Helios

REMOTE SENSING SYSTEMS

HELIOSSENSORS.COM

/ MISSION /

Helios Remote Sensing Systems is a small company with world-class capabilities. Helios delivers innovative state-of-the-art, yet practical sensing solutions to both military and civilian communities. We take cutting edge ideas and turn them into operational systems.

/ VISION /

Helios Remote Sensing Systems is a technology company built on expertise. We focus on thoroughly understanding customer needs and drawing upon our team's extensive experience, creating innovative working solutions, from initial concept through commercialization readiness.

/ VALUES /

Our customers benefit from an agile small business, able to support the needs of the warfighter more quickly and cost efficiently than larger contractors. We emphasize quality, flexibility, and speed in our work and value customer satisfaction above all else.

/ CORE COMPETENCIES /

Our expertise lies in advanced remote sensing systems engineering, advanced radio frequency (RF) signal processing design, artificial intelligence and machine learning, single / multi-sensor high resolution EO / IR / radar imagery exploitation, and related proof-of-concept design, development, and manufacturing. Helios has the necessary expertise to develop technologies within these areas in order to provide a variety of radar, RF, ESM and imagery systems and services.

/ MANAGEMENT /

Janine Szczepanski, Chief Executive Officer, has successfully guided Helios to become a leading small business. Under Janine's leadership, Helios had been selected as Technology Business of the Year for New York State for the variety of technically challenging products under development. In addition, Helios was selected as only one of ten small businesses nationwide to showcase its products to Congress and Defense Advanced Research Projects Agency (DARPA) showcased Helios' man-portable radar products at the Pentagon. As CEO, Janine initiated corporate rebranding, optimized and grew employment, expanded the customer base, and provided management guidance of the general overall business. Janine is the principal owner of Helios Remote Sensing Systems, an economically disadvantaged woman owned small business.

Education includes an MA (2008, Cornell University), BA (2003, Brown University), AAS (2005, Parsons the New School for Design).

Mr. Walter Szczepanski has over 40 years of engineering, technical consultation, and technical management experience in radar systems specification, analysis and design, performance modeling and simulation, radar technology hardware/software development, and digital signal processing design. He has acted in systems and leadership roles of increasing responsibility from employment at General Electric Aerospace and Lockheed Martin, through his current role as President and Chief Scientist at Helios.

Education includes an MBA (1978, Syracuse University), MSEE (1974, Syracuse University), Advance Courses in Engineering (1974, General Electric Co.) and BSEE (1970, University of Cincinnati). Mr. Szczepanski has published numerous papers, reports, proposals, and White Papers.

/ PROFILE /

Founded in 2007, Helios Remote Sensing Systems, Inc. is headquartered in Rome, NY at the Griffiss Business and Technology Park. The Helios team includes a number of recognized radar, electronic warfare, artificial intelligence and machine learning, image analysis, software development, and manufacturing experts. Since its establishment, Helios has secured numerous highly competitive prime contracts from various Government agencies, research labs, and commercial entities.

/ PRODUCTS/

Helios Remote Sensing Systems has developed and is producing the following products:

- Small portable radar systems: Maneuver Assurance Radar System (MARS) Unmanned Ground Vehicle (UGV) variant and Helmet Mounted Radar (HMR) variant, Man-Portable Doppler Radar (MPDR), Sense-Thru-The-Wall Radar (STTW), Structure Occupancy Detector (SOD) Unmanned Aerial System (UAS) variant and Tripod variant

- Atmospheric monitoring radars: Marine Atmospheric Radar for Boundary Layer Estimation (MARBLE) and MPDR

- Electronic Warfare detection and de-interleaving: Cognitive Software Algorithms Techniques

- Intelligence Community products: Wide Area Recognition Engine (AWARE)

/SERVICES /

Helios Remote Sensing Systems provides a full range of capabilities through the following primary areas of expertise:

Artificial Intelligence / Machine Learning technologies include:
- De-interleaving, detection, and classification of agile emitters
- Hybrid machine learning for passive 3-D localization overwater
- Active detection and classification of radar signals as human, animal, adult, child, unarmed, armed, asleep, awake.
- Inverse Synthetic Aperture Radar (ISAR) during Electronic Attack
- Biological-inspired image processing algorithms

Electronic Support & Electronic Intelligence

Electronic Support:
- ESM system architectures and processing
- Digital receiver design, development, and testing
- Signal detection, parameter measurement, feature extraction, pulse clustering, de-interleaving, mode detection, and emitter identification
- LPI signal detection
- Automatic modulation classification
- Interference mitigation
- Time Difference of Arrival (TDOA) / Frequency Difference of Arrival (FDOA) Geolocation

Electronic Intelligence (ELINT):
- System architectures design for processing both radar and communications signals: Design, development, and integration of wide-bandwidth digital receivers for Electronic Support Measures (ESM) systems.
- Development of advanced processing algorithms
  - Signal detection in the presence of interference
  - Parameter measurement and Specific Feature Extraction
  - Radar pulse clustering, de-interleaving, and classification
  - Emitter mode detection and identification.
- Development of wideband signal processing algorithms
  - Detection of Low-Probability of Intercept (LPI) signals
  - Automated modulation detection and classification
  - Geo-location of signals using TDOA/FDOA techniques.

/ SERVICES /

Advanced Radar and RF Technology, System Analysis, Design, & Development

Major radar & RF systems focus areas include:

- Advanced radar architectures: Monostatic, bistatic & multistatic
- Intelligence, Surveillance, and Reconnaissance (ISR) and fighter radar
- Ultra-Wideband (UWB) Sense-Through-The-Wall (STTW) radar
- Multiple Input, Multiple Output (MIMO) radar systems
- Synthetic Aperture Radar (SAR) and Inverse Synthetic Aperture Radar (ISAR) imaging
- Soldier-borne & man-portable radar systems
- Atmospheric & weather radar systems
- Over-The-Horizon Radar (OTHR) systems
- Foliage penetration (FOPEN) radar
- Passive radar applications
- Dismount detection, discrimination, & classification
- Radar tomographic imaging
- Advanced clutter mitigation and adaptive interference suppression
- Diverse waveform transmit and receive processing

Advanced Imagery Exploitation Technology

Relevant advanced imagery exploitation expertise includes:

- Sensor assessments: coverage, predicted performance, single and multi-sensor
- Pre-processing: radiometric calibration, registration, atmospheric correction
- Enhancement: contrast, pan-sharpening, derivative bands, leveraging polarimetric SAR
- Target feature extraction: algorithm development and assessment, multi-level approaches, biological-inspired algorithms (e.g., neural networks, genetic algorithms), anomaly detection, robust performance
- Geospatial reasoning: object attribute correlation, multiple discriminants for increased confidence
- Implementation: workflow, automation, distributed processing

RF and Digital Signal Processing Design & Development

Major RF and digital signal processing technologies include:

- Artificial intelligence and machine learning
- Direct RF to digital sampling
- Detection enhancement: AMTI / GMTI / SMTI / MIMO...
- Clutter suppression: Space-Time Adaptive Processing (STAP), ADPCA, Adaptive MTI...
- Electromagnetic Interference Suppression
- Knowledge-Aided radar signal processing
- Non-linear signal analysis
- Biologically-inspired detection and classification algorithms
- Target discrimination and classification
- Wavelet processing
- Multi-feature extraction & correlation

/ MARKETS/

Helios Remote Sensing Systems provides research and development, technical consulting services, prototype development and manufacturing in support of the Department of Defense (DoD), Department of Energy (DOE), law enforcement, first responders, and various other Government and commercial entities.

/CUSTOMERS /

- U.S. Navy - Naval Sea Systems Command (NAVSEA)
- U.S. Navy - Naval Air Warfare Center (NAVAIR)
- U.S. Navy - Office of Naval Research (ONR)
- U.S. Army – United States Army Special Operations Command (USASOC)
- U.S. Army – Army Futures Command / Army Research Office (ARO) / Army Research Lab (ARL)
- U.S. Army – Combat Capabilities Development Command (CCDC) Armaments Center / CCDC C5ISR Center
- U.S. Army – Soldier Systems Center
- Air Force Research Laboratory (AFRL)
- Defense Advanced Research Project Agency (DARPA)
- Rapid Reaction Technology Office (RRTO)
- Missile Defense Agency (MDA)
- Intelligence Community

/ PARTNERS /

Helios Remote Sensing Systems collaborates with a variety of outstanding research and development institutions and corporations. Recent partners include:

- Applied Research Associates, Inc.
- Cornell Lab of Ornithology
- LandRay Technology, Inc.
- Lockheed Martin Rotary and Mission Systems (LM-RMS)
- Lockheed Martin Missiles and Fire Control (LM-MFC)
- Massachusetts Institute of Technology (MIT)
- Michigan Tech Research Institute (MTRI)
- Millennium Antenna Corporation
- Northrop Grumman
- Sandia National Laboratories
- SRC, Inc.
- State University of New York (SUNY)
- University of Dayton Research Institute (UDRI)
- University of Oklahoma (OU)

/ CORE ADVANTAGE /

Helios maintains a sustainable competitive advantage due to our expert engineering and scientific staff with in-depth, proprietary know-how, and extensive DoD and commercial remote sensing systems experience, enabling creation of unique solutions to difficult engineering and scientific problems, notably with RF systems and imagery exploitation. Helios then has extensive experience with prototyping, developing, implementing, demonstrating and manufacturing to deliver products for customer use.

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