GNU RADIO CONFERENCE 2026

Project Update

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GNU RADIO CONFERENCE 2026

Welcome to GRCon26

WEEK AT A GLANCE

Important information

wifi: ncsu-guest

Technical Chairs

Magreth Mushi, PhD

AERPAW Platform Director - Building a community of advanced wireless and aerial autonomy enthusiasts

Alexandre Rouma

PhD Student & Research Assistant, NC State

Conference Organizers

Samantha Palazzolo

Toby Flynn

Neil Rogers

Dan Boschen

Marcus Müller

Josh Morman

Michael West

Derek Kozel

Marc Lichtman

Andrej Rode

Neel Pandeya

SETI Institute

Thank you NC State & AERPAW

GRCon26 Host

GRCon26 is generously hosted by North Carolina State University (NC State), which is home to one of the four NSF PAWR platforms, the AERPAW wireless research platform.

AERPAW

Aerial Experimentation and Research Platform for Advanced Wireless

AERPAW Lab Tour

AERPAW
Aerial Experimentation and Research Platform for Advanced Wireless

Wednesday, 3- 5 p.m., OR Friday 11-1

The Lab is a 4-minute drive (909 Capability Dr #2100, Raleigh, NC 27606).

Please follow the link to this form to sign up.

https://docs.google.com/forms/d/e/1FAIpQLScwr9MYZjcMgcBkuOHDNYnQD2CRHRv_gVM9Cn84RR3HVpBdYA/viewform

Interested?

AERPAW Tutorial

AERPAW Tutorial on Thursday:

In order to save time, we would like participants who will be attending our tutorial (and want to follow along) to do a bit of prep work before coming to the tutorial.

Link on the schedule entry for the workshop
https://docs.google.com/document/d/123tg3bWeEj4vb0N5VkmH82lzVUyms6_xcIzGAkmeDnQ/edit?tab=t.0#heading=h.9krrk91c9mji

Friday at AERPAW

AERPAW
Aerial Experimentation and Research Platform for Advanced Wireless

AERPAW Outdoor Demonstration

Join us for a live demonstration of the **Aerial Experimentation and Research Platform for Advanced Wireless (AERPAW)** on **Friday, September 25, from 9:00 AM to 11:00 AM** at **NC State University's Lake Wheeler Field Laboratory**.

https://events.gnuradio.org/e/grcon26

Amateur Radio License Exams

During GRCon26 we will be hosting Amateur Radio license exams for those interested in obtaining or upgrading their licenses **(In-Person Only)**. Check out ARRL's overview for more details about Licenses.

Amateur Radio License Exams will be offered on **Thursday Sept. 24 at 1:00 PM**.

Amateur Radio license examinations at GRCon 2026 will be conducted by:
FCVET: Five County Ham Radio Enthusiasts

Pre-registration for exams is required. Please pre-register here:
https://hamstudy.org/sessions/69e11cea1cc7787293e397fa/1

There are study guides and trial exam tests available for *free* online:

- Dan Romanchik No-Nonsense Study Guides
- ARRL trial license testing ARRL Exam Review

Last Minute Talk Submissions

Given how quickly software development moves now, we recognize that people have done impactful and interesting work with GNU Radio and SDRs that simply didn't exist back in May

During conference planning we decided to set aside a few 15m slots on Thursday afternoon for the strongest last minute submissions

If you think you have something that would be of broad interest to GRCon attendees, **talk to or email Marc Lichtman** (marc@gnuradio.org) before end of Tuesday, a group will judge and make the decision Wed morning

CAPTURE THE FLAG

Find hidden messages in radio signals

- Build flowgraphs
- Decode signals
- Capture flags
- Learn (or win?) something

START: 1100, 22 Sept
END: 1630, 24 Sept
LOCATION: Raleigh + remote

How to play

The short version: inspect the signal, recover the message, submit the flag.

1. **Choose a challenge** Start anywhere. Some solves unlock more challenges.
2. **Analyze the signal** GNU Radio a great start, but use any tool you feel comfortable with and look carefully – some signals have multiple flags.
3. **Submit the flag** Use flag{...} or flag#{...}. Ask an organizer if formatting is unclear.
4. **Collaborate encouraged.** Play solo or as a team. Collaboration is allowed and

Start here → ctf.gnuradio.org

Thank you to our Sponsors

This conference is only able to take place because of our generous sponsors

Be sure to visit the Expo Hall and learn more about each of them

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Diamond

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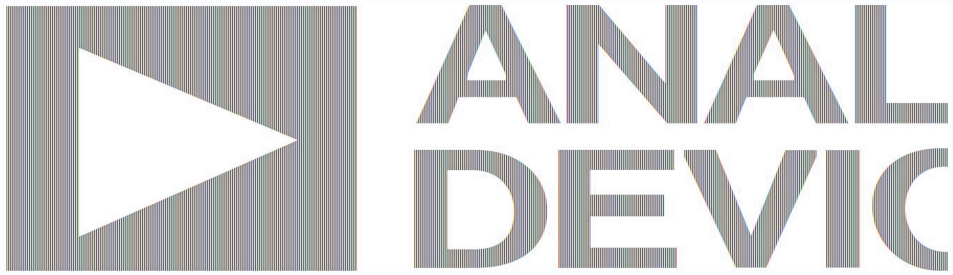
Platinum



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https://sigprolabs.com

COMMUNITY UPDATES

Upcoming Events

GNU Radio

EUROPEAN DAYS 2026

Rennes, France | 16–18 Nov 2026

Three days dedicated to Software Defined Radio, GNU Radio, open-source wireless systems, radar, testbeds and industrial innovation.

AORA STUDENT CHALLENGE

AERPAW Open Research on Autonomy

Registration deadline: Dec 31, 2026

Experiment Submission: April 30, 2027

The Challenge

Design your own concept combining **autonomous UAS with 5G/6G wireless — fully open-ended**. Build with **GNU Radio, srsRAN (LTE) + OCUDU (5G), or OpenAirInterface (OAI).**

Digital Twin → Testbed

Stage 1: develop and evaluate in AERPAW's Digital Twin, open to all registered teams. **Stage 2:** the top 6 finalists deploy unmodified on AERPAW's real aerial wireless testbed.

Review & Evaluation

A five-member committee of wireless and UAS experts scores novelty, stability, reproducibility, clarity of the reports, and potential impact.

STUDENT PRIZES (Expected to Increase if new sponsors identified)

1st Place	2nd Place	3rd Place	4th–6th Place
$5,000	$3,000	$2,000	$500 each
+ USRP B206mini	+ USRP B206mini		Runner-up awards

TIMELINE

SEP 2026	THRU DEC 2026	APR 2027	MAY 2027	JUN–JUL 2027	AUG 2027
Announcement (GRCon)	Registration	Digital Twin Dev + Report Due	Committee Evaluation #1	Testbed Deployment and Testing	Winners Announced

SPONSORS

Platinum: ODC **Gold:** NI **Silver:** Keysight Technologies, AUVSI North Carolina

Bronze: Vadum, Thurling Consulting

Interested in sponsoring AORA's student awards? Contact aerpaw-contact@ncsu.edu

Scan to Register

For more Info:

https://aerpaw.org/

The Raleigh Hamfest RARS*fest*™

April 3, 2027
Jim Graham Building
NC State Fairgrounds

2026 GSoC Administrator - Johannes Sterz Demel

GOOGLE SUMMER OF CODE 2026

Hardware in the loop CI

Sayantan Maity

Mentor: Cyrille Morin

Co-Mentor: Marcus Müller

Python-based controller for repeatable GNU Radio hardware-in-the-loop (HIL) experiments on CortexLab

How it works

```
Client / CI request
       |
       v
Flask controller (:5678)
       |
       +--> OAR reservation + reservation monitor
       |
       +--> MINUS scenario/task using the configured GNU Radio image
       |
       +--> Select available nodes and create experiments/runs/<experiment-id>/
       |
       +--> Upload files over SSH/SFTP to CortexLab
       |
       +--> Start each node script together over node SSH
       |
       +--> Run analysis.py and download results.json
       |
       v
Status API and browser dashboard
```

https://github.com/Sayantan-Maity-hub/gnuradio-hardware-in-loop

GOOGLE SUMMER OF CODE 2026

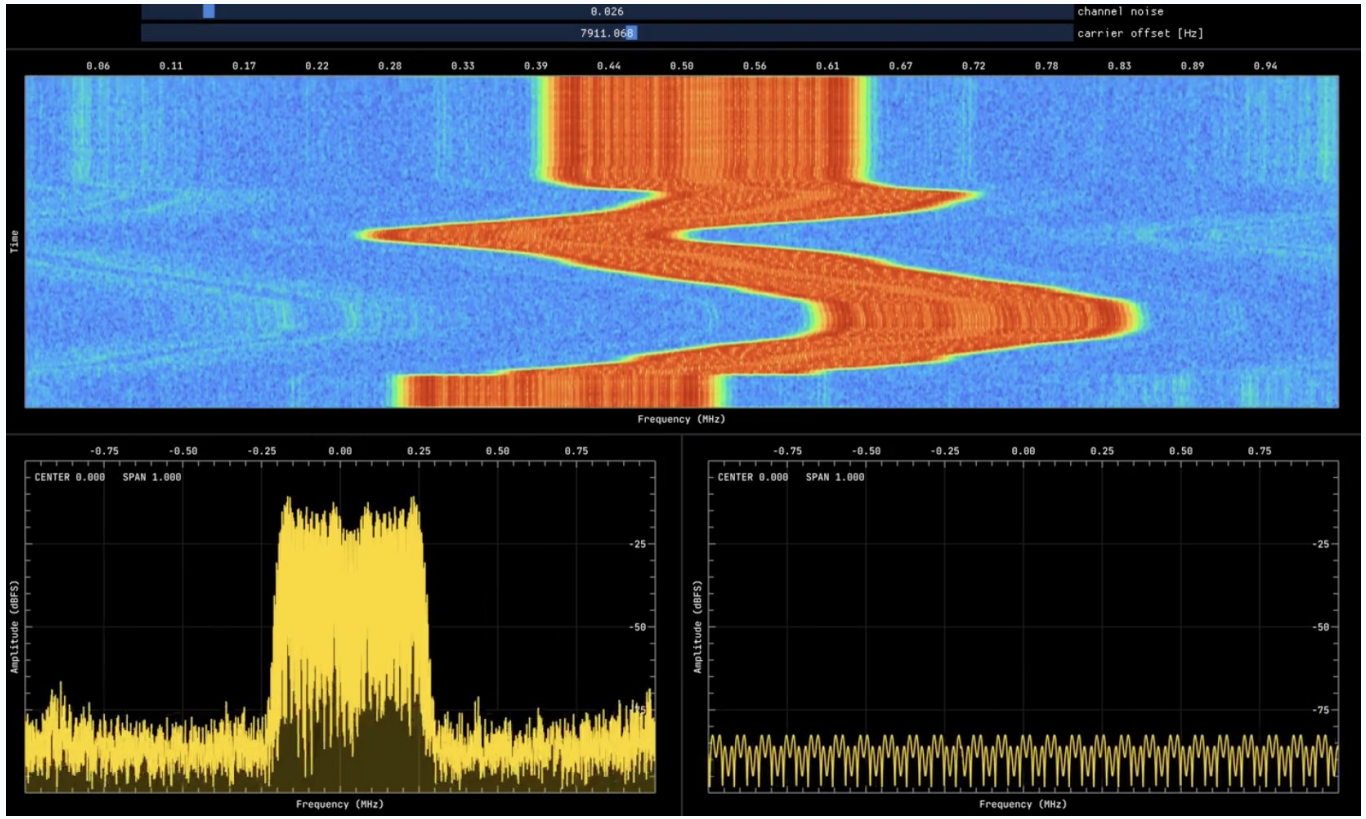
Graphical interoperability between CyberEther and GNU Radio

Youssef Mahmoud

Mentor: Luigi Cruz

Co-Mentor: Håkon Vågsether

Out-Of-Tree (OOT) module that relies on CyberEther's GPU-accelerated framework to create high-performance, modern visualization sinks for GNU Radio and GRC



https://joeonit.github.io/final-work-product

GOOGLE SUMMER OF CODE 2026

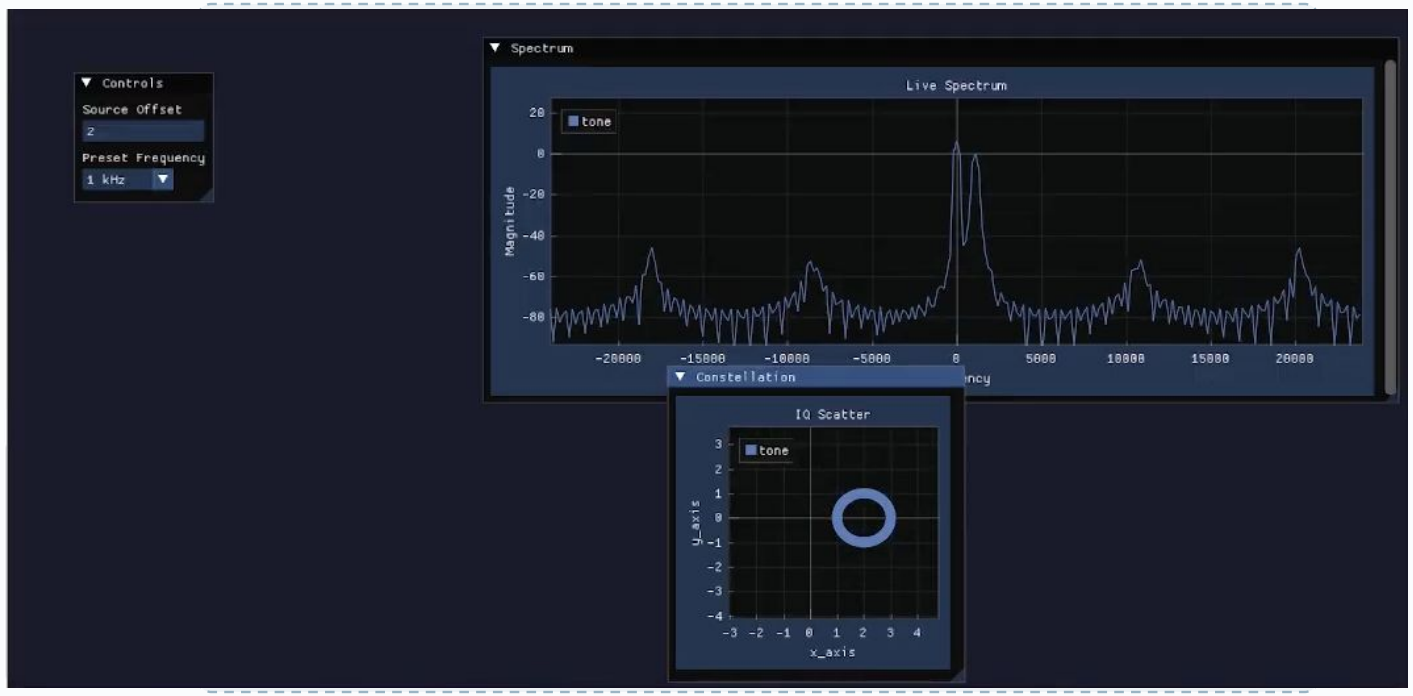
Web-based remote Plotting of running flow graphs in GNU Radio 4

Ziad Haithem Fahmi

Mentor: Cyrille Morin

Co-Mentor: Josh Morman

OOT module for GR4, serving as a successor to gr-bokeh GUI in functionality.



https://ziadfahmyzewailcity.github.io/blog-gr4.0-remotePlotting/2026/08/24/FinalWorkProduct.html

This conference is part of the GNU Radio project

And none of this happens by itself.

Almost all of the work that keeps GNU Radio healthy is volunteer work.

What is the GNU Radio Project?

- The codebase of GNU Radio 3, GNU Radio 4, VOLK, and SigMF
- The dozens of supporting projects and infrastructure
- The active contributors
- The ecosystem of modules, applications, and interfaces
- This conference, EU GNU Radio Days, other events
- *You* - everyone that is interested in making open source software radio even better

How is GNU Radio Governed - General Assembly

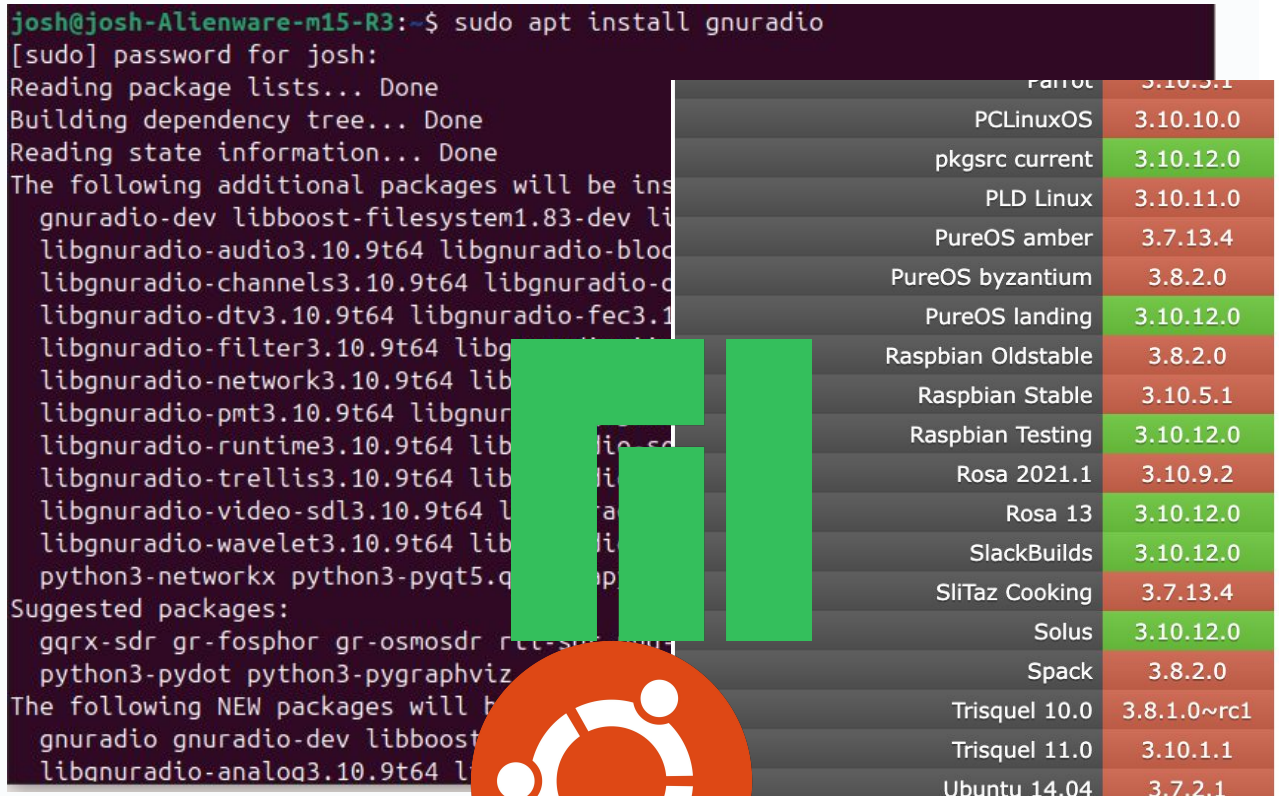
Martin Braun - Community/Ecosystem
Andrej Rode - Infrastructure
Bastian Bloessl - Architecture
Johannes Sterz Demel - VOLK
Jeff Long - Maintenance
Seth Hitefield - GRC
Josh Morman* - President
Marc Lichtman* - Vice President
Derek Kozel - SETI PI

Marcus Müller* - Chief Architect / Lead Maintainer
Nate Temple - Community
Philip Balister - Embedded
Samantha Palazzolo - GRCon
Jacob Gilbert - SigMF
Jean-Michel Friedt - Academic Engagement
Ben McCall - Documentation
John Sallay - GR 4.0
Cyrille Morin - GSoC, EU GR
Wylie Standage-Beier

Packaging

Installing GNU Radio has gone from headache to trivial over the past several years

Thanks to the packagers in our community



Debian(/Ubuntu) - Maitland Bottoms

RadioConda - Ryan Volz

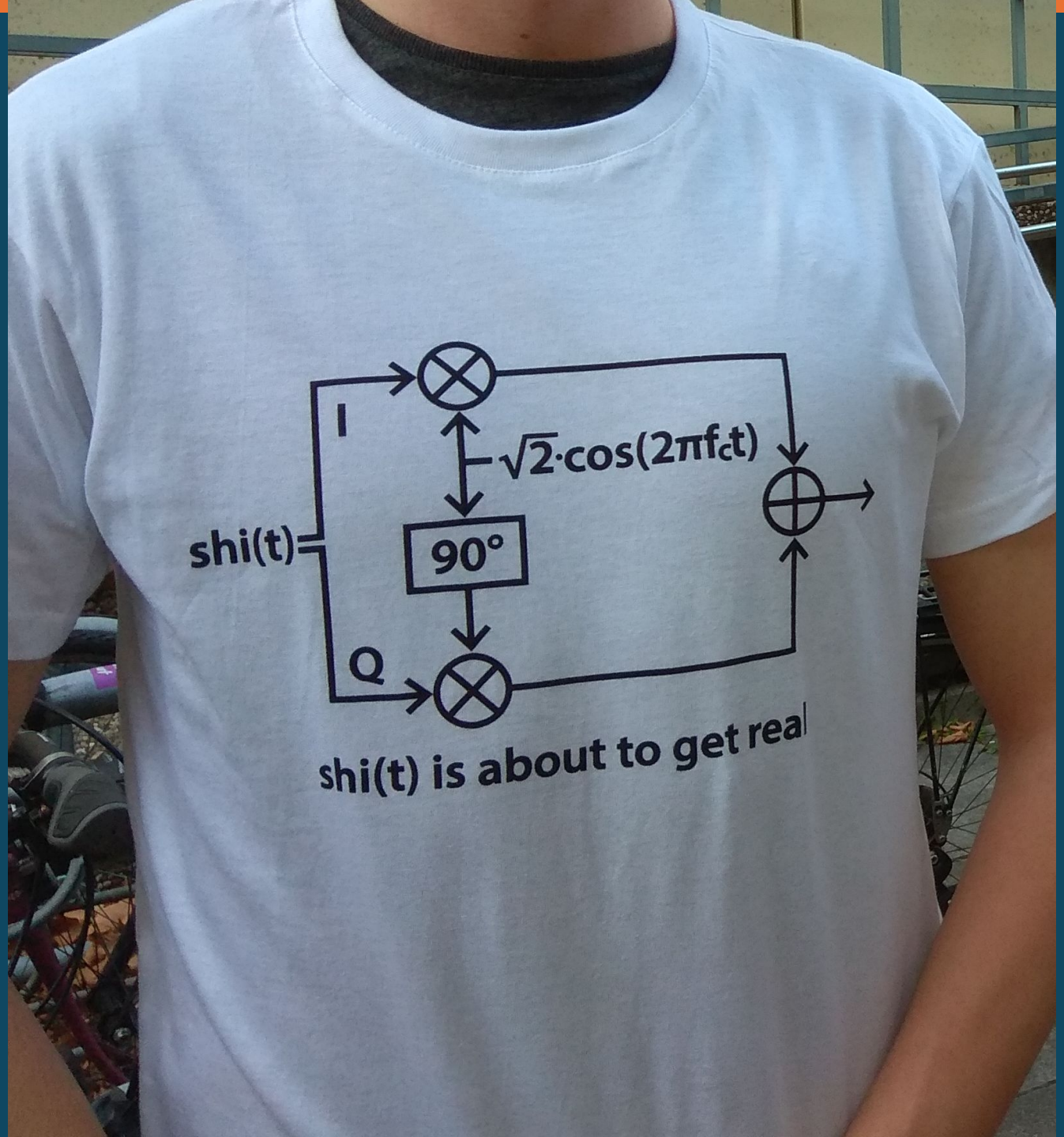
…

There is a place to help

Code / blocks	Testing	Documentation
Packaging	Examples	Infrastructure
User support	Events	Education

You do not have to be a core-runtime or DSP expert
to make an important contribution.

https://www.gnuradio.org/community/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√2·cos(2πfct)
shi(t)
90°
Q
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GNU RADIO 4 TODAY

GR4 Key Differentiators over GR3

Compute Performance	**Less Boilerplate**	**Permissively Licensed Core**	**Modern C++ Best Practices**	**Modular Scheduling**
Embedded Deployments	**Type and Memory Safety**	**SIMD and Merge**	**PMTs, Tensors, Packets, DataSet**	**Zero Copy paths**

From prototype to deployed product, empowers true rapid application development

For the last few years...

The future of the GNU Radio framework

Imagine ...

GNU Radio that is suitable for mission critical and enterprise grade applications

GNU Radio flowgraphs that can be designed as prototypes and be deployed as products with minimal additional effort

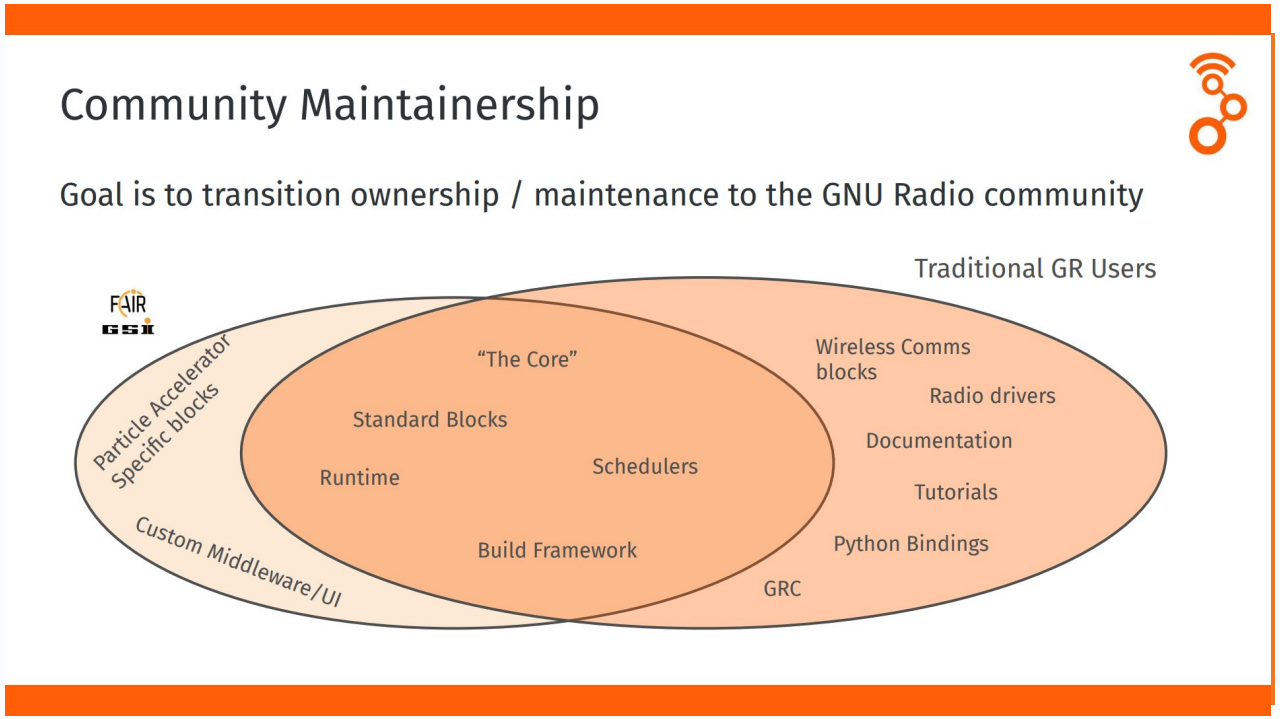
GNU Radio development workflows and data pipelines that better enable AI tools and AI/ML applications

Project Vision

STRENGTHEN	Ongoing improvement of the core framework
SPREAD	Grow and expand the reach of the project
SUSTAIN	Keep the ecosystem healthy and active

The GR4 project talk was about vision.

Last year...



Community Maintainership

"Goal is to transition ownership / maintenance to the GNU Radio community"

GRCon25, slide 62

We did not get here alone

GSI / FAIR played a more-than central role in bringing the GR4 implementation from vision to technical maturity. Brought deep expertise crucial to a long-lasting design and implementation

We thank Ralph, Alex, Simon, Matthias, Ivan, and the many other contributors and supporters at FAIR for creating the basis for GNU Radio 4

Gave us clean break point at RC2 before departing toward specific institutional requirements

VISION → COMMUNITY REALITY

Putting a stake in the ground

Users need something
they can build against.

Part of the transition was ensuring that GR4 works across our diverse user base

e.g. a project at the beginning of a PhD program should still work by the end

VISION → COMMUNITY REALITY

And stewardship matters

GNU Radio has always been more than a code base.

Community governance

Community-led stewardship

Release identity

Responsibility for the GNU Radio name

An official GNU Radio release line needs to come from the GNU Radio organization.

VISION → COMMUNITY REALITY

What has changed since the transition

Split repos	Separation of concerns, CI, licensing Easier and faster building
Top level “superbuild”	gnuradio4 easier to build than ever Designed to support broad ecosystem
Applications	Active development of downstream apps e.g. gqrx4, sigmf viewer, imgui in active development
User Interfaces	Studio as one example Interactive, web-based
Community maintenance	Active technical working group 10-15 attendees in bi-weekly meetings, active chat
ARDC grant	GR4 for Everyone!! Installers, packaging, reference modem, python

Stewardship is a team effort

Healthy projects are
maintained by teams.

GNU RADIO 4 TODAY

People are already stepping up

Jeff Long

In developing gqrx4 - stressing GR4 in ways no one has and using AI agents to majorly fix things across the stack

Wylie Standage-Bier

Developed modtool and other experimental tools to help make GR3→GR4 migration easier

Philip Balister

Getting yocto builds up and running for GR4 on embedded radios

Summary

Community maintained

Active group of developers and others helping shape the ecosystem

Release

RC3 tagged and ready for your evaluation

Use today

GR4 is ready to build against - core API is stable, blocks are evolving

Still needs work

Need downstream applications and vendor provided SDR blocks

The Repos

`github.com/gnuradio/gnuradio4-*`

gnuradio4

top level, entrypoint

-core

runtime framework APIs

-library

non-block things

-blocks

the standard blocks

-control-plane

plugin based runtime host

-studio

interactive UI

Why we did this

01

Separation of concerns

02

CI efficiency

03

Maintainability

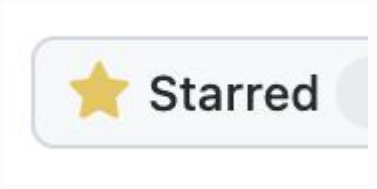
04

Whole ecosystem in mind

Try it for yourself

```
git clone https://github.com/gnuradio/gnuradio4.git
cd gnuradio4
cmake --preset dev
cmake --build --preset dev
source build/dev/activate.sh
```

https://github.com/gnuradio/gnuradio4



Star it on GitHub!!

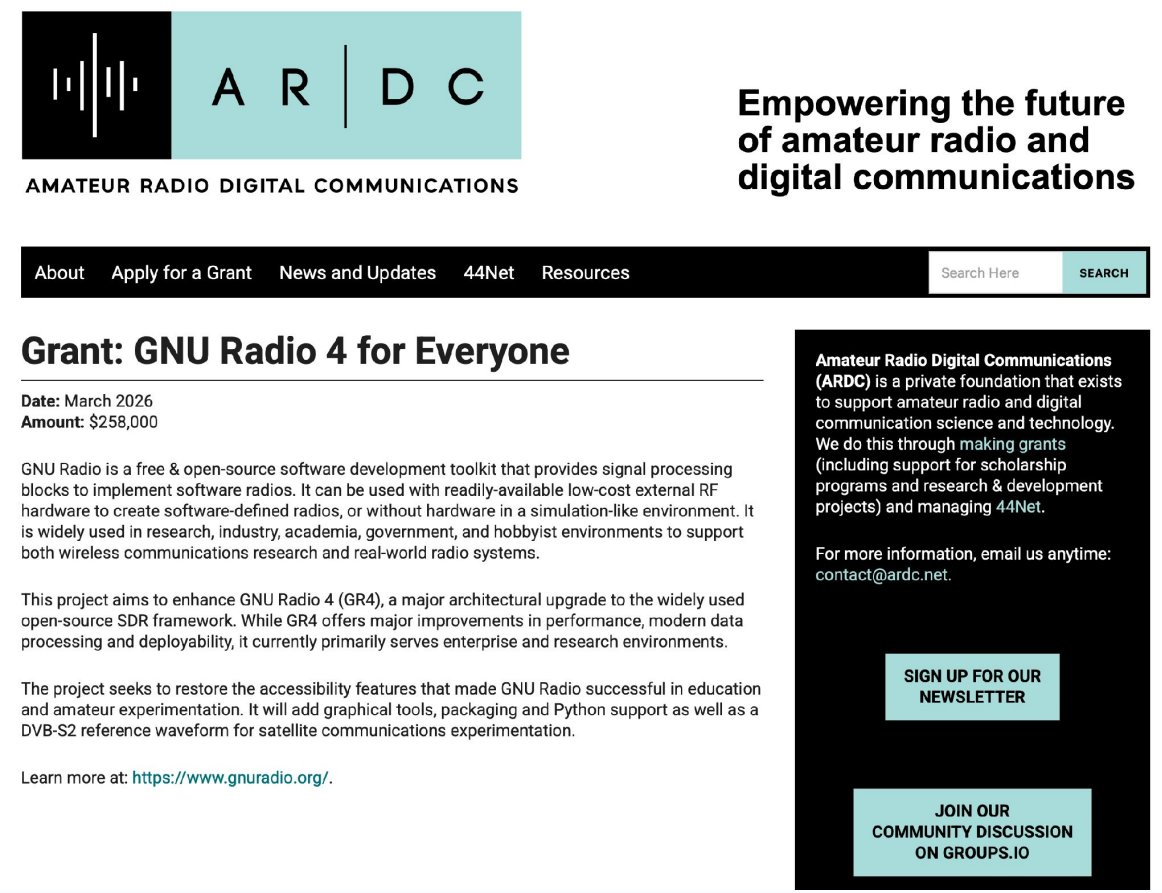
Tutorials:

https://github.com/altiolabs/gr4-block-tutorial

https://github.com/altiolabs/grcon26-intro-to-gnuradio4

Slides on the Conference Schedule

Thank you, ARDC



GNU Radio 4 for Everyone

$258,000

March 2026

GNU Radio 4 for Everyone

Graphical tools

Modern, web-based GRC interface compatible with GR4

Packaging

One-click packages for Windows and macOS - prepare distro packaging with better CMake

Python support

Python bindings to dynamically create flowgraphs in the familiar way

DVB-S2 reference waveform

Demonstrate GR4’s relevance to real-world radio and space based communication applications

What we hope to get out of it

This project aims to **bring GNU Radio 4 “to the masses”** by restoring and modernizing the accessibility characteristics that made GNU Radio successful - *while fully preserving GR4’s new architectural strengths*.

The outcome is a GNU Radio 4 experience that:

- Feels familiar to existing GNU Radio users
- Is approachable for students and amateur radio operators
- Remains suitable for advanced and deployed applications
- Establishes a sustainable foundation for long-term community adoption
- Has a shiny and new look and feel to entice new users

In the end, GR4 should work and feel like GNU Radio 3, but much better

We need your help!

Are you interested and able to contribute to a piece of this funded effort?

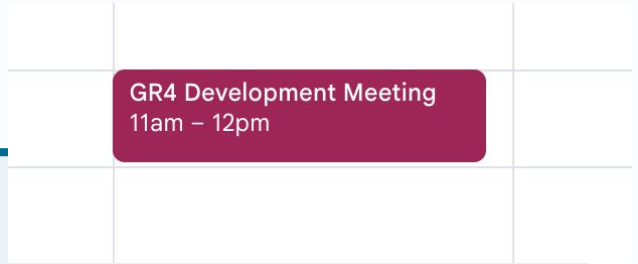
Because of some advance work on this, we should be able to expand the scope and make GR4 even better than we thought.

talk to Derek or Josh, or email info@gnuradio.org

What stands between this RC and 4.0?

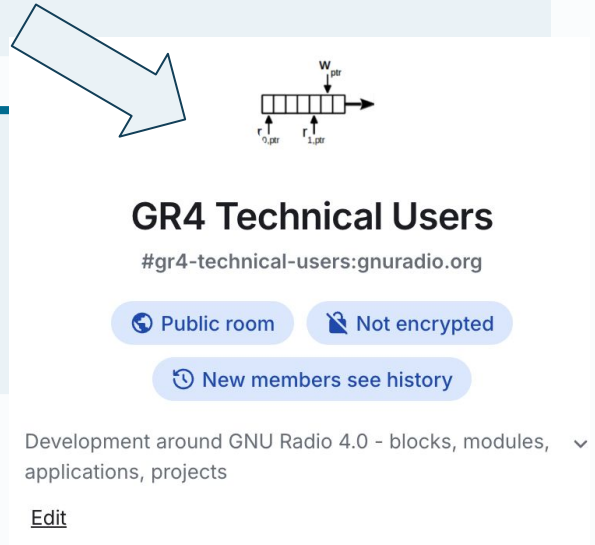
- ☐ A full set of standard blocks
- ☐ More airtime against real user applications
- ☐ Vendor provided SDR drivers (beyond Soapy)
- ☐ Blocks and examples to support comms tutorials
- ☐ ??? -> what do you need to call GR4.0 feature complete????

Get involved in GR4



01

Join the matrix chat - chat.gnuradio.org



02

Join the bi-monthly calls - 2nd and 4th Thursday every month - noon ET

03

Develop OOTs

04

Test it out for your purposes

GNU Radio 3 status

We know, and appreciate, that GR3 is at the core of much of today's infrastructure. GR3 doesn't go away.

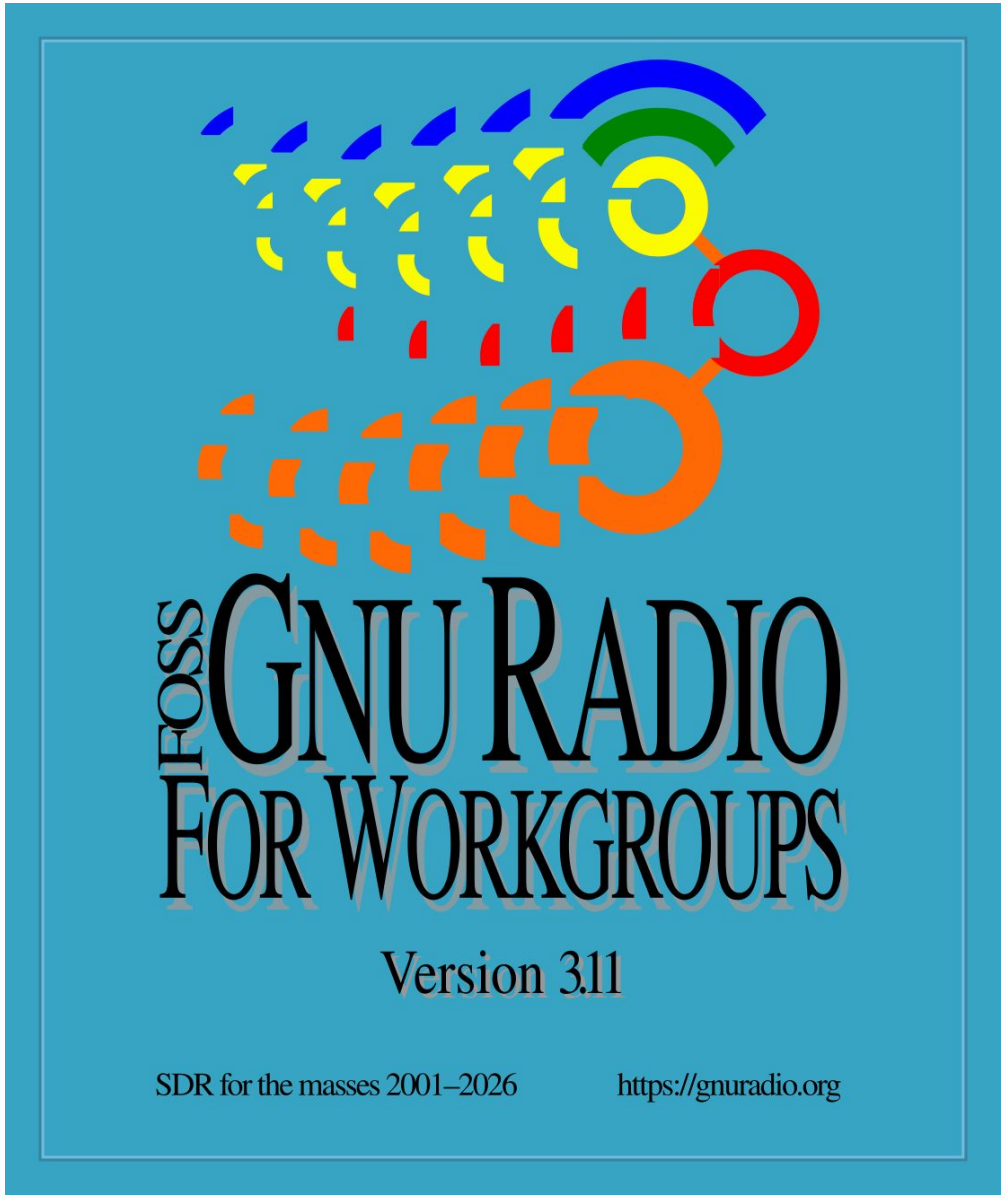
In fact:

- 3.11 is in the making, necessary due to Qt5 becoming unavailable
- 3.10.13.0 is in the final stages of preparation:
  bug fixes, enhancements for the **stable** 3.10 series

GNU Radio 3 status (contd.)

We know, and appreciate, that GR3 is at the core of much of today's infrastructure. GR3 doesn't go away.

But: GNU Radio 3 *will* become the "legacy" system at some point. We're trying to focus feature development on GNU Radio 4, and we only have so many contributors and maintainers!



VOLK Updates - Johannes Sterz Demel

Release 3.3.0 - earlier this year

Release 3.4 will be released SOON!!

Thank you to all the new contributors.

What does the community expect for VOLK and GNU Radio 4?

AI Agents having both good and bad impact across the project

How should we handle this?

Our AI Philosophy

We embrace responsible AI. We don't do slop.

GNU Radio is a project run by humans for humans. AI can be incredibly useful for the project when competent people are in the driver's seat.

Proper Use of AI

Human responsibility

1 · Human defines the change

Requirements
Design · constraints

2 · AI does bounded work

Implement · test
Explore · review

3 · Human evaluates the result

Architecture · API
Behavior · maintainability

4 · The project owns what gets merged

Delegate implementation, not responsibility.

Why continue to invest in GR4?

Why grow and maintain a shared framework in a world where AI can build you anything?

The power of a shared framework

Level of abstraction

The flowgraph+block model allows thinking of applications at a useful level

Reuse

Able to share blocks with other researchers / developers and not reinvent the wheel

Community

People working together speaking the same language

ORGANIZATIONAL ANNOUNCEMENT

ORGANIZATIONAL ANNOUNCEMENT

GNU Radio is joining the OCUDU Ecosystem

GNU Radio will join the OCUDU Ecosystem Foundation within the Linux Foundation as a technical project

What this means for the project

- Expands opportunities for GNU Radio to play a more prominent role in physical-layer experimentation, RF emulation, channel modeling and 5G-Advanced and 6G research.
- Maintain our traditional community-centered project governance
- Together, OCUDU and GNU Radio create pathways for project sustainability and collaboration across industry, government and academia.

Questions?

info@gnuradio.org

jmorman@gnuradio.org