Agenda

- AS Trends, Barriers, and Enablers
- AS Portfolio Examples
- HADR Exercise Process
Societal Trends, Barriers & Drivers

**Societal and Technology Trends**
- Growing Cultural Acceptance (Social Media, Gaming, Daily Familiarization)
- Service Oriented
- Ageing Society
- Computational Power
- Advanced Manufacturing
- Tech Fusion

**Barriers**
- Technological Limitations
- Implementation Costs
- Perception
- Human Self-preservation
- Government Regulation
- Cyber Security
- Education & Skill Sets

**Drivers**
- Dirty, Dull and Dangerous
- Environmental Factors
- Tech Advancements
- Rising Manpower Cost
- Budget Constraints
- Decreasing Production Costs
- Operational/ROI Analysis
Current Gaps in Autonomy

- 4 “Ps” of Robotics
- Command, Control, & Communications
- Operational Analysis
- Skill Sets and Education

Trusted Remote Operation of Proximate Emergency Robots
AS Enabling Technology

• Energy
• Nanotechnology
• Quantum Computing
• Virtual Reality Augmentation
• Synaptic Control/ Neuro-hacking
• Additive Manufacturing
• Self Diagnosis, Repair, and Replication
Disaster Response Workshops, War Games & Experimentation Process

- Experiments & Exercises
- Analytical Workshops & Investigations
- Concept Development, Capability Demos, & Technology Integration
Disaster Response Work Shops, War Games & Experimentation Process

Experiments & Exercises

Analytical Workshops & Investigations

Concept Development, Capability Demos, & Technology Integration
Autonomous Systems Portfolio

2015
- SMSS
- ExoSkeleton
- AMAS/Apliquae'

2025
- MULE
- F-35
- FALCON

2035
- Stalker
- Indago
- KMAX
- FURY
- UCLASS
- ROVER

2015
- Marlin USV
- Hybrid Air
- ARES

2025
- USV

2035
- MAVEN
Squad Mission Support System (SMSS)

**Description/Requirements**

- Support Light Infantry and Early Entry Forces.
- Lighten The Soldier’s Load
- Primary design is transport; evolving family of MEPs: CIED, RSTA, Resupply, Mobile Power, Maintenance, Armed
  - 1500 lbs. payload
  - All weather, Day And Night Operations
  - Highly Mobile 6X6 Drive
  - Air transportable: CH-47 Internal, UH-60 External
  - Control modes: Drivable, Teleoperation, Supervised Autonomy, SATCOM

**Fire Ox**
K-MAX Unmanned Helicopter

**Adaptability**
- Multi-Mission UAS – 24/7 Operations
- Reliable, Heavy Lift Airframe – 1.5 MMH/FH
- Minimal Deployment Footprint

**Innovative UAS**
- Robust / Redundant Unmanned Control
- Dual Dissimilar Communication Links
- Optionally Piloted – Accelerated Testing

**Life Saving Capability**
- Reduces threat of IEDs to Ground Convoys
- Augments Manned Aviation Assets

**UAS Missions**

**Cargo Resupply**
- Precision Delivery
- Unmanned Retrograde

**Inherent Missions**
- Special Operations
- Multi-Drop Carousel

**Future Capability**
- Maritime Operations
- Ship-to-Ship/Shore

- Humanitarian Assistance / Disaster Relief
- Forestry / Construction
- Intelligence, Surveillance, Reconnaissance
Disaster Response Workshops, War Games & Experimentation Process

Experiments & Exercises

Analytical Workshops & Investigations

Concept Development, Capability Demos, & Technology Integration
Unmanned Firefighting

- Emergency Response Benefits
- Fire Fighting – Wildfires, Vehicular, High Rise and Structures
- 24/7 Operations when manned fleet is grounded due to visibility
- Disaster Recovery without required infrastructure (delivery / extraction)

Using the K-MAX Helicopter and Indago Quad-rotor Unmanned Aerial Systems (UAS) specifically tailored to this unique mission can provide significant benefit to firefighting efforts.

**Capabilities:**
- Autonomous Water Pickup
- Hotspot Identification
- Dynamic UAS Retasking
- Autonomous Water Delivery
- Delivery Effects Evaluation
- Cooperative UAS Operations
- Precision Resupply Operations
- Personnel Recovery & Equipment Delivery
Disaster Response Workshops, War Games & Experimentation Process

- Experiments & Exercises
- Analytical Workshops & Investigations
- Concept Development, Capability Demos, & Technology Integration
AS Analytic Collaboration Process

Convene

Collect/Collaborate/Catalog

Analyze

Breakout Teams

Team Artifacts

Brainstorms

Qualitative Database

Surveys

Quantitative Database

Inclusive

Comprehensive

Efficient
Disaster Response Integrative Logistics (DRIL) Exercise
The DRIL Exercise

“Whole of Society” Exercise Day 0 +120

- Category 5 Hurricane devastates the Caribbean and East Coast, impacting Miami, migrating to New York

- Severe infrastructure devastation. Major transportation networks severely impeded.

- General public unrest developing quickly due to lack of information, power, and communications.

- Industrial supply chains are greatly diminished and supplies hoarded.

Objectives:
- Demonstrate coordinated collaboration, define integrated logistics processes, and implement technological solutions.
## DRIL Participation

### Distribution
- Crowley Maritime
- DHL
- American Trucking Assoc.
- Maersk
- DLA
- Erudite
- uSHIP
- SEKO
- UPS

### Infrastructure
- Florida Power and Light
- Fluor
- Verizon
- American Logistic Network
- Adapx
- SPS

### Suppliers
- Home Depot
- ISOA
- Walmart

### Government (Domestic)
- FEMA
- NORTHCOM
- DHS
- HHS
- GSA
- DLA
- USCG
- National Guard (FL)
- FL Emergency Management
- National Guard (V.I.)
- JTF - CS

### Government (International)
- SOUTHCOM
- TRANSCOM
- NAVSUP
- Department of State
- J7, J4
- USACE
- UN/WFP
- USN (HA/DR Expeditionary)
- NATO
- National Defense University

### NGO/IO
- Red Cross
- Operation Blessing
- Catholic Relief Services
- Americas Relief Team
- International Medical Corps
- PADF
- Convoy of Hope
- CARE

### Academia
- UNC Chapel Hill
- Harvard Humanitarian Initiative

### DRIL Participation
- 83 Enrollees from 52 Organizations
AS Insertion
Why this Process?

- Education/Collaboration across enterprise centers of excellence
- Develop/Socialize future operational concepts and technical applications
- Affordable, efficient relevant/credible solutions
- Leverage industry labs and resources
- Insights into “Operational” needs
- Customer relationship – Enduring trust