Aerial Robotics Working Group

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Developer/Discussion meeting

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The Agenda

- Introduction topic: Tutorials and Education
- Discussions
  - How do you get started in aerial robotics?
  - What was missing, and what is still missing?
  - Any good examples or experiences from other robotics platform?
  - ...
- Conclusion
  - Next scientific meeting ← **Want to give a presentation?**
  - Announcements

Tutorials and Education

- No standard Aerial robotics with ROS tutorial.
  - Ryan: ROS tutorials on ros.org is all ground based.
  - Ramon: Do we have an idea of why that is?
  - Gerald: 2d is more ground robots navigation
  - Ryan: Turtle bot is where the tutorials are based on and that is easier in terms of control
  - Ramon: Turtlebot is a standard withing ROS. But what if we had one with wings? Or perhaps will is still be focused on 2n navigation?
  - Ayham: Academic students- Aerial vehicles we don't have a standard stack of estimators or controllers that we can put together and get started. For ground vehicles there is already all standarized, but they have full on stacks. There are some aerial projects out there but it's not standarized
  - Gerald: There is no documentation on which messages can be used or should be used. Also, that you need to compile in all messages on both sides (px4) that you define yourself. It should be better to standarize it so that it easier for compatibility with companion computers. The entry is too high at the moment. Our students had to do a lot of investigation in order to get things to work and had to work on custom solution.
  - Theotime: Does OSRF support one aerial project?
  - Ramon: can't speak for them. Can imagine that they don't want to endorse just one.
  - ----->

Tutorials and Education

- Are people using ROS or jumping to ROS 2
  - Gerald: ROS 2
  - Ayham: Some projects still in ROS, it would be too much work for those projects for us to switch. Using PX4 MAVlink ROS, and moving to ROS 2
  - Theotime: Same as ayham
  - Gerald: ROS2 micro DDS moving to Zenoh
  - Ryan: It's good to start with ROS 2, but is unfeasible to switch to ROS 2 if projects are continuing with an existing ROS project. Researchers don't have time for switching and migration in time.
  - Kim: More tutorials in ROS?
  - Ryan: Ardupilot has a ROS tutorial, google code project that will port it to ROS 2, maybe on the official ROS website?
  - Ryan: tooli
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Tutorials and Education

Tooling

- Tooling with versioning is difficult, would we need to focus on that now?
- Gerald: Gazebo for UWB simulation is quite difficult. And also the compatibility between different versions and tooling is quite annoying (will update this based on the transcript)
- Theotime: Everything should be build with colcon perhaps? Qmake used for px4. It is a good experience, but unifying that might make things easier?
- Ramon: Providing a binary of the autopilot?
- Theotime: There is a build script available, but still need to know about how the toolchain. Need to know not only about ROS but also about the autopilot in detail.
- Ryan: Ardupilot is able to be made with colcon build, but integrating testing is difficult. The ROS build system is difficult to understand, and the launch needs to be rebuild in order to get things done. Simulation feels a bit easier to work with for integration.
- Ramon: classic or garden? Ryan: Garden
- Gerald: Hard to learn, since you need to be an expert in both systems. For a kit with a standard controllers and estimator that can already fly, might a good?
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Tutorials and Education

Tooling & Hardware Kits

- Miguel: The PX4 Vision Kit by Holybro that already have onboard computing, but ROS there is not such a configuration that is easy to fly out of the box.
- Ramon: That mentioned kit was a early attempt to provide a standard. Integration is difficult but the packages are outdated. So if we ask providers to make these kits, should that be enough? Or should they (or we) provide the tutorials and documentation as well.
- Ryan: do manufacturer have software developer?
- Ramon: They will be willing to that but we need to provide instructions
- Miguel: The community can also put in effort to make it more software
- Kim: we have software developers but mostly hardware company. Need to balance the workload. Software maintaining takes a lot of time
- Gerald: We also have a kit and do software development too. Hovergames good example. Based on ROS but still need more work on navigation for the companion computer but that will continue to grow. https://www.hackster.io/contests/nxp-hovergames-challenge-3
- Ramon: Providing the software as a package like snap, providing full image easier to share. Would that help?

Tutorials and Education

- tooling/hardware kits
- Ryan: Raspberry pi has images full on with ROS
- Ramon:
- Ryan:
- Ramon: Tried to make tutorials on ROS, with full install script, but that is quite difficult. Should define how to provide standard build systems before making tutorials.
- Kim: construct and rosject are cool
- Ryan: I agree
- Gerald: NavQplus – https://nxp.gitbook.io/8mpnavq/ has readymade Linuximage with ROS2

How did you get started in Aerial Robotics?

- Asked on Discourse:
  https://discourse.ros.org/t/how-did-you-get-started-in-aerial-robotics/31512
- Theotime: 8 months ago pretty new. Had ROS experience before. If you just follow the tutorials on px4 on ROS (1), so that works pretty good, but if you want to go advanced (updating to garden and such), it is a bit more difficult. Everything is available on the internet, but it might be handy to have something (writing tutorials are hard :))
- Ryan: can we combine anything froom nav2 ros-control
- Kim: Nav2 should be possible (no 3d), but ros-control no quadcopter control.
- Gerald: It should be good already for the control on position level. That would be the easier way forward, we assume it's in offboard control, and target waypoints.
- Miguel: It should be easier to have positioning.

What is missing? How can it be made easier?

Which are good examples from other ROS projects?

Next meeting

Scientific meeting

- Wednesday 7th of June
- 2 pm UTC

Announcements:

- Want to do presentation? Send an email to kimberly@bitcraze.io & rroche@linuxfoundation.com
- Check out and sign up as member at https://github.com/ROS-Aerial