RQ-5A Hunter UAV

### Accomplishments

- The Apache received direct video feed (Level 2 control) from the UAV at all times.
- The AH-64 controlled both the UAV and the payload cameras (Level 4 control) for 76 minutes.

### When in control:

- Apache directed the aircraft flight patterns by waypoint navigation to the target area
- Slewed the camera to identify the targets and send video to ground locations.

## UAV Payload Priorities

Brigade	Division/Corps
CRP Light – VHF SINCGARS or EPLRS	CRP Heavy
Synthetic Aperture Radar/Moving Target Indicator	SIGINT
CRP Medium – (Block One with Tactical Internet)	Mine Detection
Illuminator (Point & Shoot)	Chemical/Biological
Laser Range Finder/Designator	Foliage Penetration
Hyperspectral/Ultraspectral Imaging	Electronic Attack

Source: CG TRADOC, 12 Jul 00

## Armed UAV's

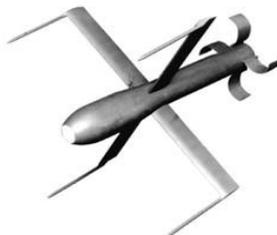
- Planned demo mounts Brilliant Anti-tank (BAT) Submunition on Hunter

### Submunition on Hunter

- BAT is routinely dropped from Cessna aircraft similar to Hunter
- BAT deploys from ATACMS at Hunter Operational Altitudes
- BAT operates autonomously once dropped from Hunter, simplifying integration

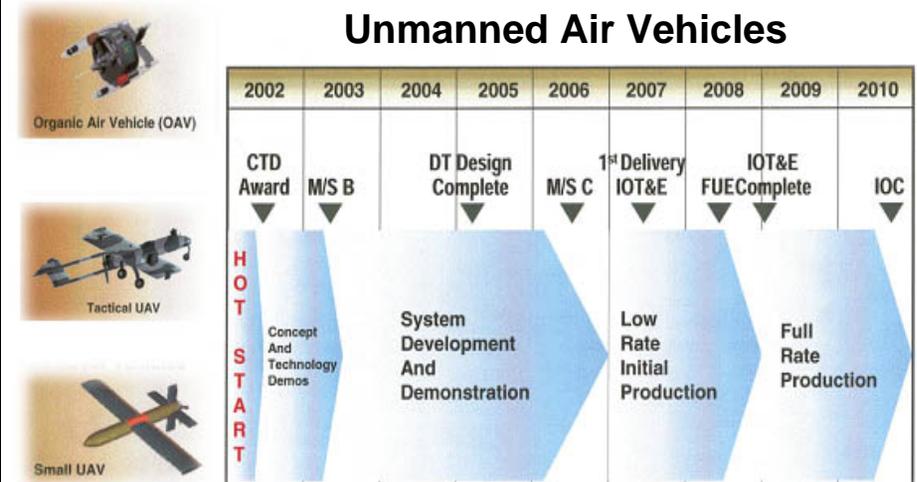
### Concept

- Mount 2 BAT submunitions, one under each wing
- Demo is in two phases over one year



11/9/2009 12:20 AM

## Future Combat System Unmanned Air Vehicles

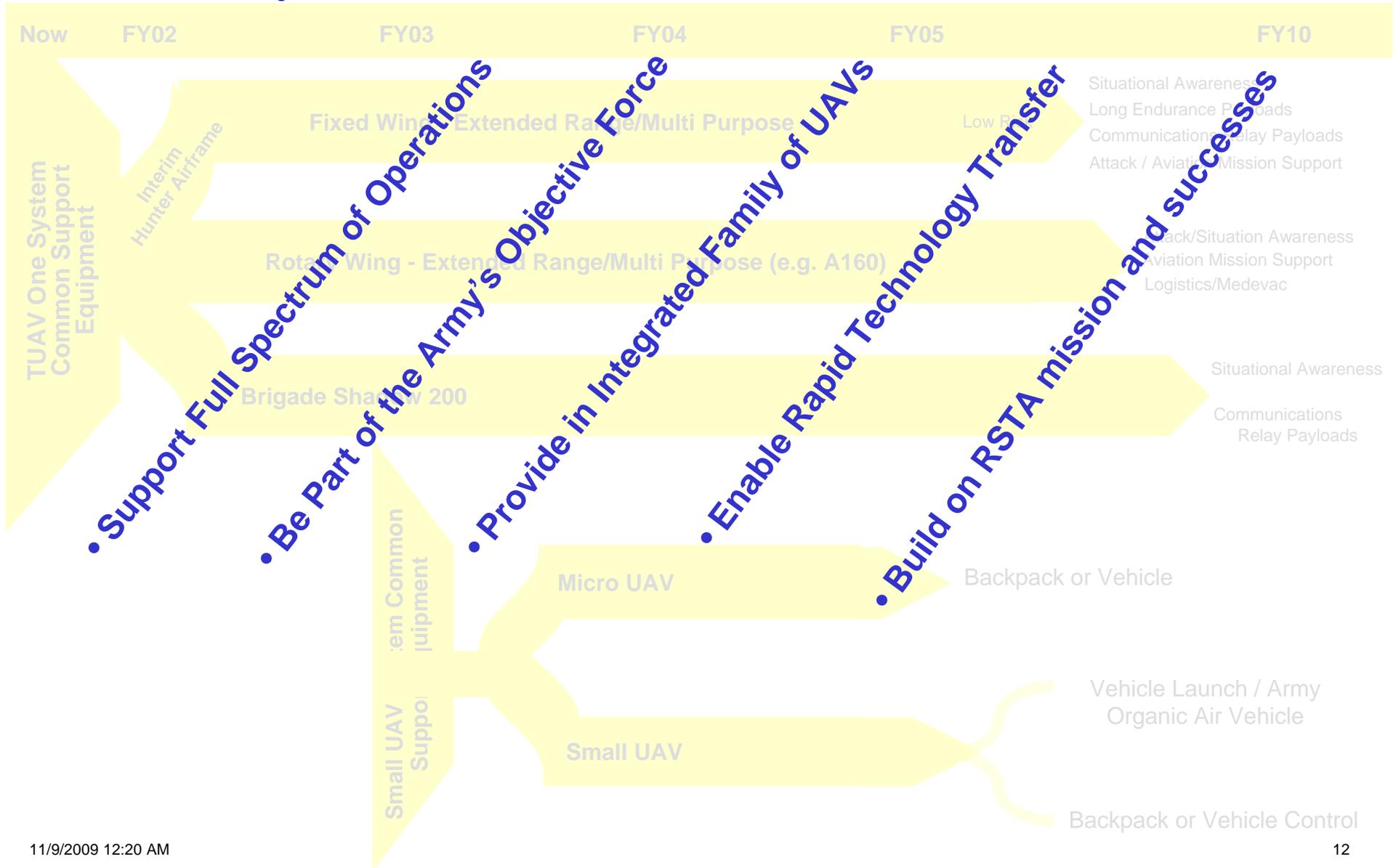




# An Army UAV Path Will ...



—“UAVS-Protecting the Point”



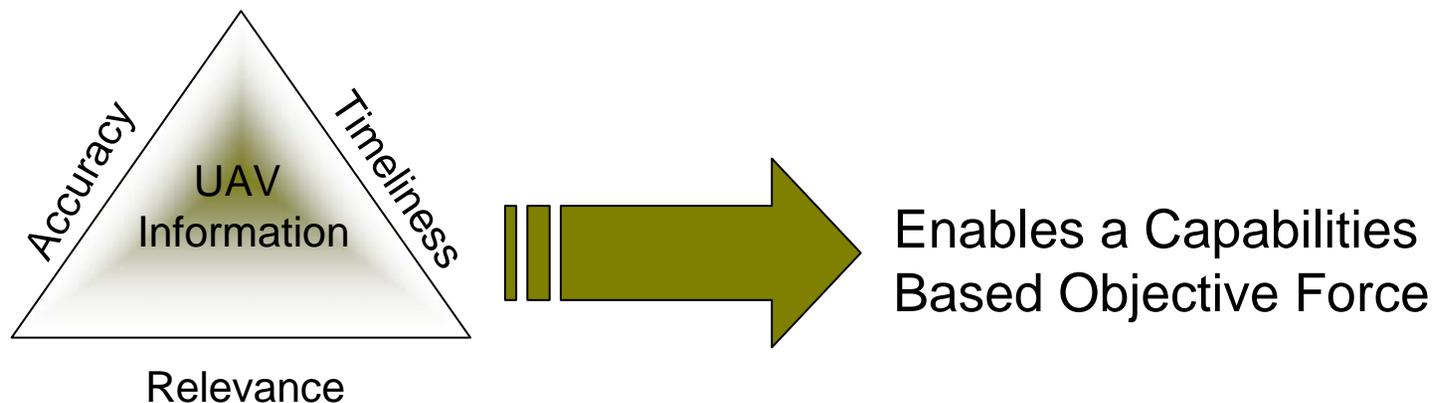


# Summary



—“UAVS-Protecting the Point”

- Army integration of all UAVs into land warfare capability
  - ✓ Army Senior-Level leaders are committed
  - ✓ Maneuver, protection, information, firepower
  - ✓ Exploit RDT&E/DARPA efforts
  - ✓ Combat and combat support roles – communications, weapons, logistics, medical
  - ✓ Provide software, training, logistics, simulation/trainers, payloads
- Army UAVs are...
  - ✓ ER/MP [Hunter], Division, Corps
  - ✓ Shadow 200, Brigade
  - ✓ SUAV/MUAV, Battalion and below
- One System approach is the foundation of Army's UAV capability



# Control from Aircraft

- Longbow - AMUST, HSKT
- Comanche - MUM, AMBL

# Army UAV Operator: 96U MOS

- 18 - 23 years old
- Top 5%
- High entrance scores
- Some have college degrees
- Secret security clearance
- Attrition = 30%



# Major Duties of UAV Operator

## § Supervises and Operates UAV

- **Mission planning**
- **Minor air frame repair**
- **Launching**
- **Remotely piloting**
- **Recovering**

# Operator Training

- **23 Week Course**
  - Private Pilot Ground School
  - (4 weeks)
  - Flight Line Operations
  - (3 weeks)
  - Intelligence Common Core
  - (3 weeks)
  - Payload Classroom
  - (1 week)
  - Vehicle Operator Classroom
  - (3 weeks)
  - Simulator Training
  - (3 weeks - 26 flights)
  - Preflight/Engine Start Lab
  - (2 weeks)





## Operator Training (cont'd)

### *Flight Training (3-4 weeks)*

- 5 Vehicle Operator 1.5 hr Flights
- Vehicle Operator Check Ride
- 5 Payload Operator 1.5 hr Flights
- Payload Operator Check Ride
- 2 Preflights, Launches, and Recoveries
- 2-3.5 Hours Local Flight Training

**Note:** 90% of the time operators don't fly the programmed mission

# External Pilot Training



- 26 Week Course
  - Ground Instruction (1 week)
  - Remote Ground Model Flights (50 flight hours)
  - 1/3d Scale Model Flights (45 flight hours)
  - Full Scale Flights (35 flight hours - 1 hr/day)
  - Night Flights (5 flight hours - 1 hr/day)

# Traditional PFR ?

NO !

“Not flying the aircraft”

Not the same task

Automation

Multiple A/C

Control from A/C (high workload)

# Training

- If the task is different, training should be to.
- Intuitive displays will reduce training time
- Displays that are close are worse the qualitatively different