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# NORAD and USNORTHCOM J8 Science & Technology



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**Chief Engineer, Science and Technology**



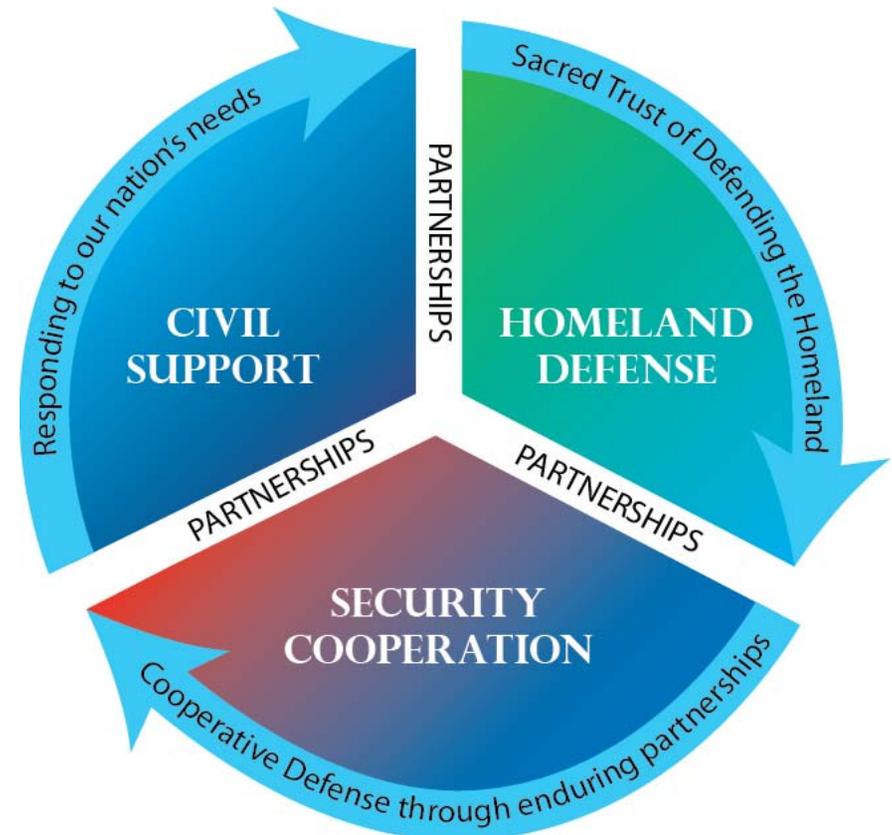


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# Mission & Enduring Priorities

- Defense of our Homelands
- Defense Support of Civil Authorities
- Regional Partnerships
- Homelands Partnerships
- Arctic
- Professionalism and Excellence
- Warfighters and Families

- Advance and improve the efficiency of our binational command
- Maintain and strengthen our regional and homeland partnerships
- Advance and sustain our capability to protect our homelands with emphasis on the issues we are most likely to confront
- Improve upon the speed of response in support of civilian authorities
- Take care of our people and their families



**Center of Gravity = Trusted Partnerships**

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# S&T Mission and Functions

- **Advises leadership on all Science and Technology (S&T) matters**
- **Creates and executes strategies and supporting plans to exploit and develop innovative processes, technology and prototypes to respond to the needs of NORAD and USNORTHCOM**
  - **Leads studies, innovation, experimentation, enabling technologies, technology demonstrations, military utility assessments, and Joint Tests**
  - **Performs US and Canadian outreach efforts to identify, assess and integrate potential solutions for identified capabilities and requirements**
  - **Articulates needed capabilities with R&D organizations**
- **Critically reviews and advocates for promising programs and projects**
- **Synchronizes S&T activities across the command and other COCOMs**
- **Focus is 6 months out to 15 years with innovation cycles of 6 - 36 months**

## ***S&T Vision:***

***Outpace the threat with partnerships, innovation,  
and technology development***

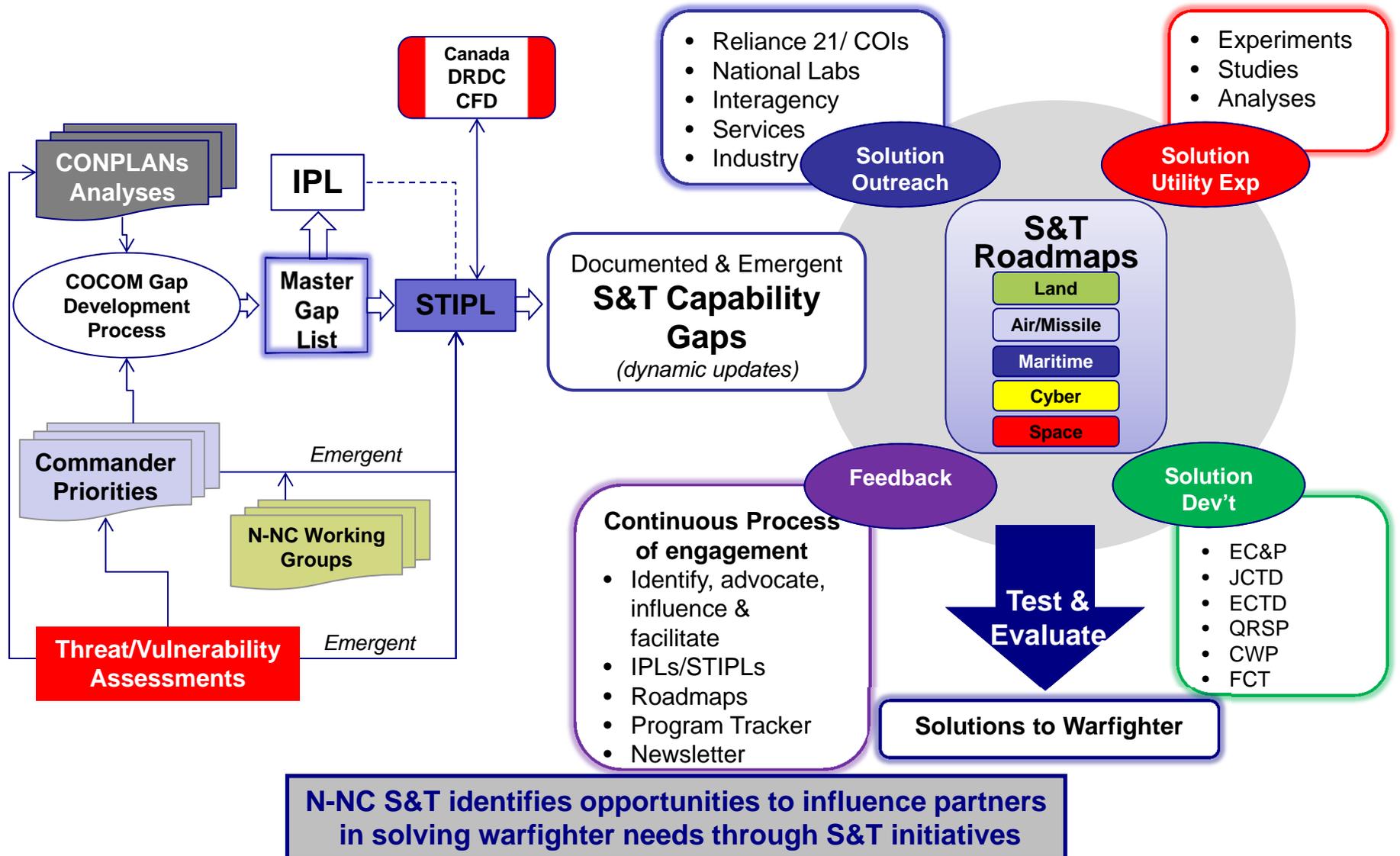
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# S&T Capability Development Process



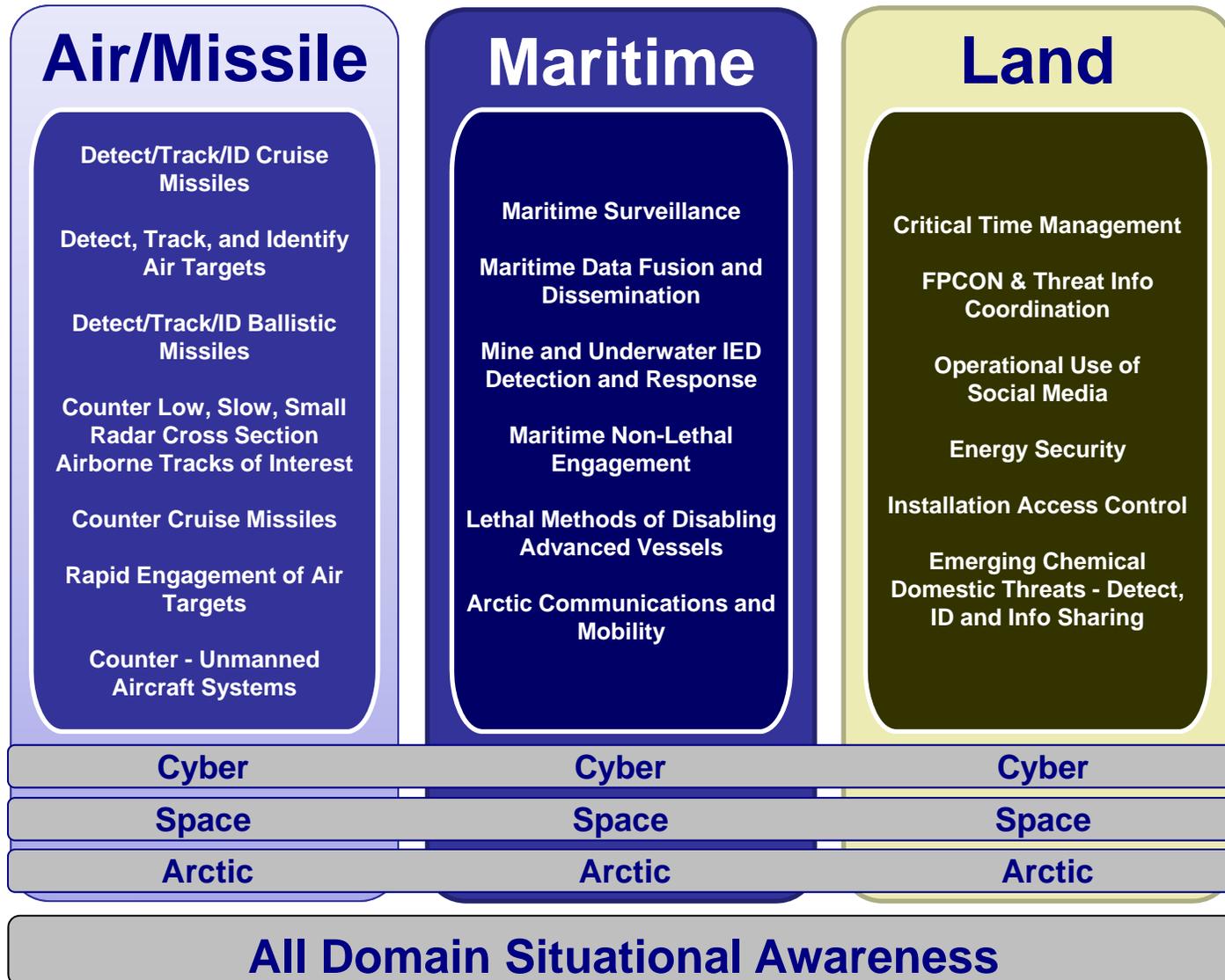
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# Select S&T Challenges



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# FY 17-21 STIPL List

## Air & Missile

(U) Track & Assess ICBMs

(U) Detect, Track & Air Targets

(U) Engage Air Targets

## Maritime

(U) Mar Surveillance Sub- Surface

(U) Maritime Non-Lethal Engagement

(U) Mine/Underwater IED (UWIED) in Homeland

(U) Mar Surveillance – Surface

(U) Mar Data Fusion & Dissemination

## Land

(U) Operational Use of Social Media

(U) Recover of USG personnel

(U) Installation Security Architecture

(U) FPCON & Threat Info Coordination

(U) CBRN Preparation and Response

(U) Integrated Emergency Disaster & Response (NIEDM)

## Cross Cutting

(U) Electric Energy Security

(U) Arctic Communications Capability

(U) Critical Time Mgmt Relative to GPS

(U) Network Resiliency

(U) Arctic Surface Transportation

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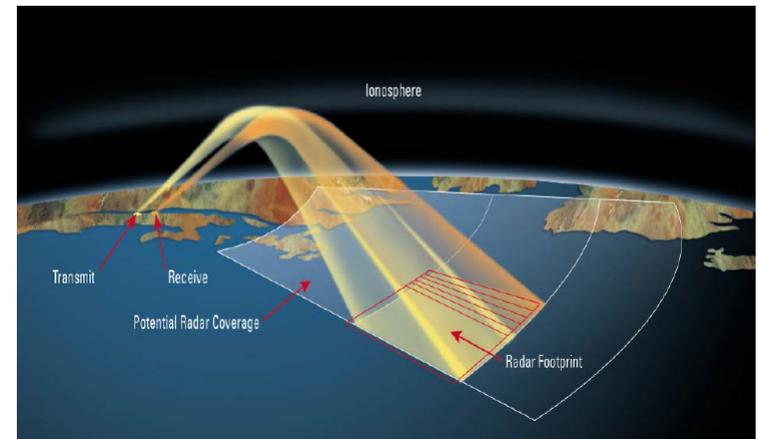
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# Air & Missile Domain Issues

- **Track & Assess ICBMs**
  - Long range radar detection
  - Positive ID & discrimination
  - Communication resiliency
- **Detect, Track, & ID Air Targets**
  - Detection at range, tracking, & ID
  - Low, slow, small RCS exploitation
  - Sensor Fusion
- **Engage Air Targets**
  - Develop Low cost per shot technologies
    - Improved Point defense capabilities (Kinetic & Non-kinetic)
  - Sensor fusion
  - Improved EW & SIGINT
  - Next generation weapon defense

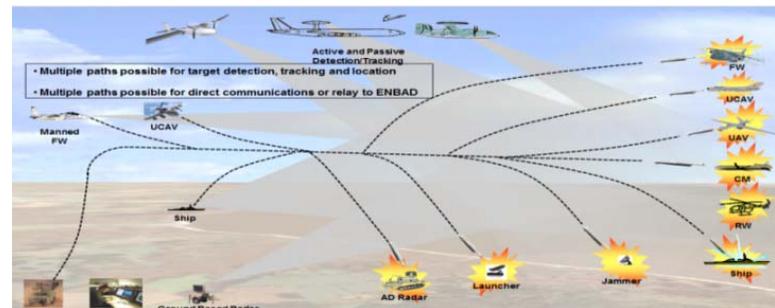
## Joint Engagement Sequence (JES)



Over the Horizon Radar



High Energy Laser Mobile Demonstrator HEL-MD



Integrated Air and Missile Defense

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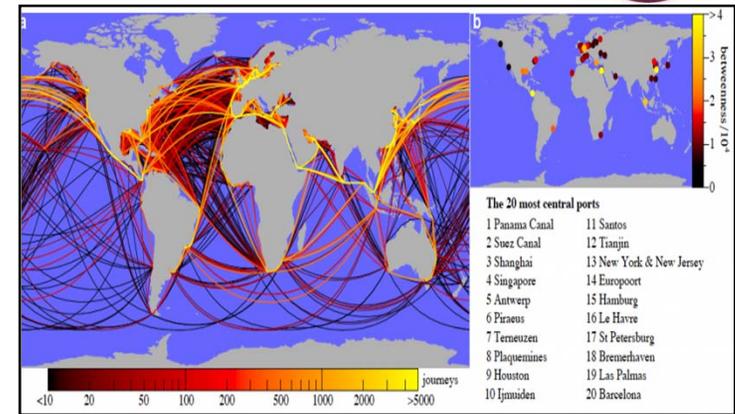


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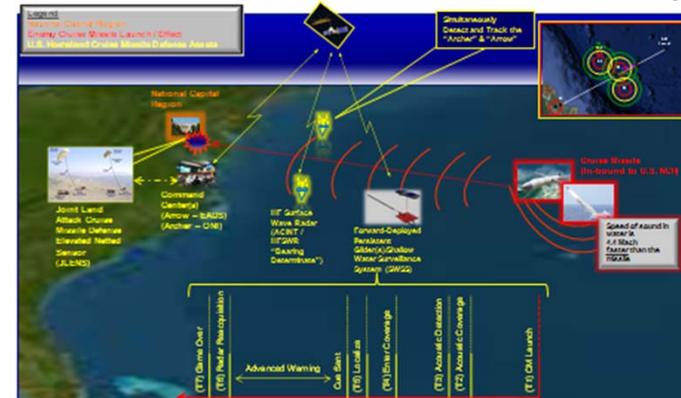


# Maritime Domain Issues

- **Maritime Surveillance – Sub surface**
  - Improve acoustic detection algorithms
- **Maritime Surveillance – Surface**
  - Low cost deployable sensors in austere environments
  - USG sensor integration to include space exploitation
- **Maritime Data Fusion & Dissemination**
  - User defined COP
  - USG sensor integration & dissemination
- **Maritime Non-Lethal Engagement**
  - Use of alternative technologies disable ships
  - Non-lethal engagement surface & air
- **Mine/Underwater IED (UWIED) in Homeland**
  - Improved port mapping & protection
  - Low collateral damage removal of UIEDs
  - Automatic change detection for Ports



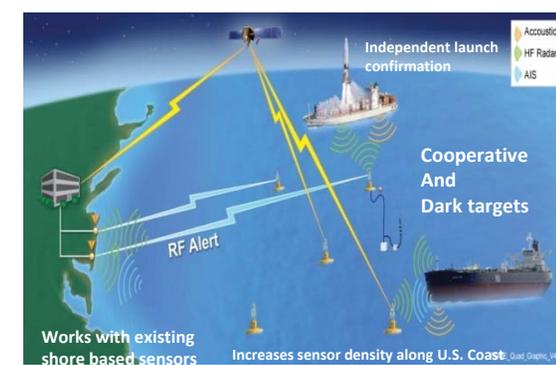
Sea lanes and ports



Cruise Missile Launch Alert Warning System



Divers disarming an undersea mine



Maritime Awareness

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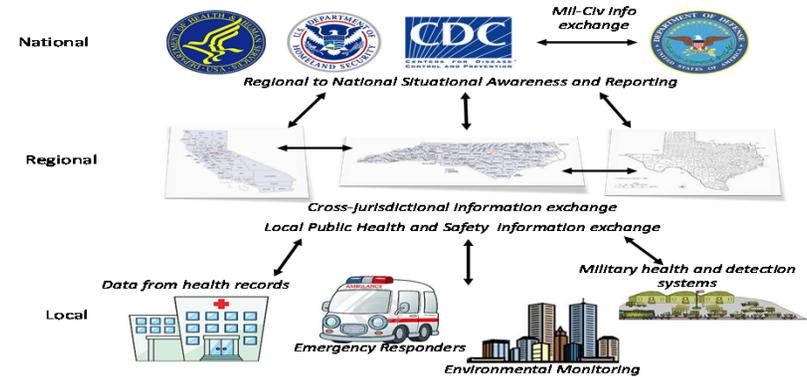


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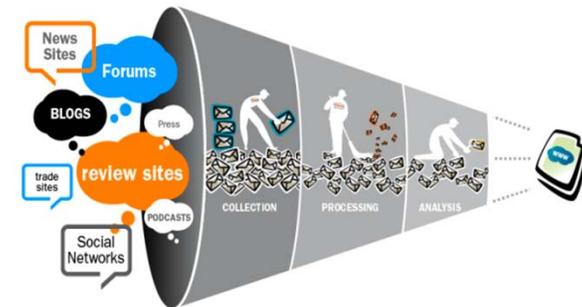


# Land Domain Issues

- **FPCON & Threat Info Coordination**
  - USG info sharing & dissemination
- **CBRN Preparation & Response**
  - Mass decontamination
  - CBRN detection, response
  - Advanced Bio-surveillance
- **Operational Use of Social Media**
  - Tech to remove US PII & ID problem areas
- **Installation & Security Architecture**
  - Continuous identity vetting
  - Interoperability with interagency partners
- **Integrated Emergency Disaster & Response**
  - USG interoperability for response
- **Recovery of USG Personnel**
  - Detection, alerts & tracking in austere circumstances



Homeland Integrated Bio-surveillance and Response Information Demonstration (HIBRID)



Leveraging Social Media to Enhance Decision Making



Installation Security Architecture

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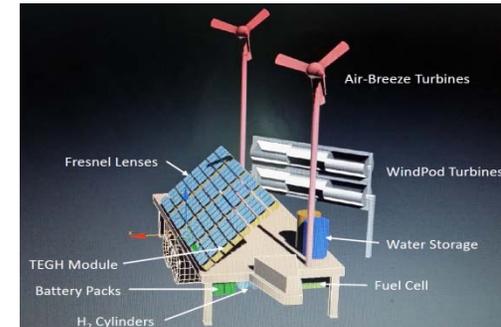


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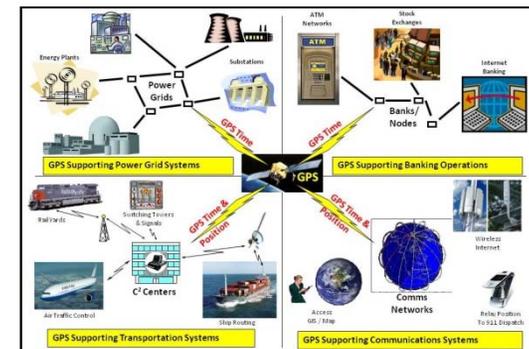


# Cross Cutting Domain Issues

- **Network Resiliency**
  - Assured Communications
- **Critical Time Management Relative to GPS**
  - Persistent & accurate timing signals
  - Redundancy from trusted sources
- **Electric Energy Security**
  - Ensured power where needed
  - Secured SCADA
- **Arctic Communication Capability**
  - 24hr persistent communications above 65° north
- **Arctic Surface Transportation**
  - Ice hardening of ships
  - Arctic hardening of ground vehicles



Renewable Energy Storage and Access Trailer



GPS Interdependency



MV Explorer SAR Trapped in Ice

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# Questions

