DroneAPI (DroneKit)
A Tutorial on Drone Control

Kevin Hester

3D Robotics

About you, me, us.

- Me: embedded geek -> fun with drones
- You: want to code with drones
- Basic python knowledge required
- This is a 'lightning' tutorial
- Perhaps you dislike balloons
- Questions?

Please follow the step by step instructions:
github.com/diydrones/droneapi-python/ELC.md

Why do this?

- Sad mavlink on drones-discuss
- But mavlink is protocol not a model
- Need a *simple* API that handles common requests (enough to write a control station)
- On python first - to be developer friendly
- On LAN or coprocessor
- Let the API eventually work on Android, WAN, etc...

DroneAPI overview

Before looking at some code, let's discuss the big picture…

- Small surface area (attributes, observers and changing state)
- Connect to the API provider to find vehicles you can access
- The vehicle object is a model of vehicle state
- Read vehicle attributes (v.location, v.mode, v.parameters ["MAX_THRUST"] etc…)
- Think about latency: Call v.flush() after writes
- Use the observer pattern for notification of state changes.

Lesson 0: Install the SDK

First get the tools (github + vagrant + SITL + droneapi)

- Show and tell - follow along at: github.com/diydrones/droneapi-python/ELC.md
- Vagrant: joy and tears
- Connect to a vehicle or SITL

```
mavproxy.py --master=localhost:14550
```

Lesson 1: Go to a location

- Our 'hello world' - changing vehicle state

```
api start simple_goto.py
api              = local_connect()
vehicle          = api.get_vehicles()[0]
vehicle.mode     = VehicleMode("GUIDED")
vehicle.commands.goto(Location(-34.36, 149.16, 30))
vehicle.flush()
```

- You now know how to find a vehicle and change it

Lesson 2: A GCS in 50 lines

- GCS == Ground Control Station
- Now we learn 'observers'
- Tk for a GUI

```
root = Tk()
root.wm_title("microGCS - the worlds crummiest GCS")
...
def updateGUI(label, value):
    label['text'] = value
...
v.add_attribute_observer('attitude', lambda attr: updateGUI(attitudeLabel, v.attitude))
```

- We've now covered the basics - get to work

Doing this for real

- Find a friend - diydrones.com
- Find or build a drone
- Optionally install a coprocessor
- Safety
    - Fly semi-manually first
    - No automatic arming
    - The 'mode switch' is your friend
    - Use a GCS
- Flight tutorial links included in the github

Thanks

- Looking for a fun hobby?
- Looking for a fun job?
- Want to do this on Android/Java? (See Fredia)
- dronekit.io
- Contact me: github.com/geeksville
- Questions?