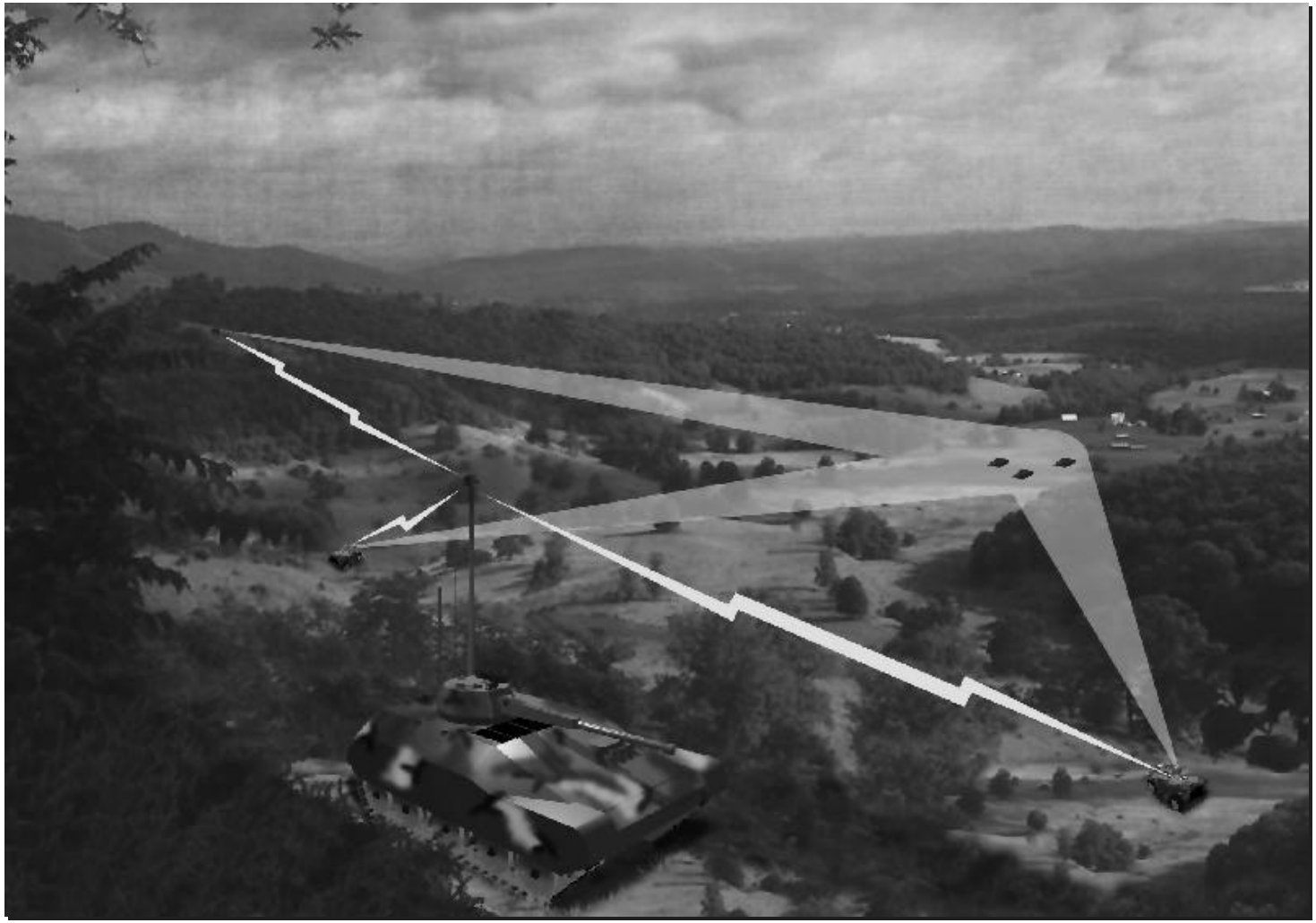
Demo III Operational Concept



Performance Goals

- Overall System
  - Intelligent, Modular, Open Software Architecture
  - Operable by Troops
  - Total Robotic Vehicle Weight: 2500 lbs
  - Transportable in Theater (e.g., Helo, V-22)
  - Ruggedization Suitable for User Appraisal
- Mobility
  - Day/Night/Limited Adverse Weather (Rain/Dust) Operation
  - Road Following: 40mph in Lane (High Reliability)
  - Cross Country: Speed Appropriate to Terrain & Vehicle Dynamics, Up to 20mph (day, dry), 10mph (night, wet)
  - Detect and Avoid All Non-Negotiable Obstacles
  - Towable by HMMWV
  - Mission Duration: 24 hrs

- Communication
  - RF Range: 10-15km using Available Military Frequencies
  - Data Rate: 25kbs/Vehicle
- Planning
  - Four Vehicle Mission
  - Operator Pre-Mission Planning & Intermittent Supervision Thereafter
  - Single Seat HMMWV Installable OCU / Non-Dedicated Vehicle
  - Planning For:
    - Feature Extraction/Trafficability Assessment
    - Tactical Behavoirs
    - Target Hand-Off Among Multiple Vehicles
    - Cooperative Search
  - DTED II (30m) Topographic Database
  - Platoon Convoying

- Control
  - Multi-Threaded Control
  - Highly Modular, 4D-RCS - JAUGS
  - Tactical Behaviors
  - Safely Operable in Mixed Force (Mounted/Unmounted, Manned/Unmanned)

DEMO III XUV

Game Plan

Pacing Technologies

- **Perception**
- **Software Architecture**
- **Man/Machine Interface**

Modeling & Simulation

Technology Development

Test Bed Integration

Alpha **Bravo** **III** User Appraisal

- **20 MPH Cross-country**
- **40 MPH on Road**
- **Day/Night**
- **Modular Mission Package**

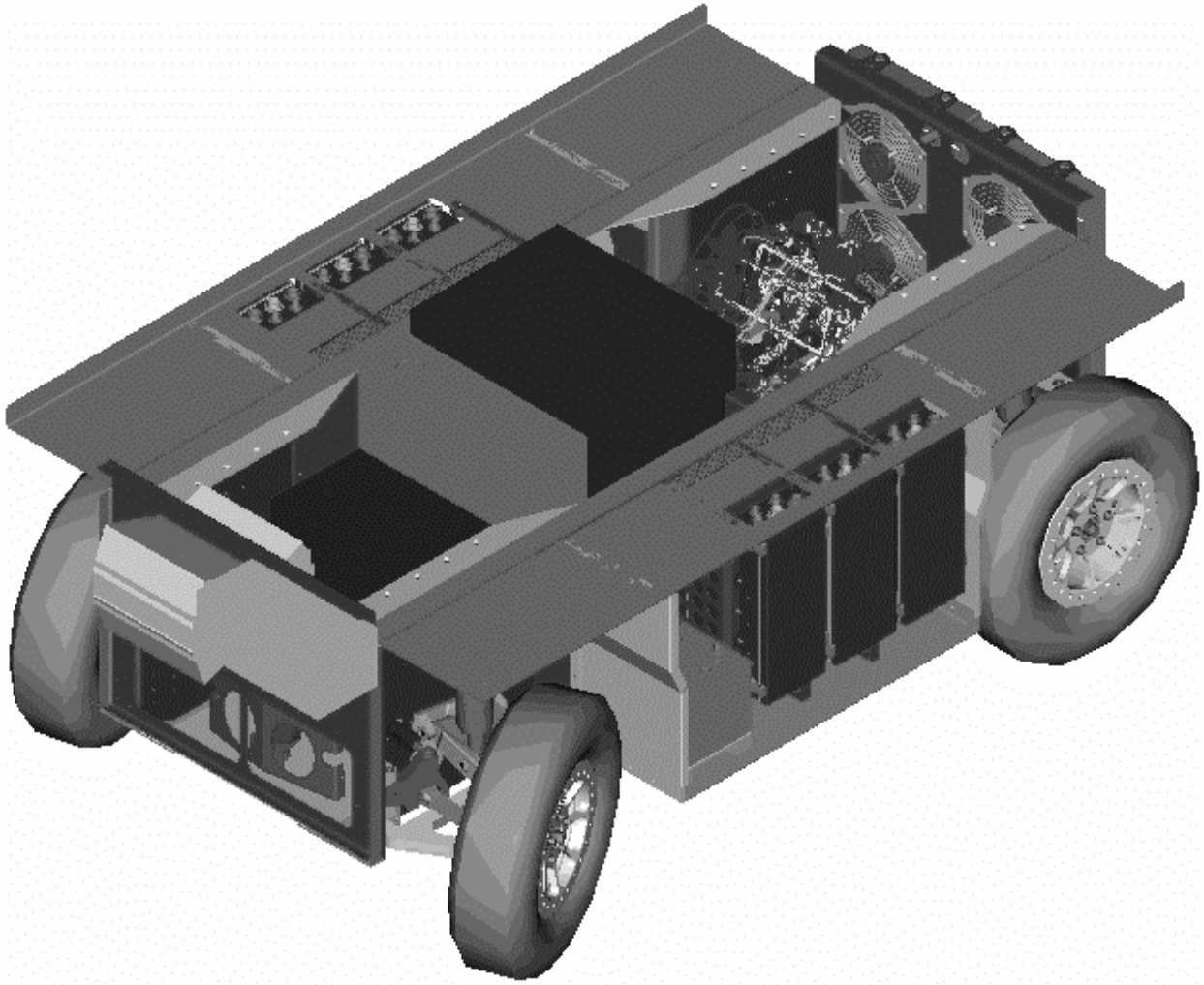
99 ***00*** ***01*** ***02*** ***03***

Demo III Experimental Unmanned Vehicle (XUV)
DEMO A Configuration

XUV DEMO B Configuration

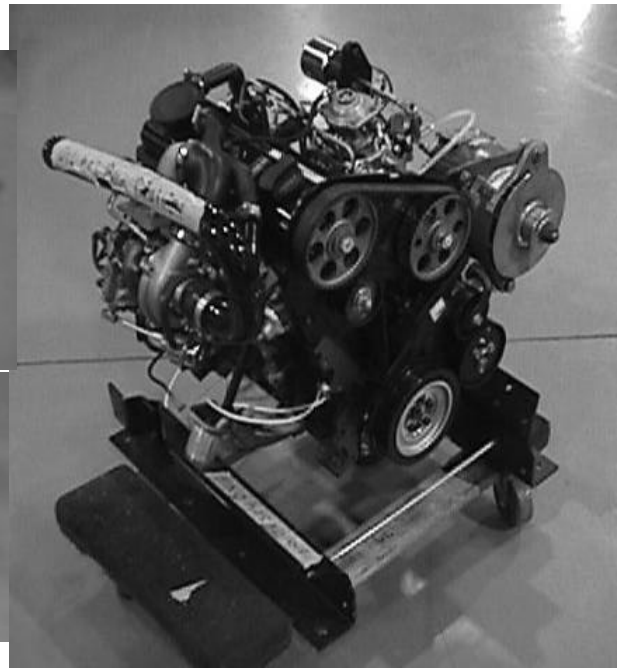
XUV DEMO III Final Configuration

Platform



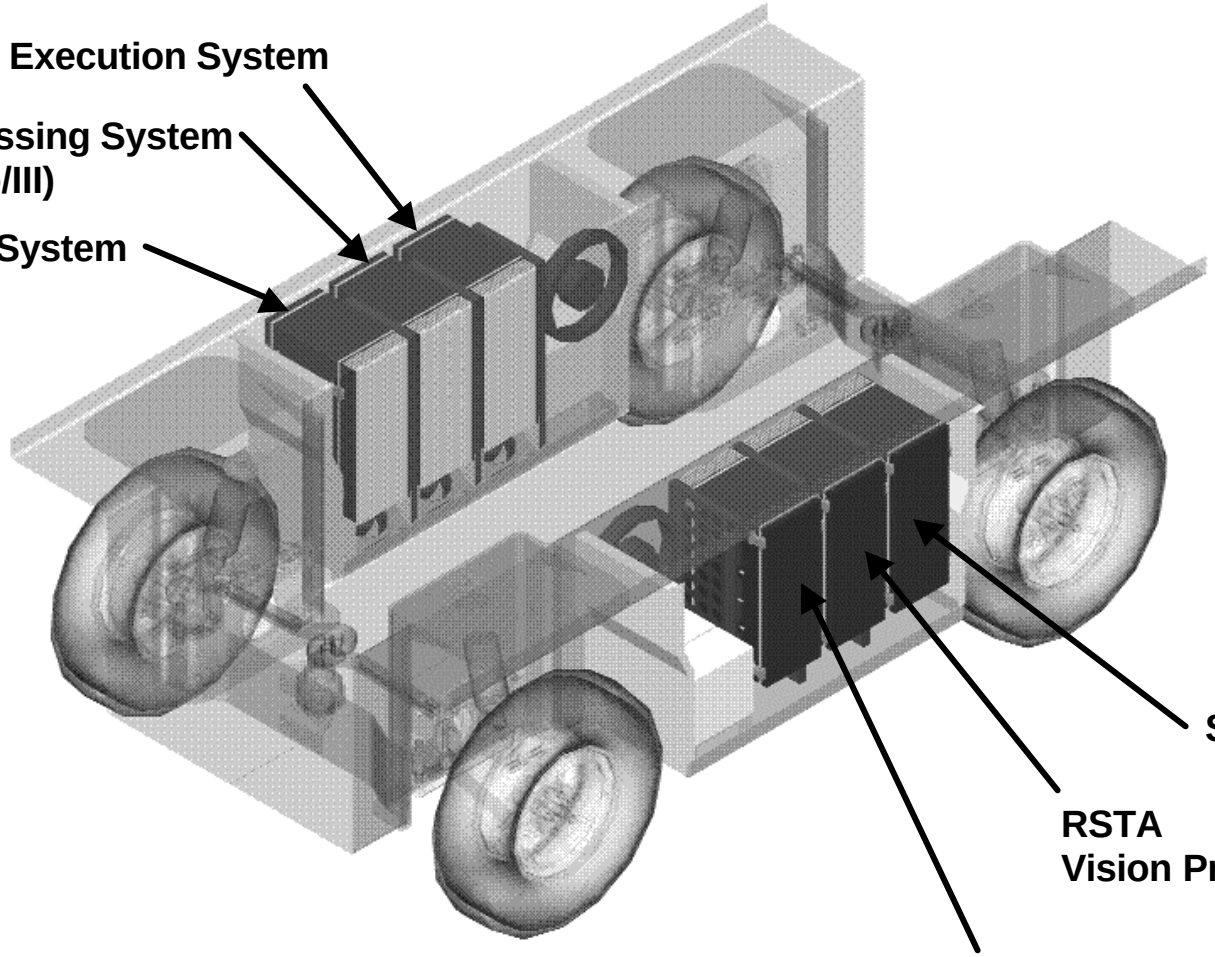
Platform - Powertrain

- 78 Hp VW Turbo Diesel Engine
- 70 GPM Sunstrand Hydrostatic Pump
- Pump Drive Sized for 4300 RPM and 2500 RPM Engine Speeds
- 15 Cu In Eaton 2-Speed Wheel Motors
- John S. Barnes Mechanical Flow Divider

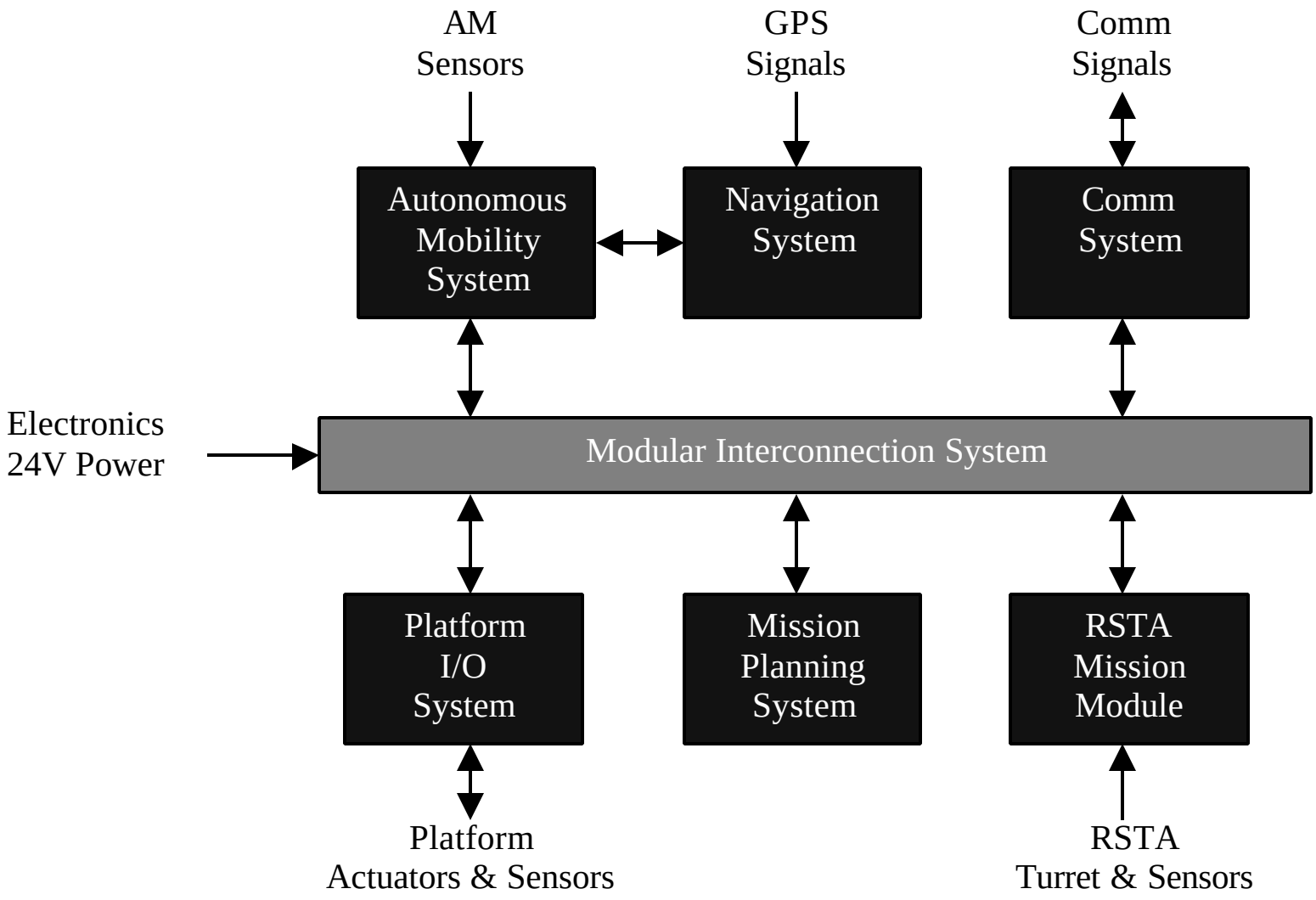


XUV Sideslope Capability

Vetronics - Processing Enclosures

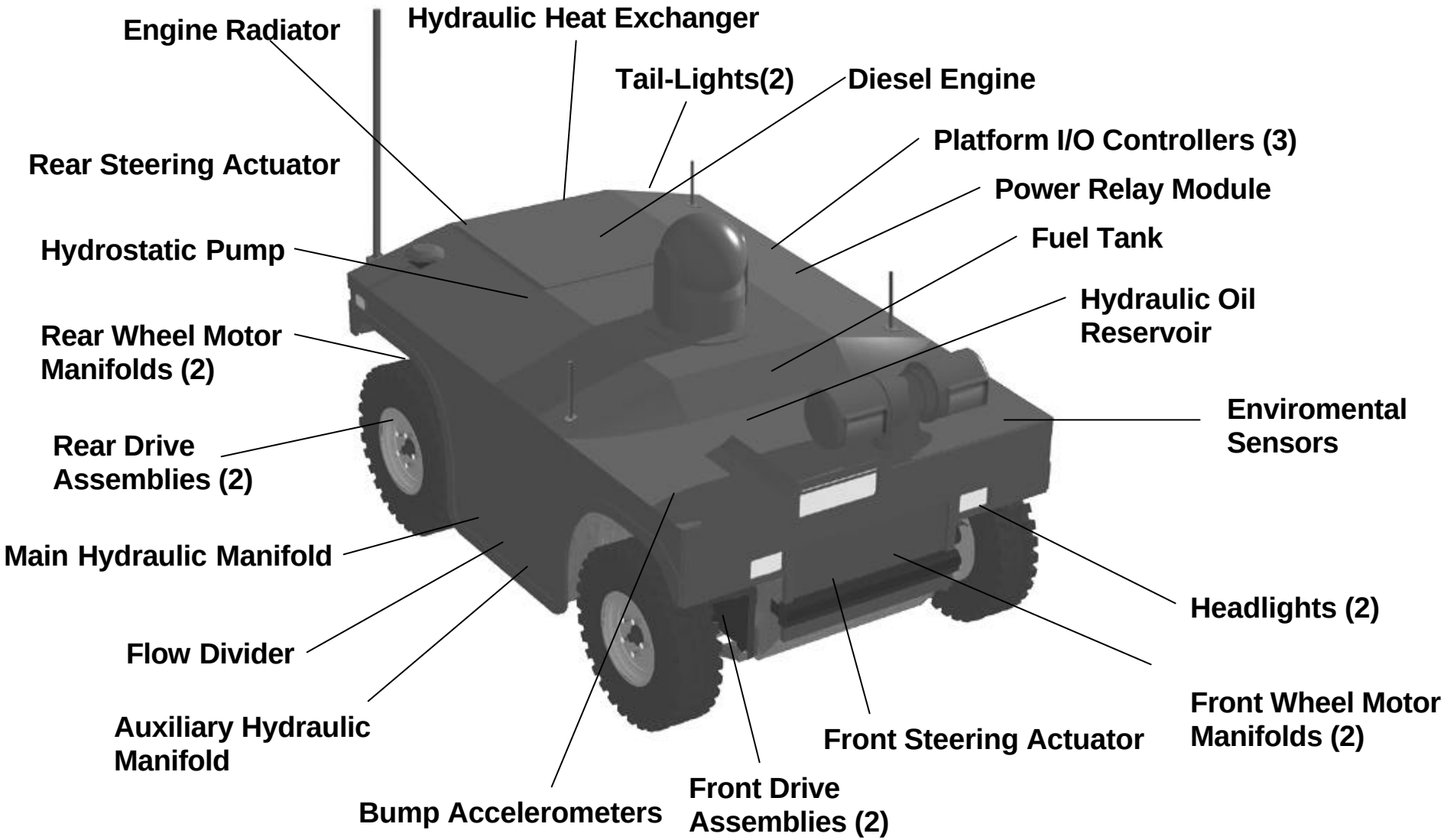


Vetronics

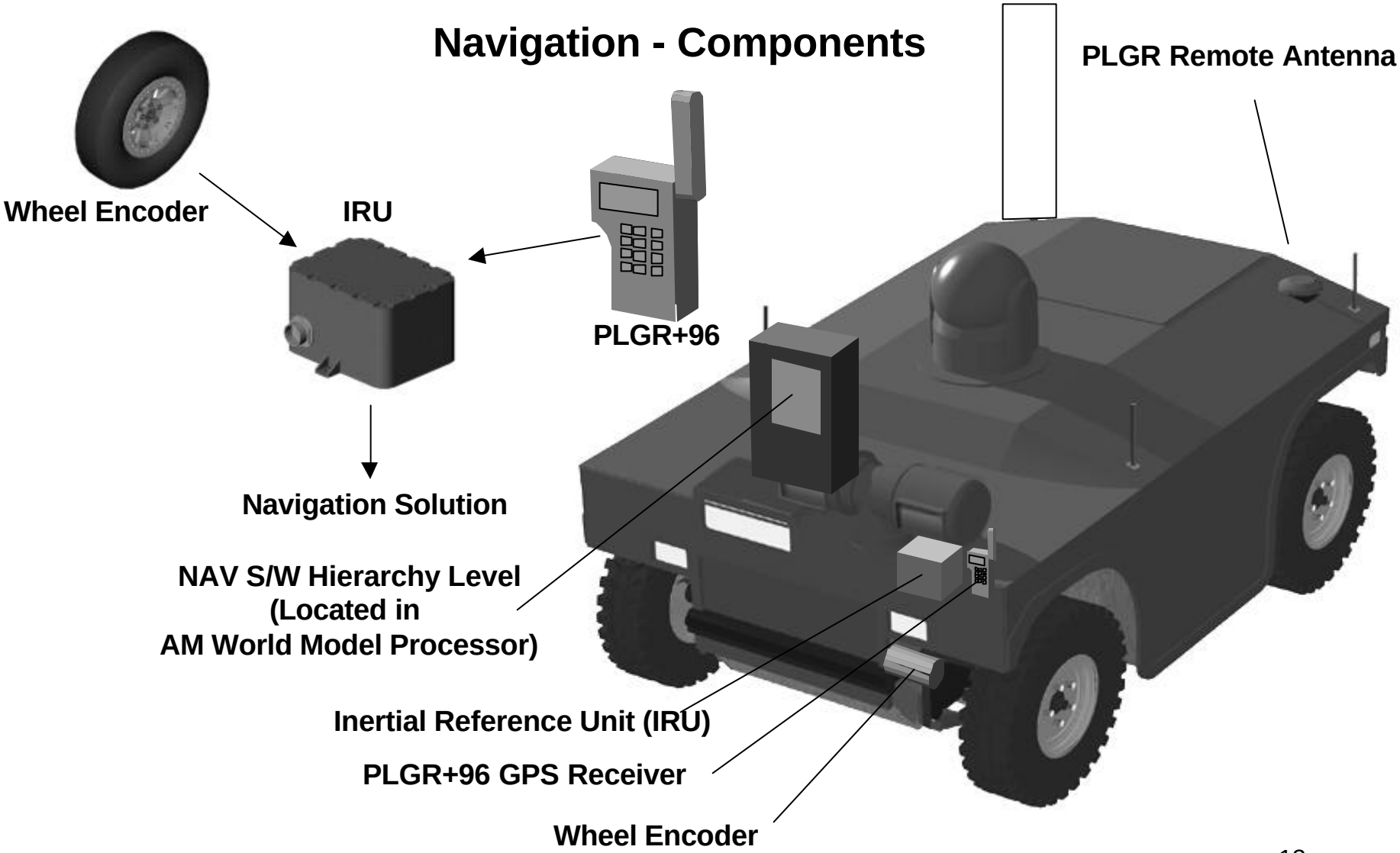

AM
Sensors
GPS
Signals
Comm
Signals
Autonomous
Mobility
System
Navigation
System
Comm
System
Electronics
24V Power
Modular Interconnection System
Platform
I/O
System
Mission
Planning
System
RSTA
Mission
Module
Platform
Actuators & Sensors
RSTA
Turret & Sensors

GENERAL DYNAMICS
Robotic Systems

ISO 9001 Certified

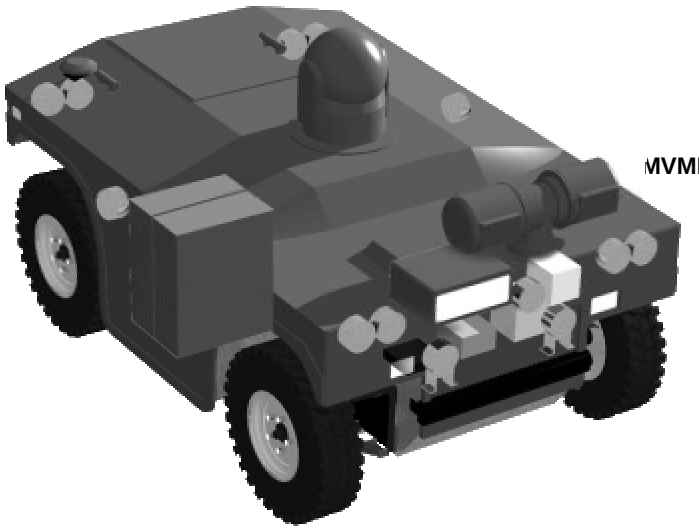


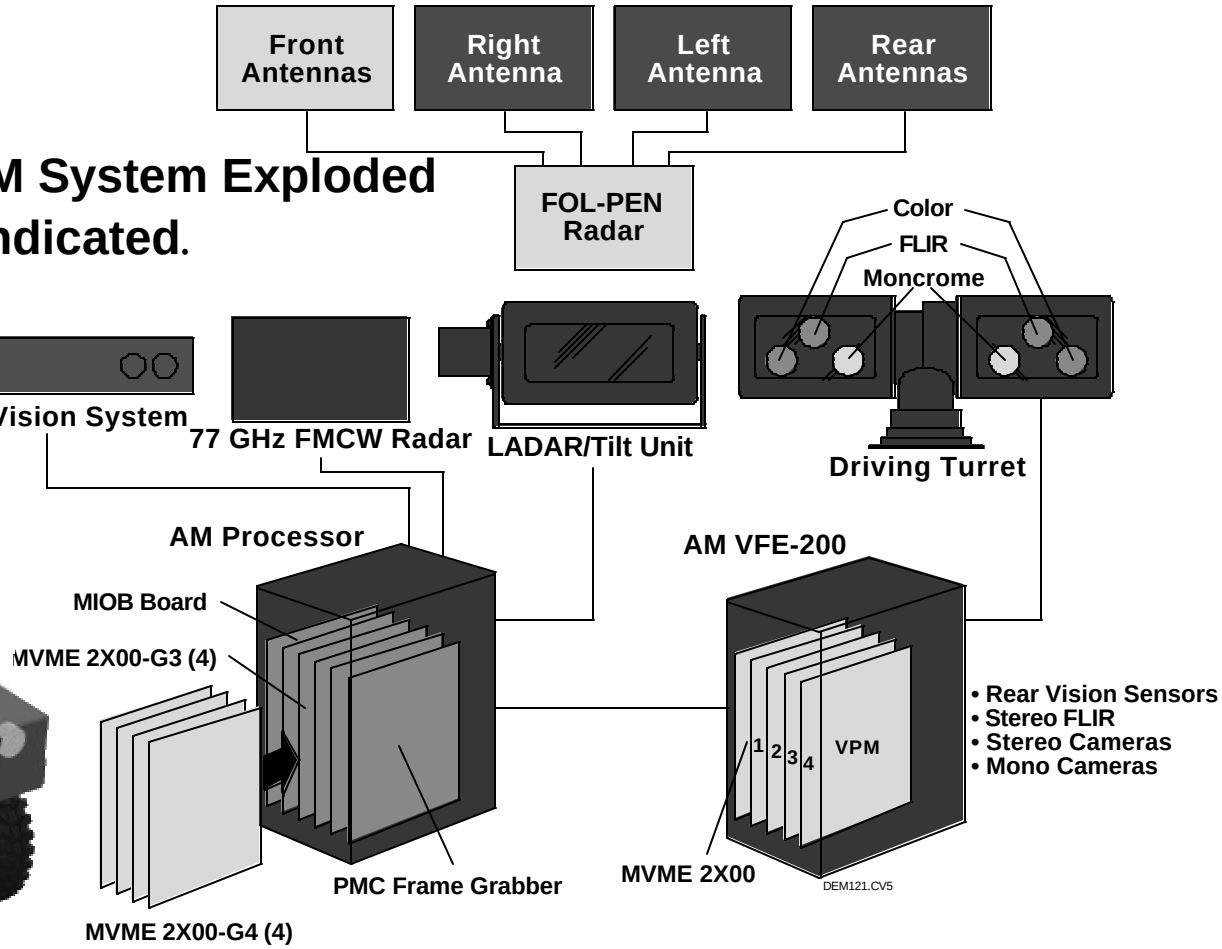
Navigation - Components



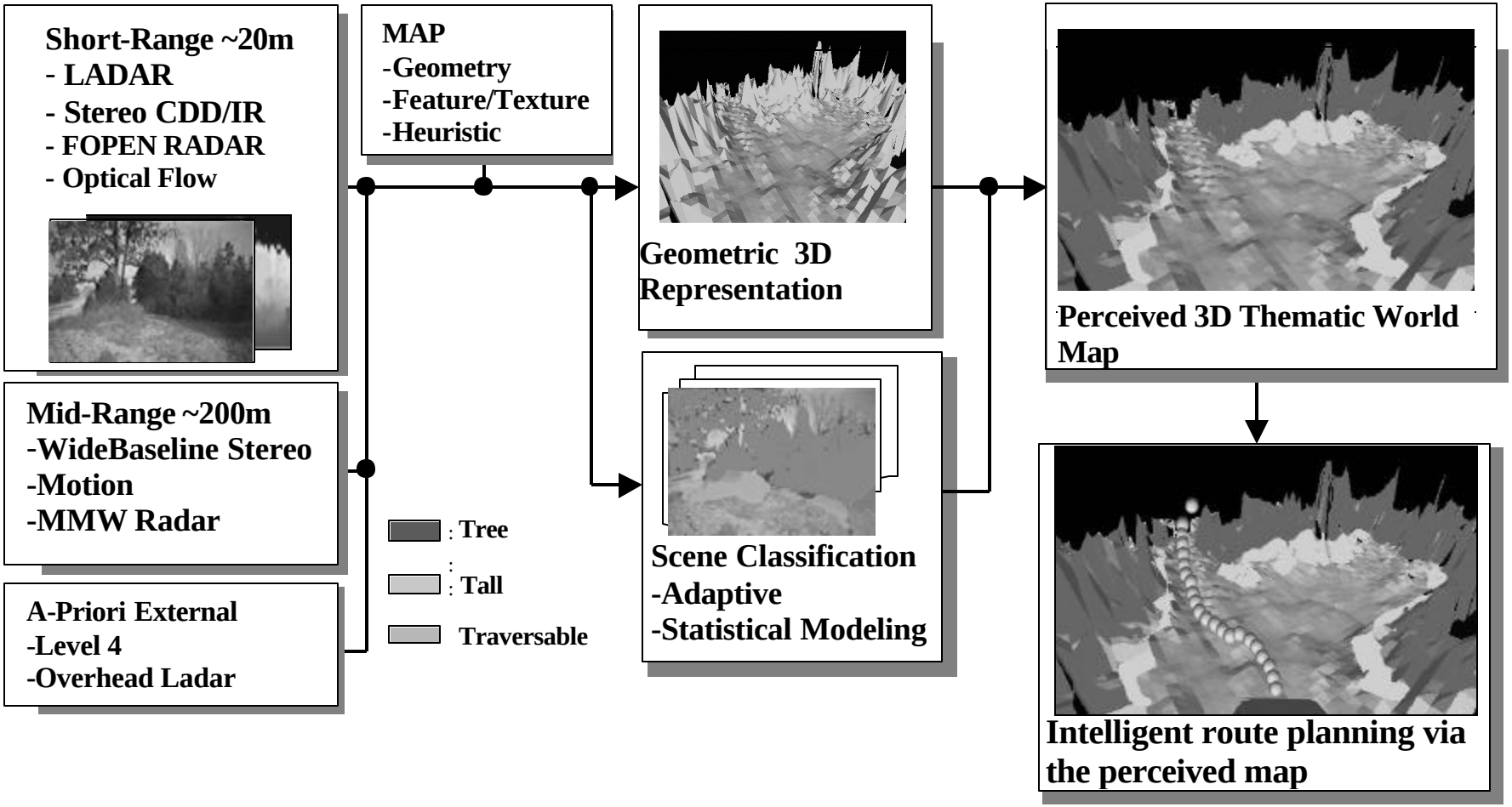
Autonomous Mobility on the XUV

- **DEMO III Vehicle with AM System Exploded**
- **Demo A, B, III sensors indicated.**

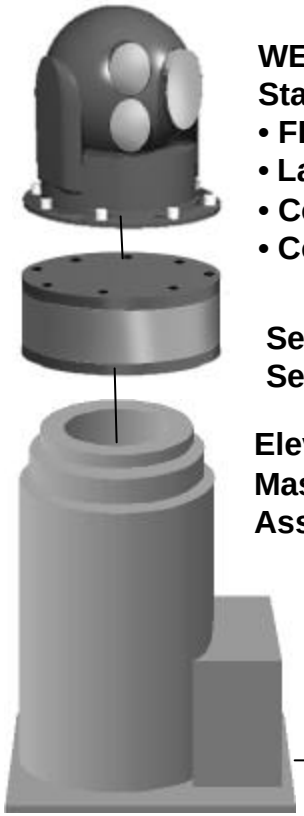




Autonomous Mobility on the XUV



RSTA on the XUV



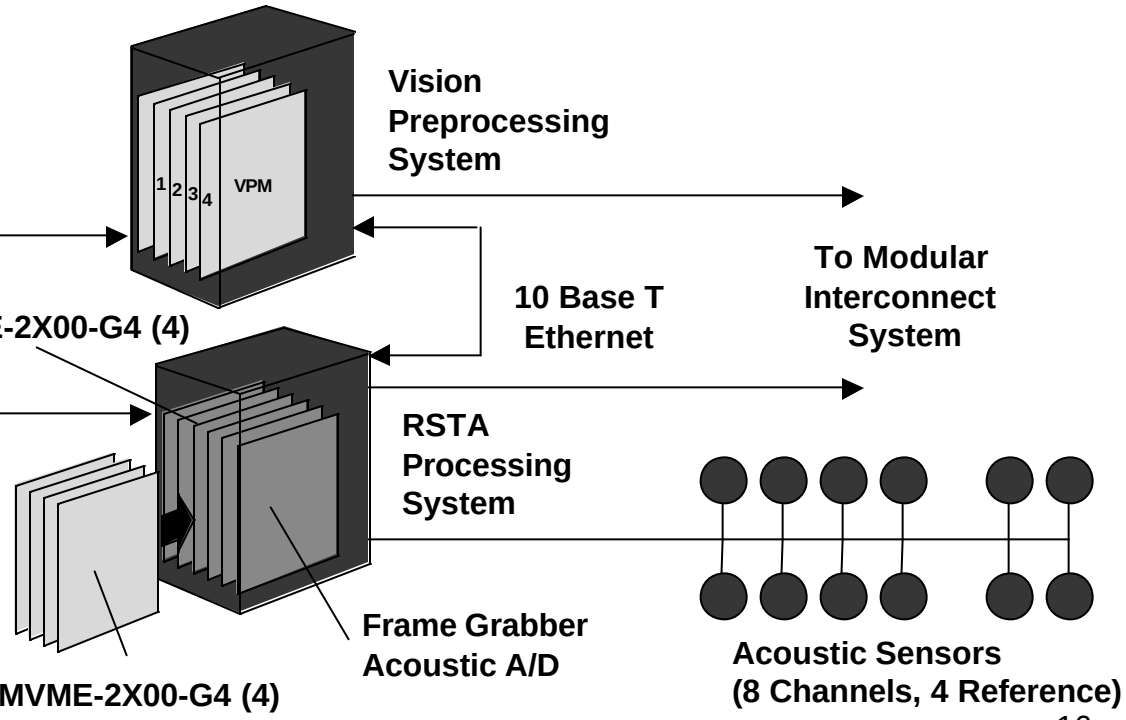
WESCAM Model 14QS Stabilized Gimbal
- **FLIR (Amber Galileo 3-5mm)**
- **Laser Ranger**
- **Color Camera**
- **Color Spotter Scope**

Self Protection Sensors

Elevated Mast Assembly

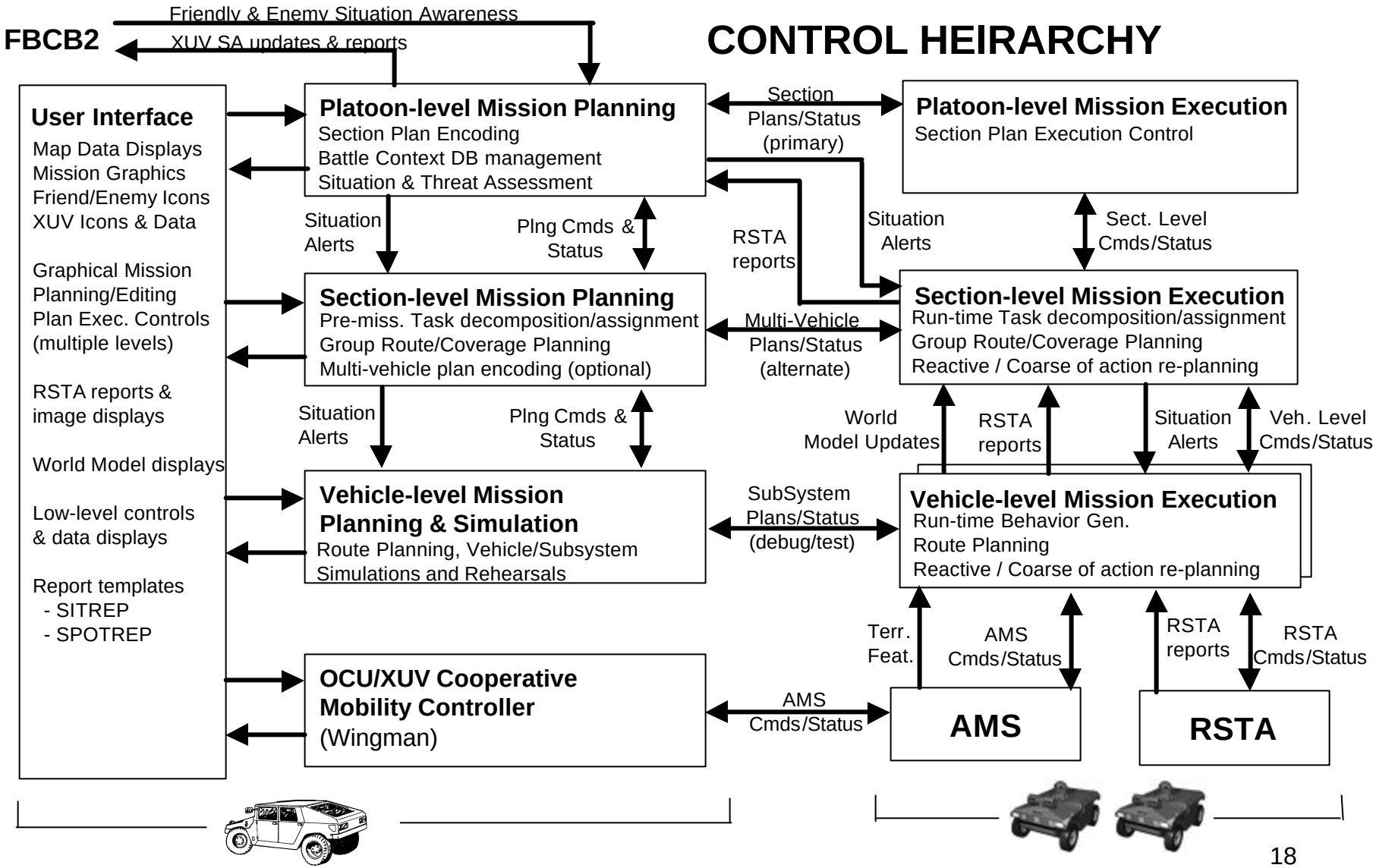
RSTA Sensor Integration Plan.

AM Sensors	Alpha	Bravo	III
Wescam 14QS Gimbal	X	X	X
Acoustic Sensor Array	X	X	X
Acoustic Noise Cancellation		X	X
Additional Cueing Sensors		X	X
Self-Protection Sensors		X	X
Mast Assembly		X	X



RSTA Mission Module

CONTROL HEIRARCHY



Operator Control Unit - Hardware

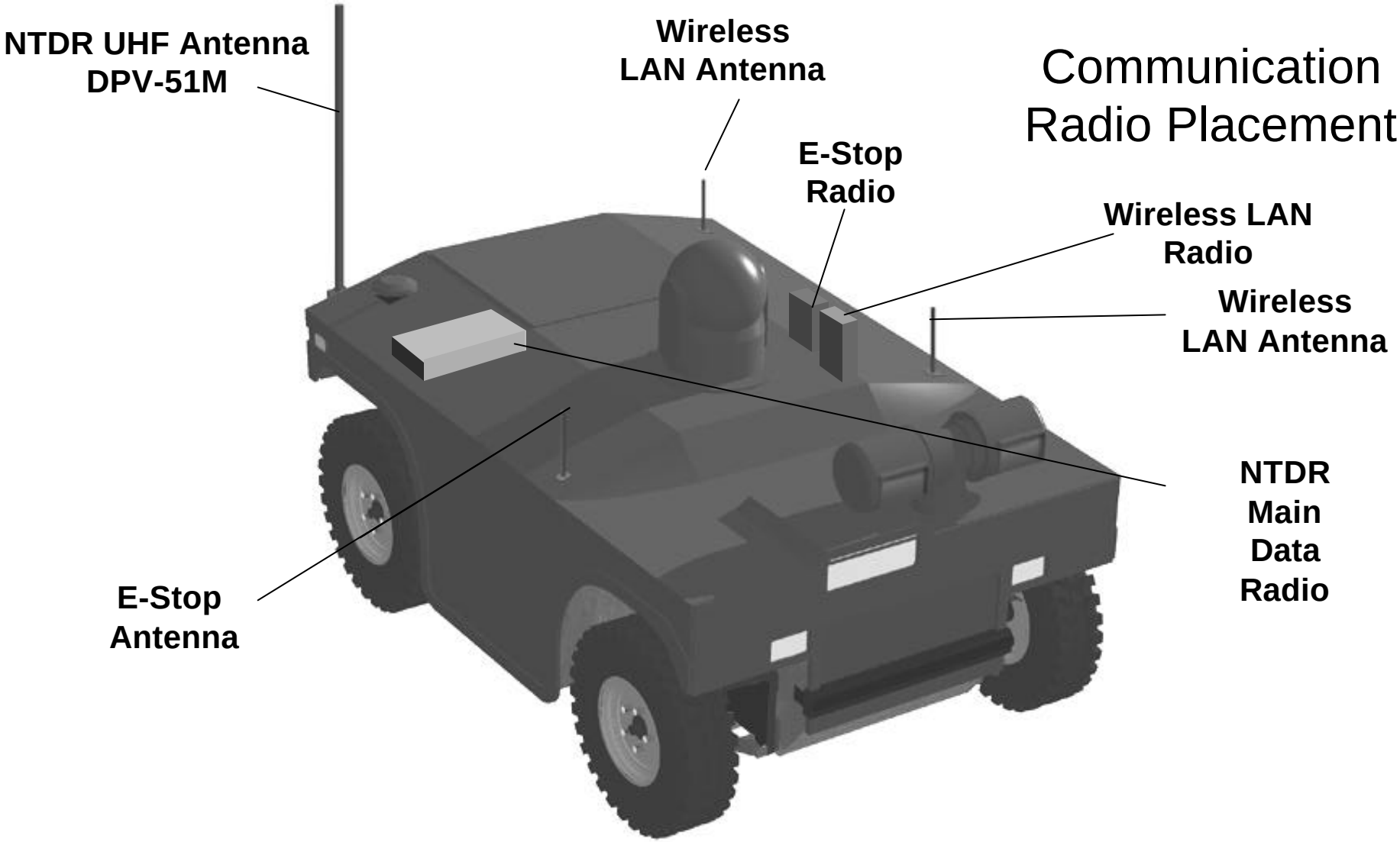
16” diagonal LCD w/ NEMA 12 enclosure

Rugged Keyboard

Multi-position swing arm for LCD

Electronics Box, shock mounted

Communication Radio Placement



JAVELIN FIRE AT REDSTONE BY UGV/S JPO