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PHILIP J. LINDEN

Professional Summary

I am an engineer who is passionate about the design and analysis of aviation and space systems, including but not limited to satellites, human spaceflight, spacecraft and aircraft structures, propulsion, mechanisms, remote sensing, imaging, and controls. I am relentlessly curious, a strong visionary, and optimistic about the future of technology and humankind.

Education

Rochester Institute of Technology *Rochester, NY* May 2017
Bachelor of Science in Mechanical Engineering – Aerospace Option
Master of Engineering in Mechanical Engineering
Graduate Paper: Cosmic Dawn Intensity Mapper (CDIM) github.com/runphilrun/CDIM-design
Undergraduate Capstone: 1 kW Arcjet Thruster github.com/RIT-Space-Exploration/msd-P17101

Technical Skills

Systems Engineering, Mechanical Engineering, Aerospace Engineering, Electro-Optical Engineering, Image Processing, Git, Python, MATLAB, Simulink, OpenCV, Docker, CAD, LaTeX, MacOS, Linux, Controls, Technical Writing

Engineering Experience

Planet *San Francisco, CA* November 2018 – Present
Space Systems Engineer / Flight Operator, SkySat Mission Operations
- Conducted flight operations for the SkySat constellation of 21 Earth observation satellites, including manual commanding, anomaly investigation & resolution, and development of new spacecraft activities, operations procedures, automated procedures, and automated on-orbit activities.
- Maintained spacecraft testbed and ground support equipment for hardware-in-the-loop testing.
- **Projects:** SkySat Payload Commissioning & Recalibration

Lockheed Martin Space *Sunnyvale, CA* June 2017 – November 2018
Electro-Optical Engineer, Optical Payload Center of Excellence
- Characterized focal plane arrays and imaging systems in optical labs.
- Systems engineering and Electro-Optical engineering on IRAD projects to support major business pursuits.
- Led a software team through critical development milestones for Matlab engineering tools.

SpaceX *Hawthorne, CA* June – August 2016
Vehicle Engineering Intern, Capsule Structures
- Modeled and drafted designs for critical structures for the Crew Dragon vehicle.
Vehicle Engineering Intern, Capsule Reusability January – July 2015
- Project development, including hands-on prototyping and designing, conducting and presenting experiments to explore changes to Dragon Cargo space capsules.
- **Projects:** Dragon Capsule Water Sealing

RIT Center for Detectors *Rochester, NY* March – May 2016
Lab Assistant, Mechanical Engineer
- Created system-level designs and modeled mechanical components for astronomy research experiments including a cryogenic sounding rocket payload, a ground-based observatory telescope, and small spacecraft.
- Led a team of undergraduate students and served as systems engineer for integration of a NASA sounding rocket research payload.
- **Projects:** Cryogenic Star Tracking Attitude Regulation System (CSTARS)

GE Aviation *Cincinnati, OH* January – May 2014
Engineering Co-op, Ultrasonic Non-Destructive Test Lab
- Analyzed scan imagery for component defects in test samples and flight hardware, including composite delaminations and weld voids.
- Developed and optimized test procedures for components with irregular geometry.
- **Projects:** GEnx Flowpath Spacer Inspection Optimization

RIT Space Exploration (RITSPEX) *Rochester, NY* Fall 2014 – Present
Alumni Member
- Mentor undergraduate students working on space exploration projects.
- Provide subject-matter expertise in imaging projects and control systems.
- **Projects:** SPEX Project Definition Document Template, *Where U At Plants?* (WUAP) HAB Payload, SPEXcast

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Detailed Project Descriptions

Cosmic Dawn Intensity Mapper (CDIM) *NASA ADS abstract | arXiv:1903.03144*   **Graduate Paper**
Contributed to a proposal for a Probe Class (~$850M) NASA mission for a 1.5 meter space telescope intended to observe near-infrared light from the early universe. Compiled financial, mass, and power budgets for the optics, instruments, cryocooler & spacecraft. Defined system-level design, generated representative CAD models and figures of the spacecraft. This mission was published in the NASA 2020 Decadal Survey. My contribution: *github.com/runphilrun/CDIM-design*

1 kW Arcjet Thruster *github.com/RIT-Space-Exploration/msd-P17101*   **Undergraduate Capstone**
Developed the concept, system-level design, and nozzle design for a small scale arcjet thruster demonstration. Worked in a multidisciplinary team of mechanical and electrical engineers. Responsible for communication between the team and the customer (RIT Space Exploration). Designed and performed CFD analysis on the thruster nozzle.

High Altitude Balloon Autonomous Altitude Control System *brickworks.github.io/Nucleus*   *Work In Progress*
Designed a control system for a high altitude balloon (HAB) to maintain a target altitude by venting gas from the balloon and dropping ballast mass in flight. I modeled passive flight dynamics of a HAB in MATLAB, Simulink, and Python. I developed a state machine and control system in Simulink and used the model to tune a PID controller. I then derived a state-space model, Kalman filter, and LQR controller from scratch to achieve better performance. First flight expected to launch in 2021.

SkySat Payload Commissioning & Recalibration *Planet*
Conducted on-orbit calibration of payload subsystems. I developed new procedures and Python scripts to automate calibration workflows and commission the payloads of eight newly launched SkySats and recalibrate payloads of the rest of the 21-satellite fleet.

Where U At Plants? (WUAP) High Altitude Balloon Payload *github.com/RIT-Space-Exploration/hab-cv*
Where U At Plants? (WUAP) is a high-altitude balloon payload using on-board image processing with a Raspberry Pi 3, Python 3 and OpenCV 3.3 to mask RGB images of the Earth and attempts to mask areas of vegetation using colorspace transformations. WUAP flew as a payload on RIT Space Exploration's HAB4 high altitude balloon mission on April 22, 2018. A Project Definition Document and post-flight report document the design intent and discuss the results.

Cryogenic Star Tracking Attitude Regulation System (CSTARS) *RIT Center for Detectors*
Designed the mechanical model of CSTARS, an experiment endorsed by the New York Space Grant and funded with $100,000 by NASA's Undergraduate Student Instrument Program. I designed CAD models for the cryogenic thermal regulation system, telescope, and mechanical supports in Solidworks 2015. I was the systems engineer for payload integration with a Black Brant IX at NASA Wallops Flight Facility.

Dragon Capsule Water Sealing *SpaceX*
Designed and tested retrofits to the Dragon Cargo capsule in order to prevent water ingress on splashdown. Investigated water entry paths, conducted experiments to validate designs, and implemented modifications on flight hardware present on Dragon vehicles since the CRS-7 mission.

GEnx Flowpath Spacer Inspection Optimization *GE Aviation*
Optimized parameters for detection of internal wrinkles in composite layups with complex geometry during ultrasonic inspection. Conducted destructive microscopy to validate results and presented findings to principal engineers.

SPEX Project Definition Document Template *github.com/RIT-Space-Exploration/SPEX-Project-Definition-Documents*
A Project Definition Document (PDD) documents a SPEX project idea and its objectives. This template defines the internal standard of quality for all SPEX PDDs and also serves as a template for other projects to build from. This template was used to define the scope of RIT's payload for the Intercollegiate Rocket Engineering Competition 2018, earning the project a $1000 grant from Students for the Exploration and Development of Space (SEDS).

SPEXcast Podcast *blog.spexcast.com*
I produce, edit, and co-host a space exploration podcast, which is a weekly discussion podcast the science and technology of space exploation. SPEXcast also features interviews with space scientists and industry members, including Tory Bruno, Chris Hadfield, and NASA Scientists.

Other Skills

Brazilian Portuguese - Intermediate Level (written & spoken)