



# Aerial Robotics Working Group

February 28th 2024  
Discussion meeting

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# The Agenda

- Announcements
- Background info about REPs
- Summary last meeting
- Proposal of improvement of REP-147 by Ryan
- Some further topic discussions
- Conclusion

# Announcements

- Diversity Scholarship Application ROScon 2024
- Indoor navigation subcommittee kick off
- Anybody else anything to share ? (Meetups, announcements..)

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 Discourse

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### Development topics for Aerial Robotics - Indoor Navigation

 Aerial Vehicles 


 botmayank





Hey,  
As a part of ROS-Aerial, we're starting an indoor navigation subcommittee. Let's use this thread to start ideating on existing projects which can be relevant that we can work on and also any new packages which can help push out an open-source autonomy stack for indoor navigation.

Feb 2 11:00 AM


 Discourse

## Announcing ROSCon 2024 in Odense, Denmark + Diversity Scholarships

 General [diversity](#), [roscon2024](#)

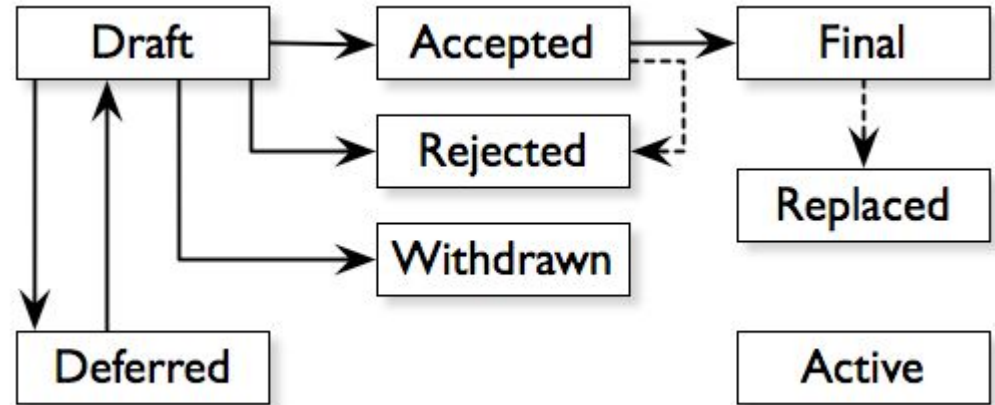
 Katherine\_Scott   1  13d

### Announcing ROSCon 2024 in Odense, Denmark + Diversity Scholarships



# What's a REP

- ROS Enhancement proposal
- Types of REP
  - Standards Track
  - Informational
  - Process
- Workflow->



<https://ros.org/reps/rep-0001.html>

# Last meeting on message standards August 16th 2023

- Current state REP-147 is not fully aligning to the needs of aerial robotics
- Consider Existing Standards and Real-World Use Cases
- Define Semantic Data Types and Behavior
- Advise: Start Small and Incrementally Build

Find the recording and transcripts here:

<https://discourse.ros.org/t/august-2023-meetings-aerial-robotics/32809/5>

# REP - 147- A Standard interface for Aerial Vehicles

- Started in 2016 as 'Draft'
- Last updated in 2018
- Given 'Deferred' status in 2022
- Tiny updates since then by Ryan

<https://www.ros.org/reps/rep-0147.html>

# Why REP-147

- Standardization and autopilot agnostic
- Tooling integration
- Alternative is MAVlink, but no ROS tooling support
- How to integrate with existing ROS tooling
- Optimization of existing telemetry solutions is perhaps not necessary (overly optimized).
- Behavior compatibility between autopilots
- Current REP doesn't define topics and desired behavior
- Current REP was meant to be platform agnostic
- Perhaps not fix topic types too much

# Why REP-147

- REP-147 not standard so people can implement something different for optimization
- Could consider downsample/upsample for covariances
- Could we start from MAVlink for most common use-cases?
- MAVlink has message defs but no behavior defs
- Limiting for autopilot devs to deal with mavlink, need to propose new message. Tedious with difference of versions.
- Futureproof- not blocking custom messages
- Custom mode interfaces
- ABI compatible
- UORB messages



# Proposal

- Start with just a few messages
- Add in vehicle status, establish one at a time
- Try solving one problem at a time
- How to ratify? Make REP199 (any number) the minimal set.
- Deferred -> not implemented on systems. Should aim to show examples
- Goal - optimize for ROS developers to talk to flight stacks
- Could do REP199 package with messages to avoid getting slowed by core messages
- Do we want a test suite? Yea, if we can.

# Proposals for improvement

- Added by Ryan
- Sensor Data Messages
  - Make IMU only report IMU data - fused EKF orientation is a different system
  - What do do with the mandatory covariance arrays?
- Control
  - No interface for dubins 3D curves, and GlobalPosition is hacked as a workaround for now
  - Unclear velocity control - how do you tell a plane to do a circle from ROS and let the autopilot pick the optimal bank angle?
- No interface for missions or geofences, but those are fairly standard by now
  - Why not [geographic\\_msgs/msg/WayPoint?](#)
- Document who is responsible for validation of messages
  - IE - is it the companion computer or the autopilot that normalizes a quaternion?

# Additional Topics to discuss

- Added by Kim
- Informational vs standards/process REPs?
- Communication protocol in REP: rtps/dds, zenoh
- Coordination with other REPs
  - REP-105 - Coordinate Frames for Mobile Platforms  
<https://www.ros.org/reps/rep-0105.html>
  - REP for Maritime - Currently in discussion phase  
<https://discourse.ros.org/t/new-ros-enhancement-proposal-for-maritime-robotics/10010>
- What is necessary to get it back into draft status
- What is necessary to get it accepted and active
- Outdoor versus indoor navigation... different REPs?



The screenshot shows a Discourse forum post. At the top, the Discourse logo and the text 'ROS Discourse' are visible. The post title is 'New ROS Enhancement Proposal for Marine Robotics' with a pencil icon indicating it's a draft. Below the title, the author is identified as 'Maritime Robotics wg-maritime-robotics, rep'. A light blue banner contains the text: 'This is the first time evan-palmer has posted — let's welcome them to our community!'. The post content begins with a profile picture of 'evan-palmer' and the text 'Hello!'. Below this, the start of the post's main text is visible: 'Folks at the Maritime WG have been holding discussions regarding a new REP for marine robotics. We would like to gather feedback on our current ideas and also from those that aren't involved in the WG.'

# Next meeting

Next up is a Developer meeting! Hopefully with more subcommittees to talk about!

- **Wednesday 13th of March 2024 at 3 pm UTC**

Github organization for this working group: <https://github.com/ROS-Aerial>

- Aerial robotics landscape: Add a info page if you like
- Community: Add yourself as member

Wanna do a presentation? Email to [kimberly@bitcraze.io](mailto:kimberly@bitcraze.io) & [rroche@linuxfoundation.com](mailto:rroche@linuxfoundation.com)

