



Aerospace Working Group

2025 Annual Update

Matthew Weber & Dr. Martin Halle



ELISA
Enabling **Linux** in
Safety Applications

Aerospace · Automotive · Linux Features

Medical Devices · OS Engineering Process

Safety Architecture · Space Grade Linux · Systems · Tools

Agenda



- Look back at major milestones and achievements in 2024
- Current focus and activities
- What's coming up in 2025 and areas and opportunities for collaboration
- Onboarding resources and how to get involved

“The Aerospace Working Group shall develop use cases to inform and influence Linux architecture and related tools, work to derive technical requirements for avionics operating systems, and seek to enhance and expand avionics software lifecycle processes, practices, and tools to enable use of Linux in avionics systems that are certified to high design assurance levels.”

2024 Achievements



- Active participation: (2023 vs. 2024)
 - 45 unique members attended meetings
 - 18 □ 23 meetings
 - Average meeting attendance is up 7.1 □ 8.91
- Use case: “**Cabin Lighting**” draft [architecture, requirements](#) and [test](#)
- Formation of [Space Grade Linux \(SGL\) Special Interest Group\(SIG\)](#)
(<https://elisa.tech/space-grade-linux-sig/>)
 - Thank you Ramon Roche and Ivan Perez (NASA Ames) for leading this!



2024 Achievements



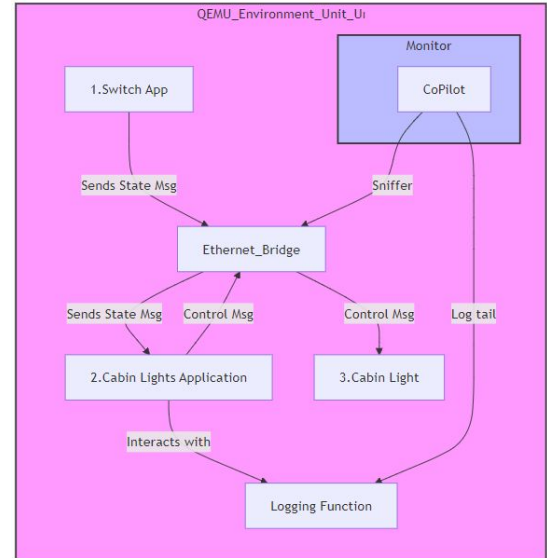
- Webinars, Workshops, and Conference Presentations:
 - [NASA Goddard Workshop](#) – “Forming an ecosystem around open source in space!” (Dec)
 - Linux Foundation Plumbers (Sept)
 - [Making Linux Fly: Towards a Certified Linux Kernel](#)
 - [Source-based code coverage of Linux kernel](#)
(Modified Condition/Decision Coverage (MC/DC))
 - Linux Foundation EOSS - [“Measuring Code Coverage of the Linux Kernel in Accordance with RTCA DO-178C Considerations.”](#) (Apr)
 - Seminar Series – [“Making Linux Fly”](#) (May)

```
33| 1.53k| while (*a_prefix && *a == *a_prefix) {  
-----  
|--> MC/DC Decision Region (33:9) to (33:37)  
|  
|   Number of Conditions: 2  
|   Condition C1 --> (33:9)  
|   Condition C2 --> (33:22)  
[...]  
|   MC/DC Coverage for Decision: 100.00%  
|  
-----
```

Current Focus and 2025 Activities



- Use case: “Cabin Lighting” [verification demos](#)
 - Prebuilt images
 - Basic examples of current use case
 - Advanced examples
 - Adjusting test apps
 - Configuring operating system
 - Building test harness and monitors



What's Coming in 2025



- Restart work on “Survey on State-of-the-Art Open Source Linux-Like Operating Systems in Avionics” [white paper](#)
 - Adding flight framework comparison (F' / cFS / GERICOS / CAST / KubOS / ...)
 - Survey on satellite use of Linux (SAT GUS / SuperDoves / ...)

Survey on State-of-the-Art Open-Source Operating Systems in Avionics

Martin Halle, Matt Kelly, Samuel R. Thompson, Steven H. VanderLeest

February 2023

Abstract

This paper is a survey of the state-of-the-art for use of Linux in regulated safety-critical systems, especially in aerospace.

A focus on real-time, and a focus on safety-critical.

A focus on Linux, but also looking at other open source operating systems, especially that are unix-like. Also include unix-like operating systems as host OS within a partition hosted by a hypervisor.

Possibly include commercial (closed-source) RTOS as well? As the very least we will overview close-source as context in the introduction.

Comparison Pros/Cons section - does this fit? Instead might be better to identify sensible selection/comparison criteria, quantify where possible.

What's Coming in 2025



- Establishing code repositories
 - Licensing plan
 - Space Grade Linux has an example of the CC-BY-SA-4 and MIT license approach (<https://github.com/elisa-tech/meta-sgl/blob/main/LICENSE>)
 - Automation plan – Combination of [GitHub](#) and [GitLab](#)
- Apply Linux Kernel Requirements and Test trace practice from ELISA Safety Architecture group

How to Get Involved

- <https://lists.elisa.tech/g/aerospace>
 - Subscribe to email list
 - Join the Aerospace and Space Grade Linux meetings



- <https://github.com/elisa-tech/wg-aerospace>
 - View meeting minutes
 - Use case and whitepaper documents
 - Use case Demos

