Parsimoni

PARSIMONI × SPACEOS FAQ

Understanding Parsimoni and SpaceOS

Your Questions Answered

PARSIMONI

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We've been getting more and more questions about how the Parsimoni satellite App Store works – and the role SpaceOS plays behind the scenes. Rather than answering individually, here is an overview of the most common ones.

1. What is Parsimoni trying to achieve?

Parsimoni is built around two core goals:

- **Make space innovation radically easier.** Developing satellite applications today involves significant technical and operational complexity. We're removing those barriers to open the door to a much broader innovation ecosystem.
- **Unlock more value from existing infrastructure.** Satellite operators and investors can generate additional revenue and capabilities from their current (underutilized) assets, securely and without additional cost.

2. What is the Parsimoni App Store?

Think of it as bringing cloud-like simplicity to space. The Parsimoni App Store is a platform where software can be deployed to satellites as easily as deploying to the cloud.

Applications can span a wide range of use cases, including:

- Earth observation
- Communications
- Security
- Data processing
- And more

3. How does deployment work?

We've created a development experience similar to Docker. Developers can:

- Build and test applications locally on their laptop or desktop
- Click "deploy"
- Instantly make their application available in the App Store, ready for deployment in orbit

No complex integration. No lengthy approval cycles.

4. What about differences in satellite hardware and sensors?

Applications are matched with available in-orbit resources.

If multiple options exist, such as different imaging resolutions, users can select the option that best fits their needs, often with corresponding pricing tiers.

5. How can one app run across different satellites?

This is where SpaceOS plays a critical role.

SpaceOS acts as a middleware layer that abstracts hardware differences and provides a unified interface for developers. The result:

> *Develop once, run on any compatible satellite.*

This approach has already been demonstrated in collaboration with ESA through the “Hardware-Agnostic App Store” project.

6. How difficult is it to build for the App Store?

If you already develop software, the learning curve is minimal thanks to a familiar (Docker-like) development environment.

If you don’t, we can connect you with trusted partners to help turn your idea into a working application.

7. What does it cost to publish an app?

- **Cost:** Free
- **Time:** Seconds

Once your application is ready, publication in the app store is automatic. SpaceOS ensures secure isolation in orbit, removing the need for additional validation steps.

8. What programming languages are supported?

Most common languages are supported, including Python, C/C++, Rust, and others.

9. What exactly is SpaceOS?

SpaceOS powers everything behind the scenes.

It is a **unikernel (library operating system)** that can:

- Run directly on satellite hardware
- Or operate on top of existing software stacks

Its lightweight architecture, strong security model, and developer-friendly design make it both powerful and easy to adopt.

10. Does SpaceOS replace the existing operating system?

No.

SpaceOS works seamlessly alongside existing systems (such as flight control or payload OS). There’s no need to replace what’s already in place.

That said, SpaceOS can also operate as a primary payload OS if required.

11. How secure is SpaceOS?

Security is built into the core: SpaceOS is **secure by design**.

- Developed largely in OCaml, a memory-safe language that prevents many common vulnerabilities (including the majority of zero-day memory corruption attacks)
- Critical components are formally verified
- Minimal footprint reduces attack surface ("security by subtraction")
- Supports CCSDS SDLS and advanced cryptography, including post-quantum methods

12. Has SpaceOS security been validated?

Yes, extensively.

- In one challenge, 10 bitcoins were offered to anyone who could hack a MirageOS-based system running in the cloud (MirageOS is a core component of SpaceOS). Despite the code being open source and easily accessible, more than 150,000 attempts failed.
- In the Parsimoni "Hack A Satellite From the Inside" project (in partnership with ESA, and soon also with NASA/JPL), participants attempted to break application isolation onboard a satellite system. No one succeeded, so the EUR 10,000 prize money was not claimed.

13. Can SpaceOS be used independently of the App Store?

Absolutely.

While it powers the Parsimoni App Store, SpaceOS is also available as a standalone solution for organizations that want secure, scalable in-orbit computing, without relying on a shared marketplace.

14. Where does SpaceOS come from?

The technology originated at the University of Cambridge, developed by Thomas Gazagnaire (CTO and co-founder of Parsimoni) and his team.

It also contributed to innovations behind Docker for Desktop, one of today's most widely used developer platforms.

SpaceOS builds on that foundation to bring the same principles, security, scalability, and efficiency, to space infrastructure.