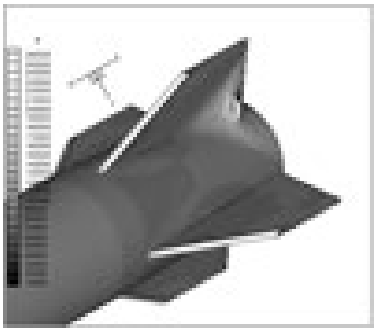
DoD University Affiliated Research Centers (UARCs)
Core Technical Competencies

Georgia Institute of Technology - Georgia Tech Research Institute

Overview

GTRI's strengths are based on world-class subject matter experts in systems engineering, sensors, and information and telecommunications technology, a unique laboratory infrastructure including classified facilities, and collaboration with Georgia Tech's academic colleges and access to the vast intellectual resources of one of America's premier research universities. From developing new systems to keeping older systems state-of-the-art, GTRI's researchers drive innovation beyond the basics to prototyping, field testing and real-time, real-scenario performance.

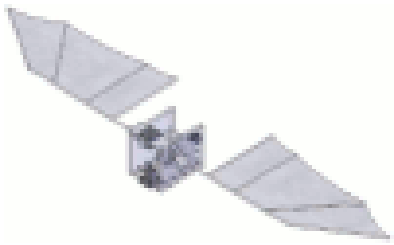


Mechanical Actuators for Guidance of a Supersonic Projectile

Core Technical Competencies

In order to fulfill their mission, GTRI possesses the following CTCs:

- Autonomous Systems & Robotics
- Advanced Electronics
- Advanced Aerodynamics (Fixed & Rotorcraft)
- Human, Social, Cultural & Behavioral Modeling
- Information Assurance, Computer Network Ops., Anti-Tamper
- Modeling, Simulation and Virtual Environments
- Multi & Hyperspectral Sensors
- Networks & Communications
- Nanotechnology
- Optical Sensors & Systems
- RADAR & LADAR
- Radio Frequency Sensors / Electronic Warfare
- Software Research
- Systems Eng. & Int.



Miniature Flexible Flapping Wing Mechanism for Use in a Robotic Air Vehicle

Quick Facts

Location: Atlanta, GA

Sponsor: U.S. Army

Website:

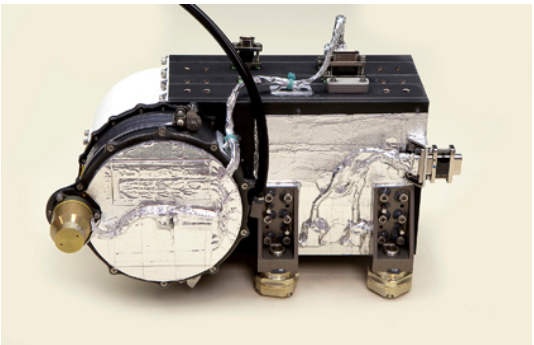
http://www.gtri.gatech.edu/

GTRI has a broad set of missions that go well beyond defense and national security. In total, it has over 700 full-time engineers and scientists, plus additional faculty members, part-time students and consultants and support personnel. Among full-time researchers 70 percent hold advanced degrees.

Johns Hopkins University - Applied Physics Laboratory

Overview

JHU-APL has made significant contributions in the areas of air defense, strike and power projection, submarine security, antisubmarine warfare, strategic systems evaluation, command and control, distributed information and display systems, sensors, information processing and space systems. Additionally, APL conducts a wide range of research and analyses in the areas biomedicine, civilian space, cyber operations, national security analysis, undersea warfare, and strategic systems.



NASA's Juno spacecraft, set to arrive at Jupiter in 2016, carries three of these APL-built Jupiter Energetic-particle Detector Instrument (JEDI) units.

Core Technical Competencies

In order to fulfill their mission, JHU-APL possesses the following CTCs:

- Directed Energy Technology
- Information Assurance, Computer Network Ops., Anti-Tamper
- Information Technology
- Medical & Biomedical Res.
- Modeling, Simulation and Virtual Environments
- Networks & Communications
- Ocean & Undersea Environments
- Optical Sensors & Systems
- Rapid Prototyping & Fielding
- Software Research
- Space System Design
- Space Environments
- Systems Engineering & Integration.

JHU-APL is engaged in a variety of efforts to advance and capitalize upon the use of space-based assets.

Quick Facts

Location: Laurel, MD

Sponsor: U.S. Navy

Website: http://www.jhuapl.edu/

Of JHU-APL's full-time staff of 4,700:
73% are technical staff
and
17% have a Doctorate
51% have a Masters
24% have a Bachelor's
with degree in the following fields:
56% in Engineering
28% in Math/Computer Sciences
16% in Physics, Chemistry, other

Massachusetts Institute of Technology - Institute for Soldier Nanotechnologies

Overview

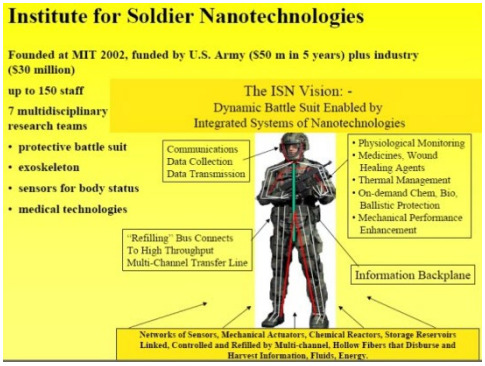
ISN's mission is to dramatically improve the survivability of the soldier by working at and extending the frontiers of nanotechnology through fundamental research and transitioning with our Army and industry partners. It operates as a three-member team leveraging unique capabilities of the US Army, industry, and MIT. Fundamental science and engineering research is the centerpiece of the ISN mission. ISN research is divided into three capability areas: protection; injury intervention and cure; and human performance improvement.

Nanotechnology particle model

Core Technical Competencies

In order to fulfill their mission, ISN possesses the following CTCs:

- Advanced Materials & Survivability
- Casualty Care & Human Performance
- Medical & Biomedical Research
- Nanotechnology



Blending nanotechnology into exoskeletons could mean major advancements in solider survivability, lethality, and mobility.

Quick Facts

Location: Lexington, MA

Sponsor: U.S. Army

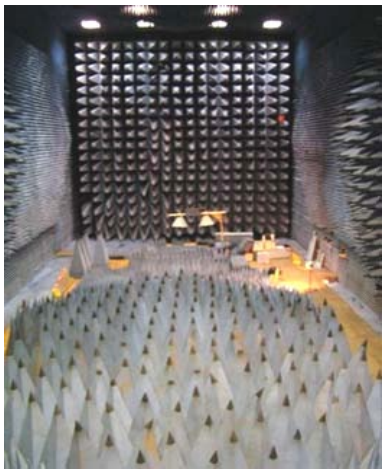
Website: http://web.mit.edu/isn/

ISN's 5 Strategic Research Areas are:
1: Light Weight, Multifunctional Nanostructured Fibers and Materials
2: Battle Suit Medicine
3: Blast and Ballistic Protection
4: Chem/Bio Materials Science - Detection and Protection
5: Nanosystems Integration

Pennsylvania State University, Applied Research Laboratory

Overview

PSU-ARL is a university center of excellence in naval science and technologies with preeminence in undersea missions and related areas. It provides solutions to problems in national security, economic competitiveness, and quality of life through basic and applied research, exploratory development, advanced development, and manufacturing technology in support of the Navy technology base. Additionally, ARL champions the transfer of advanced technologies and manufacturing processes.

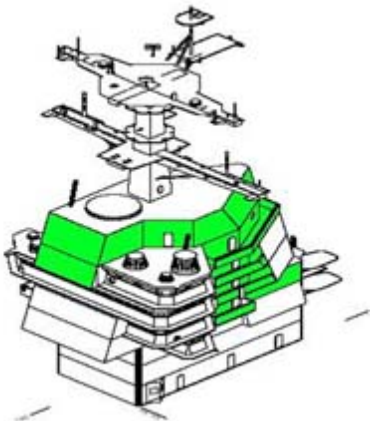


PSU-ARL has a 100 ft long, 40 ft wide and 40 ft high anechoic chamber for tests of 100 MHz to 100 GHz

Core Technical Competencies

In order to fulfill their mission, PSU-ARL possesses the following CTCs:

- Autonomous Systems & Robotics
- Manufacturing Technology
- Modeling, Simulation and Virtual Environments
- Networks & Communications
- Ocean & Undersea Environments
- Power, Propulsion, Energy & Alt. Fuels
- Radio Frequency Sensors / Electronic Warfare
- Space System Design
- Systems Engineering & Integration



Additional work includes composite materials for use on a variety of military platforms

Quick Facts

Location: State College, PA

Sponsor: U.S. Navy

Website: http://www.arl.psu.edu/

Established in 1945, ARL is the largest research unit within Penn State with more than 1,000 faculty and staff.

ARL's Water Tunnel was completed in 1949 as the Navy's principal hydrodynamic facility.

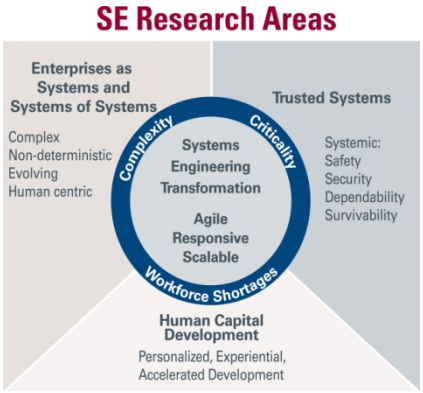
It is also a DoD Manufacturing Technology (MANTECH) Program affiliate.

Stevens Institute of Technology - Systems Engineering Research Center

Overview

Established in 2008 and led by Stevens Institute of Technology, the SERC is a national resource providing a critical mass of systems engineering researchers—a community of broad experience, deep knowledge, and diverse interests. SERC leverages the research and expertise of senior lead researchers from 22 collaborator universities. This unique UARC consortia of focused systems engineering researchers delivers impact well beyond what any one university could accomplish.

SERC focuses on context dependent and change-enabling workflows as part of complex systems of systems analysis



SERC has a broad range of research projects spread across 3 main focus areas.

Core Technical Competencies

In order to fulfill their mission, SERC possesses the following CTCs:

- Information Technology
- High Power Computing & Data Set Analysis
- Modeling, Simulation and Virtual Environments
- Organization, Fusion & Mining Data
- Systems Engineering & Integration
- Technology Acquisition & Business

Quick Facts

Location: Hoboken, NJ

Sponsor: USD(R&E)

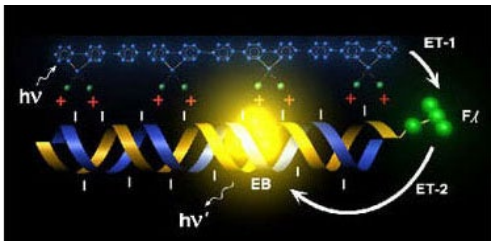
Website: http://www.sercuarc.org/

The SERC research strategy aligns three mission areas which are supported by four Research Areas: Enterprises and Systems of Systems (ESOS), Trusted Systems (TS), Systems Engineering and Systems Management Transformation (SEMT) and Human Capital Development (HCD). It is comprised of hundreds of experienced researchers – faculty, graduate students, and government staff - from across the systems engineering spectrum.

University of California, Santa Barbara - Institute for Collaborative Biotechnologies

Overview

The Institute for Collaborative Biotechnologies (ICB) conducts fundamental scientific research in two areas of emphasis: sensors, materials and information processing and technical fundamentals enabling transition of cutting edge biotechnology research into these application areas such as bio-inspired materials and energy, biomolecular sensors, bio-inspired network science, and biotechnological tools.

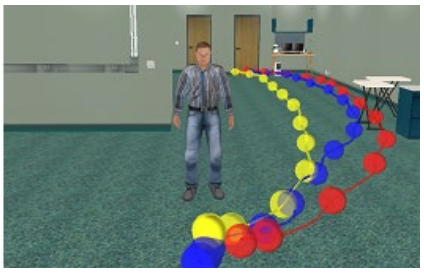


Biomolecular Sensors

Core Technical Competencies

In order to fulfill their mission, ICB possesses the following CTCs:

- Medical & Biomedical Research
- Nanotechnology



Ongoing research includes Human interaction efficiency for advanced virtual agents

Quick Facts

Location: Santa Barbara, CA

Sponsor: U.S. Army

Website: http://www.icb.ucsb.edu/

ICB is led by the University of California, Santa Barbara (UCSB), in partnership with Massachusetts Institute of Technology (MIT) and California Institute of Technology (Caltech). ICB research is driven by more than 60 premier faculty and over 150 researchers working together as interdisciplinary teams of molecular biologists, chemists, physicists and engineers.

University of Hawaii, Applied Research Laboratory

Overview

UH-ARL conducts a wide range of research and analysis in the areas of oceanography and environmental research, astronomical research, advanced electro optical systems, laser, LADAR and remote sensing detection systems, and research in various engineering programs to support sensors, communications, and information technology.

UH-ARL work includes IED detection

Core Technical Competencies

In order to fulfill their mission, UH-ARL possesses the following CTCs:

- Information Technology
- Environmental Sciences
- Networks & Communications
- Ocean & Undersea Environments
- Optical Sensors & Systems
- Space Environments

UH-ARL conducts astronomical research for the navy

Quick Facts

Location: Honolulu, HI

Sponsor: U.S. Navy

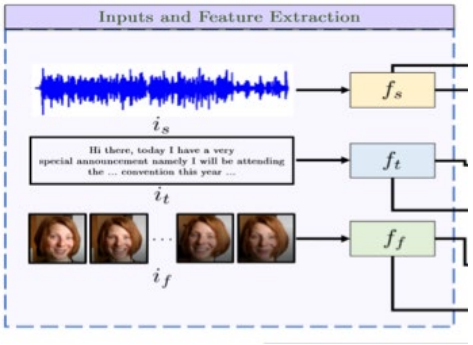
Website:
http://www.hawaii.edu/arl/

Established in 2008, UH-ARL is research center of excellence for critical Navy and national defense science, technology and engineering with a focus in naval missions and related areas.

University of Maryland - Applied Research Laboratory for Intelligence and Security

Overview

Founded in 2018, ARLIS is the only UARC focused on the human domain where understanding and designing for human diversity – behaviors, beliefs, values, strengths, limitations, and vulnerabilities – confers competitive advantage in "Computing, Code, Cognition, and Communities". The focus is on integrating applied research and development in the social and behavioral sciences, AI, and computing into new and existing DoD capabilities.

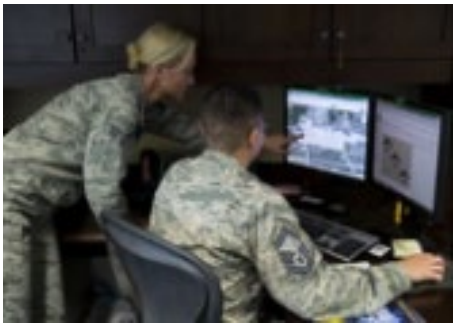


Research seeks to gain insights into behavior and emotional states of individuals based on gestures.

Core Technical Competencies

In order to fulfill their mission, CASL possesses the following CTC:

- Autonomy and AI
- Social Science
- Human Performance and Augmentation
- Industrial Security
- Advanced Computation and Cyber-Infrastructure



Prototype and demonstrate next generation cognitive augmentation.

Quick Facts

Location: College Park, MD

Sponsor: OUSD(I&S)

Website: https://www.arlis.umd.edu

Key growth areas:
Cognitive Security
Chinese language
AI/Systems Engineering
Supply chain/technology protection
Counter-intelligence and Insider Trust

University of Southern California - Institute for Creative Technologies

Overview

ICT was established in 1999 with a multi-year contract from the US Army to explore a powerful question: What would happen if leading technologists in artificial intelligence, graphics, and immersion joined forces with the creative talents of Hollywood and the game industry? The answer is the creation of engaging, memorable and effective interactive media that are revolutionizing learning in the fields of training, education and beyond.

High Resolution Face Scanning

Core Technical Competencies

In order to fulfill their mission, ICT possesses the following CTCs:

- Cognitive Enhancement
- Information Technology
- High Power Computing & Data Set Analysis
- Human, Social, Cultural & Behavioral Modeling
- Modeling, Simulation and Virtual Environments

ICT and the US Army Simulation and Training Technology Center created the Military Terrain for Games Pipeline to speed development of multiple simulation training backgrounds

Quick Facts

Location: Los Angeles, CA

Sponsor: U.S. Army

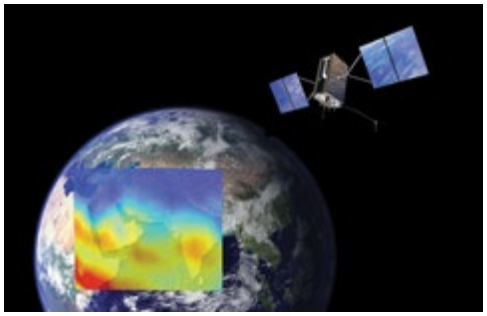
Website: http://ict.usc.edu/

ICT is able to leverage its location near major movie and game studios, and ICT's main focus is on human interactions and emotions—areas that are recognized as increasingly important in developing critical thinking and decision-making skills.

University of Texas at Austin - Applied Research Laboratories

Overview

The University of Texas Applied Research Laboratories (UT-ARL) is a research unit conducts research dedicated to improving our national security through applications of acoustics, electromagnetics, and information sciences.



UT-ARL has been involved in electromagnetic research since 1945

Core Technical Competencies

In order to fulfill their mission, UT-ARL possesses the following CTCs:

- Ocean & Undersea Environments
- Optical Sensors & Systems
- Modeling, Simulation and Virtual Environments
- Surveillance Systems and Platforms

Acoustic research in the Arctic

Quick Facts

Location: Austin, TX

Sponsor: U.S. Navy

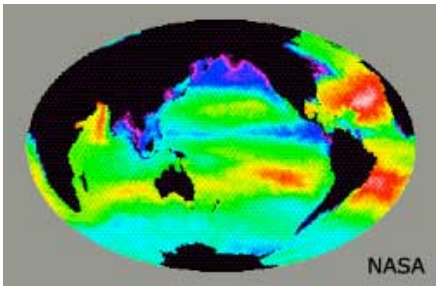
Website:
http://www.arlut.utexas.edu/

UT-ARL's executive director provides guidance to 7 directors who manage 4 research laboratories and 3 service areas. The executive director reports directly to UT's vice president for research. More than 50% of the research staff hold advanced degrees, and 52 staff members, or 19%, hold PhD degrees, primarily in physics and engineering.

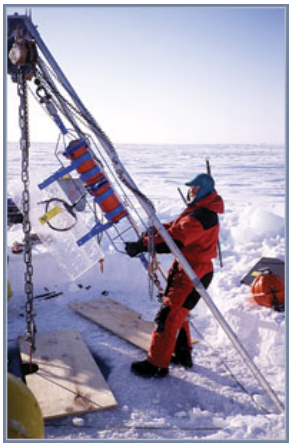
University of Washington, Applied Physics Laboratory

Overview

The University of Washington APL (UW-APL) conducts a wide-range of research on the earth's climate cycles with satellite and *in situ* sensing of ocean winds, currents, and air-sea fluxes; observations of Arctic sea ice, its variations and effects on mid-latitude oceans; and ocean tomography that reveals how the abyssal ocean mixes and sequesters carbon. It also conducts research in the basic and applied physics of sound—from sonars used to probe the geology of the deep ocean floor to hand-held high-frequency focused ultrasound devices to image and stop internal bleeding without surgery.



Researchers are calibrate data from space with in situ measurements of ocean salinity



Hands-on at the North Pole Environmental Observatory

Core Technical Competencies

In order to fulfill their mission, UW-APL possesses the following CTCs:

- Atmospheric and Meteorological Sciences and Environments
- Autonomous Systems & Robotics
- Environmental Sciences
- Medical & Biomedical Research
- Multi & Hyperspectral Sensors
- Networks & Communications
- Ocean & Undersea Environments
- Optical Sensors & Systems

Quick Facts

Location: Seattle, WA

Sponsor: U.S. Navy

Website: http://www.apl.washington.edu/

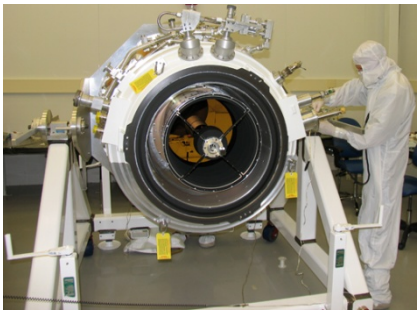
APL-UW is organized into eight scientific and technical departments:

- Air-Sea Interaction & Remote Sensing
- Center for Industrial & Medical Ultrasound
- Electronic & Photonic Systems
- Environmental & Information Systems
- Ocean Acoustics
- Ocean Engineering
- Ocean Physics
- Polar Science Center

Utah State University, Space Dynamics Laboratory

Overview

SDL's mission is to advance scientific and defense objectives by researching, developing and characterizing sensor, electronic, and software systems; providing program lifecycle support; and enhancing the education and development of scientists and engineers. The engineering, technical and support staff of SDL meet this challenge by advancing the Lab's core competencies in electro-optical sensor systems, calibration, thermal management, reconnaissance systems, and small satellite technologies.



The telescope on the Wide-field Infrared Survey Explorer during assembly at SDL

Core Technical Competencies

In order to fulfill their mission, SDL possesses the following CTCs:

- Advanced Electronics
- Atmospheric and Meteorological Sciences and Environments
- Geospatial Intelligence
- Information Technology
- Modeling, Simulation and Virtual Environments
- Multi & Hyperspectral Sensors
- Optical Sensors & Systems
- Software Research
- Space System Design
- Space Environments
- Systems Engineering & Integration

SDL's Intelligent Geo-Aware Sensor System (IGSS)

Quick Facts

Location: Logan, UT

Sponsor: MDA

Website: http://www.sdl.usu.edu/index

SDL employs over 350 scientists, engineers and professionals and over 100 students from USU.

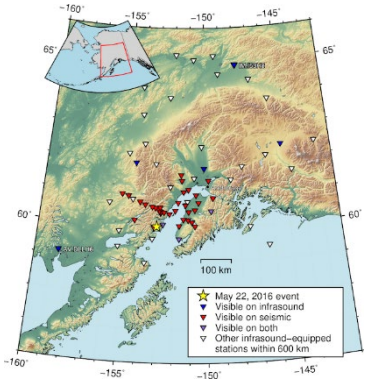
Levels of Workforce Degrees:

36% Masters
35% Bachelors
12% None
11% PhD
6% Associates

University of Alaska, Geophysical Detection of Nuclear Proliferation

Overview

The Geophysical Detection of Nuclear Proliferation (GDNP) UARC was established to detect, locate, characterize, and assess the threat potential of nuclear activities worldwide through research, development, testing, and evaluation of scientific and technological capabilities.



Seismoacoustic insights from the May 22nd, 2016 Iliamna volcano rock and ice avalanche.

Core Technical Competencies

In order to fulfill their mission, GDNP possesses the following CTCs:

- Nuclear Treaty Verification
- Geophysical Measurement and Signature Intelligence
- Instrumentation and Monitoring
- Basic and Applied Geophysics Research

Quick Facts

Location: Fairbanks, Alaska

Sponsor: ODASD(TRAC)

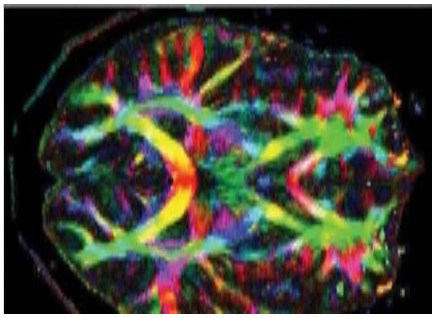
Website: https://watc.alaska.edu/uarc

The GDNP UARC was created to recognize the accomplishments and growing stature of nuclear treaty monitoring support programs at the Geophysical Institute of the University of Alaska Fairbanks.

University of Nebraska, National Strategic Research Institute

Overview

Established in 2012, NSRI is the only UARC in the country dedicated to delivering solutions for Combating Weapons of Mass Destruction (CWMD). With more than two decades of expertise in the detection and identification of chemical and biological agents, NSRI has leveraged this knowledge base to develop new and improved methodologies for detection, identification, and clinical diagnosis of exposure to chemical and biological weapons.



Center for Brain, Biology and Behavior investigates brain injuries and potential neuroloaical basis of decision makina.

Core Technical Competencies

In order to fulfill their mission, NSRI possesses the following CTCs:

- Nuclear Detection and Forensics
- Detection of Chemical and Biological Weapons
- Passive Defense against Weapons of Mass Destruction
- Consequence Management
- Space, Cyber, Telecom Law, including space traffic management

Quick Facts

Location: Lincoln, Nebraska

Sponsor: USSTRATCOM

Website: https://nsri.nebraska.edu/

NSRI is expanding its physical footprint beyond Nebraska to better support defense customers. The NSRI National Capital Region Laboratory and Conference Center opens in Annapolis Junction, Md., and the NSRI Fredericksburg Field Office & Laboratory opens in Fredericksburg, VA.