Unmanned Revolution

The Driving force of The Drone Revolution

ArduPilot Unconference 2017
Xiamen, China October 22-23rd 2017

By Jani Hirvinen / ArduPilot Org
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- Brief intro of Jani & jDrones
- ArduPilot Today
- ArduPilot History
- Influence to Sz/China Drone industry
- How to engage with the team
jDrones CEO Mr. Jani Hirvinen

+ Experienced technopreneur
  + +40yrs Aviation, Electronics
  + +35yrs Computers, Software, Mechatronics
  + +25 Internet services / data hosting

+ Creator of ArduCopter, MinimOSD, IOBoard, I2C ESCs, Power PDB, ..... 

+ Founding member of: jDrones, DIYDrones, DroneCode and ArduPilot Organization

+ ArduPilot core since the beginning

“One of his most impressive contributions was the hardware design for the official ArduCopter frames, motors and whole concept including firmware's, which he did almost single-handedly and really accelerated the project”
– Chris Anderson, Founder of 3D Robotics
Speaking of Young People…

Jani's daughter Ally, 3y5m, "working" on APM2.5
jDrones in brief

- Founded at 2010, Fin/Thai company
- Internationally recognized Drone developer / manufacturer (jDrones).
- Specialized on: Electronics/Robotics, Sensor networks, telemetry systems, IoT, Drones (air, land, sea)
- Custom R&D: Electronics, frames (air, sea land), Software engineering, OEM services
- Brands owned: jDrones, jD-UAS, jD-Tactical
- ArduPilot organization, Infrastructure/HW Lead

CEO, Mr. Jani Hirvinen
- Founder of jDrones
- International Patents
- Internationally known UAV/Drone developer

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ArduPilot Development group

Total: ~20 nationalities involved, over 300 people globally

Tier 0, CORE Developers
- JANI FI/TH LEAD HW/IT
- Randy JP/CA LEAD AC
- Tridge AU LEAD AP
- Tom US
- Sandro BR
- Max IS/RU
- Francisco PRT
- Roberto IT

Tier 1, Developers
- Craig US LEAD EST
- Paul US LEAD RF
- Lucas BR LEAD HW
- Seppo FI/AU
- Michael AU
- Philip AU
- Marco IT
- Robert CA

Tier 2, Developers (contributors)
(Invesense, ST Microele. Atmel, Intel, Qualcomm, NASA, Lightwave,....)

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World's **Nr.1** Open Autopilot system

APM Major milestones:

- **2009**: Initial hardware
- **2010**: APM1 & ArduCopter released
- **2011**: APM2 released
- **2012**: APM2.5 released
- **2013**: Pixhawk released
- **2014**: Pixhawk2 released

1st Gen, 2nd Gen, 3rd Gen, 4th Gen, 5th Gen

Over 1,500,000 units on the market

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ArduPilot Today...

- Multicopters
- Fixedwings
- VTOL / Quadplanes
- Submarines
- Rovers
- Rocket airplanes
- Boats
- Tractors, even full size
- ... and many more

All systems fully autonomous

From single units to swarming...

UAV OBC / AU
Winners -12, -14, -16
ArduPilot Infrastructure:

Autotest, Firmware, Documentation, Logs processing, discussion forums, generic websites, eMail systems.

Over +170,000 unique visitors, +9,000,000 page views / monthly

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ArduPilot “Control Room”

+ Real-Time monitoring
  + Global servers (SG, US, NL, TH)
  + Compilation processes, Simulations
  + Security systems
  + Process flows

Process Flow for Software development

+ ~10 Terabytes / Month
+ +30 firmware versions
+ +29.000 commits in repo
+ Firmware server stats
  + 3.8 TB in last 30 days
  + 18.7 mill requests last 30 days

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ArduPilot History, past 7 years

DIYDrones

Original Co-Founders: Chris, Doug, Jani, Jordi

2009-10

2010

Jani releases ArduCopter 1 platform
Revolutionizes the world of drones

Aug. 2010

APM 1.4-2.6, Pixhawk 1 & 2, MinimOSD, MissionPlanner, ArduCopter, ArduPlane, ArduRover, IOBoard, ....

2015

Feb. 2016 3DR departs ArduPilot group, partners with Qualcomm

Jani/Tridge/Randy Craig/Philip founds organization

2016

Nr. 1 Open Autopilot system in the World
Beginnings of ArduPilot / ArduCopter

Original ArduCopter in 2010

ArduCopter multicopter that started The Drone revolution,

Original work began under DIYDrones community. Idea was to create robust multicopter platform that is hackable and parts were easy to replace.

Simple and practical system that hit international success and started current revolution..


Sky Viper V2450GPS “ArduCopter” in 2017

Next GEN “micro copters” with fully capable autopilot system inside and GPS assisted flight operations, real-time video feed.

Released 2017 by SkyRocket

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OSD That changed the FPV world

**Video OSD System.**

Base of the FPV operations. Nowadays industrial defacto OSD around the world.


Versions of MinimOSD:
- 1.0 by 3DR, 1.1 by jDrones, 1.2 by jDrones

ArduCAM OSD Software written by
- Sandro Benigno
- Jani Hirvinen

New version under design due MAX7456 chip is EOL. ETA Q1/2018 based on STM32 Architecture.

*Just a small example of devices created jointly* 

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Saturday 21st Oct, Outside of Hotel

MinimOSD running ArduCAM firmware on HexaCopter
ArduPilot Ecosystem

Hundreds of Accessories
- Laser range detectors
- Optical flow sensors
- Communication systems
- ADS-B Transponders
- Autopilots, Video OSDs
- Deployment systems
- Generic sensors …….
ArduPilot, driving the industry “defacto’s”

- Power PDB, Power modules,…
- UAVCAN ESCs and other peripherals
- Autopilot systems
- Folding frames, side / umbrella
- Protection cages
- OSD systems
- Telemetry systems
- Add-on’s:
  - OpticalFlow, Airspeed sensors, external compasses, Displays,...........
And where are we heading?

We are at the beginning of how whole humankind is working...

• Logistics
• Transportation
• Security
• Search & Rescue

Just to name few...
Global UAV Award

23th June 2017 / Shenzhen, China

Mr. Jani Hirvinen / ArduPilot group receives the Global UAV award for the work done in past years. Award was given at Drone World Congress 2017.

Only 5 people in world have received such an award.

They are (left to right):
- Mr. Tom Verbruggen, CEO of IDRONECT, Belgium
- Mr. Lan Yubin, Professor South China Agri.Univ, China
- Mr. Jani Hirvinen, ArduPilot Co-Founder, Thailand
- Mr. Brian Wynne, President and CEO of AUVSI, USA
- Mr. Paul Xu, Vice President of DJI, China

“In recognition of the outstanding contributions to the Global UAV Industry”
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Influence to China Drone Industry
The Retail Revolution

- **ArduPilot & Pixhawk: Clear Nr.1**
  MultiWii, OpenPilot CC3D

- Arduino, DJI Accessories, FPV Racers, ESCs, Motors,...

- From 5 - 5000 companies

2009 - 2018 timeline:
- ArduCopter 1.0
- APM2.5 released
- DJI P3
- The CUBE released
- Multicopter clones
- 3rd modem clones
- Pixhawk clones

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ArduPilot GEO Statistics

China involvement highly endorsed

- First Chinese partners 2016
- Biggest user base on MP
- Second biggest on documents
  - Some parts already translated

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ArduPilot is open source software

https://github.com/ArduPilot/ardupilot

ArduPlane, ArduCopter, ArduRover source  http://ardupilot.org/

Latest commit de02643 35 minutes ago

- .github updated contributors url. Was pointing at missing file, now its at la... 10 months ago
- APMrover2 Rover: add available memory to PM message 4 days ago
- AntennaTracker Tracker: update rangefinder declaration a month ago
- ArduCopter Copter: version to 3.6-dev a day ago
- ArduPlane Plane: fixed attitude logging for ttailsitters 2 hours ago
- ArduSub Sub: Implement JSButton function to toggle between forward/lateral input 2 days ago
- Tools default-params: Added parameter files for octa and octa-quad 2 days ago
- benchmarks waf: add gbenchmark Waf tool a year ago
- docs docs: Fix typos 11 months ago
- libraries DataFlash: added Log_Write_AttitudeView 2 hours ago

Copy of text from images:

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ArduPilot & Open source

ArduPilot is the world's most widely used open source flight code

- **Non-Profit company**, part of Software-In-The-Public-Interest (SPI)
- **Estimate 1,500,000+ users** globally on multiple platforms
- **Supports**: Multicopters, Airplanes, Rovers, Blimps, Trackers
- **Complete ecosystem** around main project, MAVLink, APSync,....
- **Financially supporting partner network** is growing (30+ partners)

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Engaging with the team

1. **Company** puts in at least one **developer** to work on company’s priorities.
2. **Developers review** each other’s work, **Senior Developers** making the **final** decisions.
3. **Weekly** and ad-hoc **meetings** make the team function just like any other team.
4. **Company dedicates one developer** who is **fluent in English** speaking as a company representative on weekly meetings and to engage often with other members.

   **“If no English speaking inhouse, use consulting firm if necessary”**

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Where to find more?

- ArduPilot wiki:
  - ardupilot.org

- Support forums:
  - discuss.ardupilot.org

- ArduPilot software:
  - github.com/ArduPilot/ardupilot

- Developer chat:
  - gitter.im/ArduPilot/ardupilot

- Other: ardupilot.org/copter/docs/common-contact-us.html
Thank you!

For questions and more, please stop the “smurf” after the presentation.

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