

Lessons learned from 15 years of open source robotics

Infra for Drones





whoami

Ramón Roche

General Manager

Dronecode / Linux Foundation

(Still) an individual contributor

10+ years working in aerial robotics

Co-Lead ROS Aerial Robotics CWG

Co-Lead Space Grade Linux SIG



The Open Source UAV Ecosystem

We are setting the standards in the drone industry with open-source

What the hell is Dronecode Foundation

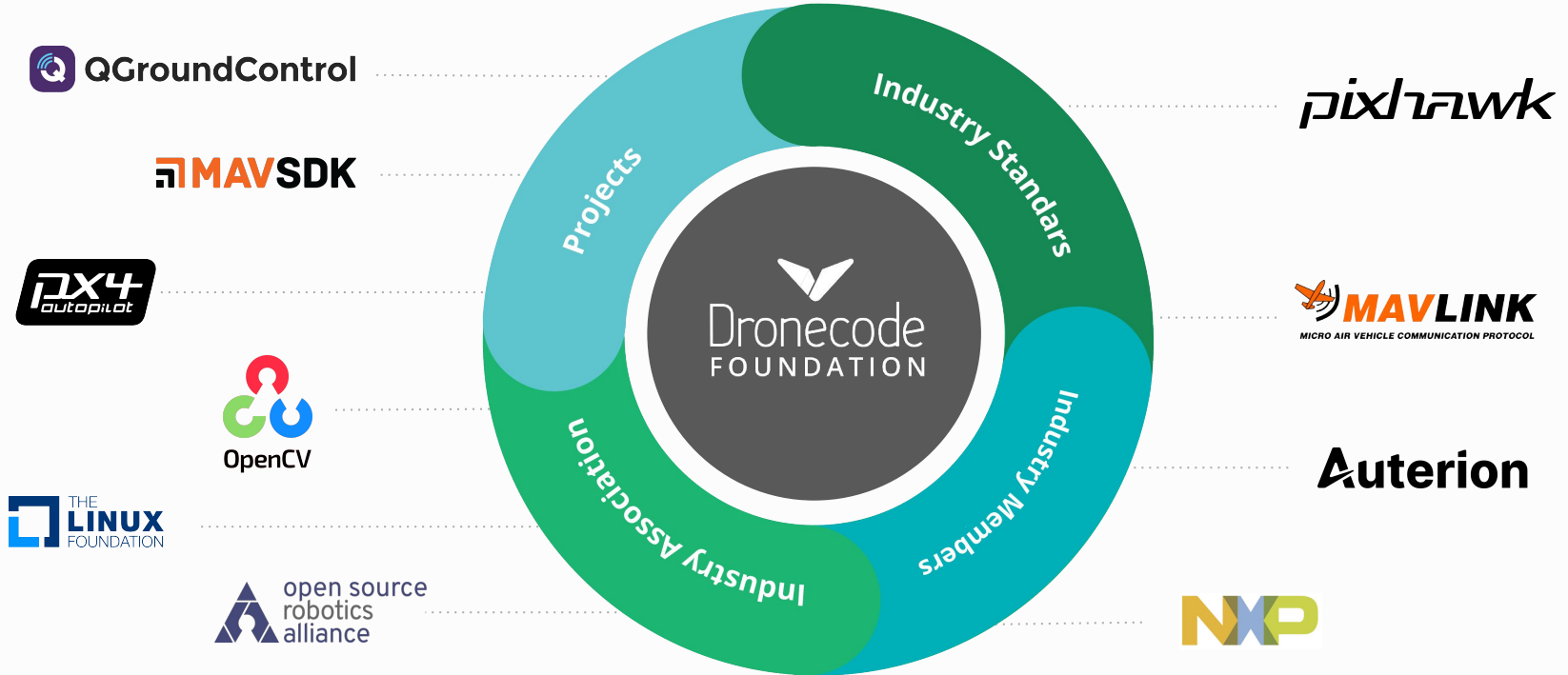
The Dronecode Foundation, marked its 10th anniversary in 2024, we are part of the Linux Foundation.

In simple words, we are a non-profit formed to safeguard open source projects, promote collaboration, standardization, and support the commercial adoption of the open source projects.

- Neutral home for open source projects
- Promoting open collaboration
- Help set standards to accelerating innovation
- Supporting commercial and research use



The Dronecode Ecosystem



| We are setting the standards in the drone industry with open-source

Member Community

These are the member companies that play an integral role in shaping the future of the industry.

Auterion

NXP

3DR

ARK
ELECTRONICS

CUAV

 **DRONEBLOCKS**


FREEFLY

HHLA | **Sky**

German
Innovation Award
Winner 2021

 **Holybro**

rROBU.IN
Your Ideas, Our Parts

MODAL 
ROBOTIC PERCEPTION

SIYI

 **sunflower labs**

TII Technology
Innovation
Institute

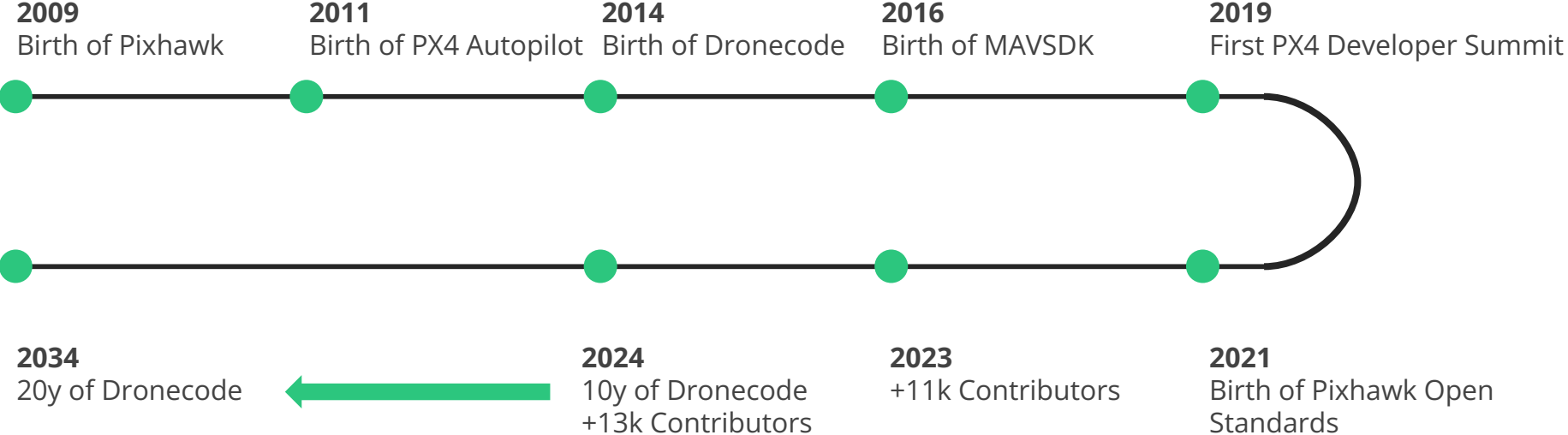
UMy

VAYDYN

 **WATTS**
INNOVATIONS

 **wingtra**

Brief Timeline



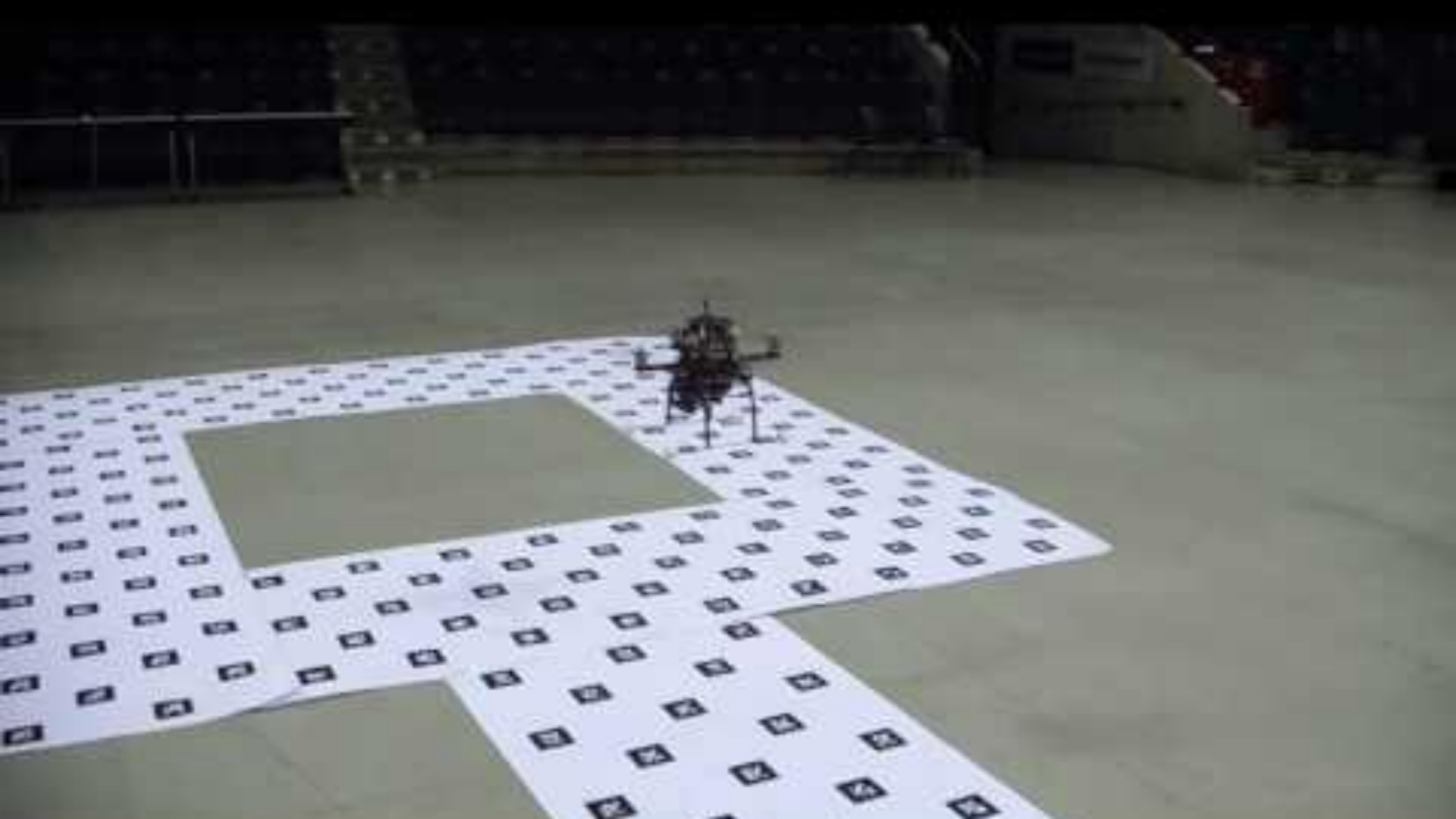
Putting things into perspective

- \$1B Project Value
- 59.72M Total Lines of Code
- 13,307 Total Unique Contributors
- 1,900 Contributors in 2024
- 100+ Git Repositories
- 20 Dronecode Members
- 5 Top-Level Open Source Projects



GroundControl

2009



2011



4x speed


Today



PX4 BASED OMNICOPTER USING THE NEW DYNAMIC MIXING SYSTEM





 DroneUp

FAA
CERTIFIED
OPERATION

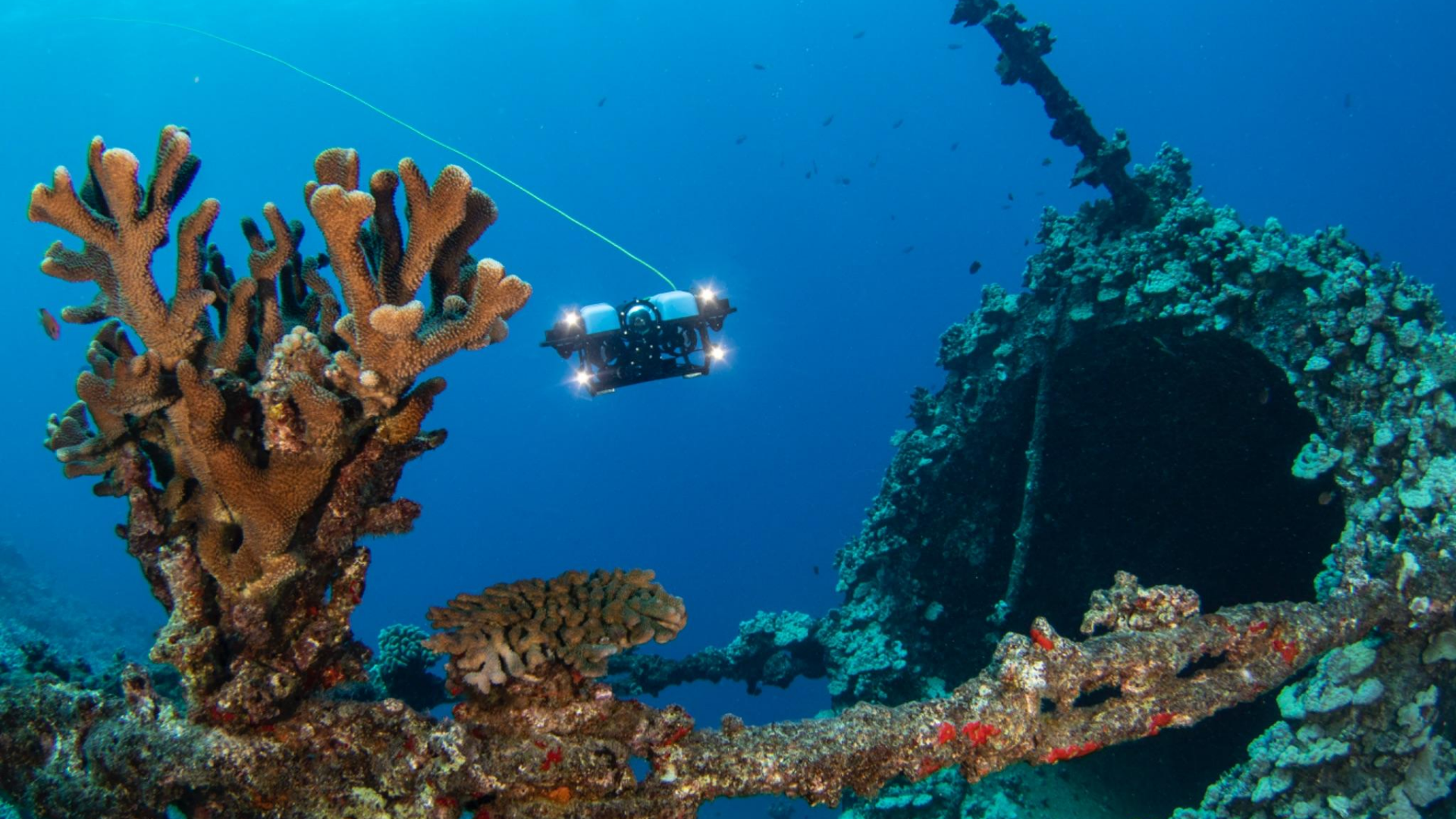
STAND CLEAR



wingtra







How are these varied applications possible with the same codebase?

PX4 Autopilot - The Answer

Autonomy Stack originally developed for Aerial Robotics, primarily Multi Rotors, over time extended to support Fixed-Wing, VTOL, and Over & Under Surface Vehicles.

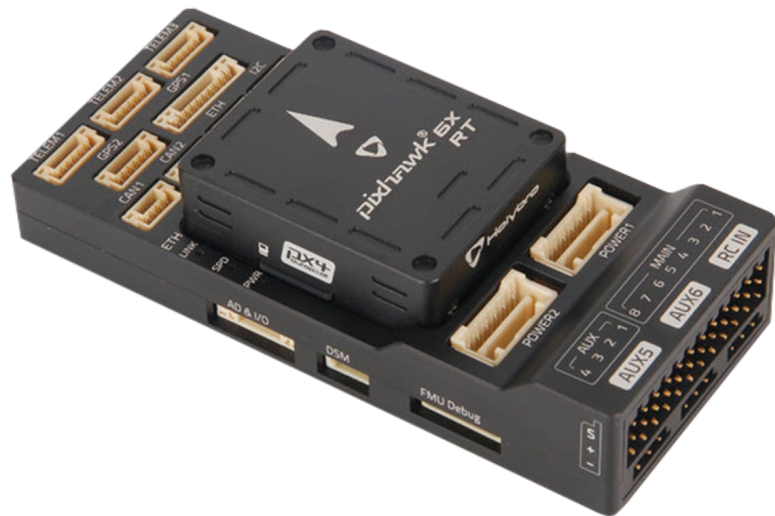
Main Characteristics:

- Runs **realtime** on top of Apache NuttX RTOS
- 100% C++ based
- **Modular** architecture with a **DDS-compatible middleware** (uORB)
- Modules are fully **parallelized**, and **thread safe**
- Great hardware support
- Support for custom builds, **trim what you don't need**
- More than **1M** vehicles using PX4
- More than **13k** developers

- **Flight Modes** provide a set of helpers to control autonomy
- **Flight Tasks** allowing developers to extend flight modes
- **Parameter** database exposing functionality back to users
- **Events interface** giving developers a system-wide API for notifications
- **Control allocation** translates thrust and torque commands into actuator commands which control motors and servos
 - Controllers do not require special handling for airframe geometry
- Native **ROS 2 Support** through DDS

PX4 Autopilot - Hardware Support

- Support for more than 80 boards from 30+ manufacturers
- Drivers for more than 100+ sensors
 - IMU, Baro, Actuators, GPS, INS, CAN, UWB... etc.
- Main Architectures Supported
 - STM32 - STMicro
 - iMX - NXP Semiconductors
 - RISC-V



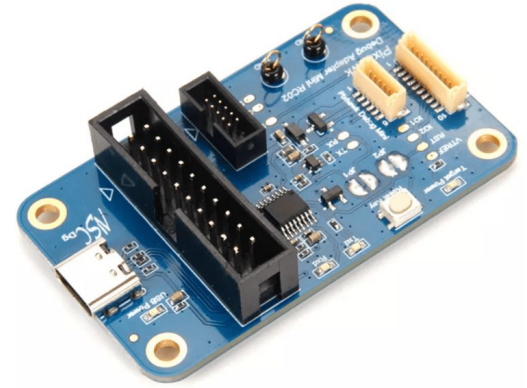
Pixhawk Hardware

Open Hardware & Open Standards

Started as a flight controller open hardware project with the first versions of Pixhawk's

Evolved into an Open Standard for

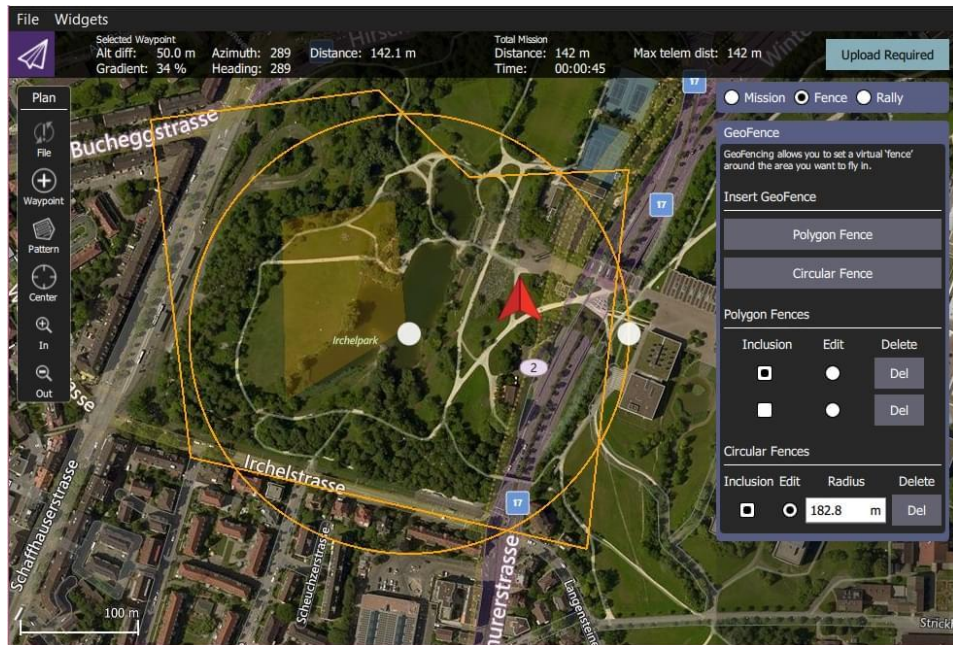
- Flight controllers
- Payloads (Gimbals)
- Smart Batteries
- Connectors
- Debuggers



PX4 Autopilot + QGroundControl - Autonomous Missions

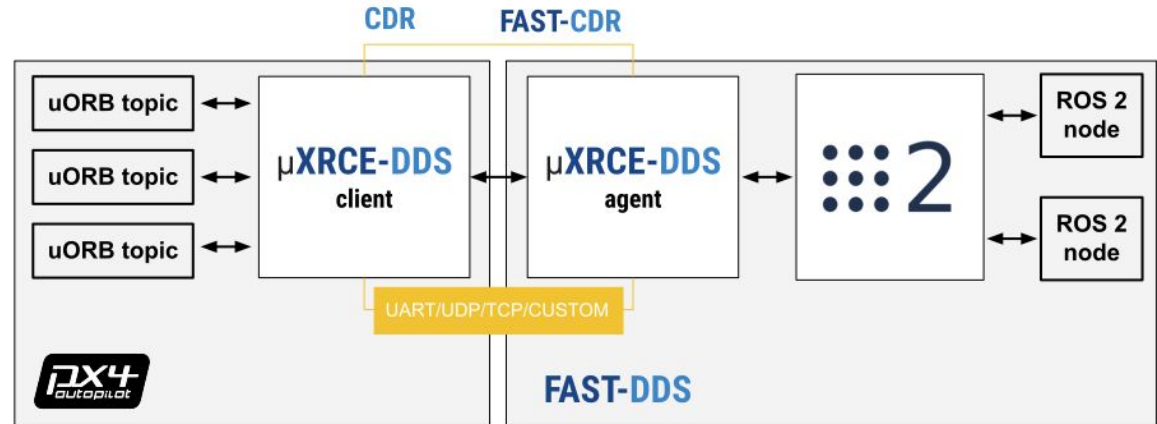
Define waypoints with customizable actions that allow you to control the behavior of vehicles.

Standardized mission protocol through MAVLink



PX4 Autopilot - ROS 2 Support

- Thanks to uORB middleware we can communicate directly with the ROS 2 middleware (XRCE-DDS based)
- PX4 internal modules can share data with ROS 2 nodes
- Agent / Client approach
- Ethernet and Serial support
- ROS 2 QoS Supported
- We are ready for the switch to Zenoh!

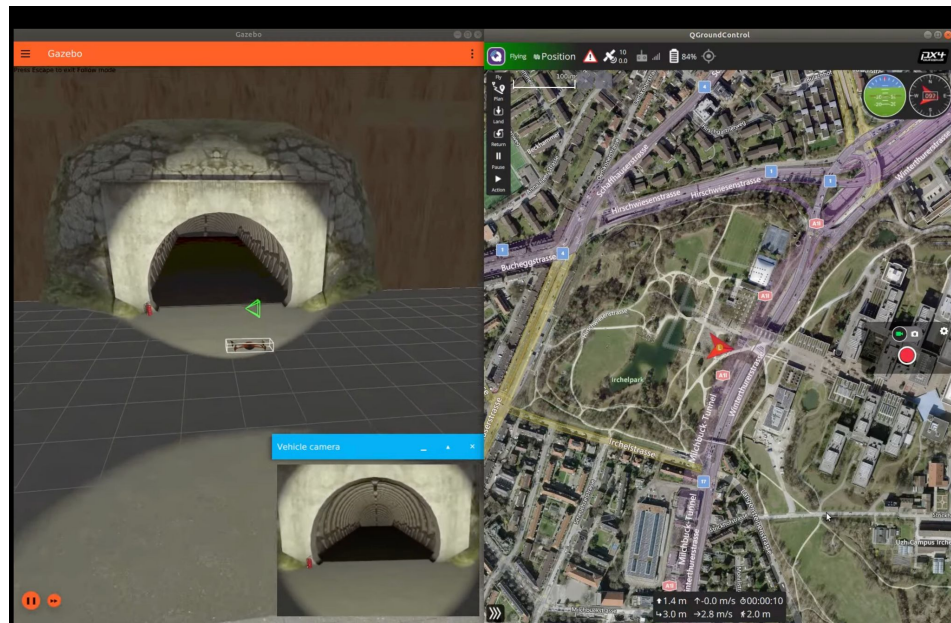


PX4 Autopilot - Simulation

Gazebo is our default simulation agent, we support both classic and modern gazebo, with multiple worlds and models to choose from.

Other Simulation Engines Supported

- Gazebo Classic
- AirSim
- Flight Gear
- jMAVSim



[Gazebo Simulation Docs](#)

How to even begin testing PX4?

Let's split the problem into tiny problems

Developer Testing

- Unit Tests
- Integration Tests / Simulation Tests
- Hardware In the Loop Tests

End User Testing

- Flashing / Installing
- Setting Up
- Tuning
- Manual Flight
- Autonomous Flight
- Validation of Testing

How to even begin testing PX4?

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Can be run in CI

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How to even begin testing PX4?

Developer Testing

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- Manual Flight
- Autonomous Flight
- Validation of Testing



Needs humans in the loop

Tests in the Cloud

*or at least initiated by the cloud

What can be run in CI?

Developer Testing

- Unit Tests
- Integration Tests / Simulation Tests
- Hardware In the Loop Tests*

Builds

- Releases
- Pull Requests

Unit Tests

- We run unit tests as frequently as possible
- Our coverage is less than ideal < 60%
- It's super hard to incentivise contributors to write more
- Tests run in around 7mins
- You can select to run some or all

```
Building [tests]
1765     Start 133: sitl-perf
1766 133/146 Test #133: sitl-perf ..... Passed 0.02 sec
1767     Start 134: sitl-search_min
1768 134/146 Test #134: sitl-search_min ..... Passed 0.02 sec
1769     Start 135: sitl-sleep
1770 135/146 Test #135: sitl-sleep ..... Passed 2.02 sec
1771     Start 136: sitl-versioning
1772 136/146 Test #136: sitl-versioning ..... Passed 0.02 sec
1773     Start 137: sitl-controllib_test
1774 137/146 Test #137: sitl-controllib_test ..... Passed 0.02 sec
1775     Start 138: sitl-lightware_laser_test
1776 138/146 Test #138: sitl-lightware_laser_test ..... Passed 0.02 sec
1777     Start 139: sitl-rc_tests
1778 139/146 Test #139: sitl-rc_tests ..... Passed 0.06 sec
1779     Start 140: sitl-uorb_tests
1780 140/146 Test #140: sitl-uorb_tests ..... Passed 4.68 sec
1781     Start 141: sitl-mavlink
1782 141/146 Test #141: sitl-mavlink ..... Passed 0.05 sec
1783     Start 142: sitl-imu_filtering
1784 142/146 Test #142: sitl-imu_filtering ..... Passed 10.07 sec
1785     Start 143: dyn
1786 143/146 Test #143: dyn ..... Passed 0.01 sec
1787     Start 144: posix_hrt_test
1788 144/146 Test #144: posix_hrt_test ..... Passed 2.04 sec
1789     Start 145: posix_cdev_test
1790 145/146 Test #145: posix_cdev_test ..... Passed 2.04 sec
1791     Start 146: posix_wqueue_test
1792 146/146 Test #146: posix_wqueue_test ..... Passed 2.04 sec
1793
1794 100% tests passed, 0 tests failed out of 146
1795
1796 Total Test time (real) = 48.23 sec
```

Unit Tests

6,649 workflow runs		Event ▾	Status ▾	Branch ▾	A
✓	ark: v6x: update net config Checks #27866: Pull request #24281 synchronize by dakejahl	dakejahl:pr-arkv6x_net_c...	📅 4 hours ago 🕒 7m 30s		
✓	ark: v6x: update net config Checks #27865: Pull request #24281 opened by dakejahl	dakejahl:pr-arkv6x_net_c...	📅 5 hours ago 🕒 7m 26s		
✗	Split battery-related messages into two files Checks #27864: Pull request #24111 synchronize by sdomoszlai13	sdomoszlai13:add-battery..	📅 12 hours ago 🕒 2m 43s		
✗	Split battery-related messages into two files Checks #27863: Pull request #24111 synchronize by sdomoszlai13	sdomoszlai13:add-battery..	📅 12 hours ago 🕒 2m 41s		
✓	sbgecom: Implement sbgECom INS driver Checks #27862: Pull request #24137 synchronize by tolesam	SBG-Systems:dev/sbgecom_...	📅 12 hours ago 🕒 7m 32s		
✗	SIH-SITL integration tests Checks #27861: Pull request #24237 synchronize by mbjd	mbjd:sih_sitl_testing	📅 12 hours ago 🕒 7m 23s		
✗	Add support for parsing CBAT message Checks #27860: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	📅 13 hours ago 🕒 3m 0s		
✗	Add support for parsing CBAT message Checks #27859: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	📅 13 hours ago 🕒 2m 46s		
✗	Add support for parsing CBAT message Checks #27858: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	📅 13 hours ago 🕒 2m 42s		

Integration Tests

- Builds and runs PX4 in simulation mode
- Controls PX4 via API calls using the SDK
- Happens faster than realtime
- Tests are written in C++
- The most fragile of our tests
 - A python script is orchestrating the whole thing
 - Frequent timeouts between process comms

```
✓ Run SITL / MAVSDK Tests
2947
2948 Results:
2949 - iris:
2950   - 'Failure Injection - Reject mid-air when it is disabled': succeeded
2951   - 'Land on GPS lost during mission (baro height mode)': succeeded
2952   - 'Land on GPS lost during mission (GPS height mode)': succeeded
2953   - 'Continue on mag lost during mission': succeeded
2954   - 'Continue on baro lost during mission (baro height mode)': succeeded
2955   - 'Continue on baro lost during mission (GPS height mode)': succeeded
2956   - 'Continue on baro stuck during mission (baro height mode)': succeeded
2957   - 'Continue on baro stuck during mission (GPS height mode)': succeeded
2958   - 'Takeoff and Land': succeeded
2959   - 'Fly square Multicopter Missions including RTL': succeeded
2960   - 'Fly square Multicopter Missions with manual RTL': succeeded
2961   - 'Fly straight Multicopter Mission': succeeded
2962   - 'Offboard takeoff and land': succeeded
2963   - 'Offboard position control': succeeded
2964   - 'Offboard attitude control': succeeded
2965   - 'Fly forward in position control': succeeded
2966   - 'Fly forward in altitude control': succeeded
2967 - iris:
2968   - 'Offboard attitude control': succeeded
2969 - standard_vtol (not selected)
2970 - tailsitter (not selected)
2971 - typhoon_h480 (not selected)
2972 Overall result: PASS
```

Integration Tests

Triggered via pull request 5 hours ago

 dakejahl synchronize #24281 [dakejahl:pr-arkv6x_net_c...](#)

Status

Success

Total duration

14m 13s

Artifacts

–

sitl_tests.yml

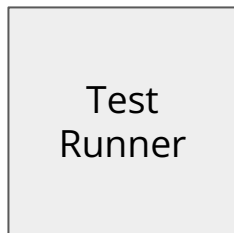
on: pull_request

Matrix: build

- ✓ Testing PX4 iris 8m 41s
- ✓ Testing PX4 standard... 13m 26s
- ✓ Testing PX4 tailsitter 13m 35s

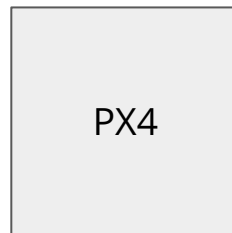
Integration Tests

Each test launches a new PX4 and Gazebo instance



- Failure Injection
- Land if GPS Lost
- Takeoff and Land
- Fly a square
- Fly straight

Faster than Realtime Execution



Simulation Engine

Integration Tests



mrpollo opened on Nov 18, 2024 · edited by mrpollo

Edits ▾ ⋮

We need to improve the current SITL tests.

Stage 1

- Improve specific failing tests ⋮
 - (vtol) Fly VTOL mission with wind change (ramped_up_wind.world)
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11940615234/job/33283663787#step:19:3117>
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11946116827/job/33299931473#step:19:3089>
 - (vtol) RTL direct home with approaches
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11941237714/job/33285631449#step:19:2169>
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11943817019/job/33293577322#step:19:2172>
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11963888081/job/33355197712?pr=24020#step:19:2401>
 - (vtol) RTL direct home not as rally point
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11904739730/job/33174054458?pr=23958#step:19:2461>
 - (VTOL) RTL direct Mission Landing
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11980160836/job/33403865204#step:19:4046>
 - (trailsitter) RTL direct Mission Land
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11941448644/job/33286304485#step:19:1446>
 - (tailsitter) RTL direct rally without approaches
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11944522384/job/33295599685#step:19:2865>
 - (tailsitter) RTL direct rally with approaches
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/11950993944/job/33313676674?pr=24011#step:19:3231>
 - <https://github.com/PX4/PX4-Autopilot/actions/runs/12006914556/job/33466430076?pr=23961#step:19:3272>

Integration Tests

SITL Tests

[sitl_tests.yml](#)

Filter workflow runs



6,635 workflow runs	Event	Status	Branch	Actor
ark: v6x: update net config SITL Tests #32476: Pull request #24281 synchronize by dakejahl	dakejahl:pr-arkv6x_net_c...	5 hours ago 14m 13s		...
ark: v6x: update net config SITL Tests #32475: Pull request #24281 opened by dakejahl	dakejahl:pr-arkv6x_net_c...	5 hours ago 14m 19s		...
Split battery-related messages into two files SITL Tests #32474: Pull request #24111 synchronize by sdomoszlai13	sdomoszlai13:add-battery...	13 hours ago 2m 16s		...
Split battery-related messages into two files SITL Tests #32473: Pull request #24111 synchronize by sdomoszlai13	sdomoszlai13:add-battery...	13 hours ago 2m 16s		...
sbgecom: Implement sbgECom INS driver SITL Tests #32472: Pull request #24137 synchronize by tolesam	SBG-Systems:dev/sbgecom_...	13 hours ago 15m 59s		...
SIH-SITL integration tests SITL Tests #32471: Pull request #24237 synchronize by mbjd	mbjd:sih_sitl_testing	13 hours ago 13m 13s		...
Add support for parsing CBAT message SITL Tests #32470: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	13 hours ago 2m 17s		...
Add support for parsing CBAT message SITL Tests #32469: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	13 hours ago 2m 29s		...
Add support for parsing CBAT message SITL Tests #32468: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	13 hours ago 2m 17s		...

Hardware In The Loop

- Linux Desktop
 - Jenkins Slave
- USB Hub
- FTDI to Hardware
- Flashes and Runs Tests
- 20+ Hardware Boards
- Lives in one of the maintainers house
- No longer running
 - Too fragile, Timeouts, interrupts
 - We have plans for a new version
 - Not all supported hardware was found



Hardware In The Loop



Builds builds builds

Context

- Our primary development environment supported is Ubuntu LTS, currently 24.04
- Our GCC toolchain is arm cross build gcc
 - v9.3.1 (arm-none-eabi-gcc)
- Dependencies can be installed by a helper script
 - `./Tools/setup/ubuntu.sh`

Example

```
$ make px4_fmuv6x
```

- You always need to specify the hardware target
- We support more than 80 boards

When do we need to build?

- On every PR so we can guarantee the code at least builds
 - but also so we can fly it (when needed)
- On releases so we can produce the release artifacts

Builds builds builds

Triggered via pull request 4 hours ago

 dakejahl synchronize #24281 [dakejahl:pr-arkv6x_net_c...](#)

Status

Success

Total duration

16m 30s

Artifacts

23

build_all_targets.yml

on: pull_request

Matrix: setup

✓ Scan for Board Targets

35s

✓ 23 jobs completed

Show all jobs

⌚ Upload Artifacts to S3

0s

⌚ Create Release and Upload...

0s

Builds builds builds

```
> [✓] Configure ccache
[✓] Building [nuttx-px4-0]
  1 ▶ Run ./Tools/ci/build_all_runner.sh px4_fmu-v6x_bootloader,px4_fmu-v6x_
    v6x_multicopter,px4_fmu-v6x_default,px4_fmu-v3_default,px4_fmu-v2_fixedw
  16 ▶ Building: [px4_fmu-v6x_bootloader]
  166 ▶ Building: [px4_fmu-v6x_zenoh]
  4659 ▶ Building: [px4_fmu-v6x_rover]
  5858 ▶ Building: [px4_fmu-v6x_flash-analysis]
  7164 ▶ Building: [px4_fmu-v6x_multicopter]
  8440 ▶ Building: [px4_fmu-v6x_default]
  9740 ▶ Building: [px4_fmu-v3_default]
  11127 ▶ Building: [px4_fmu-v2_fixedwing]
  11987 ▶ Building: [px4_fmu-v2_rover]
  12847 ▶ Building: [px4_fmu-v2_multicopter]
> [✓] Arrange Build Artifacts
```

[Build Group \[nuttx-px4-0\] summary](#)

Build Times

- **px4_fmu-v6x_bootloader** - 0h 0m 58s elapsed
- **px4_fmu-v6x_zenoh** - 0h 2m 3s elapsed
- **px4_fmu-v6x_rover** - 0h 0m 55s elapsed
- **px4_fmu-v6x_flash-analysis** - 0h 0m 51s elapsed
- **px4_fmu-v6x_multicopter** - 0h 0m 51s elapsed
- **px4_fmu-v6x_default** - 0h 0m 36s elapsed
- **px4_fmu-v3_default** - 0h 1m 33s elapsed
- **px4_fmu-v2_fixedwing** - 0h 0m 45s elapsed
- **px4_fmu-v2_rover** - 0h 0m 31s elapsed
- **px4_fmu-v2_multicopter** - 0h 0m 32s elapsed

Job summary generated at run-time

Builds builds builds

- Running on self hosted runners
- Hosted in AWS
- Using [RunsOn](#)
- < 20 min total run time

Build all targets

[build_all_targets.yml](#)

Q Filter workflow runs

...

2,762 workflow runs		Event ▾	Status ▾	Branch ▾	Actor ▾
✓	ark: v6x: update net config Build all targets #2764: Pull request #24281 synchronize by dakejah1	dakejah1:pr--arkv6x_net_c...	4 hours ago 16m 30s	...	
✓	ark: v6x: update net config Build all targets #2763: Pull request #24281 opened by dakejah1	dakejah1:pr--arkv6x_net_c...	5 hours ago 16m 49s	...	
✗	Split battery-related messages into two files Build all targets #2762: Pull request #24111 synchronize by sdomoszlai13	sdomoszlai13:add-battery...	12 hours ago 5m 51s	...	
✗	Split battery-related messages into two files Build all targets #2761: Pull request #24111 synchronize by sdomoszlai13	sdomoszlai13:add-battery...	12 hours ago 5m 40s	...	
✓	sbgecom: Implement sbgECom INS driver Build all targets #2760: Pull request #24137 synchronize by tolesam	SBG-Systems:dev/sbgecom_...	12 hours ago 14m 29s	...	
✗	SIH-SITL integration tests Build all targets #2759: Pull request #24237 synchronize by mbjd	mbjd:sih_sitl_testing	12 hours ago 11m 37s	...	
✗	Add support for parsing CBAT message Build all targets #2758: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	12 hours ago 6m 2s	...	
✗	Add support for parsing CBAT message Build all targets #2757: Pull request #24088 synchronize by sdomoszlai13	sdomoszlai13:add-cbat-ms...	12 hours ago 5m 39s	...	
✗	Add support for parsing CBAT message	sdomoszlai13:add-cbat-ms...	12 hours ago	...	

Summary of CI

ark: v6x: update net config #24281

 Draft

dakejahl wants to merge 2 commits into `PX4:main` from `dakejahl:pr-arkv6x_net_config` 

 Conversation 5

 Commits 2

 Checks 57

 Files changed 1



dakejahl commented 6 hours ago • edited ▾

Member ...

Updated ARK V6X Kconfig options to match our production line settings

New defaults

```
INFO [netman] DEVICE=eth0
INFO [netman] BOOTPROTO=static
INFO [netman] NETMASK=255.255.255.0
INFO [netman] IPADDR=192.168.0.4
INFO [netman] ROUTER=192.168.0.1
INFO [netman] DNS=192.168.0.254
```









Summary of CI



Some checks were not successful

[Hide all checks](#)

1 failing, 55 successful, and 2 skipped checks

✗	 Container build / Build and Push Container (pull_request) Failing after 4m	Details
✓	 Build all targets / Scan for Board Targets (pull_request) Successful in 35s	Details
✓	 Checks / build (check_format) (pull_request) Successful in 1m	Details
✓	 Clang Tidy / build (pull_request) Successful in 8m	Details
✓	 EKF Change Indicator / unit_tests (pull_request) Successful in 4m	Details
✓	 FLASH usage analysis / Analyzing px4_fmu-v5x (pull_request) Successful in 3m	Details



This pull request is still a work in progress

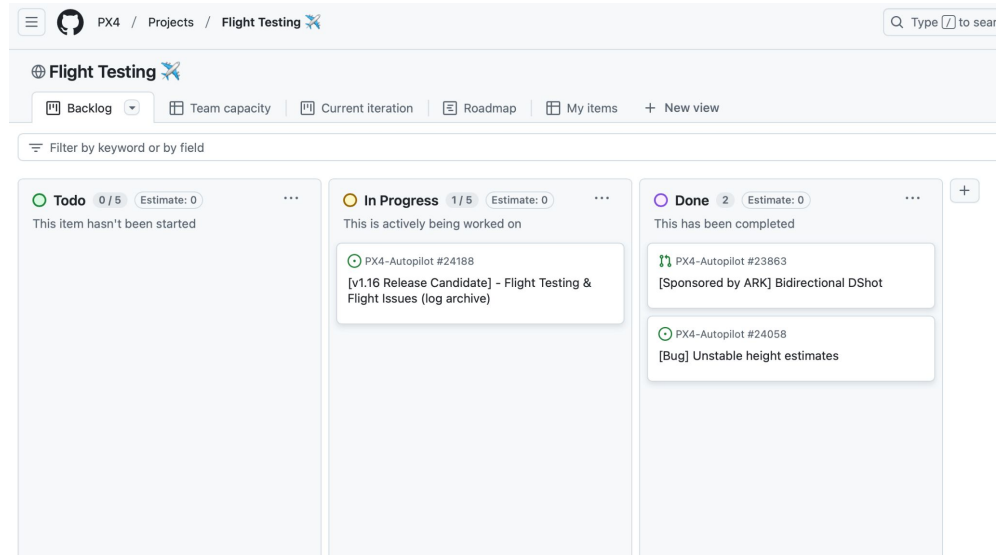
Draft pull requests cannot be merged.

[Ready for review](#)

Human In the Loop Tests

End User Testing - Pilots Flying Hardware!

- We rely on our community for tests flights
- One of our member companies is providing recurrent tests
- Other community members also pitch in
- We wrote “Test Cards” with instructions for pilots to follow
- Github Project for tracking of PRs or Issues that require testing
- Pilots upload logs from flights to our servers





PX4 Log Review



Upload a Log File

Select and upload a log file for plotting and analysis. You can browse through public log files on [this page](#).

Description (optional):	<input type="text"/>
Additional Feedback (optional):	<input type="text"/>
E-Mail:	<input type="text"/>
<small>Will only be used to send you a link to the uploaded file (including a link to delete) and is not stored on the server.</small>	
Access to the log:	<input type="text" value="Public"/>
<small>Make this log publicly available under CC-BY PX4 license. The PX4 community can use it to improve the flight stack.</small>	
ULog File:	<input type="text"/> <input type="button" value="Choose File..."/>
<input type="button" value="Upload"/>	

PX4 Log Review









 Flight Review [Upload](#) [Statistics](#) [Browse](#)

Browse public Log Files

Use [this script](#) for automated download of public log files (license: [CC-BY PX4](#)).

Show entries

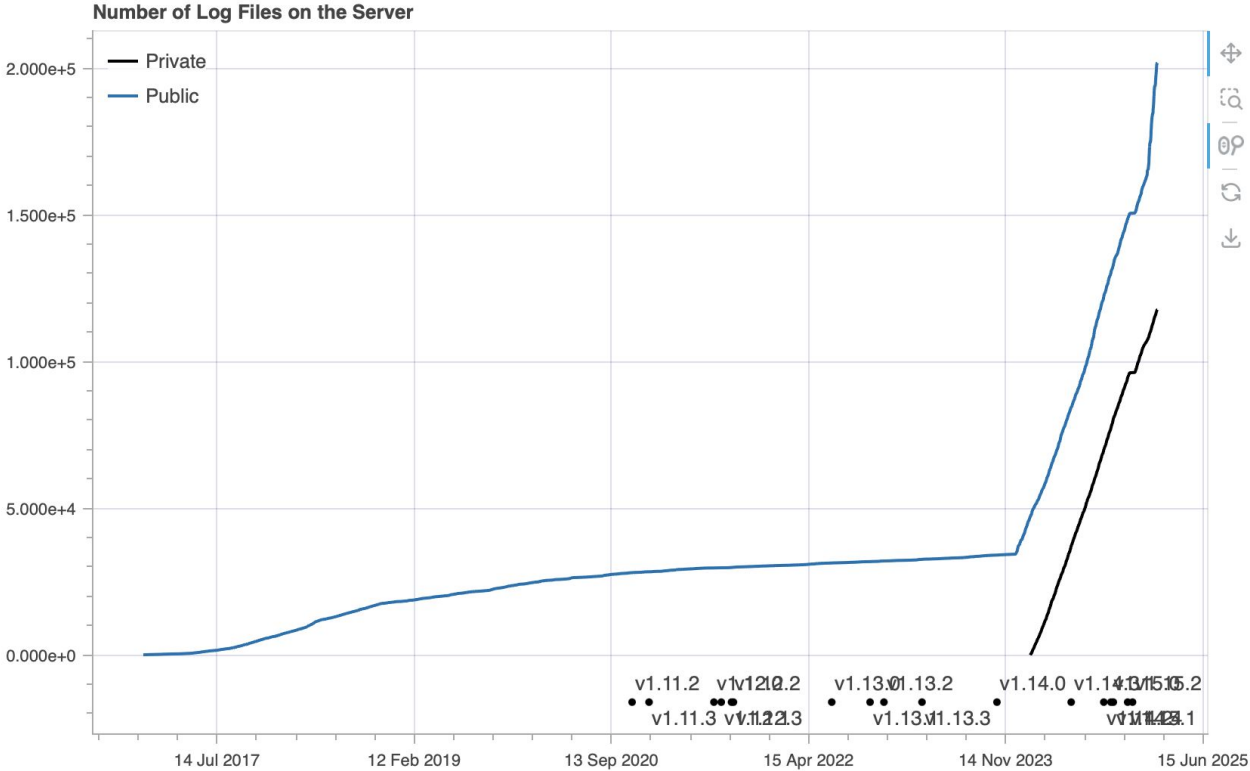
Search:

#	Upload Date	Overview	Description	Type	Airframe	Hardware	Software	Duration	Start Time	Rating	Errors	Flight Modes
1	2025-02-01	Not rendered / No GPS		Quadrotor	Generic Quadcopter	CUAV_NORA	v1.15.1	0:00:33	N/A		0	Stabilized
2	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:28	2025-02-01 01:29		0	Position
3	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:00:45	2025-02-01 01:20		0	Position
4	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:23	2025-02-01 01:13		0	Position
5	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:29	2025-02-01 01:05		0	Position
6	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:12	2025-02-01 00:55		0	Position
7	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:11	2025-02-01 00:48		0	Position
8	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:32	2025-02-01 00:29		0	Position
9	2025-02-01	Not rendered / No GPS		Quadrotor	4351	CORVUS_FMU_V6X	v2.9.0	0:11:46	N/A		0	Offboard
10	2025-02-01			Quadrotor	Generic Quadcopter	PX4_FTG_FMU_V6C	v1.14.3	0:01:43	2025-02-01 00:11		0	Altitude, Position

Showing 1 to 10 of 170,903 entries

Previous **1** 2 3 4 5 ... 17091 Next

PX4 Log Review



PX4 Log Review



Flight Review

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Do you need help with interpreting the plots? See [here](#).

PX4 Quadrotor

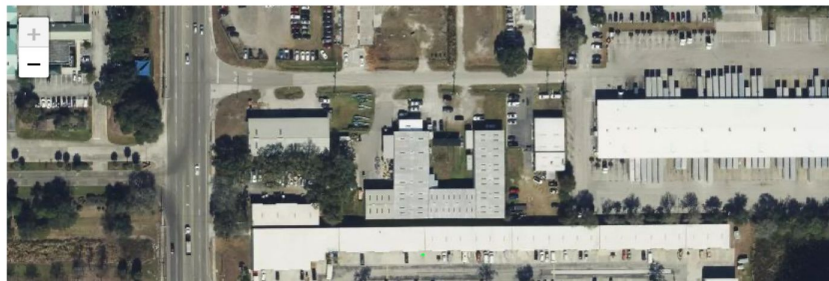
Open 3D View

Open PID Analysis

Airframe: Generic Quadcopter
Quadrotor x (4001)
Hardware: PX4_FTG_FMU_V6C (V6C000001)
v1.14.3 ([c20f7546](#))
Software Version: branch: ftg-v1.14.3
OS Version: NuttX, v11.0.0
Estimator: EKF2
Logging Start?: 01-02-2025 02:29
Logging Duration: 0:01:28
Vehicle Life
Flight Time: 1 hours 38 minutes 10 seconds
Vehicle UUID: 000600000003337383932335108003a0028

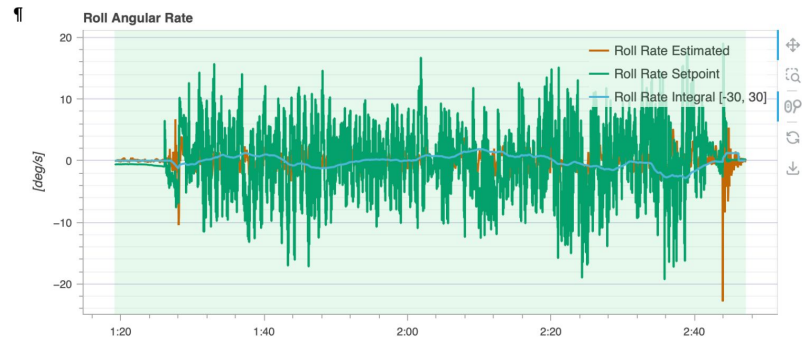
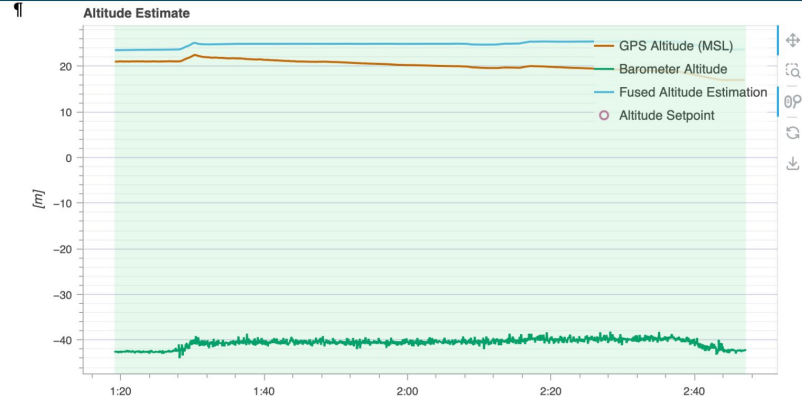
Distance: 7.8 m
Max Altitude Difference: 2 m
Average Speed: 0.3 km/h
Max Speed: 4.0 km/h
Max Speed Horizontal: 0.7 km/h
Max Speed Up: 4.0 km/h
Max Speed Down: 2.0 km/h
Max Tilt Angle: 2.4 deg

Add a detected error...



PX4 Log Review

- PID Tracking Performance
- Vibration
- Actuator Controls
- Acceleration Power Spectral Density
- Raw Acceleration
- Raw High-rate IMU Data Plots
- Actuator Outputs
- GPS Uncertainty
- GPS Noise & Jamming
- Thrust and Magnetic Field
- Sampling Regularity of Sensor Data
- Logged Messages
- etc..



How does this work?

afwilkin 2 days ago Member

Following the tests outlined [here](#)

[Arm and Take-off](#)
Video: <https://www.loom.com/share/6ab405b7b71d426d8a55fa5b50d906de>
Log: https://review.px4.io/plot_app?log=1809ab53-0576-4952-83f9-96762e040c66

[Flight](#)

Stabilized:
Video: <https://www.loom.com/share/6ab405b7b71d426d8a55fa5b50d906de>
Log: https://review.px4.io/plot_app?log=1809ab53-0576-4952-83f9-96762e040c66

Altitude:
Video: <https://www.loom.com/share/35cc4a5185074605b092a9548852556a?sid=3b0b36de-7eb3-4010-9cb2-84272b707644>
Log: https://review.px4.io/plot_app?log=5161578f-2dd4-45b5-aacc-bfc18d68b1fc

Position
Video: <https://www.loom.com/share/ebb87c86ba1c4ca59a090509b13493af?sid=f41d0e77-c455-4ce3-a6a9-68b8f61735ec>
Log: https://review.px4.io/plot_app?log=1ded9991-d23a-4409-9c23-e5fa144621e7

[Landing](#)
Video: <https://www.loom.com/share/2fe0d6627fc742d189a0a98e27732082?sid=c54ebc9f-447e-4abf-875a-355a7c609141>
Logs:
https://review.px4.io/plot_app?log=335c5220-8ed4-478d-9153-0e7efbeb9836
https://review.px4.io/plot_app?log=6317f09e-1f3d-4110-8760-360ac2f590a1

MaEtUgR 2 days ago · edited by MaEtUgR Edits Member

@afwilkin I had a look at your original log. RC input data looks fine. Translation to setpoints also looks high level ok, tracking is not good and I think this is because the yaw rate and hence also the yaw goes unstable:



Could it be that your vehicle's motor mounts on the arm are not rotated the right way or even rotated slightly the wrong way? That could explain the lack of yaw authority even if the propeller turn direction and motor assignment is correct. For reference the motors should be ever so slightly (2-5°) tilted like indicated on my drawing (assuming props turn in default "cleaning" direction otherwise everything is the opposite way):

Conclusion

Learn More & Get involved

GitHub / Docs / Forums /
Discord / Weekly Calls

- Github: [PX4](#), [Pixhawk](#),
[MAVLink](#), [MAVSDK](#),
[QGroundControl](#)
- [Documentation](#)
- [Forums](#)
- [Discord](#)
- [Calendar](#)

Enjoy Brussels

Thank You