SPAWAR
Systems Center
PACIFIC

SCIENCE AND TECHNOLOGY

Science and Technology (S&T) Basic and Applied Research initiatives are found in all technical areas. Supporting activities ensure research is forecast, demonstrated, and transitioned in partnership with industry and academia to provide a mechanism for transferring technology from laboratory to the fleet.

SSC Pacific Unique S&T Capabilities

- Basic and applied research
- Support to Defense Advanced Research Projects Agency (DARPA)/Intelligence Advanced Research Projects Activity (IARPA)/Defense Threat Reduction Agency (DTRA/Office of Naval Research (ONR)
- Small Business Innovation Research (SBIR)
- Marine mammals systems and research
- Experimentation management

Growing and strengthening our technical superiority and avoiding surprises from potential adversaries has always been one of the greatest advantages of the U.S. military. SSC Pacific enables this advantage through nurturing the next generation of the Science, Technology, Engineering, and Math (STEM) workforce, looking out 10 years to forecast and instantiate the “next big thing.”

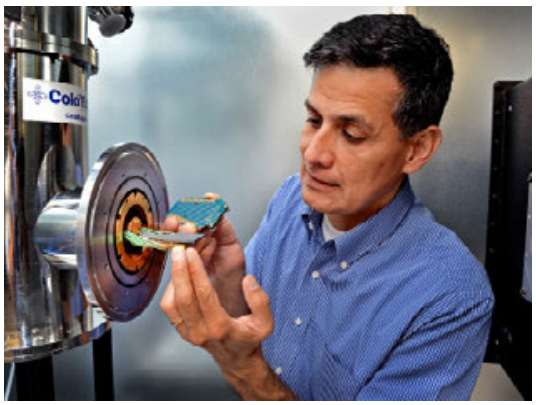
Some of SSC Pacific’s current Science and Technology efforts include:

- **Strategic technology** – integrated underwater systems and designs, communications systems, and navigation
- **Tactical technology** – military capabilities that create asymmetric technological advantages
- **Information innovation** – improved computing power, network bandwidth and storage density, and sensing and measurement technologies
- **Augmented/Virtual Reality** – Heads-Up display capabilities merging data science with the real world
- **Cyber Research and Development** – software immunization, autonomic cyber defense, secure and resilient cloud computing, homomorphic encryption, machine learning and anomaly detection, SCADA and ICS protection, tactical cyber operations, and resilient computing and networking
- **Kinetic Energy Harvesting** – microbial fuel cells used to collect renewable energy from environment for C4I missions
- **Advanced Dynamic Magnetometer (ADM)** – inexpensive, small, mobile sensor with military and civilian applications
- **Graphene-based devices** - photonic detectors, antennas, transistors leverage graphene’s flexibility, transparency, and scalability
- **Cryogenics** – transformational super conducting electronics technologies that improve signals

SSC Pacific's experimentation efforts contribute to building the Fleet of the Future, developing advanced concepts and facilitating the transfer of capabilities to the field. These notable efforts and innovative achievements have led to the issue of 282 patents to SSC Pacific personnel in the last five years.

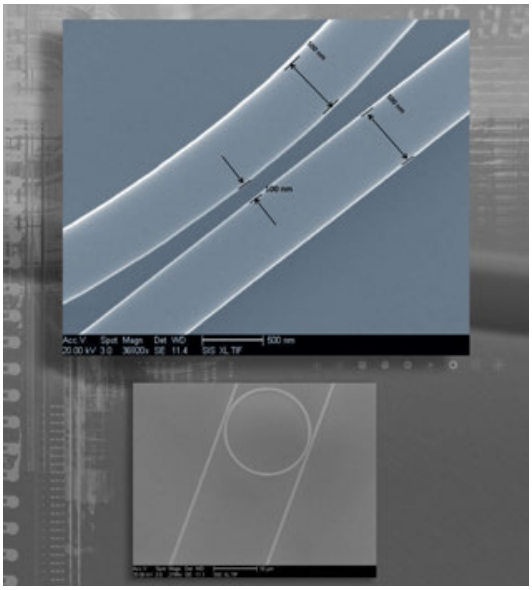
With the Warfighter

SSC Pacific is developing GPS alternatives that will assure the accuracy and integrity of the position, navigation, and timing (PNT) solution during situations when GPS is unavailable. These alternatives will leverage existing shipboard capabilities that are not traditionally part of the navigation solution, but that have access to spatial or temporal information. SSC Pacific is working with the surface fleet to demonstrate these alternatives, which include using a ship's capability to create a line of bearing to a radio frequency emitter whose location is known, to bound the drift of the ship's inertial navigation system. Another example of leveraging already existing shipboard capability to provide PNT information is the use of the ship's satellite communications capability to perform nanosecond-level time synchronization with the rest of the fleet. Demonstration of these capabilities in an operational environment is scheduled for summer 2016.



Dr. Marcio De Andrade, SSC Pacific physicist, prepares a superconducting device for testing at the cryogenic platform located in the Cryogenic Exploitation of Radio Frequency (CERF) lab. (Photo by Alan Antczak.).

Sailors measure wind direction and speed prior to flight operations. (U.S. Navy photo by Mass Communication Specialist 1st Class Ronald Gutridge/Released).



Microscale photonic chips allow for significant reduction of data center power consumption.

Space and Naval Warfare Systems Center Pacific (SSC Pacific)
53560 Hull Street San Diego, California 92152-5001
Public Affairs Office: (619) 553-2717
www.spawar.navy.mil/pacific

SD 1526 • April 2016 JN16286
SSC Pacific, San Diego, CA 92152-5001