

JOSEPH GRUBER

SUMMARY

Mission-driven software engineer and engineering leader passionate about bringing modern technology, including a DevOps technical approach, to the space industry. I bring over 15 years of software engineering, systems engineering, and program leadership experience in developing and operating earth-observing satellites, ground segments, and crewed launch vehicles.

From designing, testing, and deploying a complex autonomous system for satellite constellation mission management to software and hardware validation for a human-rated launch vehicle, my background spans all mission lifecycle phases. I bring broad cross-functional expertise in driving technology modernization, mission systems engineering, spacecraft operations, integration & testing (I&T), project management, and anomaly resolution.

As a capable and creative problem solver, wearing many hats in a fast-paced environment is where I thrive. I excel at leading multi-disciplinary teams in combining current systems & software engineering best practices with an agile mindset and have a strong bias for action to solve modern space engineering challenges.

EXPERIENCE

Maxar Technologies – Denver, CO

Aug 2021 – Present

Space Programs Delivery, Ground Software - Sr. Software Engineering Manager

- Built an engineering vision leading an agile team of software engineers through transitioning legacy systems to a modern cloud-native, serverless-first microservice architecture across multiple ground software products.
- Drove DevOps practices across all products, including developing the first CI/CD pipeline in GitLab, automating release artifacts through Artifactory and S3, centralizing logging and monitoring with ELK, automating unit and integration testing, and migrating manual infrastructure to infrastructure as code (IaC) via Terraform.
- Facilitated team growth to scale with the organization's needs through employee upskilling, training, & stretch opportunities.
- Architected prototyped design for a near real-time telemetry ingestion, monitoring, and visualization system utilizing InfluxDB, Amazon ECS, and Amazon Kinesis.
- Implemented a support model to provide 24/7 operational support of production command and telemetry systems for dozens of spacecraft.
- Initiated transition of existing Python 2 scripts to Python 3 and began migrating components of commanding and telemetry products from Java/C++ to Python microservices.

Amazon Web Services – Denver, CO

Jun 2020 – Aug 2021

AWS Ground Station - Sr. Space & Satellite Systems Technical Program Manager

- Drove agile software development and systems engineering efforts across a cross-functional team of software, hardware, and RF/antenna engineers. Responsible for assessing risks, planning development goals, and overcoming technical obstacles for a global network of ground stations used for satellite commanding, control, and downlink.

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🇺🇸 U.S. Citizen

🏠 TS/SCI (Inactive), Secret (Inactive)

EDUCATION

Embry-Riddle Aeronautical Univ.
Masters of Aeronautical Science
(Space Studies)

Florida Institute of Technology
B.A. Business Administration
(Computer Information Systems)

Hillsborough Community College
A.A. Computer Information Systems

CERTIFICATIONS

AWS Solutions Architect – Associate

AWS Certified Cloud Practitioner

FreeFlyer - Level 1

Satellite Tool Kit (STK) – Master

Professional Scrum Master (PSM-I)

AWARDS

NASA Flight Dynamics Support
Services Team Technical Innovation
Award

NASA/NOAA GOES-R Process
Improvement and Innovation Award

- Specified deliverables, defined roadmaps, and managed schedules to scale and sustain operations and reliability of software components and hardware systems. Led anomaly investigations and recovery for high-severity events.
- Architected and defined launch and early orbit phase (LEOP) operational and contingency processes. Conducted test events and mission simulations. Developed Python library of ephemeris utilities for pre-launch, on-orbit, and reentry analysis.
- Directed LEOP support team for the deployment of numerous low-earth orbit (LEO) satellites in coordination with multiple satellite operators, including Amazon's first operational launch support for a customer.
- Designed, built, validated, and deployed capability for custom ephemeris data support for scheduling satellite contacts removing Space-Track dependency for customers.
- Planned and coordinated the launch of four international, multi-antenna ground stations and three new AWS ground station regions. Led security assessment and readiness resulting in FedRAMP Moderate authorization.
- Interfaced with customer-facing technical teams providing subject matter expertise and training in multiple areas, including spaceflight operations, space situational awareness (SSA), orbit propagation, and flight dynamics.

Blue Origin – Kent, WA

Feb 2019 – Jun 2020

New Shepard Production, Test, & Operations – Software Lead, Scrum Master, Technical Project Manager

New Shepard Software Architecture – Technical Project Manager

- Led multi-discipline engineering teams developing, validating, and qualifying crewed launch vehicle avionics flight software and hardware. Orchestrated requirements definition, system design, system verification, deployment, and operations support.
- Drove cross-organizational improvements to software engineering strategy according to mission and safety-critical engineering standards leading to the first on-schedule flight software mission deliverable.
- Modernized the continuous delivery and infrastructure automation of software tooling, utilizing a cloud-based parallelized simulation architecture, reducing overall verification and validation time.
- Provided schedule, cost, and technical coordination, for multiple payload and flight test missions across parallel software and hardware release schedules.
- Created and coordinated software compliance plans to document safety and reliability for flight software qualification review.

a.i. solutions – Lanham, MD

Jul 2016 – Feb 2019

NASA Earth Science Mission Operations (ESMO) – Mission Software Engineer

- Responsible as team lead for a high-performance software system, providing 24/7 operational support for multiple NASA earth-observing satellites. Responsible for flight dynamics, space situational awareness, and collision avoidance of international earth science satellite constellation.
- Designed and deployed DevOps infrastructure, using a combination of GitLab CI/CD and AWS services, for flight dynamics system and constellation coordination software resulting in an 80% reduction of manual testing and improved scalability for future missions.
- Planned and implemented automated close approach violation and debris avoidance maneuver capabilities through the automated acquisition of ephemeris data via Python Lambdas, allowing for a 5x increase in daily conjunction assessments.
- Spearheaded process improvements and implemented corrective actions achieving CMMI-DEV Level 3 maturity.
- Created migration plan and led initiative to upgrade and modernize legacy, end-of-life software components ensuring reduced risk and increased lifespan of multiple spacecraft.

NASA Space Network Ground Segment Sustainment (SGSS) – Consulting Software Engineer

- Analyzed Oracle system architecture design for upgraded tracking and data relay satellite system (TDRSS) ground segment. Advised stakeholders on engineering best practices for the space network operations center's modernization and future sustainment operations.
- Formulated lifecycle supportability risks and associated mitigation strategies to meet service-level requirements from contractor system design and architecture documentation before operational handover.

Mission Support Lead (Research/Unpaid)

- Planned and coordinated mission operations for multiple human analog missions in a simulated Martian habitat located in a remote environment.
 - Recruited and guided a large global mission operations team on long-duration, human spaceflight simulations as the primary communications and support interface to isolated crew members.
 - Collaborated across local support, research teams, and engineering teams to develop processes and procedures for daily operations and contingency/emergency operations.
 - Developed frontend and backend cloud architecture and Python services for proto-flight distributed monitoring of habitat systems using AWS EC2, SNS, SQS, RDS (MySQL), S3, and Lambda.
 - Architected unique time-delayed communication protocols to simulate deep-space communication delays.
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ECG, Inc. – Greenbelt, MD

Mar 2014 – Jan 2016

NASA Geostationary Operational Environmental Satellite R-Series (GOES-R) – Lead Planner

- Responsible for programmatic and technical coordination during the design, assembly, and integration & test of GOES-R spacecraft, instrument, and ground segment
 - Contributed to architecture and deployment of petabyte-scale data storage solution, using Python and Bash, for CCSDS-formatted level zero raw products used for spacecraft instrument calibration and validation.
 - Generated plans, schedules, and timelines for launch and orbit-raising activities to validate on-orbit performance requirements and mission data products' operational readiness.
 - Supported mission, flight, and launch readiness reviews on behalf of the chief engineer's office, creating and organizing schedule analysis and performance analysis reports.
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Wyle Laboratories – Arlington, VA

Feb 2012 – Mar 2014

F-35 Joint Strike Fighter (JSF) – Lead Planner

- Led planning team for initial operational test & evaluation phase providing programmatic and technical oversight throughout integrated baseline reviews, system design, and development flight testing.
 - Conducted probabilistic risk analysis quantifying technical and programmatic risks.
 - Developed custom Python solutions for automated data analysis and metrics reporting for flight readiness.
 - Witnessed and supported test events, simulations, and validation exercises, reporting results and metrics.
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Prior Experience

- Systems Integration Engineer – United States Southern Command (USSOUTHCOM), SAIC & CTSC
- Software Analyst – United States Central Command (USCENTCOM), Lockheed Martin

PROFESSIONAL AFFILIATIONS

- Flight Software Workshop – 2022 Conference Committee
- Zed Factor Fellowship – Mentor
- Consultative Committee for Space Data Systems (CCSDS) – Associate
- American Institute of Aeronautics and Astronautics (AIAA)
- International Council on Systems Engineering (INCOSE)
- Project Management Institute, PMBOK Risk Management Content Editor
- Toastmasters – Advanced Communicator, Advanced Leader

RELEVANT SKILLS

Platforms

Amazon Web Services (AWS Compute, Database, Networking, Storage), Docker, Windows Server, Linux (Ubuntu, Red Hat), RTLinux, Mac OS X, Solaris, VMware, Hyper-V, NASA core Flight System (cFS)

Software

a.i. solutions FreeFlyer, AGI Satellite Tool Kit (STK), Atlassian (JIRA, Confluence, Bitbucket), CloudFormation, Docker, GitHub, Gitlab, IBM Rational DOORS, IBM Rational Team Concert (RTC), Jenkins, Kubernetes, Microsoft Project, Microsoft SQL Server, MySQL, MongoDB, MathWorks MATLAB, MathWorks Simulink, Oracle Primavera P6, Oracle Primavera Risk Analysis (PRA), Orekit, OS/COMET, Puppet, TeamCity, Terraform

Programming Languages

Python, JavaScript, Node.JS, PHP, C#, C++, SQL, Visual Basic.Net, Visual Basic for Applications (VBA), Bash

Mechanisms & Process

Agile methodology (Scrum, Kanban), Infrastructure as Code (Terraform, CloudFormation), Schedule Management, Test Driven Development, Automated Testing, Verification & Validation (V&V), Requirements Development, Release Planning, NASA-STD-3001, NPR 7150.2, NPR 7120.5, DO-178C, CMMI-DEV (Level 3)