

Ardupilot development news



Rapid development

- The last year has seen about 4k commits go into the ArduPilot main git tree
 - plus lots more in PX4Firmware and PX4NuttX
- More committers
 - we've had a bit over 50 people contribute patches, including lots of new developers
- More code
 - ArduPilot git tree has grown from about 530k lines to about 605k lines of code

Collaboration

- Increased collaboration with PX4 project
 - We have had great collaboration on drivers and infrastructure, and I hope this will grow even more
 - This will be especially relevant as we extend into companion computers, with projects like the ROS bridge
- Great collaboration with 3DR
 - Our core partner is 3DRobotics who have supported ardupilot so much
- More collaboration is good!
 - we have also enjoyed a really good relationship with VirtualRobotix, jDrones, RFDesign and others
 - I expect this will expand to more groups, especially as the capabilities of the ardupilot platform expands through projects like DroneAPI



What have we been up to?

- Continued move to common libraries
 - less vehicle specific code, more common libraries with consistent behaviour
- Consolidating AP_HAL development
 - built upon AP_HAL to make ardupilot more portable and more flexible
 - 3 new ports: FlyMaple, VRBrain and Linux
- Heaps of new features
 - too many to list here. What was your favourite?

What can we do better?

- It should be easier to get into development
 - still more we can do on developer documentation (though a big thank you to Bruce and others for their great work!)
 - we need to make SITL accessible on Windows
- We need faster review and merging
 - too many issues and patches wait for too long
 - I think we need a wider group of patch reviewers

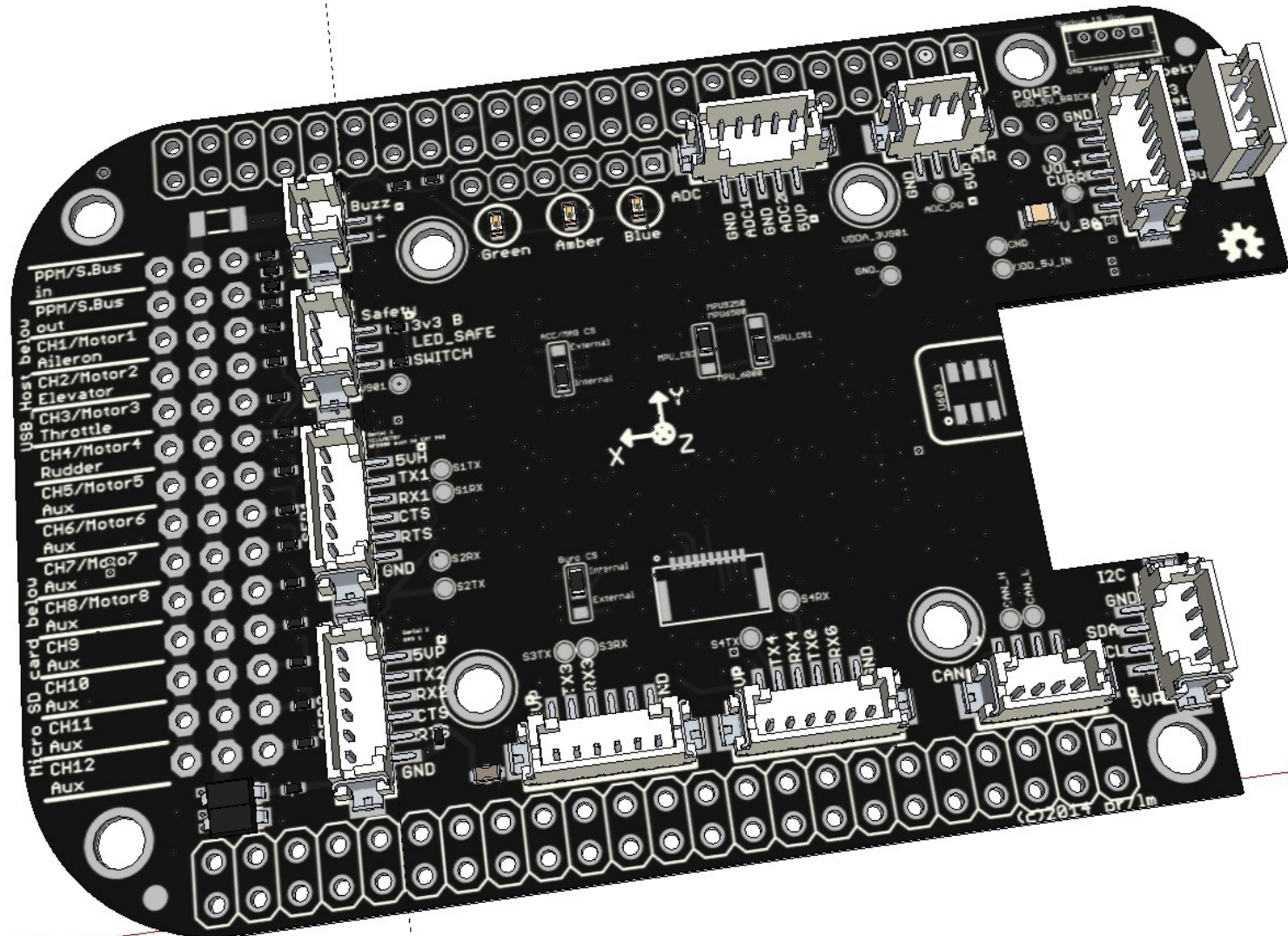
Favourite Topics

- Some of my favourite ardupilot projects at the moment
 - the Linux/BBB port, and the PXF
 - Terrain following, both using SRTM and Lidar
 - Companion computers, and DroneAPI
 - making drones more fun to fly and drive!

Linux/BBB and the PXF

- ArduPilot can now run on embedded Linux
 - initially targetting BeagleBoneBlack, but we expect other boards will follow
 - port is at early stage, yet to get to first flight, but should be soon!
 - 3 great students (Sid, Anuj and Victor) working on it over summer
 - Basic SPI and I2C sensors working, but not reliable yet! (Gyro, Accel, Baro, GPS, Compass, Airspeed)
 - PWM working on PRU

PixHawk Fire Cape



Terrain Following

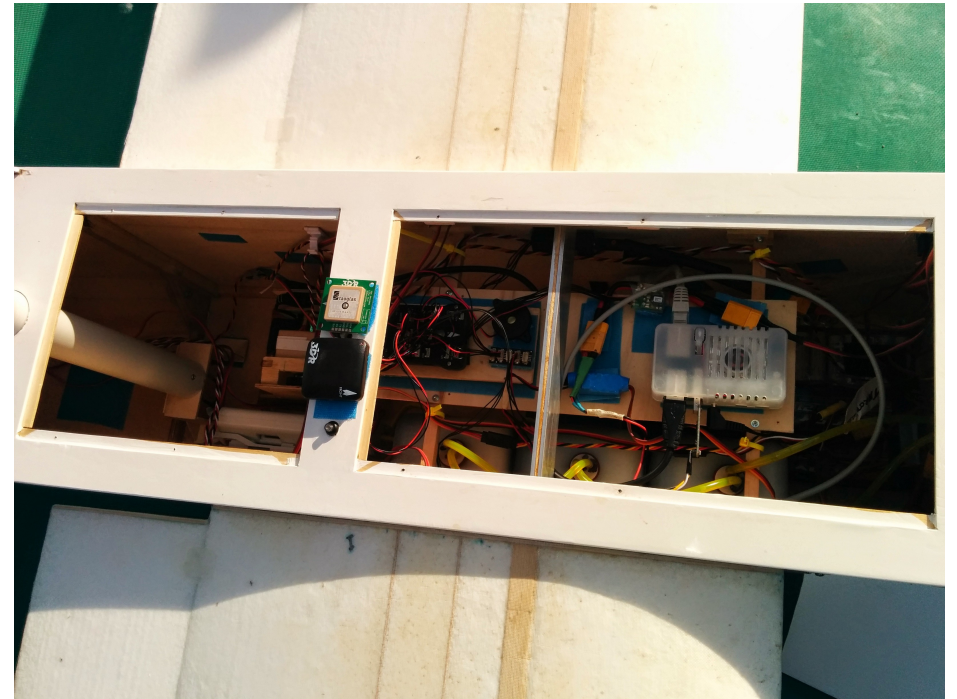
- Autopilots should make life easier for pilots
 - Missions should be able to specify WPs as AGL
 - RTL should understand the terrain, and not go through a hill!
- How to do terrain following?
 - SRTM data and terrain sensors (primarily Lidars)
 - store SRTM data on the microSD card, possibly supplemented with MAVLink
 - use good range finders (Lidars) to detect terrain while flying

Companion Computers

- Lots of small embedded Linux boards available
 - huge amounts of CPU power, low cost (eg. Odroid)
 - enormous potential when combined with ArduPilot as a companion board
 - large memory, fast storage and lots of CPU really changes what a drone can do
- What to use for?
 - situational awareness and live mapping (SLAM)
 - image recognition for S&R
 - environmental monitoring and agriculture

Companion Computers (2)

- Red balloon popping!
 - great example of pairing an Odroid with a Pixhawk
 - MAVLink as the link between autopilot and Linux
 - DroneAPI providing a higher level control platform integrated with existing code via MAVLink
- CanberraUAV search and rescue
 - sophisticated in-aircraft image recognition
 - utilising ground control in a much smarter way



Making drones more fun!

- Drones are different things for different people
 - some just want a stable camera platform
 - some want a work platform for agriculture or S&R
 - many people just want to have fun!
- Autopilots as enablers for people having fun
 - extend what people can do with their vehicles
 - help people to master their vehicles themselves



Making drones more fun! (2)

- How have we made APM:Plane more fun?
 - addition of training mode to help teach people to fly manually
 - addition of acro mode to help people get the most out of their aircraft
- What else can we do?
 - trick mode! prop-hang, knife-edge, maybe rolling loops?
 - virtual dihedral for taming a sports plane for beginners



More information

- Background to the Linux/BBB port
 - <http://diydrones.com/profiles/blogs/a-peek-into-the-future-of-ardupilot>
- Future plans for APM development
 - <https://groups.google.com/forum/#!topic/drones-discuss/vsSn7g3PSno>

