

## **Melanie N Ott**

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### **Professional Experience**

30 years of experience with developing optical fiber, photonic and optoelectronic technologies and subsystems for space flight and harsh environments.

**2025 Co-owner, Senior Engineer** Lightworker Photonics LLC.

**2021 - 2024 Consultant** for high reliability optical fiber assemblies for harsh environments.

**1994 - 2021 Distinguished Aerospace Instrument Engineer**, NASA Goddard Space Flight Center (GSFC) Greenbelt MD. Ott served as a senior engineer and photonics expert for challenging environments, as the NASA Photonics Group team creator and leader. Beginning in the late 1990s, she managed several programs focused on qualifying optoelectronic components and fiber optic assemblies. As lead hardware engineer, she oversaw development, testing, manufacturing, and integration of various optical fiber and photonic subsystem projects and was responsible for all requirements, contracts, budget, schedule and design reviews from the group. For 11 years, she worked at GSFC as a contractor with companies such as Unisys, Swales, SigmaSpace, MEI, before becoming a Civil Servant in 2005. Her key skills are in designing high reliability custom photonic solutions suited for harsh space, military and industry applications.

- **Primary Development Lead (PDL)** project/mission lead engineer; production and qualification on multiple flight projects simultaneously for development of fiber optics and photonics for missions requiring high performance, stability and reliability. Responsible for multiple space act agreements with universities and industry to support instrument development from design to integration including: Lucent, Space Systems Loral, Univ of Az, Northrup Grumman, Boeing, etc.
- **Components engineer**; Provided senior leadership in packaging design, development, manufacturing processes, testing, and screening, as well as the qualification and integration of devices such as laser components and optoelectronics. Provided expertise on integrated optics, semiconductor sources and detectors, mini lidar elements, and fiber optic assemblies and subsystems used in telescopes, communication equipment, spectroscopy, ranging devices, and lidar systems. Especially recognized for development of complex optical fiber arrays in partnership with Fred Taulgwalder from Diamond SA.
- **Expert** for applying risk mitigation lessons learned from building highly reliable hardware from commercial technologies and was a frequent invited speaker at events and conferences around the world. Ott Co-Chaired at events like International conference on space optics (ICSO) in Europe alongside Dr. Nikos Karafolas. She was an invited presenter at SPIE, OSA, IEEE (NSREC) and ISROS. Ott made herself available for consulting on radiation effects and packaging to alleviate optical degradation modes for prime industry partners such as WL

Gore, Lucent, Spectran, Micropac, Diamond, Polymicro, Space Photonics and Carlisle, USConnect, Gooch and Housego, Nufern, Lightpath, OFS, Ball, Honeywell etc.

- **Failure Modes Expert** in optical and photonic devices, with a focus on their degradation under environmental stresses like vibration, thermal, vacuum, and radiation. Ott's hands-on expertise in fiber optic packaging and upjacketing improved quality standards and integration for NASA, government agencies, and industry.

#### **NASA mission summary between 1994-2021;**

- **1994-2021: NASA Parts and Packaging Program:** Advised on photonics and optical fiber technologies, developing testing standards for fiber optic interconnects in harsh environments. Contributed to global optical fiber test standards for vibration, thermal, and radiation verification with IEEE, SAE, JEDEC, ESA, and CNES. Assessed integrated optical modulators, fiber interconnects, radiation effects, and commercial lidars for flight. Best known for radiation database papers on optical fiber.
- **1998-2000: Ice, Cloud, and land Elevation Satellite, (ICESat) Geoscience Laser Altimeter System (GLAS),** fiber optic hardware consultant and test engineer.
- **1998-2010: Sandia National Labs,** Hardware lead for interagency agreements to provide qualification on extra-vehicular optical assemblies (12 Mrad radiation exposure environment) with MTP array connectors.
- **1999-2004: Mercury Laser Altimeter** on MESSENGER, lead fiber optic hardware engineer
- **2003-2008: Lunar Reconnaissance Orbiter, Laser Ranging Mission and the Lunar Orbiter Laser Altimeter (LOLA),** lead system engineer, fiber optic array assembly design to integrations on multiple subsystems across the LRO.
- **2004-2021 Laser Interferometer Space Antenna (LISA)** fiber optics component expert for studies on feasible commercial options for early LISA development. Fiber optics lead for space flight optical assemblies (along with Dr. Linda Mondin from European Space Agency) for the Glasgow Univ. UK.
- **2007-2009: Express Logistics Carrier for International Space Station (ISS)** transceiver packaging consulting; optical fiber subsystem production, test and integration for ISS requirements.
- **2007-2010; Mars Science Lab ChemCam on the Mars Rover Curiosity,** development, test, and fabrication of the flight optical fiber and multi fiber spectrometer array assemblies delivered to JPL. Difficult environmental requirements due to external placement on instruments for both radiation and thermal range.
- **2008-2017: James Webb Space Telescope.** high performance, reliable, cryogenic ground support assemblies delivered to ISM Optics team, Ball Aerospace, and GSFC integration at JSC.
- **2012-2017: ICESat-2 Advanced Topographic Laser Altimeter (ATLAS)** Fiber Optic Subsystem (lead system engineer). Services including qualification of components: Q-switch, laser diodes; mechanical interfaces for optical components; optical array assemblies development, qualification and integration.
- **2013-2016: Advanced Exploration System's Ka-Band Objects Observation and Monitoring System (KaBOOM),** Co-Investigator – optical fiber phase system implemented at Johnson Space Center.
- **2016-2018: Global Ecosystem Dynamics Investigation Lidar (GEDI);** lead fiber optic engineer, led the Photonics group for the Beam Dithering Unit laser component support activities, the laser fiber feedthrough, the Bench Checkout Equipment electro/optical rack.

- **2016-2018 SuperCam Mars2020 Rover**, lead for optical fiber assembly hardware similar to Chemcam.
- **2017–2020; Europa Clipper, Interior Characterization of Europa using Magnetometry (ICEMAG)** optical fiber lead @ GSFC for JPL extreme radiation and cryogenic requirements.
- **2019-2021; Roman Space Telescope**: Lead fiber optic and photonics lead for wide field instrument optoelectronics development from commercial parts.
- **2003-2021; Optoelectronic device/component qualification** and technology maturation (laser diodes, detectors, modulators, etc) for: ITT Rochester, GSFC’s Solar Orbiter Mission, Satellite Servicing Capabilities Office, Mars Organic Molecule Analyzer (MOMA) Mission, ICESat-2 Mission, Origins Spectral Interpretation Resource Identification Security Regolith Explorer (OSIRIS-Rex), University of Arizona (Mars mission), Roman Space Telescope, Lucy Mission.
- DOE Q, DoD TS SI/TK as of 2021.

### **Education**

- Associates of Science in Engineering, Howard Community College, Columbia MD, 1987.
- Bachelors of Science in Electrical Engineering, Virginia Polytechnic Institute and State University, 1989.
- Masters of Science in Electrical Engineering: Optics, Virginia Polytechnic Institute and State University, 1993.

### **Patents**

July 31, 2018 Patent number 10036632, “System to perform radio frequency interferometry using optical fiber sensing signal processing techniques”, Melanie N Ott, William J. Thomes, Eleanya E. Onuma.

August 18, 2002 Patent number 6445861, “Sol-gel processing to form doped sol-gel monoliths inside hollow core optical fiber and sol-gel core devices made thereby,” Harry C. Shaw, Melanie N. Ott, Michele V. Manuel.

### **Honors/Awards**

2001 Directorate Award, Contractor Excellence Award for Customer Service.

2003 NASA Group Achievement Award, ICESat Geoscience Laser Altimeter System.

2004 NASA GSFC Mercury Laser Altimeter Instrument Team.

2007 NASA Agency Honor Award, Exceptional Service Medal for leadership and world recognition of the photonics group.

2008 NASA Honor Award, the LOLA Development Team on LRO.

2008 NASA Honor Award, The Laser Ranging Development Team on LRO.

2008 NASA Robert H Goddard Award, Exceptional Achievement in Engineering for LRO.

2010 NASA GSFC AETD Science & Technology Advancement Award, Photonics Group.

2013 NASA Agency Honor Award, Exceptional Achievement Medal for Innovation for fiber technology in 2013.

2018 -2021 Principal Investigator: NASA Space Technology Mission Directorate, Game Changing Development Program: InP (Laser) Integrated Photonics (Circuit) Evaluation: TRL Enhancement Project

2018 – 2021 NASA Goddard Senior Fellow; advisor to the center director Chris Scolese as part of the GSFC Senior Fellows.

**Related Publications (please see <https://photonicsarchive.com>)”**

- Justin R Crepp, et al. [“Resolving the Young 2 Cygni Runaway Star into a Binary Using ILocator.”](#) the Astronomical Journal, American Astronomical Society Volume 169:48 December 2024.
- Melanie N. Ott, Cameron H. Parvini, Hali L. Jakeman, W. Joe Thomes, Eleanya E. Onuma [Space Flight LiDARs, Navigation & Science Instrument Implementations: Lasers, Optoelectronics, Integrated Photonics, Fiber Optic Subsystems and Components](#), SPIE Photonics West 2020 Conference, February 4, 2020.
- Melanie N. Ott, Cameron H. Parvini, Hali L. Jakeman, W. Joe Thomes, Eleanya E. Onuma [Space Flight LiDARs, Navigation & Science Instrument Implementations: Lasers, Optoelectronics, Integrated Photonics, Fiber Optic Subsystems and Components](#), invited paper, SPIE Photonics West 2020 Conference, February 4, 2020.
- Melanie N. Ott, [Photonics for Space Flight Instruments](#), The NEPP Annual Electronics Technology Workshop Presentation, June 2019.
- Melanie N. Ott, [Implementation of Commercial Components in Space Flight Optical Science Instruments](#), Plenary Presentation, The Optical Society of America: Workshop on Optics in Space, Melbourne, FL, May 2019.
- Melanie N. Ott, [Development and Qualification of Space Flight Hardware for Optical Systems](#), Panel Presentation, Optical Fiber Communications (OFC), Session on Space Photonics; Disruptive Satellite Laser Communications and Astro photonics, San Diego CA, March 2019. Melanie N Ott, William J Thomes, Eleanya E. Onuma, “System to Perform Radiation Frequency Interferometry Using Optical Fiber Sensing Signal Processing Techniques,” application for patent publication data; May 24, 2018
- Melanie N Ott, W. Joe Thomes, Eleanya Onuma, Robert Switzer, Richard Chuska, Diana Blair, Erich Frese, Marc Matysek, "The fiber optic system for the Advanced Topographic Laser Altimeter System (ATLAS) instrument," SPIE Planetary Defense and Space Environmental Applications Vol. 9981, August 2016.
- Barry Geldzaher et al., “Real-Time Atmospheric Phase Fluctuation Correction Using a Phased Array of Widely Separated Antennas: X-Band Results and Ka-Band Progress,” Advanced Maui Optical and Space Surveillance Technologies Conference, AMOS Proceedings, September 2016. <https://amostech.com/2016-technical-papers>.
- W. Joe Thomes, et al. “Cryogenic fiber optic assemblies for space flight environments: design, manufacturing, testing and integration,” SPIE Planetary Defense and Space Environment Applications, Vol. 9981, September 2016.
- Barry Geldzaher et al., “First Results of Coherent Uplink from a Phased Array of Widely Separated Antennas: Steps Toward Real-Time Atmospheric Phase Fluctuation Correction for a High Resolution Radar System,” Advanced Maui Optical and Space Surveillance Technologies Conference, AMOS Proceedings, September 2015. <https://amostech.com/2015-technical-papers>.
- Barry Geldzaher et al., “Field Demonstration of Coherent Uplink from a Phased Array of Widely Separated Antennas: Steps Towards a Verifiable Real Time Atmospheric Phase Fluctuation Correction for a High Resolution Radar System,” Advanced Maui Optical and Space Surveillance Technologies Conference, AMOS Proceedings, September 2014. <https://amostech.com/2014-technical-papers>.

- Ben Gallagher, Scott Knight, Allison Barto, W. Joe Thomes, Melanie Ott, "JWST ASPA fiber optic development for testing at 2.12 um," SPIE Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation, Vol 9151, August 2014.
- Roger C. Wiens et al. "The ChemCam Instrument Suite on the Mars Science Laboratory (MSL) Rover: Body Unit and Combined System Tests, Springer Space Science Reviews, Vol. 170, Issue 1-4, pp 167-227, September 2012.
- W. Joe Thomes, John Cavanaugh, Melanie Ott, "Proton radiation testing of laser optical components for NASA Jupiter Europa Orbiter Mission," SPIE Conference on Nanophotonics and Macrophotonics for Space Environments V, Vol. 8164, September 2011.
- Melanie Ott, W. Joe Thomes, Richard Chuska, Robert Switzer, Diana Blair, "Small form factor optical fiber connector evaluation for harsh environments," SPIE Conference on Nanophotonics and Macrophotonics for Space Environments V, Vol. 8164, September 2011.
- W. Joe Thomes, Melanie Ott, Richard Chuska, Robert Switzer, Diana Blair, "Fiber optic cables for transmission of high-power laser pulses," International Conference on Space Optics, Proceedings Vol. 10565, October 2010.
- C. Lindensmith W. T. Roberts, M. Meacham, M. N Ott, F. LaRocca, W. J. Thomes, "Development and qualification of a fiber optic cable for Martian environments," International Conference on Space Optics, Proceedings Vol. 10565, October 2010.
- W. T. Roberts, et al. "Mult-mode optical fibers for connecting space-based spectrometers," Proceedings International Conference on Space Optics, Vol. 10565, Rhodes Island Greece, October, 2010.
- Melanie N. Ott, "Space flight applications of optical fiber: 30 years of space flight success," IEEE Aerospace Fiber-Optics and Photonics Technology (AVFOP) Conference, September 2010.
- Victor Scarpine, Stephen Kent, Susana Deustua, Michael Sholl, Stuart Mufson, Melanie Ott, Matthew Wiesner, Brian Baptista, "The ring of fire: an internal illumination system for detector sensitivity and filter bandpass characterization," SPIE Conference on Space Telescopes and Instrumentation 2010, Optical Infrared and Millimeter Wave, Vol. 7731, August 2010.
- David Smith et al. "The Lunar Orbiter Laser Altimeter Investigation on the Lunar Reconnaissance Orbiter Mission," Springer Space Science Reviews, Vol. 150, Issue 1-4, pp 209-241, January 2010.
- Maria T. Zuber et al. "The Lunar Reconnaissance Orbiter Laser Ranging Investigation," Springer Space Science Reviews, Vol. 150, Issue 1-4, pp 63-80, January 2010.
- Melanie N. Ott et al, "The fiber optic subsystem components on the Express Logistics Carrier for International Space Station," IEEE 35<sup>th</sup> European Conference on Optical Communication, pp 1-4, September 2009.
- Melanie N. Ott et al. "The optical fiber array bundle assemblies for the NASA Lunar Reconnaissance Orbiter," International Conference on Space Optics, Proceedings Vol. 10566, October 2008.
- Melanie N. Ott et al. "Applications of optical fiber assemblies in harsh environments: the journey past, present, and future," SPIE Conference on Optical Technologies for Arming, Safing, Fuzing, and Firing IV, Vol. 7070, September 2008.

- William Thomes, Frank LaRocca, Robert Switzer, Melanie Ott, Richard Chuska, "Vibration performance comparison study on current fiber optic connector technologies," SPIE Conference on Optical Technologies for Arming, Safing, Fuzing, and Firing IV, Vol. 7070, September 2008.
- Melanie N. Ott, Robert Switzer, Richard Chuska, Frank LaRocca, William Joe Thomes, Shawn Macmuphy, "Development, Qualification, and Integration of the Optical Fiber Array Assemblies for the Lunar Reconnaissance Orbiter," SPIE Optics and Photonics Conference, Nanophotonics and Macrophotonics for Space Environments II, Vol. 7095, San Diego CA, August 2008.
- Melanie Ott, "Qualification and Lessons Learned with Space Flight Fiber Optic Components," Invited presentation to Optical Society of America (OSA) Conference; Frontiers in Optics 2007/Laser Science XXIII/Organic Materials and Devices for Displays and Energy Conversion/Space-Qualification of Materials and Devices for Laser Remote Sensing Instruments I, (FiO 2007) September 16-20, 2007.
- William Thomes, Frank LaRocca, Melanie Ott, Xiaodan "Linda" Jin, Richard Chuska, Shawn MacMurphy, Tracee Jamison, "Investigation of hermetically sealed commercial LiNbO<sub>3</sub> optical modulator for use in laser/LIDAR space-flight applications," SPIE Optics and Photonics Conference, Nanophotonics and Macrophotonics for Space Environments, Vol. 6713, September 2007
- X. Jin, et al. "Space Flight Qualification on a Novel Five-fiber Array Assembly for the Lunar Orbiter Laser Altimeter (LOLA) at NASA Goddard Space Flight Center," SPIE Optics and Photonics Conference, Photonics Technology for Space Environments II, Vol. 6713, Aug 28, 2007
- Melanie N. Ott, Xiaodan "Linda" Jin, Frank V. LaRocca, Adam J. Matuszeski, Richard F. Chuska, Shawn L. Macmurphy, "Requirements Validation Testing on the 7 Fiber Array Connector/Cable Assemblies for the Lunar Reconnaissance Orbiter (LRO)," Invited paper, SPIE Optics and Photonics Conference, Photonics Technology for Space Environments II, Vol. 6713, Aug 28, 2007.
- Melanie Ott, et al. "Photonic component qualification and implementation activities at NASA Goddard Space Flight Center," SPIE Optics and Photonics Conference on Photonics for Space Environments XI, Vol. 6308, August 2006.
- Xiaodan "Linda" Jin, Melanie N. Ott, Frank V. LaRocca, Ronald M. Baker, Bianca E.N. Keeler, Patricia R. Friedberg, Richard F. Chuska, Mary C. Malenab, Shawn L. Macmurphy, "Space Flight Qualification on a Multi-Fiber Ribbon Cable and Array Connector Assembly," International Society for Optical Engineering, SPIE Optics and Photonics Conference on Photonics for Space Environments XI, Photonics Technologies for Radiation Environments II, Vol. 6308, August 2006.
- Melanie N. Ott, D. Barry Coyle, John S. Canham, and Henning W. Leidecker, "Qualification and issues with space flight laser systems and components," Proc. SPIE Conference on Solid State Lasers XV: Technology and Devices, Vol. 6100, 1-15 pp. February 28, 2006.
- Jonathan Rall, Joseph Kujawski, Mike Obland, Melanie Ott, "Multi Spectral Lidar (MSL)," SPIE, Lidar Technologies, Techniques, and Measurements for Atmospheric Remote Sensing, Vol. 5984, November 2005.

- Melanie N. Ott, "Validation of Commercial Fiber Optic Components for Aerospace Environments" SPIE Conference on Smart Structures and Materials, Smart Sensor Technology and Measurement Systems, Vol. 5758, March 2005.
- C. Barnes, M. Ott, et al, "NASA Electronics Parts and Packaging (NEPP) Program: assurance research on optoelectronics," SPIE proceedings Conference of Photonics for Space Environments X, Vol. 5897, August 2005.
- Melanie N. Ott, Marcellus Proctor, Matthew Dodson, Shawn Macmurphy, Patricia Friedberg, "Optical Fiber Cable Assembly Characterization for the Mercury Laser Altimeter," International Society for Optical Engineering, SPIE AeroSense Conference on Enabling Photonic Technologies for Aerospace Applications V, Proceedings Vol. 5104, April 2003.
- Melanie N. Ott, Shawn Macmurphy, Patricia Friedberg, "Characterization of a twelve channel optical fiber, ribbon cable and MTP array connector assembly for space flight environments," International Society for Optical Engineering, SPIE Aerosense Conference Proceedings on Enabling Photonic Technologies for Aerospace and Applications IV, Vol. 4732, April 2002.
- Melanie N Ott, "Radiation effects data on commercially available optical fiber: database summary," IEEE 39<sup>th</sup> Annual International Nuclear and Space Radiation Effects Conference: Radiation Effects Data Workshop, pp 24-31, July 15-19, 2002.
- Melanie Ott and Patricia Friedberg, "Technology Validation of Optical Fiber Cables for Space Flight Environments," SPIE Conference on Optical Devices for Fiber Communication II, Vol. 4216, 2000.
- Melanie N. Ott, "Electron Induced Scintillation Testing of Commercially Available Optical Fibers for Space Flight," Nuclear and Space Radiation Effects Conference Data Workshop Proceedings, Norfolk, Virginia, July 1999.
- Melanie Ott, "Fiber optic cables assemblies for space flight II: thermal and radiation effects," International Society for Optical Engineering, Conference on Photonics for Space Environments VI, SPIE Proceedings Vol. 3440, October 1998.
- Melanie Ott, Joy Bretthauer, "Twelve Channel Optical Fiber Connector Assembly: From Commercial off the Shelf to Space Flight Use" International Society for Optical Engineering, Conference on Photonics for Space Environments VI, SPIE Proceedings Vol. 3440, 1998.
- Kenneth A. LaBel, Cheryl J. Marshall, Paul W. Marshall, Philip J. Luers, Robert A. Reed, Melanie N. Ott, Christina M. Seidleck, and Dennis J. Andrucyk, "On the Suitability of Fiber Optic Data Links in Space Radiation Environment: A Historical Scaling Technology Perspective," IEEE Aerospace Conference, Volume 4 , 1998, Page(s): 421-434.
- Melanie Ott, Jeannette Plante "Fiber optic cable assemblies for space flight applications: issues and remedies," American Institute of Aeronautics and Astronautics/Society of Automotive Engineers World Aviation Congress Anaheim, CA, Oct 1997.
- Ott hosted a website in the area of photonics, fiber optics, and laser subsystems for 30 years. The archive of which is available: <https://www.photonicsarchive.com>. For now the link has been severed to photonics.gsfc.nasa.gov due to resource issues.