DroneCode Unconference

March 23rd to 25th 2015
Note: the wednesday unconference will be available via mumble to allow remote participation

Monday

On Monday we are having some DroneCode member discussions and presentations in the morning. Note that these overlap somewhat with some drone related talks in the main ELC program. See the ELC program for details on the drone related talks.

Tuesday

All day ELC drone talks, see ELC program

Evening DroneCode BOF

We will have a Birds of a Feather session 6:30pm to 8pm on Tuesday evening.
At the start of the BOF there will be a demonstration of APM:Plane on Linux flying in Australia by Andrew Tridgell

Wednesday - the Unconference!

Wednesday is the big 'unconference' day for DroneCode. We will have a room all day for talks and discussions on all things related to DroneCode.
To anchor the discussions we will have a set of short talks by members of the development community. These talks will act as an introduction to round table discussion topics.

How to Participate

You can participate in the unconference either by being there in person (if you are going to ELC) or by joining the discussions on mumble. We will use the DroneCode channel in mumble. There will be a microphone in the room and we will also be live streaming via hangouts on air. To actively participate in the discussions you should join the mumble channel. Please be careful to mute yourself when not speaking.

Rough Timetable

As an unconference the schedule tends to be quite loose, but it will be roughly:
8am to 9am: breakfast
9am welcome and introductions
9:15 first presentations and discussions
10:00 to 10:30 break
10:30 to 12:00 more presentations and discussions

12:30 Lunch. We are still working out details for lunch.
We would like to getting some takeaway food in so we can continue discussions over lunch, and allow remote participants to continue to participate
2:00 - 4:00 pm After lunch: more presentations and discussion

Short Presentations

During the unconference we will have a series of short presentations. The aim of these presentations is to set the scene for subsequent round-table discussions. Each presentation will be between 5 and 15 minutes long. After each talk the presenter will lead discussions on the topic with the audience.

IMU Temperature Compensation

This discussion topic will be introduced with a presentation by a presentation of Hessel van der Molen
Discussion topics:

- Temperature compensation goals
- Calibration procedure

https://docs.google.com/document/d/1EtuXglWrihQs-win3iUWQ9ECwOlQn4-aT5xi0u2p5Y4/edit#

PX4 VTOL Vector Control

This discussion topic will be introduced with a presentation by a presentation of Roman Bapst
Discussion topics:

- VTOL support in PX4 native
- High-level overview of the benefits of the new controller (submitted to IROS 2015)
- Current simulation capabilities
- System identification and infrastructure (wind tunnels)

The onboard distributed system: Leveraging UAVCAN

This discussion topic will be introduced with a presentation by Pavel Kirienko on UAVCAN and the PX4 ESC codebase
Discussion topics:

- The onboard distributed system with all actuators and sensors on the same bus
- ESC developments and test state
- Future convergence of the individual CAN node codebases

Automated 3D SITL with 3D Physics

This discussion topic will be introduced with a presentation of Thomas Gubler and Andreas Antener

Discussion topics:

- Additional capabilities of the 3D physics simulator over standard flight simulators
- Headless and interactive benefits
- Logging and post-flight analysis

IMU experiments and filtering strategy

This discussion topic will be introduced with a short presentation by Jonathan Challinger on his IMU filtering experiments.
Discussion topics:

- IMU sampling strategy
- API for accessing raw samples from PX4 IMU sensor drivers
- handling of delta angles and delta velocities
- use of filtered and unfiltered data in EKF
- IMU temperature calibration

EKF developments

This discussion topic will be introduced by Paul Riseborough.
Discussion topics:

- fusing of optical flow and rangefinder data
- handling of GPS and non-GPS operation transition
- handling of height above ground estimates
- special cases for landing and takeoff

BREAKING FOR LUNCH, BACK AT 1:15 pm PST

Hybrid Vehicle Development

This discussion topic will be introduced with a presentation by Trevor Strand on the current state of his tuldevelopment
Discussion topics:

- VTOL support in PX4 native
- building simulators for tiltrotors and hybrid vehicles

Travis, Jenkins and Hans

This discussion topic will be introduced with a demonstration of automated pull request testing by Lorenz Meier and continued with a hardware jig extension by Philip Rowse and Andrew Tridgell.
Discussion topics:

- automated on-hardware testing (Hans) - this would make a great combination with the next talk as combined frontend / backend
- automated SITL testing with environment / physics / simulated camera views (Jenkins)
- unit testing and general CI (Travis, least novelty / new information)
-

ROS

This discussion topic will be introduced with a presentation by Tully Foote from the Open Source Robotics foundation.
Discussion topics:

- ROS in general
- ROS on drones
- existing ROS use cases

DroneAPI structure and usage

This discussion topic will be introduced with a presentation by Kevin Hester on the current state and structure of DroneAPI (slides from the tutorial yesterday)
Discussion topics:

- structure of DroneAPI
- language bindings
- ROS vs DroneAPI - when to use either?
- licensing of core components
- future steps: stats, gcs df upload, px4 support, more webgoodness, mavlink evolution

General Discussions

As well as the core topics above, we will have lots of general discussion time. There will be opportunities for impromptu presentations. Discussion topics may include:

- Secure communications between Ground Station and Vehicle
- Sense and avoid strategies and way forward
- hosting of core projects within DroneCode
- Linux and autopilots
- NuttX crash dumps
- next generation mavlink features
- variable length mavlink messages
- ‘DataFlash’ logging format and variable length messages
- national rules for UAV certification
- hardware platform roadmap
- project governance