Manned / Unmanned Systems Interoperability Track 1

Who is the End User?

Combat Military

First Responder

Decision Makers (all echelons)

- Coast Guard
- Survey Companies
- Private/personal watercraft, aircraft
- General Population
- Customs/Port Control
- Environmentalists (VIMS, NOAA)
- Agriculture/Aquaculture

Manned / Unmanned Systems Interoperability Track 1

What is the unsolved challenge? What is the greatest need?

Intelligent autonomy

Interoperability

Endurance

- Safety
- Cost
- Policy
- IFF – Threat ID
- Interface
- Transition from manned to unmanned (automated SA)
- Maintain
- Communication
- Lines of Authority
- Fiscal Responsibility (who's paying)
- Insurance
- Operational Management
- Balance between security and efficiency (port through-put)

Manned / Unmanned Systems Interoperability Track 1

What research is needed or underway?

- Increased automation/autonomy
- COLREGS—standard of navigation for all vessels—safety issue
- Data fusion

Manned / Unmanned Systems Interoperability Track 1

What current technology could be “re-adapted?”

- Automatic target recognition
- Nanotechnology & Adv materials, power, size, endurance
- Autonomous / swarm control
- Intelligent agents

Manned / Unmanned Systems Interoperability Track 1

What regional partnerships make sense?

- Joint interagency workgroup to identify needs (fed, state, local, military, ..
- Innovation engine that includes: small and large business, academia, government, FFRDC with technology board oversight
- Seek small business expertise

Manned / Unmanned Systems Interoperability Track 1

How does this relate to other tracks?

- Sensor fusion: must combine info to prevent overload
- Force multiplier
- Alternative energy—duration without maintenance

Manned / Unmanned Systems Interoperability Track 2

Who is the End User?

Warfighter

Emergency responders

- Scientist/researcher
- Law enforcement
- Sensor operator
- ATC
- Systems Engineer that's going to integrate
- AI programmer
- Hacker – unintentional user
- Command and control office
- Remote users—not operators of unmanned system but users of the information
- Plant managers
- Dept of Ag
- Transportation industry
- Technology Luddites — don't really want to use unmanned systems but will be forced to
- Industrial users
- NASA
- Crop duster
- Explorers
- Air shows
- Road & railroad, pipeline inspector
- Fish finders
- Search & rescue
- Mission development

Manned / Unmanned Systems Interoperability Track 2

What is the unsolved challenge? What is the greatest need?

Trust
Common Standards
SA (human and unmanned)
All depend on ***local comprehensive test facility**** (accessible to non-military)

- Safety
- Bandwidth
- Continuous communication
- Reliability
- Right information- Right time (context definition, AI/HMI/HSI)
- Cost
- Training
- Protocol development (teaming/data back to C2)
- Acquisition of Systems (Integration of disparate systems, Interface control)
- Support systems (logistics, training)
- Sensors
- Energy
- Obsolescence (speed of)
- Coordination/collaboration (between systems & between man & unmanned and between developers)
- Risk assessment for operators
- Difference between Designer/Engineer and User
- Bugs (in system)
- Consistency (single system/among systems)
- Deterministic (Trust)
- Include user in the development of the system

Manned / Unmanned Systems Interoperability Track 2

What research is needed or underway?

- Standards: Joint interoperability (including getting around the politics of multiple standards
- Situation awareness (pilot/uav)
- Intuitive design
- Exploitation of new/alternative energy sources

Manned / Unmanned Systems Interoperability Track 2

What current technology could be “re-adapted?”

- Energy source to extend time in the field
- FBI filtering systems
- Modify and improve unmanned-unmanned communications to provide unmanned-manned transmissions
- GPS/Laser/FLIR/Link/Wind/RAP funding

Manned / Unmanned Systems Interoperability Track 2

What regional partnerships make sense?

- Local Educational / academia (university & high school)
- Federal labs & Govt facilities
- Automotive industry & manufacturing/technology groups

Manned / Unmanned Systems Interoperability Track 2

How does this relate to other tracks?

- Utilization of the systems engineering process
- Enable users to be more effective
- Use a consolidated solution set for build specifications

Manned / Unmanned Systems Interoperability Track 3

Who is the End User?

First Responders (emergency personnel)

FEMA

Military

- Not involved in operations
- Equipment and personnel
- Person who provides effect
- Stratified personnel
  - Combatants
  - Operators
  - Planners
  - Coordinators
  - Logistics

Commercial entities

- Shipping companies

Manned / Unmanned Systems Interoperability Track 3

What is the unsolved challenge? What is the greatest need?

- Operational considerations in Port
- Multiple jurisdictions – control issues
- Multiple policies
- Intermingling v. interoperability
- Safe & reliable operations
- Common standards (Are there commercial standards that would work better than military standards?)
- Unequal risk for Unmanned systems (as opposed to manned systems)
- Integration of unmanned operations in a manned port/harbor environment (NAS, population on land & water, boat traffic, ...)

Manned / Unmanned Systems Interoperability Track 3

What research is needed or underway?

- Fail-safe automated systems
- Research in highly nonlinear,non-apriori operational environments
- Reliable outputs of autonomous decision systems

Manned / Unmanned Systems Interoperability Track 3

What current technology could be “re-adapted?”

- Apple/iPhone applications development model
  - Web-enabled service-oriented architecture
  - facebook/twitter
  - Including security models
  - Open-source, general acceptance, re-purposing

Manned / Unmanned Systems Interoperability Track 3

What regional partnerships make sense?

- Technology: NASA, universities, dod,R&D labs, robotics COE, policy – any stakeholder
- Stakeholders need to be in identified partnership
- United front and upholding the agreed upon partnership
- Comments: what's the forcing function? – political discussion
- Must have official backing from DoD
  - Is ADM Roughead OK with his personnel and equipment being involved in this and being protected by this?

Manned / Unmanned Systems Interoperability Track 3

How does this relate to other tracks?

Sensor fusion – collecting and presenting information in a form that doesn't require the user to “connect the dots” – critical enabler for interoperability