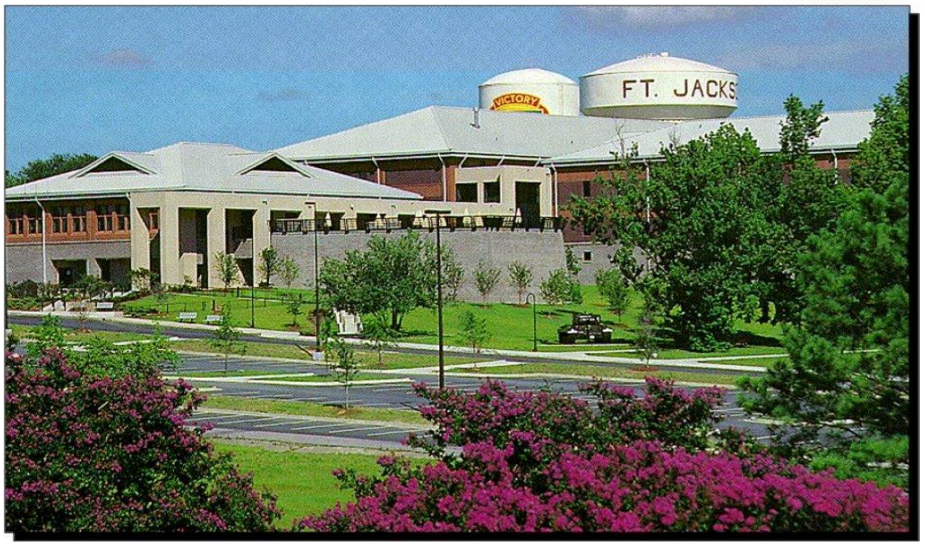
TWV Conference Autonomous Vehicle Technology Panel



Home of the Army's Sustainment Think Tank!
Combined Arms Support Command and the
Sustainment Center of Excellence
Fort Lee, Virginia and Fort Jackson, South Carolina

DOD Offset Strategies

Previous Offset Strategies

- **"First Offset Strategy"**
  - Emphasis on ***nuclear deterrence to avoid the large increase in defense expenditures*** necessary to conventionally deter Warsaw Pact forces during the 1950s.
- **"Second Offset Strategy"**
  - Following the Vietnam War, U.S. tolerance for defense expenditures plummeted while Warsaw Pact forces outnumbered NATO forces by three to one in Europe.
  - DoD sought ***technology to "offset" the numerical advantages*** held by U.S. adversaries.
    - Emphasized: ***Intelligence, Surveillance, and Reconnaissance (ISR) platforms; Precision-Guided Weapons; Stealth***; and the expansion of space's role in military communications and navigation.
    - Guided by a long-range research and development plan that enabled U.S. and allied forces to ***hold adversary forces at risk long before they could bring superior numbers to bear.***
  - ***Shaped, in many ways, the U.S. military of today.*** Key resulting systems include:
    - Airborne Warning and Control System (AWACS) found on the E-2s and E-3s
    - F-117 stealth fighter and its successors
    - Modern precision-guided munitions
    - Global Positioning System (GPS)
    - Significant enhancements in reconnaissance, communications, and battle management

These Offset Strategy's technologies continue to enable U.S. global precision strike today

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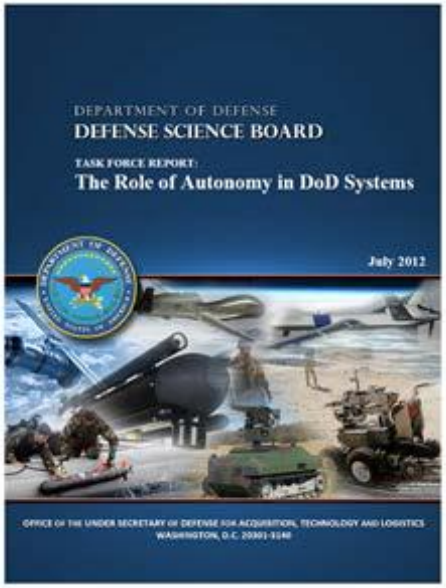

Toward a Third Offset Strategy

- **Autonomous Learning Systems**
  - Delegating decisions to machines in applications that require faster-than-human reaction times
    - Cyber Defense, Electronic Warfare, Missile Defense
- **Human-Machine Collaborative Decision Making**
  - Exploiting the advantages of both humans and machines for better and faster human decisions
    - "Human strategic guidance combined with the tactical acuity of a computer"
- **Assisted Human Operations**
  - Helping humans perform better in combat
- **Advanced Manned-Unmanned System Operations**
  - Employing innovative cooperative operations between manned and unmanned platforms
    - "Smart swarm" operations and tactics
- **Network-enable, autonomous weapons hardened to operate in a future Cyber/EW Environment**
  - Allowing for cooperative weapon concepts in communications-denied environments

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DOD Technology for Increasingly Intelligent Systems

Operating Safely & Efficiently

Machine-Assisted Operations

Human-Machine Teams

Near-Term	Mid-Term	Far-Term
Present - 2020	2020-2030	2030+

Teaming of Men and "Intelligent Machines" to Expand Capabilities

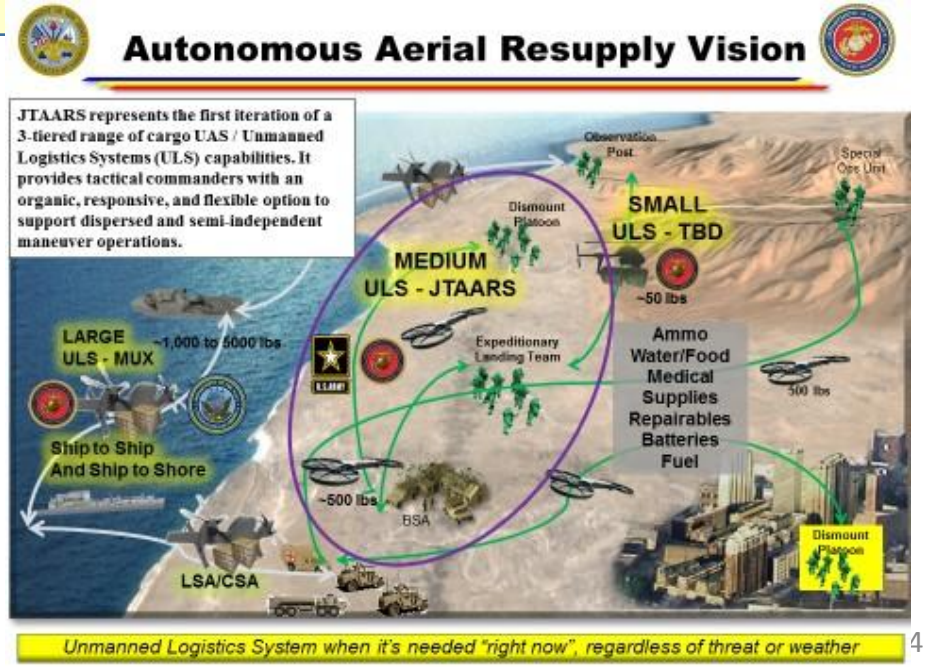
JTAARS

Joint Tactical Autonomous Aerial Resupply System (JTAARS) is an Unmanned Logistics System (ULS) that provides rapid, responsive, and flexible transportation options in support of dispersed and semi-independent infantry operations. Organic to maneuver units and their sustainment elements, JTAARS lightens Soldier loads and allows commanders to control the timing of delivery of mission critical, time sensitive supplies and equipment.

JTAARS CONOPS

JTAARS is employed in tactical situations where time, threat, terrain, weather or other priorities make traditional methods of resupply unavailable or unresponsive. FSC personnel load preconfigured supply packages (water, MREs, Cl. V, Cl. VIII, batteries) or essential Soldier/mission equipment onto JTAARS platform. JTAARS self-navigates to supported element's position, then returns autonomously after unloading of supplies/equipment and loading of retrograde.

- Pre-MDD Joint requirements effort between SCOE (TCM-Trans), MCOE (TCM-IBCT), and USMC (HQMC I&L and CD&I)
- TCM-Trans hosts bi-monthly requirements IPT with all key stakeholders, including USAACE, MCCOE, MCOE, and HQMC
- Operationally relevant payload/range: ~300-800lbs, ~20-50 mi
- Multiple parallel technology development efforts underway
- Potential program timeline: JROC approved CDD FY21; MS B FY22; FUE FY26



Future MSV Automation

The Maneuver Support Vessel family will be employed to provide operational and tactical connector heavy and light sustainment maritime lift for short through extended periods over extended distances, and surface movement to move and support mission-tailored force elements dispersed across a wide area of the ***future manned/unmanned*** Joint Combined Arms operational environment. MSV capabilities will be able to rapidly self-deploy between theaters, as well as intra-theater, and conduct both extended and short duration heavy/light lift operations between intermediate support bases, sea bases, austere access points, degraded ports, and bare beaches without external interfaces. MSV capabilities will also be capable of operating in shallow coastal waters and maneuver in inland waterways and rivers in support of dispersed force elements. MSVs will also be capable of interfacing and operating with Naval, inter-agency, and commercial platforms, ports and facilities.

MSV CONOPS

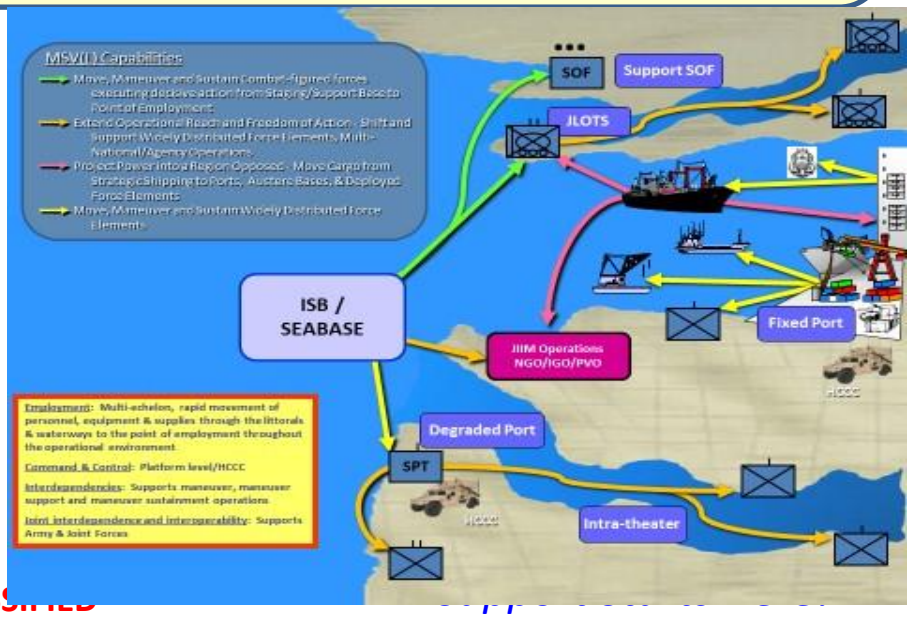
In the joint operating environment (JOE), Army forces will leverage all domains; land, air, space, cyberspace and maritime (to include the littorals) to conduct simultaneous deployment, employment and sustainment operations on a complex and uncertain security manned/unmanned landscape in which the pace of change continues to accelerate. Littorals are a critical area of the operational environment that provides the Joint Force Commander with multiple options to operate across multiple domains to present our enemies with multiple dilemmas. MSV(L) will be employed by U.S. Forces operating in a geo-strategic, non-linear environment of considerable uncertainty. MSV(L) will primarily operate in the same operating environment (OE) as the Army's BCTs, and will be subject to many of the same threats. As a waterborne movement and maneuver capability, MSV(L) will also operate in environments anticipated for Joint Sea Basing and Joint Logistics Over-the-Shore (JLOTS). Because of the increasingly joint character of warfare, critical, interdependent littoral and inland waterway operations will take place simultaneously on the ground, at sea, in the air and in space. Thus, the ability of Joint land power forces will increasingly become dependent on the ability to operate throughout the littorals and inland waterways in order to leverage advantage over our adversaries. As a movement and maneuver support capability, MSV(L) is a critical enabler employed to overcome A2/AD environments, made more difficult by naturally restricting features such as choke points, restricted waterways, high shipping density consisting of both large ships and small craft and shallow water compounded by tips of peninsulas, offshore islands, bays Define Littorals

MSV-L

- MS B- Scheduled for Aug 17
- CDD AROC approved 11 Oct 16
- EMD Phase FY17-FY21
- AROC approved CPD FY21; MS C 4th QTR FY21; FUE 4th QTR FY25
- TCM-Trans hosts bi-monthly requirements IPT with all key stakeholders, including MCOE and HQDA
- Operationally relevant payload/range: ~85 Stons, ~360 mi

MSV-H

- Pre-MDD MS A Joint requirements effort between SCOE (TCM-Trans), MCOE (TCMs), and USMC (HQMC I&L and CD&I)
- TCM-Trans will host bi-monthly requirements IPT with all key stakeholders, including MCOE, and HQMC
- Operationally relevant payload/range: ~TBD STons, ~TBD mi
- Potential program timeline: JROC approved CDD FY26; MS B FY27; FUE FY31



DOD Technology for Increasingly Intelligent Systems

Army Watercraft Focus

Operating Safely & Efficiently

AWS Focus:

- IETMs
- CBM+
- RAM
- Force Protection (FP) Applique kits
- By-wire & Active Safety Kits

Machine-Assisted Operations

AWS Focus:

- Leader Follower/Automated Capability
- Integrated Joint Service Mission Command/COP
- Additive Manufacturing
- Fire Suppression Systems
- Prognostics
- Automated Loading Capabilities
- Automated Modular Design
- EPA/Alternative fuel efficiency
- Integrated FP/Survivability capabilities

Human-Machine Teams

Near-Term	Mid-Term	Far-Term
Present - 2020	2020-2030	2030+

Teaming of Men and "Intelligent Machines" to Expand Capabilities





CASCOM…The Army's Sustainment Think Tank

Support Starts Here!

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