

James Lux, P.E.

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SunRISE Project Manager, Astronomy and Physics Directorate.

JPL Data Standards Manager, Interplanetary Networking Directorate

(818)354-2075 ofc, (818)395-2714 cell

jimlux@jpl.nasa.gov

## **Summary of experience**

### **JPL Data Standards Manager – June 2024 – present**

Jim manages the development and promulgation of data standards, particularly with respect to the CCSDS standards process. He coordinates the activities of about a dozen participants in the standards process: Working group chairs, deputies, and participants, as well as area directors and deputies. He also participates in several of the working groups.

### **SunRISE Project Manager – August 2016 - present**

Jim is the project manager for SunRISE, a Risk Class D, JPL Type II mission sponsored by the Heliophysics Division of NASA Science Mission Directorate, currently scheduled for launch in Late 2025. SunRISE will fly six spacecraft in a constellation just above GEO to image the Sun at low radio frequencies. He has been project manager since the Step 1 proposal, through Phase A/Step 2, the Site Visit, Extended Phase A, Phases B and C, and now into Phase D.

### **Iris SDL Contract Technical Manager – July 2015 – January 2020**

Jim was the task manager and contract technical manager for the production of six Iris radios at Space Dynamics Lab in Logan, Utah. The Iris is a JPL designed and prototyped (for MarCO) software defined Deep Space Transponder for Class D cubesat missions. These transponders were, for the most part, destined for cubesats on the Artemis 1 launch. He was responsible for working with the subcontract manager for subcontract mods, issuing technical direction memos, working through technical problems, coordinating with JPL subject matter experts to assist SDL when needed. He also worked with the 6 mission specific JPL Telecom Cognizant Engineers to coordinate deliveries among the six, ensure that the radios were correctly configured, and that SDL's test campaign met the needs of the mission using the radio. Jim received the NASA Exceptional Public Achievement Medal for this work.

### **Task Manager, DARPA High Frequency Research (DHFR) Testbed – February 2015 – July 2018**

Jim managed the development and delivery of 2 3U Cubesats as the DARPA High Frequency Research (DHFR) Space Testbed, incorporating a sensitive HF receiver and

crossed dipole antennas. Mr. Lux was responsible for the initial proposal and task plan development in early 2016, management of schedule and resources for the project and tailoring JPL processes for a fast moving (18-month) development leading to a launch in August 2017, and another in December 2017. He also served as the instrument architect, working with the DARPA sponsor, the JPL Project System Engineer (PSE) and the JPL Science team to clarify science requirements, define system, spacecraft, and instrument requirements and develop the implementation approach, instrument design, test plan, and calibration/validation strategy. DHFR required the use of cryptographic protection of the up and downlink, which was implemented and operated by SDL. After the successful launch of the second spacecraft, he worked with the DARPA team, and the ops team at Space Dynamics Lab, to develop on orbit measurement strategies and test campaigns, recovery from anomalies, and data analysis.

**Task Manager & PI, DHS FINDER victim detection radar – Feb 2012 – Sep 2015**  
**DARPA HERMA – Oct 2013 – Apr 2015**  
**DHS MPULSe – Jan 2015 – Feb 2018**

Mr. Lux was the Task Manager for the rapid development of FINDER (Finding Individuals for Disaster and Emergency Response), a victim detection radar for the Department of Homeland Security. FINDER was developed with a rapid prototyping cycle starting in April 2012 going through 3 iterations before producing the final prototype product in September 2013. In 2014, Mr. Lux managed the production of 10 prototype FINDER units in a few months along with a year of field tests in a variety of simulated disaster environments. The FINDER design was transitioned to commercial production in 2015. Jim received the JPL Explorer award for Scientific and Technical Excellence for this work.

The FINDER work led to HERMA – a DARPA sponsored task to investigate authentication using microwave sensing of heartbeat micromotions. Another part of this task investigated detection and identification of human presence at long standoff distances. Finally, FINDER and HERMA evolved into another DHS sponsored task HERMA, developing a sensor that can detect moving or stationary targets for, e.g. cuing a surveillance camera and distinguish human from animals by gait or heartbeat/respiration signatures. This work all required working with the Caltech Institutional Review Board for experimentation with human subjects. It also resulted in several patents for Caltech.

**Task Manager, JPL PI – ScaN Testbed, STRS, CoNNeCT – June 2008 – April 2019**

Mr. Lux was the JPL Principal Investigator and Task Manager for the ScaN Testbed, an experimental Software Defined Radio (SDR) platform that was installed on the International Space Station from 2012 to 2019. Starting in 2008, as JPL PI, Mr. Lux collaborated with the PI at GRC, and was involved in the development of system level requirements, integration and test plans, on orbit commissioning, and on orbit testing and resource management of the platform. He managed the development of the software for the CoNNeCT SDR that JPL provided to the ScaN Testbed. ScaN Testbed was the culmination of a NASA effort to develop a set of standards for Software Defined Radio

implementation (NASA-STD-4009A), and was formulated to provide a “working demonstration” of the standard with 3 flight radios. Jim received the NASA Exceptional Achievement Medal for this work.

### Earlier work at JPL

Earlier in Mr. Lux’s 18 years at JPL, he was responsible for the development of a calibration ground station used to calibrate the Seawinds radar on QuikSCAT and ADEOS II. He developed the architecture and managed the breadboard development of an experimental radar scatterometer using distributed processing among multiple space qualified DSP processors. He was involved in the development of the requirements and design of a deep space transponder that became known as UST (Universal Space Transponder). He was the task manager for an experimental space telecom system using an array of four 3-meter apertures for high rate communications from Jupiter, using electronic steering to provide fine pointing of the very narrow beam.

### Even earlier work

Before joining JPL in 1998, Mr. Lux developed products and managed IT for a physical special effects company, ran a software consulting company, developed electronic warfare equipment (for communications and radar systems), and a variety of other mostly software related activities, in both embedded and enterprise scale environments. Prior to attending UCLA in 1977, Mr. Lux developed and published a screening method for children’s learning disabilities using the visually evoked cortical potential (EEG).

### Selected Publications

- Kasper, J., T. J. W. Lazio, A. Romero-Wolf, J. P. Lux, and T. Neilsen. 2022. "The Sun Radio Interferometer Space Experiment (SunRISE) Mission." In *2022 IEEE Aerospace Conference (AERO)*, 1-8.
- Lazio, T. J. W., J. C. Kasper, A. Romero-Wolf, J. P. Lux, and T. Neilsen. 2022. "The Sun Radio Interferometer Space Experiment (SunRISE) Mission." In *2022 United States National Committee of URSI National Radio Science Meeting (USNC-URSI NRSM)*, 340-41.
- McGarey, Patrick, Issa Nesnas, Adarsh Rajguru, Matthew Bezkrovny, Vahraz Jamnejad, Jim Lux, Eric Sunada, Lawrence Teitelbaum, Alexander Miller, Steve Squyres, Gregg Hallinan, Alex Hegedus, Alexander, and Jack Burns. (2022). How to Deploy a 10-km Interferometric Radio Telescope on the Moon with Just Four Tethered Robots. 1-8. 10.1109/AERO53065.2022.9843745.
- Gregg Hallinan, Jack Burns, Jim Lux, Andrés Romero-Wolf, Lawrence Teitelbaum, Tzu-Ching Chang, Jonathon Kocz, Judd Bowman, Robert MacDowall, Justin Kasper, Richard Bradley, Marin Anderson, David Rapetti, Zhongwen Zhan, Wenbo Wu, James Keane, Mark Panning, Andrew Klesh, Issa Nesnas, Alex Austin. (2021). FARSIDE: A Low Radio Frequency Interferometric Array on the Lunar Farside. *Bulletin of the AAS*. 53. 10.3847/25c2cfcb.60683360.

- R. Lutz, M. Lavin, J. Lux, K. Peters, N. Rouquette, "Using Operational Experience to Build Requirements Knowledge in Mission-Critical Product Lines", chapter in *Managing Requirements Knowledge*, W. Maaleg, A. Thurimella, Ed., Springer, 2013
- R.Reinhart, et al, *Space Telecommunications Radio System (STRS) Architecture Standard*, NASA-STD-4009, NASA-STD-4009, June 2014
- R.Reinhart, T. Kacpura, S.Johnson, J.Lux, "Development of NASA's Space Communication and Navigation Test Bed aboard ISS to Investigate SDR, On-board Networking and Navigation Technologies", IEEE AESS, April 2013
- S.K.Smith, N. Mysoor, J. Lux, B. Cook, B. Shah, "Frequency Agile Multi-Channel X-Band Coherent Receiver/Transmitter for the Advanced Deep Space Transponder," *The Interplanetary Network Progress Report*, v 42-166, Aug 15, 2006
- Lux, J., Chapin, E., Li, S., Amaro, L, Quintero, O., "Distributed Metrology and Control for Large Radar Apertures", Annual Report & Poster, Jet Propulsion Laboratory, October 2005
- Bachmann, A. Clark, D., Lux, J., Steffke, R., "Multiprocessor Digital Signal Processing on Earth Orbiting Scatterometers", *IEEE 2001 Aerospace Conference*, March, 2001., Vol 5, 2001, pp 2241-2248, vol 5
- Adams, Jon T, Lux, James P., "Ground Calibration of an Orbiting Spacecraft Transmitter", *IEEE 2000 International Geoscience and Remote Sensing Symposium*, July 24-28, 2000., pp 37-49, v.5
- Lux, James P., "Detection of Learning Disabilities Using the Visually Evoked Cortical Potential", *Journal of Pediatric Ophthalmology*, v.14, n.4, pp243-253, July 1977

### Patents

- 10,201,278 - JP Lux, VP Cable, SM Haque, MR McKee, H Ghaemi, RK Ohanian - Life detecting radars - 12 Feb 2019
- 9,870,457 - JP Lux, E Chow, MR McKee, SM Haque, A Tkacenko – HERMA – Hearbeat microwave authentication – 16 Jan 2018
- 9,986,934 - JP Lux, RK Ohanian, R Quintero, TM Torrez, K Ishikawa, MR McKee, SM Haque, S Holmes, C Spurgers - Microwave radar sensor modules. – 5 Jun 2018
- 6,279,244 – JG Gill, D Hixon, J Lux, MJ Becker – Fan advertising device - 28 Aug 2001
- 5,971,765 – J Gill, D Hixon, J Lux, M Becker – Method and system for generating artificial tornadoes and related vortex phenomena – 26 October 1999