

Thomas W. Cooley, PhD.

Objective: A challenging opportunity which will capitalize on my 35 years of proven senior leadership competencies, innovative skills, technical know-how, government SES-level proficiency, and subject matter expert in domain space technologies.

PROFESSIONAL EXPERIENCE:

President, TC Space Consulting, LLC

Mar 2023 – Present

Advise space technology companies, academic institutions, and other enterprises to meet the technical, policy and organizational challenges faced to bring ideas to fruition. Apply technical knowledge and senior level government experience to develop strategic roadmaps to navigate policy and government rules to enable new innovative capabilities to emerge in the space eco-system. Expertise provided spans the realm of acquisition, launch, space operations, advanced remote sensing, resource exploitation, communication systems, Space Situational Awareness, resiliency, and in-space maneuver & services.

Air Force Research Laboratory (AFRL), Albuquerque, New Mexico

1998 – Mar 2023

DoD Space Community of Interest Lead, OUSD(R&E)

2015 - Mar 2023

Primary space science and technology leader for DoD; Represent DOD on White House interagency committees; led development of Space S&T framework for stand up of US Space Force; Coordinate Space S&T investments across Air Force, Army, Navy, DARPA, MDA and USSF; Lead international engagements with allies on multiple Space S&T efforts.

Chief Scientist (ST), Space Vehicles Directorate (AFRL/RV), KAFB NM

2017 - 2022

Primary space science and technology leader for AFRL/RV, leading space technology investments. Responsible for planning and oversight of technical quality of annual ~\$200M Space Force science and technology program and >\$100M in externally funded research and development funding. Oversee scientific quality and new investments to ensure game-changing technologies are pursued. Act as the OSD Space Community of Interest lead for all space-related science and technology issues across the DoD >\$500M/yr. investment. Senior Technical lead for 600 civilian & military employees, and a member of the Scientific and Technical (ST) cadre of the Senior Executive Service (SES) for the Space Force.

Senior Technical Advisor (ST), AFWERX & SpaceWERX

2021-2022

Strategic lead for Department of Air Force Small Business programs. Evaluated, assessed, made recommendations for organizational change, and led organizational change to improve efficacy for program administering ~\$900M of appropriated funds designated to spur innovation through small businesses. Engaged innovation eco-system from small company accelerators run by AFWERX to Venture Capital firms creating co-funding structures and communication channels for strategic partnerships.

Senior Scientist for Space Situational Awareness (ST), Directed Energy Directorate, 2015 - 2017

Led Air Force Science and Technology enterprise for Space Domain Awareness (SDA) including space flight experiments, ground-based observations, and data processing programs. Initiated multiple internal and collaborative programs to enhance space surveillance technology & capabilities, working across academia, international partners, US acquisition & operational units to deliver needed capabilities. Translate SDA requirements into research activities to address the full range of needs for US Gov't. Initiated SDA data libraries to incorporate commercial and allied data for dramatically improved space object observations.

Space ISR Mission Lead, AFRL Sensors Directorate, WPAFB & KAFB.

2012 - 2015

Responsible for all AFRL space based ISR investments and coordination for AFRL of all related technology programs. Directed studies to support technical investment decisions. Create investment planning documents directing technical objectives. Guided all AFRL customer interfaces for programs in ~\$50M investment portfolio; and supported wide range of space ISR system acquisitions and program evaluations/reviews. Provided AF with vision of what "can be" based on user needs and current and future technologies. Led, directed and supported studies including Hypertemporal Military Utility Study, Missile Defense Analysis of Alternatives (AOA), Overhead Persistent Infra-Red (OPIR) AOA (for MDA), and AF Weather AOA.

TacSat-3 Principal Investigator and Program Manager, AFRL, KAFB

2009- 2012

Charged with leading team efforts from design through launch and operations of TacSat-3/ARTEMIS (Advanced Responsive Tactically Effective Military Imaging Spectrometer). Responsible for managing all aspects of ~\$110M program successfully through launch, on-orbit checkout and highly successful 12-month science validation campaign. Skillfully managed international and interagency team for all operations and experimentation to produce both sound scientific results and innovative new products for multiple military users. Responsible for crafting/maintaining international projects and interagency agreements to dramatically enhance the AFRL investment with high value experimentation and utility assessment. Led the technical team of government and contractors to successfully solve on-orbit technical and operational challenges. Provided detailed information to senior leaders throughout US Government, partnering allies and appropriate information to open media. Worked with data users, requirements organizations and acquisition agencies to define the next generation of affordable imaging spectrometers, both airborne and space-borne, based on the success of ARTEMIS.

Hyperspectral Exploitation PM & PI, AFRL, KAFB

2000 – 2009

Led Hyperspectral Imaging (HSI) space initiatives including development of TacSat-3/ARTEMIS. Authored multiple spectral remote sensing road maps, security/policy, military utility studies, papers and experiment design documents. As Principal Investigator, managed tech validation for space demonstration systems and established strategic partnering to leverage government resources from NASA, SMC, NASIC and many other US government organizations or international allies. Managed research activities of ~10+ civilian employees, ~5-10 military employees and many in-house and external contractors (~20 to 50) to advance sensor and algorithm technologies. Conducted research and published advances in HSI exploitation for military applications and HSI fusion with other sensors. As recognized world leader in imaging spectroscopy technology, advised DoD and Intelligence Community (IC) agencies on current technology, critical investments and strategic international partnerships. Led US government wide consortium on atmospheric modeling and inversion techniques including DoD, Civil and IC communities. Led and organized international workshops on imaging spectroscopy technologies including: sensor design, algorithms, calibration, atmospheric compensation and data fusion with other sensor modalities. Invited to speak at classified & international meetings related to imaging spectroscopy technologies and programs. Responsible for directing and overseeing AF validation efforts on multiple

satellite systems including NASA Hyperion, TacSat-3/ARTEMIS and various classified programs. Led technical studies including ORS-1 feasibility and acquisition planning study, Hyperspectral Military Utility Study, and various technology assessment studies.

Warfighter-1 Hyperspectral Space Demonstration PI, AFRL/KAFB 1998 – 2001

Led HSI algorithm development effort for Warfighter-1 program, an early commercial partnership for dual use remote sensing space capabilities. Manage technology validation for Warfighter-1 and advanced AF interests through participation in interagency HSI licensing and classification deliberations. Managed research activities of contractors to assess total system performance. Conducted research and published regularly in HSI exploitation for tactical applications and HSI fusion with other sensors.

Senior Member Technical Staff, Nichols Research Corporation, Albuquerque, NM. 1995-1998

Conducted research at AF Phillips Lab on passive remote sensing satellite systems for future DoD imagers. Research included: ‘smart sensor’ focal plane arrays using analog neural networks; simulated using software and optical testbed; robust atmospheric removal algorithms for multi-spectral (MSI) and HSI imaging systems; discrimination algorithms for HSI data from visible to LWIR; Data fusion of MSI/HSI image data. Led technical activities of spectral sensing program including two programmers and three engineers.

Post-Doctoral Research Scientist, Centre d’Etudes et de Recherches de Toulouse (CERT ONERA), Complex Scientifique de Rangueil, Toulouse, France. 1995

Performed Centre National d’Etudes Spatiales (CNES, the French Space Agency) funded research on the effect of measurement scale for remote sensing calibration and operational analysis with specific application to future instrument calibration. Created computer model of physical phenomena for passive remote sensing in visible and IR bands. Worked with CERT, CNES and other French agency personnel to create physical/radiative model for improved MSI sensor calibrations (for SPOT).

NASA Graduate Fellow, University of Arizona Optical Sciences Center, Tucson, AZ. 1991-1995

Modeled remote sensing systems including NASA LITE (Lidar In-space Technology Experiment), eye-safe diode and water vapor dial lidar, and optical radiometer systems. Realized comprehensive multimode model for diode-laser differential absorption lidar. Designed/implemented correlative measurement calibration campaigns for IR channel of LITE; performed analysis for calibration from desert playa. Worked with NASA and LITE Science Steering Group to ensure valid surface calibration. Performed sensitivity study and inversion for atmospheric aerosol characteristics using atmospheric radiative transfer code.

Member Technical Staff, Jet Propulsion Laboratory (JPL), Pasadena, CA. 1988-1991

Led development and testing of millimeter wave phased array antenna for breadboard demonstration of GaAs Monolithic Microwave Integrated Circuits (MMICs) for future spacecraft transmit systems. Designed/tested MMICs and other microwave components and systems. Implemented and tested MMIC water vapor radiometer and superconducting microwave filter for space experiment.

EDUCATION:

Ph.D. Optical Sciences, University of Arizona, Tucson, AZ, 1995

M.S. Electrical Eng. & Applied Physics, California Institute of Technology, Pasadena, CA, 1991

B.S. Electrical Engineering, Rensselaer Polytechnic Institute, Troy, NY, 1988

SELECT AWARDS AND HONORS:

Fellow, Air Force Research Laboratory (2011)
Society of Photographic Instrumentation Engineers (SPIE), Fellow (2016) and Associate Editor for Optical Engineering
American Institute of Aeronautics and Astronautics (AIAA), Associate Fellow (2006), and Space Systems Technical Committee
2011 AIAA Top Space Experiment Award
2010 C4ISR Journal “Big 25” Award overall winner, for Tactical Satellite-3
2010 & 2001 AFRL Commander’s Cup Team Award
2009 Harold Gardiner Director’s Cup Award, AFRL/RV
2008 AFRL International Team Award (team lead & program manager)
2007 1st Quarter Division International Award
2006 4th Quarter Division Technology Transfer Achievement Award (Team Lead)
2005 AFRL Annual Scientific/Technical Management Individual Award Finalist
2004 AFRL Space Vehicles Directorate Annual Scientific/Technical Management Award
2002 3rd Quarter Directorate Outstanding Leadership Award
2001 AFRL/Space Vehicles Directorate Annual Scientific/Technical Achievement Team Award
2000 4th Quarter Directorate Leadership Award
Various Certificates for Acquisition Leadership, SAB Leadership and other activities
NASA Graduate Fellowship, 1991-94
U.S. Patent - Miniature Modular Microwave end-to-end Receiver; Granted June 8, 1993.
Multiple NASA *Certificate of Recognition* 1990-1992
1994-1988 -Rensselaer Scholastic Scholarship recipient

CAREER-RELATED TRAINING AND ADDED SKILLS:

USAF Air War College, Distance Learning Program, Air University, Oct 2007
APDP Level 3 Systems Planning, Research, Development and Engineering (SPRDE), Feb 2002
Acquisition Center of Excellence (ACE) training for acquisition professionals (2012)
Air Force Advanced Contract Law Course, Mar 2004
Air Force Intellectual Property and Proprietary Rights Course, Mar 2004
DAU Program Management Tools Course (PMT 250) Oct 2002
President, Graduate and Professional Student Council, University of Arizona, 1993-94
Board of Directors; National Association of Graduate and Professional Students (NAGPS), 1994.
Proficient in written and spoken French

PUBLICATIONS:

- Co-author: Manolakis D., Lockwood R., Cooley T., **Hyperspectral Imaging Remote Sensing, Physics, Sensors, and Algorithms**, 2016 *Cambridge University Press*
- Over 70 publications, list available on request including:
 - 10 refereed, journal publications (including Classified Journals):
 - >14 DoD Studies or Reports, published in DTIC or in media
 - 59 Contributed conference papers.

PROFESSIONAL AND RELATED ACTIVITIES:

- Earth System Observatory (ESO) Independent Review Board (IRB); May - October, 2022
- New Space New Mexico Advisory Board & Subject Matter Expert, May, 2018-Present
- SPIE Fellow

- Associate Editor for Optical Engineering: space optical systems, 2014-2017
 - Technical Committee for Imaging Spectroscopy Conference (multiple years)
- AIAA Associate Fellow & invited speaker, national award recipient
- Senior Member, Institute of Electrical and Electronics Engineers (IEEE),
- Independent reviewer for Department of Energy Remote Sensing Programs
- National Academy of Sciences – Invited Panel Member performing review of Small Satellite Programs (2010)
- Contributor to STRATCOM Scientific Advisory Panel (2012-2015)
- Lead for various Agency Studies