



**FEDERAL LAB CONSORTIUM/
NORTHEAST PENNSYLVANIA ALLIANCE
“ACTION” CONFERENCE**

NASA TARGETED TECHNOLOGIES

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Innovative Partnerships Program
NASA Headquarters



NASA SPACE ACT AGREEMENT

- Integral to 1958 authorizing legislation creating NASA for the agency to:
 - *“enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work and on such terms as it may deem appropriate...with any agency...any state...any person, firm, association, corporation or educational institution”*
- **Reimbursable Agreement**
 - Use on a reimbursement basis for unique goods and services not fully utilized by NASA
- **Non-Reimbursable Agreement**
 - Quid-pro-quo collaboration of resources for mutually beneficial activity/goals
- **Other Types of Collaboration:** license, software use agreement, enhanced use lease agreement (Kennedy Space Center, Ames Research Center)
- Regardless of type of agreement, collaboration with NASA is driven by the agency’s challenges and requirement to retire and replace the Shuttle, complete the ISS, and prepare for long duration exploration missions while advancing fields in science and aeronautics.



NASA RESEARCH AND TECHNOLOGY HIGHLIGHTS BY CENTER

- **AMES RESEARCH CENTER**
 - Information Technologies, Aerospace Systems, Autonomous Systems for Space Flight, Nanotechnology, Space Life Science/Biotech, Computational Fluid Dynamics and Aviation Operations
- **DRYDEN FLIGHT RESEARCH CENTER**
 - Aerodynamics, Aeronautics Flight Testing, Flight Systems, Revolutionary Flight Concepts, Thermal Testing, and Integrated Systems Test and Validation
- **GLENN RESEARCH CENTER**
 - Aeropropulsion and Power, Communications, Information Technology, High-Temperature Materials Research, Microgravity Science and Technology, including Bioengineering, and Instrumentation and Control Systems
- **GODDARD SPACE FLIGHT CENTER**
 - Earth and Planetary Science Missions, LIDAR, Cryogenic Systems, Tracking, Telemetry, Command, Optics and Sensors/Detectors
- **JET PROPULSION LAB**
 - Deep and Near Space Mission Engineering and Operations, Microspacecraft, Space Communications, Remote and In-Situ Sensing, Microdevices, Robotics and Autonomous Systems



NASA RESEARCH AND TECHNOLOGY HIGHLIGHTS BY CENTER

- **JOHNSON SPACE CENTER**
 - **Life Sciences/Biomedical, Medical**
- **KENNEDY SPACE CENTER**
 - **Fluid Systems, Spaceport Structures & Materials, Process & Human Factors Engineering, Command, Control & Monitoring Technologies, Range Technologies, Biological Sciences**
- **LANGLEY RESEARCH CENTER**
 - **Aerodynamics, Flight Systems, Materials, Structures, Sensors, Measurements and Information Sciences**
- **MARSHALL SPACE FLIGHT CENTER**
 - **Materials, Manufacturing, Non-Destructive Evaluation, Biotechnology, Space Propulsion, Controls and Dynamics, Structures and Microgravity Processing**
- **STENNIS SPACE CENTER**
 - **Propulsion Systems, Test/Monitoring, Remote Sensing and Non-Intrusive Instrumentation**



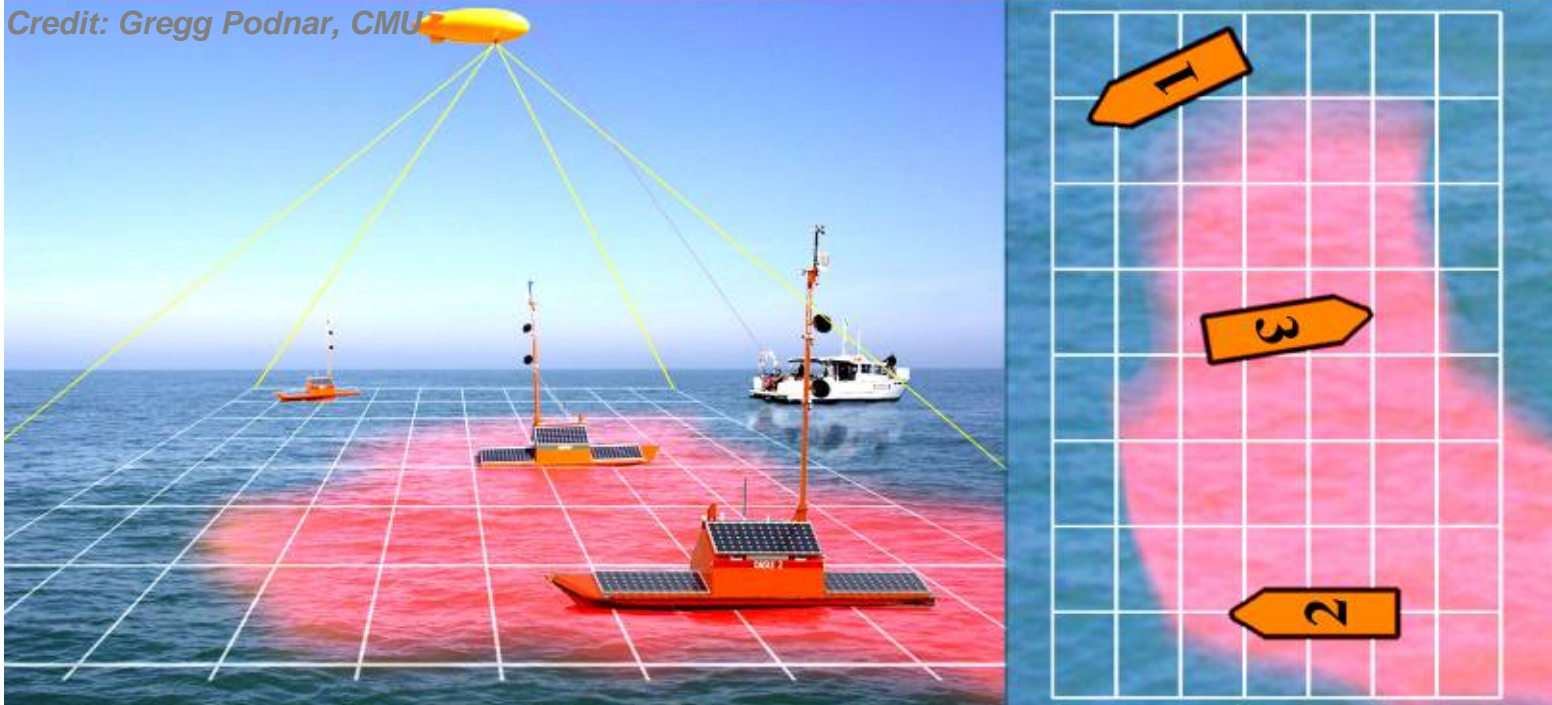
NASA EXAMPLES OF TARGETED TECHNOLOGIES



GSFC/Chesapeake Bay “ESTO” Collaboration project

- Development of a telesupervised adaptive sensor system for remote platforms
 - Collaboration among NASA Goddard Space Flight Center, Jet Propulsion Lab, **Carnegie Mellon University**
 - Adaptive changes in goals, tasks, and movements
 - ESTO project: Autonomous monitoring of toxic algae blooms in Chesapeake Bay estuary using robotic and sensor technology

Credit: Gregg Podnar, CMU





Antarctic Habitat Demonstrator

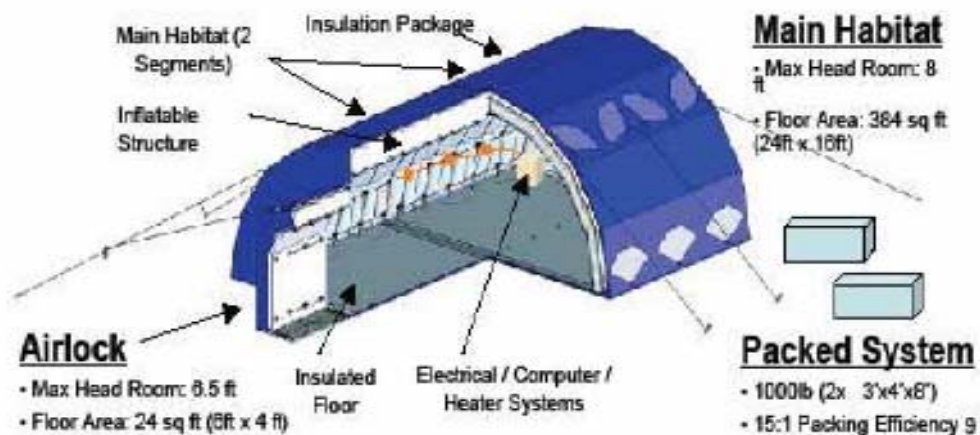


- NASA / NSF / ILC Dover Innovative Partnership Program (IPP)
- Test of expandable structures in Antarctic Analog to advance NASA knowledge base for lunar application
- Test of expandable structures to advance NSF knowledge and assess applicability to polar missions



System Requirements (NASA & NSF Combined) - Annotated

- Reconfigurable components
- Erected by 4 people in 4 hours
- Can withstand 100 mph winds
- High Packing Efficiency
- Can deploy on uneven ground
- Withstand the Antarctic winter
- Multiple cycle use
- Lighting/power/data acquisition
- Meet NSF building codes





Non-Invasive Test Detection Cardiovascular Disease

- Imaging technology originally designed at NASA JPL to interpret spacecraft images.
- JPL and U of California teamed to explore adaptation of imaging for medical uses.
- Gary Thompson, a heart attack survivor, secured an exclusive license for the technology and started a company, **Medical Technologies International**.



ArterioVision™ is a CIMT test that uses **ultrasound image-capturing and analysis software** to noninvasively identify the risk for the major cause of heart attack and strokes: atherosclerosis.



Voltage Controller Saves Energy, Prolongs Motor Life

The energy-saving soft start allocates power in direct proportion to the motor's required workload, eliminating wasted electricity. Power Efficiency Corporation's core technology is based on patented improvements to NASA technology.



- A NASA engineer at Marshall Space Flight Center, Huntsville, Alabama developed a concept in the late 1970's to electronically adjust voltage based on motor load, and thus reduce energy waste.
- Technology patented in 1984; now known as Nola devices.
- **Power Efficiency Corp., Las Vegas**, licensed the NASA voltage controller technology in 1985 and has since made patented improvements to the technology.



TREATMENTS TO PREVENT CORROSION IN STEEL AND CONCRETE STRUCTURES

- Kennedy Space Center is vulnerable to a range of natural challenges including salty, corrosive sea breezes. This impacts the center's facility structures including launch pads.
- To protect against corrosion, NASA:
 - Developed an electromigration technique sending corrosion-inhibiting ions into steel reinforcing bars within concrete.
 - Partnered in 1997 with Florida Technological Research and Development Authority, and **Surtreat Holding LLC of Pittsburgh**, a company that developed a chemical option to fight structural corrosion. NASA combined its technique with Surtreat's chemical processing.
- NASA has a new approach, liquid galvanic coating, that Surtreat has licensed to improve its own coating technology. New approach first tested in early 2007 at US Army port in Okinawa Japan.
- This new coating technology may be used in highway and bridge infrastructure, piers and docks, concrete balconies, cooling towers, etc.



TREATMENTS TO PREVENT CORROSION IN STEEL AND CONCRETE STRUCTURES

This parking structure was suffering from water and deicing salt infiltration, causing a number of corrosion-related problems throughout the structure. The Surtreat chemicals migrated over 2 inches below the surface, halting corrosion.

Surtreat uses topically applied, chemically reactive, migrating formulations unique to each project.





SECURE AMBULATION MODE (S.A.M.)

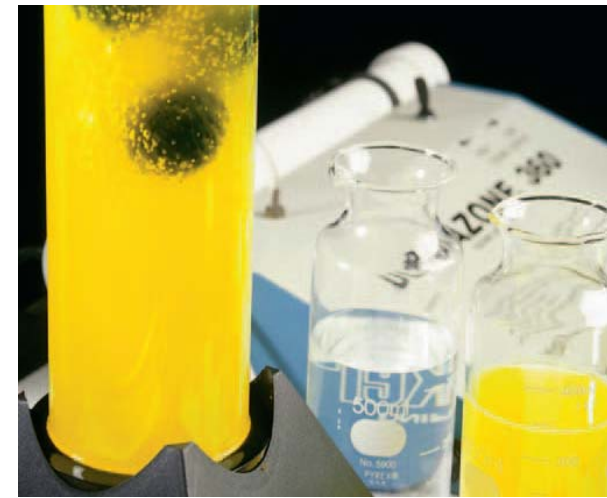


- Cabling system originally designed for use in robotics and sounding rocket operations involving NASA Goddard Space Flight Center
- Technology licensed in 2003 to **Enduro Medical Technologies, East Hartford CT**
- Enduro modified the technology into a wheeled walker relieving pressure on legs.
- Used in rehabilitative therapy for spinal cord injury and degenerative disease.
- A walker was donated by Enduro Medical Technology to Walter Reed Medical Center for soldiers with spinal cord or traumatic brain injuries.



OTHER EXAMPLES --FLORIDA--

Ingestible Thermometer
HQ, Inc., Palmetto, Florida



Advanced Water Purification
Systems, AJT & Associates,
Cape Canaveral, FL



Groundwater Remediation
Goseyntec, Titusville, Florida
University of Central Florida



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