

Portable. Embedded. Rust.



1AD, September 1st, 2026

Q: Can We (re)Program Our MCU-based Edge Devices?

- ★ Hardware abstraction, concurrency ?
- ★ Sensor/actuator drivers ?
- ★ 3rd party libs (network stack, crypto...) ?

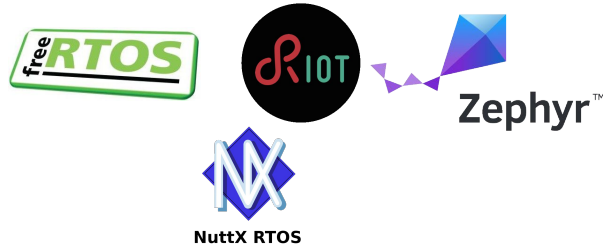
Q: Can We (re)Program Our MCU-based Edge Devices?

A: Open source code ecosystem + real-time operating systems (RTOS)

Q: Can We (re)Program Our MCU-based Edge Devices?

A: Open source code ecosystem + real-time operating systems (RTOS)

RTOS in C/C++



RTOS in Rust



Why Rust instead of C/C++?

- **Built-in memory safety**
- More high-level ergonomics
- More modern tooling (crates...)
- **Similar low-level control + perf.**

Why Rust instead of C/C++?

- Built-in memory safety
- More high-level ergonomics
- More modern tooling (crates...)
- Similar low-level control + perf. [1]



[1] B. Thapa *et al.* 'Embedded Rust or C Firmware? Lessons from an Industrial Microcontroller Use Case with Ariel OS'. *In Proceeding of IEEE DCOSS IoT, 2026.*



Why Rust instead of C/C++?

- **Built-in memory safety**
- More high-level ergonomics
- More modern tooling (crates...)
- **Similar low-level control + perf.**

Ecosystem of embedded Rust crates:

- embassy: >200kLoC, 12k commits, 700+ contributors
- esp-hal: >100kLoC, 2k commits, 100+ contributors
- smoltcp: ~45kLoC, 1.9k commits, 150+ contributors
- probe-rs: ~90kLoC, 6k commits, 300+ contributors
- ... many more!

Why Rust instead of C/C++?

- **Built-in memory safety**
- More high-level ergonomics
- More modern tooling (crates...)
- **Similar low-level control + perf.**

Ecosystem of embedded Rust crates:

- embassy: >200kLoC, 12k commits, 700+ contributors
- esp-hal: >100kLoC, 2k commits, 100+ contributors
- smoltcp: ~45kLoC, 1.9k commits, 150+ contributors
- probe-rs: ~90kLoC, 6k commits, 300+ contributors
- ... many more!

Advantage: **lots of features**, lively community

Drawback: **hard to navigate** (and to bundle/use)

Why Rust instead of C/C++?

- **Built-in memory safety**
- More high-level ergonomics
- More modern tooling (crates...)
- **Similar low-level control + perf.**

Ecosystem of embedded Rust crates:

- embassy: >200kLoC, 12k commits, 700+ contributors
- esp-hal: >100kLoC, 2k commits, 100+ contributors
- smoltcp: ~45kLoC, 1.9k commits, 150+ contributors
- probe-rs: ~90kLoC, 6k commits, 300+ contributors
- ... many more!

Advantage: **lots of features**, lively community

Drawback: **hard to navigate** (and to bundle/use)

➡ **Ariel OS solves this problem!**

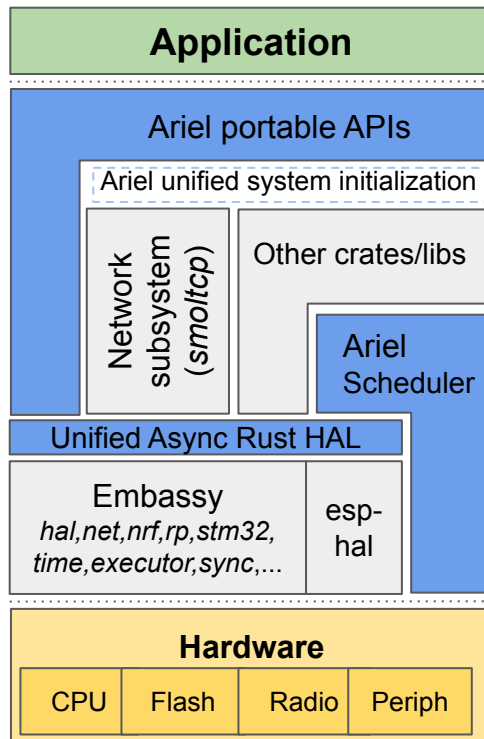


Ecosystem of embedded Rust crates (leveraged):

- embassy: >200kLoC, 12k commits, 700+ contributors
- esp-hal: >100kLoC, 2k commits, 100+ contributors
- smoltcp: ~45kLoC, 1.9k commits, 150+ contributors
- probe-rs: ~90kLoC, 6k commits, 300+ contributors
- ... many more!



Join community at
github.com/ariel-os/ariel-os

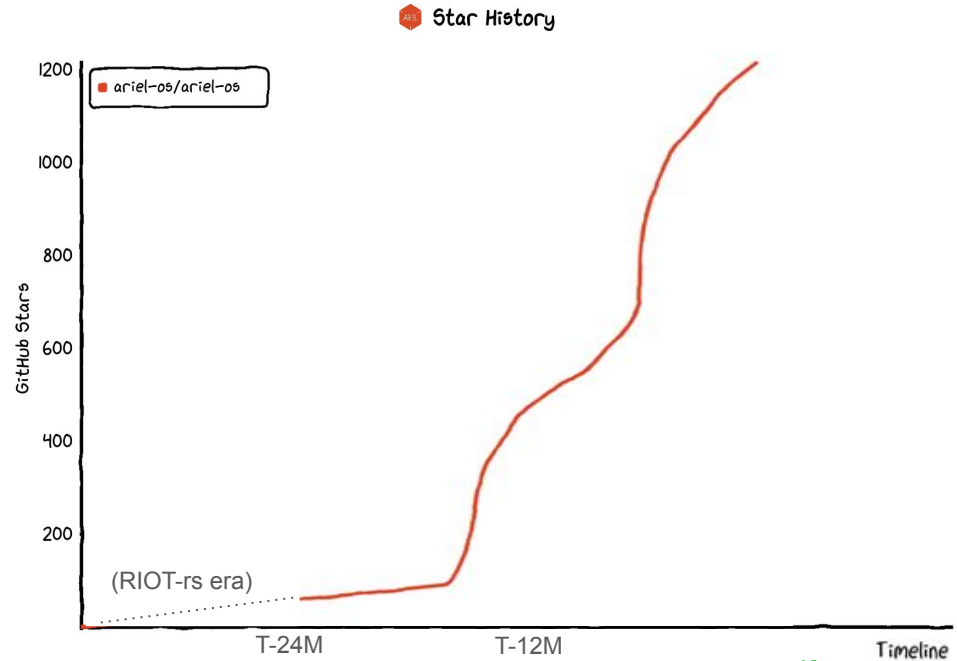


- Portable code
- Ariel OS code
- Embassy & Rust ecosystem



Ariel OS – *The last ~12 Months*

+ ~1000 Github stars

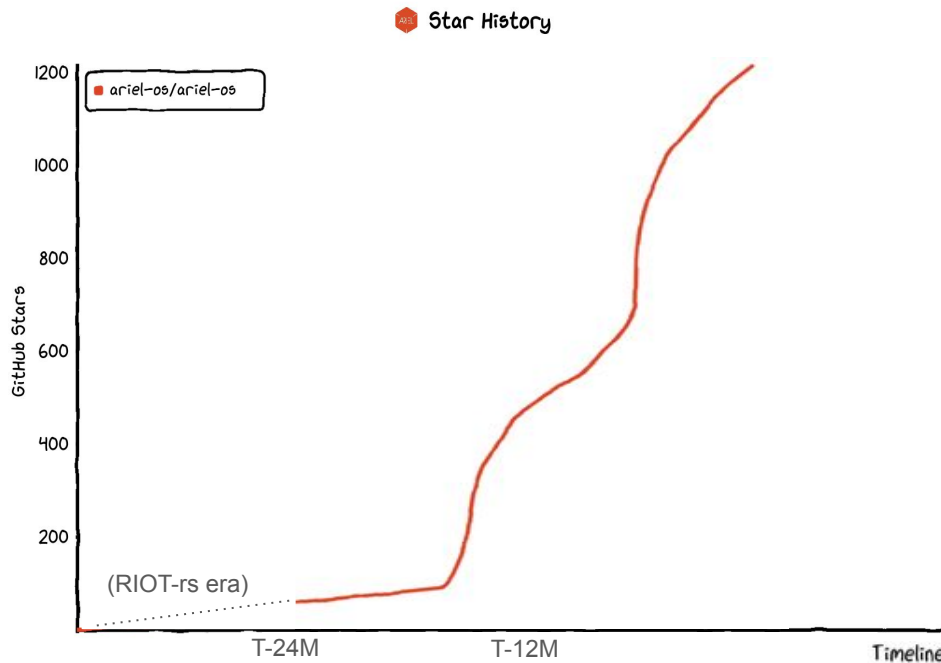




Ariel OS – *The last ~12 Months*

+ ~1000 Github stars

- >700 PRs (~2k commits) merged
- >700k CI minutes in >150k CI jobs
- Three releases: 0.3.0, 0.4.0, 0.5.0



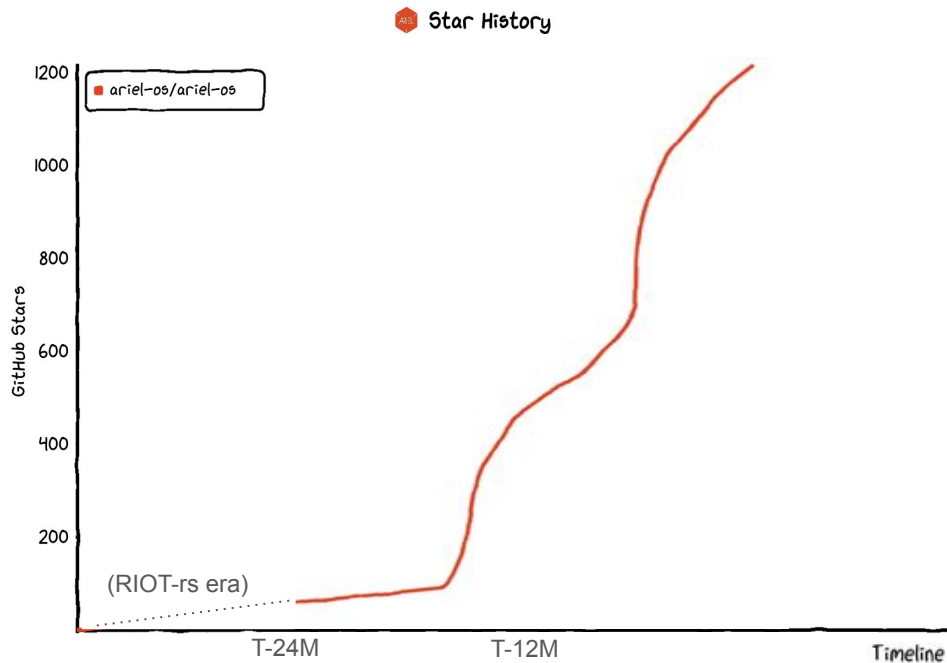


Ariel OS – *The last ~12 Months*

+ ~1000 Github stars

- >700 PRs (~2k commits) merged
- >700k CI minutes in >150k CI jobs
- Three releases: 0.3.0, 0.4.0, 0.5.0

Ariel OS: **now 30+ contributors**
from EU, North America, Asia.





Ariel OS – *The last ~12 Months*

- **Hardware**
 - native port
 - SBD (generated board support)
 - Sensor abstraction
- **Networking**
 - BLE support on nrf, esp, rp
 - Cellular via nrf-modem
 - GNSS
- **Documentation**
 - generated board documentation
 - many improvements to the book
- **... and much more ;)**

Ariel OS – *The last ~12 Months*

- Booths at RustWeek, CLT, VivaTech'25...
- Talks at FOSDEM, IEEE DCOSS...
- First products developed with Ariel OS!



Application	STSW-SDATALOG-R	
Middleware	MEMS Drivers	Ariel OS
Hardware Abstraction	Rust Embassy Framework	
Hardware	STM32 Nucleo development board STEVAL-MKBOXPRO NUCLEO-F401RE + X-NUCLEO-IKS4A1	

1AD – Agenda

Sept 1st Morning

Welcome & registration, starting at ~8:30am.

- **Tutorial:** Embedded Rust with Ariel OS (~90min, starting at 9am). MC: [@ROMemories](#)

(Coffee break at ~10:30am)

Session 1 (starting at ~11am. MC: [Karin Lammers](#))

- **Recap of the year with Ariel OS** (~10mn) – [Emmanuel Baccelli](#) & [Kaspar Schleiser](#) (Inria / FU Berlin).
- **A great RTOS is no longer enough:** On Governance, Regulation, Ecosystem, & AI as Pillars for Ariel OS (~30mn) – [Tiago Manczak](#) (Infineon Technologies).
- **Embedded-CAL:** A Formally Verified Cryptographic Provider for Embedded Platforms (~30min) – [Robin Hundt](#) & [William Takeshi Pereira](#) (CE Labs).

(Lunch break at ~12:30)

Sept. 1st Afternoon

Session 2 (starting at ~1:30pm. MC: [Emmanuel Baccelli](#))

- **The Future Must be Updated:** The Status of Secure OTA Software Updates with Ariel OS (~25min) – [Koen Zandberg](#) (FU Berlin).
- **What the Fuzz!?** A Journey into Structure-aware Fuzzing on a Rust SUIT-Manifest Parser (~25min) – [Marcel Fink](#) (Hochschule Augsburg).
- **Function-driven Multi-platform Architecture** (~15min) – [Luuk Oudshoorn](#) (Nedap).
- **Rethinking Isolation for Nanosatellites** (~25min) – [Alexander Yanovsky](#) (LIG), [David Darras](#) (Polytech Grenoble), [Bala Andegue](#) (Betalab).

Session 3 (starting at ~3:30pm. MC: [Kaspar Schleiser](#))

- **hophop:** Towards DECT-2020 NR+ support in Rust with Ariel OS (~25min) – [Christian Amsüss \(@chrysn\)](#).
- **From C Ops-Tables to Safe Rust Traits:** Interop Patterns for no_std Embedded (~25min) – [Akshai M](#) (Analog Devices).
- **treVM:** Tiny Rust Embedded Platform for WebAssembly VM Deployments with Ariel OS (~25min) – [Antoine Lavandier](#) (Inria).
- Ad hoc planning of Session 4

(Break at ~4:45pm)

Session 4 (starting at ~5:00pm. MC: [@chrysn](#))

- **1AD Unconf**, ad hoc side-meetings (~1h)
- Summary of side meetings output & **CHAOS** outlook (~15min)
- Wrap-up at ~6:15pm

Cocktail (starting ~6:30pm. On-site at Polytech Grenoble. MC: [Didier Donsez](#))

- Enjoy Cheeses & Wines! Cheeses are provided by renowned [Fromagerie Les Alpes](#), awarded **MOF** in 2007, basically «*meilleur fromager du monde*»!

Diner (informal/optional)

- For those interested, we'll go together somewhere TBD after the cocktail. Contact [ariel-os@inria.fr](#) if you would like to join.

BONUS Sept. 2nd

- *In the morning:* you can participate to **CHAOS: Collaborative Hacking with Ariel OS**. Browse and/or propose hackathon topics in the dedicated [pad](#). Estimated start ~9:30am.
- *In the afternoon:* you have the opportunity to carry on with the **RIOT Summit**: more info available online over [here](#).

Thanks to all involved...

Enjoy 1AD!

Special thanks to 1AD & Ariel OS supporters:

