

# ANDREW LYJAK

6205 N Oakland Ave, Indianapolis IN, 46220

+1 734 604 6163 ✉ alyjak@gmail.com

## EDUCATION

---

### **Bachelor of Engineering in Aerospace Engineering**

2005 - 2009

Minor in German

University of Michigan, GPA: 3.456/4.000

### **Masters of Space Systems Engineering**

2009 - 2010

University of Michigan, GPA: 7.538/8.000

## INTERESTS

---

Design and Development Processes, Distributed Systems, Resilient Systems, Autonomy, Automation, Software Certification, Verification of Complex Systems, Model Driven Development, Continuous Integration, Agile Development

## SKILLS AND TOOLS

---

Software Development Processes, Software Process Audits, System Certification, Verification Planning, Fault Tolerance Analysis, Python, Javascript, HTML, CSS, Bash, Linux, R, C, C++, SQL, L<sup>A</sup>T<sub>E</sub>X, ReStructuredText, Graph Analysis, Graph Databases, git, Trac, Subversion, JIRA, Confluence

## SPACEX SOFTWARE RELIABILITY ENGINEERING

---

### **Software Certification for NASA Safety and Quality Requirements**

2010 - Present

Certification activities applicable to Crew and Cargo Dragon for the NASA COTS, CRS, CCtCap, and CCP contracts

- Designed and Implemented the Flight Software Development Plan. This document defines SpaceX's custom agile development process for designing, developing, and verifying SpaceX flight software. (2011)
- Designed and Implemented the Dragon Flight Software "Computer Based Control System" certification documentation. This material was used to demonstrate SpaceX compliance with NASA software safety requirements and also defined many of the software safety test and analysis activities executed for verification of software safety. (2011)
- Performed Flight Software Development Audits to verify software quality, and compliance with NASA requirements. (2012)
- Maintained the above certifications through all changes to system design and software 2012 through present.

### **Independent Verification and Validation (IVV) Contract Management (2010 - Present)**

- Serve as the technical point of contact for SpaceX's IVV Contracts for safety critical software. In this role, ensure that the contractor is provided sufficient data to effectively evaluate the safety of the flight software with respect to its design, source code, and verification results. The contracts include IVV coverage of Crew Dragon, Cargo Dragon, and SpaceX's Autonomous Flight Termination System (AFTS).

### **Software Process Tool Development**

2013 - 2014

- branchdiff - an application to view the differences between Subversion branches to facilitate merge decisions between them. Displays differences as commits or as the set tickets referenced within those commit messages.
- Developed an application for viewing change over time for various Trac ticket queries.
- Performed trade studies on various software development ticketing systems – Trac, JIRA, Phabricator, Redmine.

### **Design and Development of the SpaceX Software Standard**

2013-2015

- Developed an internal software engineering standard. The purpose of which is to provide a set of requirements that can be used for different classifications of software development, classifications include A, for safety and mission critical software, to D, used for desktop, R&D, or other non-critical applications. The standard provides sets of requirements for different aspects of software design and development, ranging from change management, risk management, verification processes, and technical and analytical requirements for safety critical software. The standard is currently on version 1.3 and is used for all software related to the NASA Commercial Crew contract.

### **Design, Development, and Execution of the SpaceX Fault**

#### **Tolerance Analysis Process**

2016-present

- In tandem with another engineer at SpaceX, developed the Fault Tolerance Analysis Process. This process is used to evaluate autonomous and piloted electromechanical control systems to systematically evaluate their fault tolerance and develop adequate fault detection, isolation, and recovery algorithms and procedures such that each systems' health and redundant capabilities are successfully managed.
- Developed test and analysis plans for verifying all documented aspects of completed Fault Tolerance Analyses
- With a team of 6 other SpaceX Engineers, executed the Fault Tolerance Analysis Process against the 33 separate autonomous control systems present within the Crew Dragon Architecture

### **Incorporating Software Development Processes within Systems Design Processes**

2015-present

- Installed, Modified, and Administered an internal fork of ReadTheDocs for use within the SpaceX Intranet (2015-Present). Now used for design documentation by over 200 internal projects
- Tracegraph - Design and Development a protocol for defining systems relationships. Protocol includes data format, markup, execution algorithm, visualization layer. The protocol was developed to simplify requirements and verification traceability, and system dependency management. The protocol can be used for impact analysis for existing designs or prototyping and simulation of initial complex system designs.

## **DECLARATION**

---

I hereby declare that all the details furnished above are true to the best of my knowledge and belief.