

# Mark Opfell

## Skills and Exposure

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| <b>Standards</b>              | DVB-S2, CCSDS, IRG, Ethernet, FCC, ITU  |
| <b>RF Tools</b>               | VNA, SDR, GNU Radio, VSA                |
| <b>General Software Tools</b> | Python, Git*, Linux, Bash               |
| <b>Python Libraries</b>       | NumPy, Matplotlib, Scapy                |
| <b>Networking</b>             | UDP/IP, iPerf, Wireshark                |
| <b>Cloud</b>                  | AWS EC2 & S3                            |
| <b>Volcano Ascents</b>        | Mount Rainier, Mount Baker, Mount Adams |

## Experience

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|-----------|---|----------------|
| Job Title | <b>Senior RF and Telemetry Engineer</b> |                |
| Employer  | <b>Relativity</b>                       | Long Beach, CA |
| Period    | <b>August 2025 – Present</b>            |                |

Developing real time rocket telemetry system for first flight safety.

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|-----------|--|-------------|
| Job Title | <b>RF Communications System Engineer</b> |             |
| Employer  | <b>Amazon: Kuiper</b>                    | Redmond, WA |
| Period    | <b>July 2024 – Present</b>               |             |

Built, and ran bare metal UDP/IP throughput experiments on a FPGA. Developed a Python driver capturing raw telemetry frames of RSSI on Gateway LNBs, and coupled RF transmit power from BUCs. The Python driver could reboot individual gateway hardware and reverse faults.

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|-----------|--|----------------------|
| Job Title | <b>Lead Communication Systems Engineer</b> |                      |
| Employer  | <b>Albedo</b>                              | Remote & Some Travel |
| Period    | <b>October 2021 – March 2024</b>           |                      |

Created, evaluated, and built space-to-ground digital communications payload (gigabit class) for high data rate visible and thermal sensors. Developed the mission data chain from modulated waveform to frames, packets, and connections. Analyzed and tested with: engineering model radios, GNU radio, technical deep dives into CCSDS and DVB-S2 standards, and Python code for the processing pipeline.

Lead NGSO imaging satellite constellation ITU, and FCC 312 Schedule S regulatory filings. Ran RF analysis support efforts with Python scripts, and ITU Spacecap. Collaborated with orbital dynamics expert, and mechanical engineers to decompose legal wording into requirements for satellite architecture and material choices ensuring proper post mission disposal.

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|-----------|-----------------------------------|-----------------------|
| Job Title | <b>Senior RF Systems Engineer</b> |                       |
| Employer  | <b>BlackSky</b>                   | Tukwilla, WA & Remote |
| Period    | <b>April 2019 – October 2021</b>  |                       |

Created RF architecture diagrams, link budgets, test plans, and ran hands-on troubleshooting. Collaborated with customers and suppliers to design, manufacture, test, launch, and operate X (payload), S (TT&C), GPS, and UHF-band space-based software defined radios linked to ground stations enabled by the AWS Ground Station service and the KSAT Lite ground station network.

Collaboratively designed, simulated, sourced, advised layout, and validated: parts, mixed signal PCB, connectors, cabling, and enclosure for a GPS RF system self-compatibility filter. Multiple spacecraft successful in-orbit operation.

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|-----------|-----------------------------------|-------------|
| Job Title | <b>RF Systems Engineer</b>        |             |
| Employer  | <b>Kymeta</b>                     | Redmond, WA |
| Period    | <b>February 2018 – March 2019</b> |             |

Developed and executed over-the-air combined OSI application, transport, network, and physical layer level test cases for a mobile Azure cloud connected MIMO Ku-band terminal with software defined phased array flat panel antennas and a DVB-S2 satellite modem

Wrote phased array antenna cross-polarization optimization algorithm in Python and integrated it with production level test codebase along with documentation, theoretical and actual response data.

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|-----------|-----------------------------------|-------------------|
| Job Title | <b>Senior RF Systems Engineer</b> |                   |
| Employer  | <b>Maxar</b>                      | Mountain View, CA |
| Period    | <b>March 2015 – January 2018</b>  |                   |

Wrote specifications, triaged vendors, reviewed test data collateral, and directed the installation, unit level and system level tests of the following passive and active RF units: diplexer, waveguide, directional coupler, band pass filter, low noise amplifier, downconverter, high power load, circulator, coaxial cable, master reference oscillator, and synthesizer.

|           |  |                   |
|-----------|--|-------------------|
| Job Title | <b>Associate -&gt; RF Systems Engineer</b> |                   |
| Employer  | <b>Maxar</b>                               | Mountain View, CA |
| Period    | <b>September 2013 – March 2015</b>         |                   |

Developed Python analysis tool from scratch to model complex amplitude and time delay of 10,000+ RF units for ground-based beam-forming.

## Education

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|------------|--|--|
| Degree     | <b>Bachelor of Science in Electrical Engineering</b> |  |
| University | <b>University of California, Davis</b>               |  |
| Period     | <b>June 2009 – June 2012</b>                         |  |

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