

# Configuration de drones FPV

Taulabs/Cleanflight

Rolf Ziegler, Mai 2016

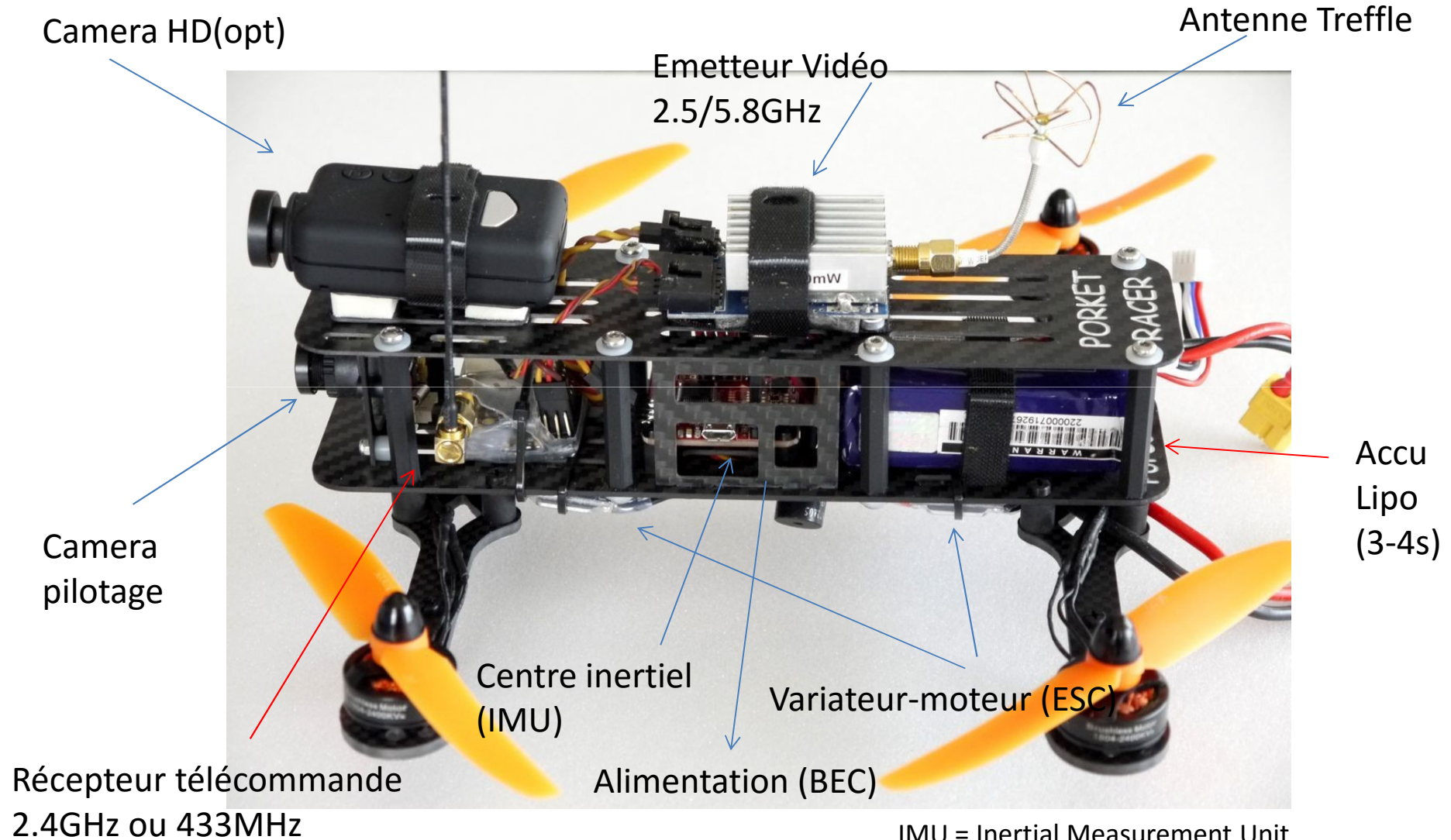
# Agenda

1. Fonctions
2. Structure des solutions
3. Modularité
4. Compilation
5. Configuration
6. Extension
7. Exemple pratique
8. Q&R

# Fonctions de base

- Télécommande (norme de transmission, fréq.)
- Mixage moteur, PID
- Equilibre (Gyro, accéléromètre)
- Vidéo (FPV, vol en immersion)
- Orientations (Magnétomètres)
- Etat et consommation ACCU

# Fonctions de base



IMU = Inertial Measurement Unit  
BEC = Battery Elimination Circuit  
ESC = Electronic stability control

# Fonctions optionnelles

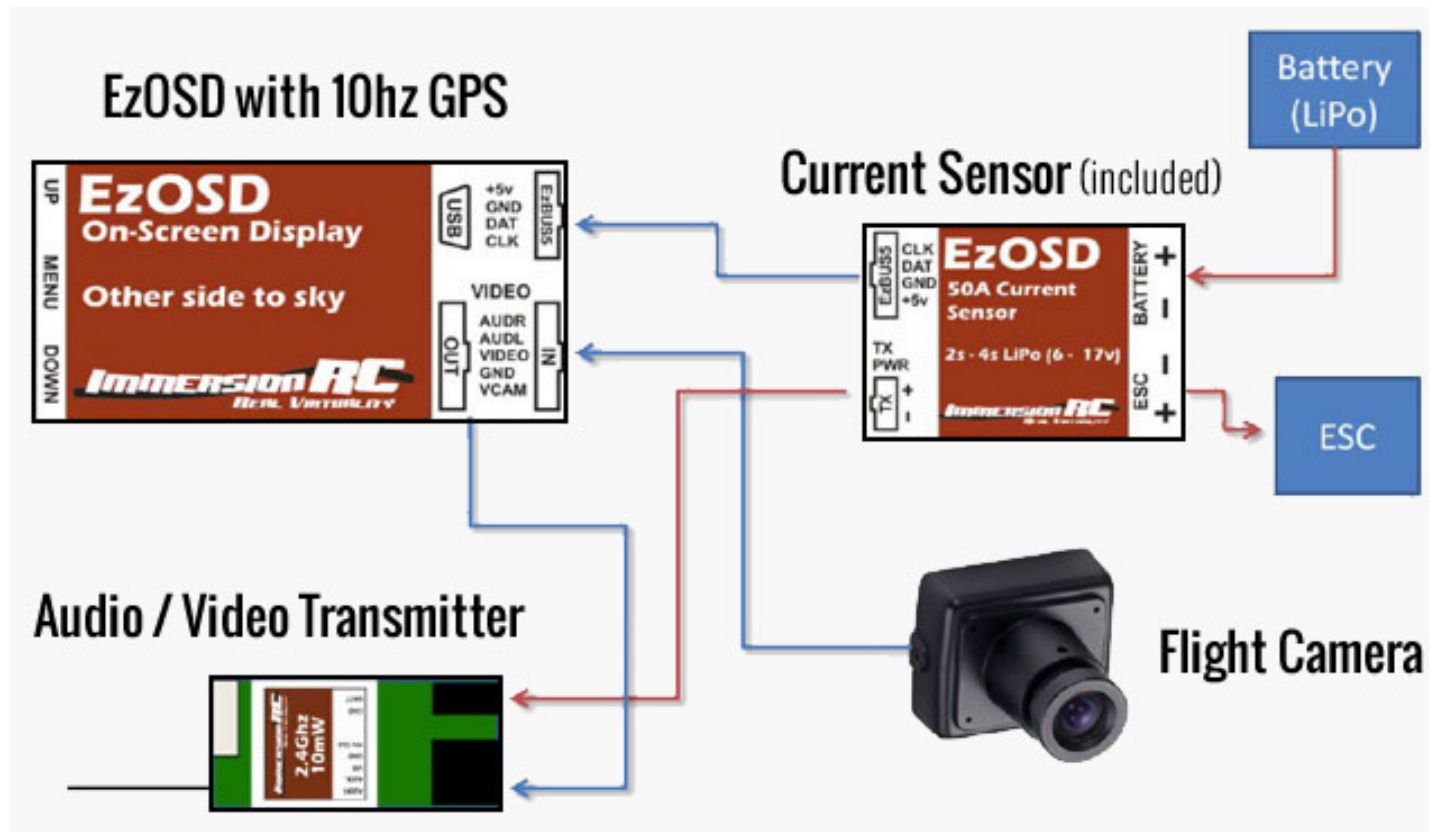
- OSD, insertion vidéo (page suivante)
- Camera vidéo HD
- Télémétrie (transmission de données de vol)
- GPS (localisation, retour automatique)
- Configuration de l'aéronef
- Affichage LED
- Enregistrement de données de vol

# Exemple OSD



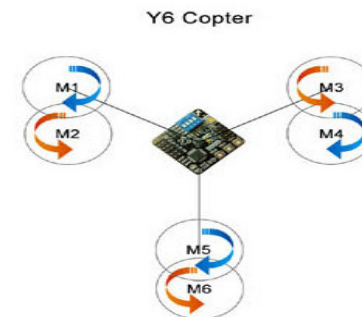
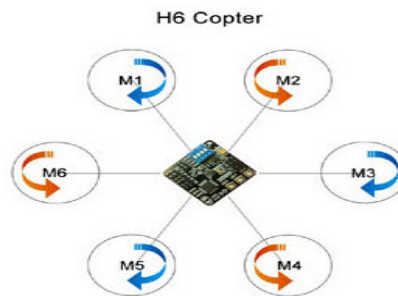
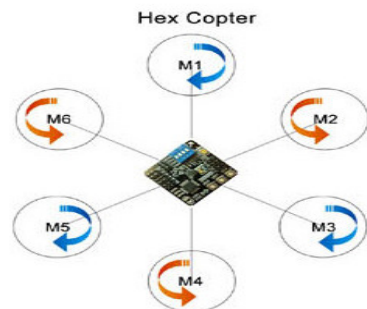
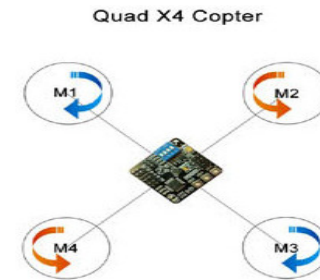
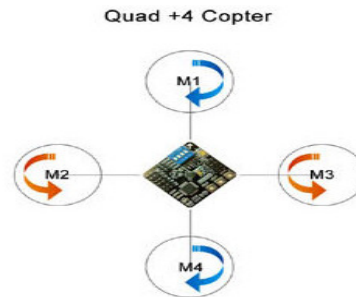
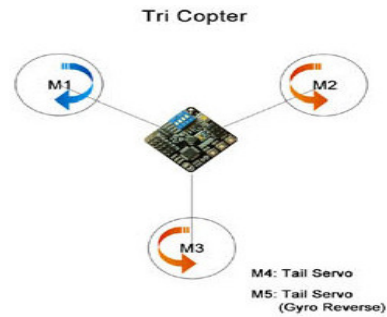
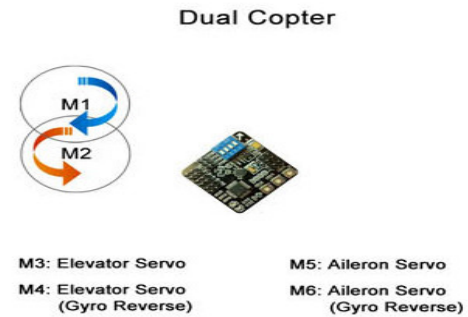
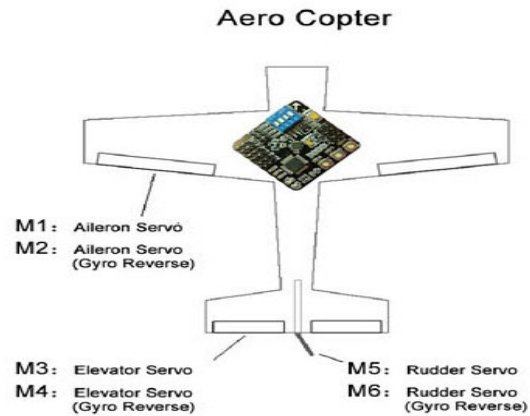
# OSD (On screen Display)

Incrustation de données dans l'image (Style HUD)



HUD = Head Up Display

# Configuration de l'Aéronef





# Fonctions intégrées dans l'IMU

- Fonctions Hardware

1. PWM Moteurs
2. PPM in/Radio
3. Battery mon.
4. Buzzer
5. FR-Telemetry
8. Bluetooth
9. Reset

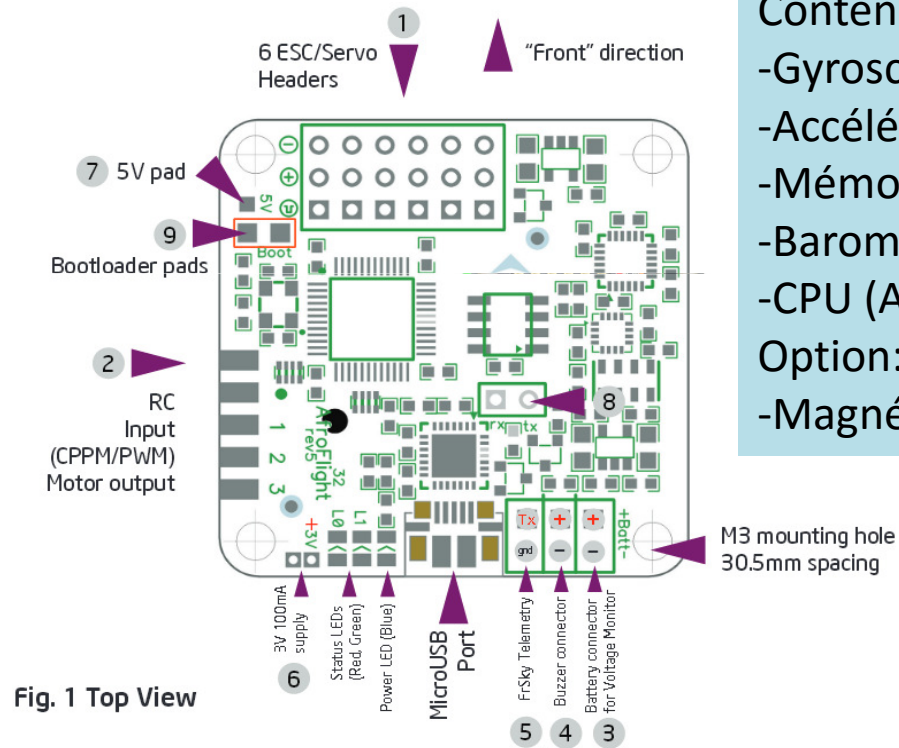
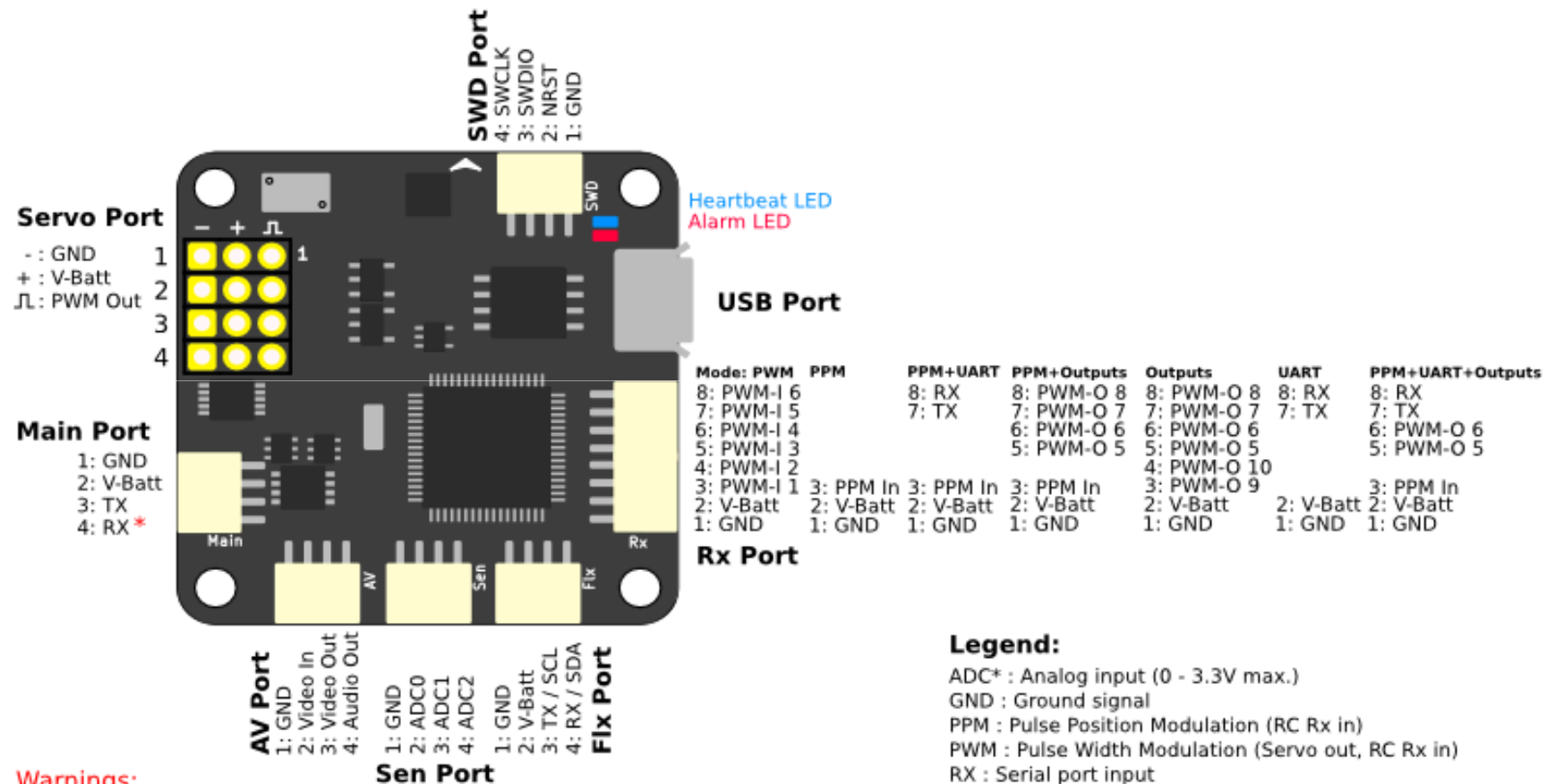


Fig. 1 Top View

Contenu minimal:  
-Gyroscope  
-Accéléromètre  
-Mémoire  
-Baromètre  
-CPU (ARM)  
Option:  
-Magnétomètre

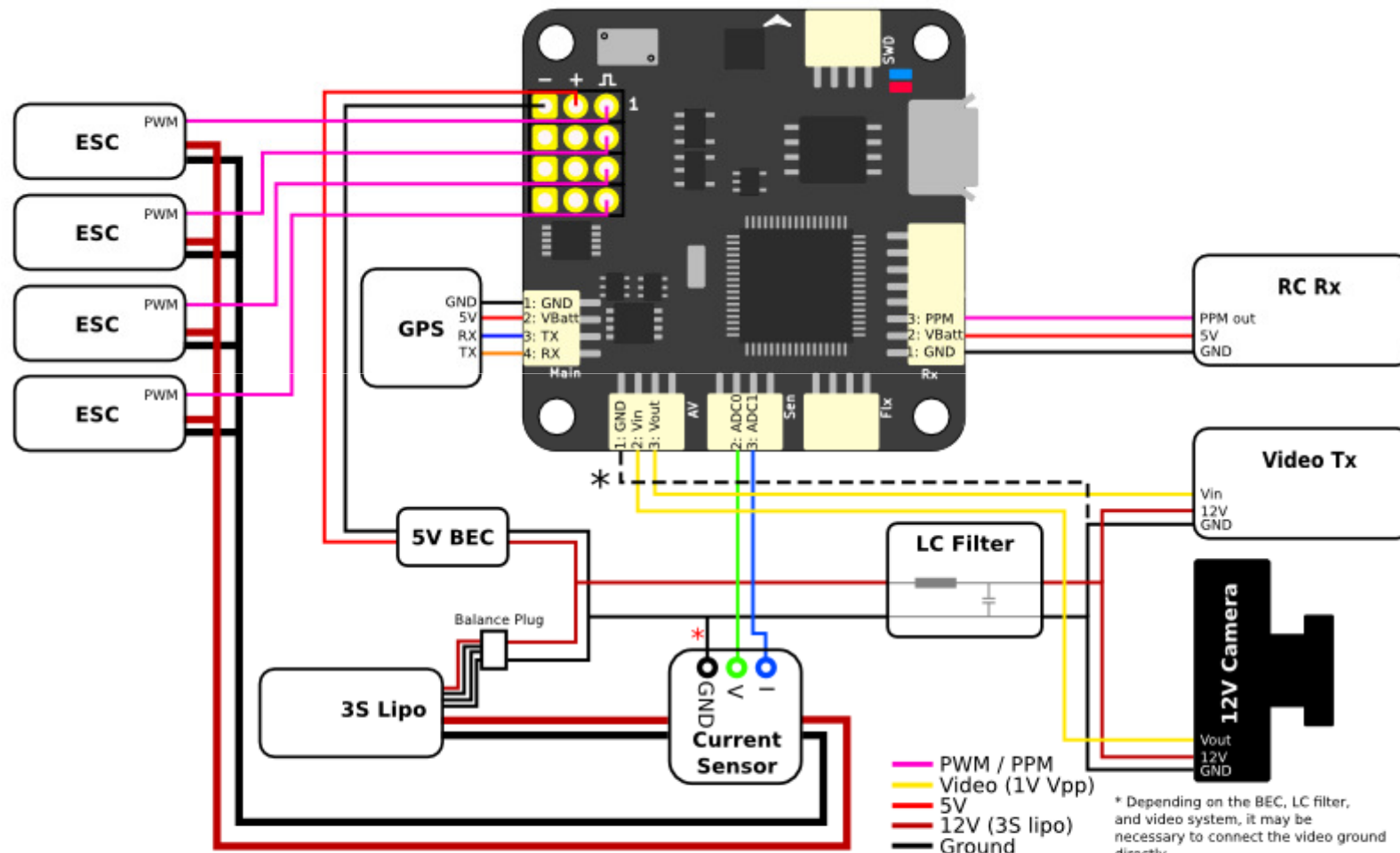
# Flexibilité du HW



## Warnings:

- All digital inputs are 5V tolerant, except Main Port RX (3.3V)
- ADC input max. voltage 3.3V, higher voltages will damage the board
- V-Batt max. voltage 6V, do not draw more than 1A combined on all ports

# Câblage



\* Note: When powering part of the system through the balance plug as shown here, connect the GND from the balance plug to the sensor. Failure to do so can result in the full lipo voltage being output on the V port of the sensor, which will possibly damage the Brain.

# Fonctions Proiciel

- Configuration Aéronef (Mixage Fix->Flash)
- Stabilisation (Giro,.. Param. PID ->Flash)
- Configuration Moteur (format, vitesse,...)
- Télémétrie, envoi de données au sol (FrSky)
- Format GPS
- Fonctions des LED's (couleur, flash,...)
- Plan de vol

DEMO

# Taulabs/dRonin

## Paramètre du drone

The screenshot displays the dRonin GCS software interface. The window title is "dRonin GCS". The menu bar includes "File", "Edit", "Tools", "Window", and "Help".

The main interface is divided into several sections:

- Left Sidebar:** A vertical list of icons representing different drone components: Hardware, Vehicle, Input, Output, Attitude, Stabilization, and Modules. The "Modules" icon is currently selected and highlighted in blue.
- Top Tabs:** A row of tabs for different configuration categories: "Enable", "Misc", "Battery", "Airspeed", "Vibration", "Geofence", "HoTT Telemetry", and "PicoC". The "Enable" tab is active.
- Enable Tab Content:**
  - A message: "After enabling a module, a power cycle is required before you can save those settings."
  - A warning: "Some modules are shown greyed out. These modules are either enabled from their own configuration tabs, or are automatically enabled by configuring appropriate ports on the 'Hardware' configuration tab."
  - A list of modules with checkboxes, all of which are currently greyed out:
    - GPS
    - Battery Monitoring
    - UAVO Mavlink stream (for use with minimOSD)
    - Com Bridge
    - Airspeed
    - Altitude Hold
    - Vibration Analysis
    - Vtol Path Follower
    - Path Planner
    - PicoC Interpreter
    - HoTT Telemetry
    - FrSky Hub Telemetry
    - Light Telemetry
    - Geofence
    - Autotune
    - FrSky S.PORT Telemetry
    - Logging
    - MSP Telemetry
    - TxPID
- Bottom of Enable Tab:** Two buttons: "Reload Board Data" (with a question mark icon) and "Save".

- Right Panel:**
- Control icons: a green down arrow, a green up arrow, a green down arrow with a red border, a red up arrow with a red border, a trash can icon, and an eye icon.
- A "Filter:" input field and a "Clear" button.
- A table with columns "Property", "Value", and "Unit".
- Expandable sections: "> Settings" and "> Data Objects".

The bottom status bar contains several elements:

- Navigation tabs: "Welcome", "Flight data", "Configuration", "System", "Scopes", "Advanced", and "Firmware".
- Connections: "USB: Brain-FPVF" with a dropdown arrow and a "Disconnect" button.
- System indicators: "Tx" and "Rx" status bars, a battery level indicator, and a clock showing "04:25".

# Vérification des interfaces

## mise à jour des données, suivi GPS, console

The screenshot displays the dRonin GCS (Ground Control Station) software interface. The window title is "dRonin GCS". The menu bar includes "File", "Edit", "Tools", "Window", and "Help".

The main interface is divided into several sections:

- Property Table:** A table with columns for "Property", "Value", and "Unit". The "Data Objects" section is expanded, listing various data points such as "AccelDesired (12 bytes)", "Accels (16 bytes)", "ActuatorDesired (24 bytes)", "AttitudeActual (28 bytes)", "GCSReceiver (16 bytes)", "GCSTelemetryStats (21 bytes)", "Gyros (16 bytes)", and "LogiqngStats (141 bytes)". Several items are highlighted in orange.
- Play/Pause Controls:** Includes "Play" and "Pause" buttons, a "Status: Idle" indicator, "Playback speed: 1.00", and "Jump to: 0.00s".
- Flight Status:** Displays "Coord: 0°0.000' S 0°0.000' W 0.00 m", "Speed: 0.00 m/s", "Heading: 0.00 deg", and "H / V / P DOP: 0.00 / 0.00 / 0.00". It also shows "Sats Used: 0" and "Fix Type: No GPS".
- Map:** A circular compass rose and a world map showing the drone's location.
- Console Log:** A scrollable area containing debug messages, including "usbmonitor detection cycle complete", "Bootloader disconnection detected", and "TelemetryMonitor: connected".
- Bottom Bar:** Contains tabs for "Welcome", "Flight data", "Configuration", "System", "Scopes", "Advanced", and "Firmware". It also shows "Connections: USB: Brain-FPVF" and a "Disconnect" button.

# Interface télémétrie dRonin

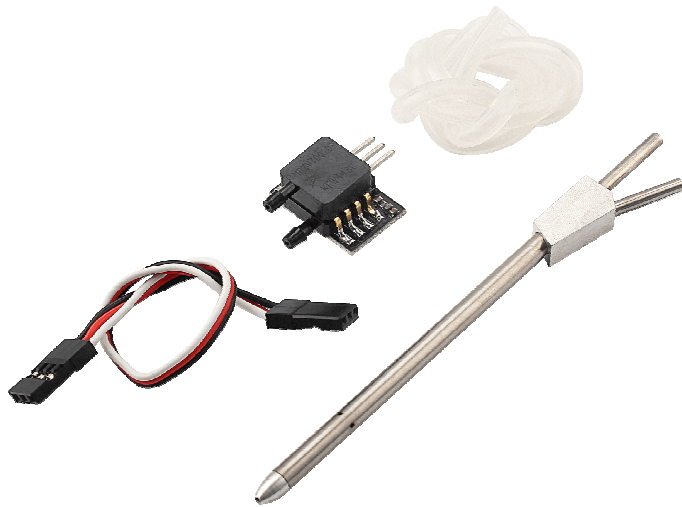
The screenshot displays the dRonin GCS (Ground Control Station) interface. At the top left, the title bar reads "dRonin GCS" with standard window controls. Below it is a menu bar with "File", "Edit", "Tools", "Window", and "Help".

The main interface is divided into several sections:

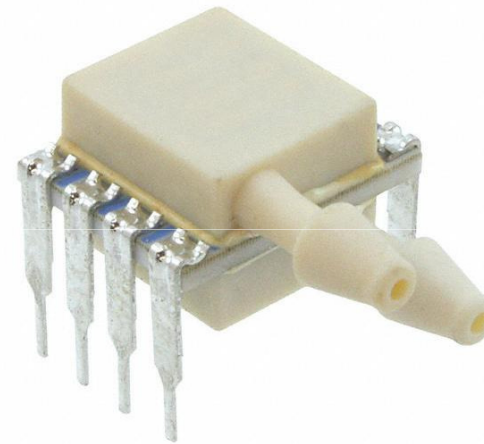
- Top Left:** "FlightTime 1286" and "ARM" status (indicated by a red prohibition sign). A "Manual" button with a stick figure icon is also present.
- Top Right:** "Normal" mode, "Magic Waypoint" button, and a "Go To Place:" input field.
- Center Left:** A 3D attitude indicator showing roll, pitch, and yaw. It includes a heading scale at the top (0 to 340 degrees) and vertical scales for roll (0 to 10) and pitch (0 to 20). A small aircraft icon is shown at the bottom with "0/831" next to it.
- Center Right:** A world map showing the drone's current location over the Atlantic Ocean, with a compass rose in the top left corner.
- Bottom Left:** A small 3D model of the drone.
- Bottom Center:** A system status panel with various indicators:
  - Power, Battery, 1:Telemetry, 2:GPS, 3:AUX, I2C, Temp/Baro.
  - Sensors, System config, Path Planner, Gimbal, Boot Fault, Path follower, Attitude.
  - CPU, Stack, Memory, Event System, Stabilization, Flight Time.
  - PWR Sense, ADC In, USB, I2C, JTAG, ALTHOLD.
  - RC Input (1-8).
- Bottom Right:** A status bar with coordinates: "0.000000 lon: 0.000000 293.1deg 2. 0000000 0.000000 2792290 -152.9296 -5.2631e+06 -1.7024e+07".
- Bottom Bar:** A navigation bar with tabs: "Welcome", "Flight data", "Configuration", "System", "Scopes", "Advanced", "Firmware". On the right, it shows "Connections: USB: Brain-FPVF" and a "Disconnect" button.



# Projet: ajout d'un capteur Avantage OpenSource



MPXV7002 Tension proportionnelle  
à la pression relative



MS4525 Alimentation  
3.3v Interface I2C

# dRonin, Open-Source (GIT)

The image displays a file explorer window for the dRonin project, showing the build process. The main window is titled 'mydRonin' and contains several sub-panels:

- Left Panel (mydRonin):** Lists the project's root directory structure. The 'ground' folder is highlighted, and an arrow points to the 'ground' folder in the middle panel. The 'README.md' file is highlighted at the bottom, with a size of 2.7GB.
- Middle Panel (mydRonin > ground):** Shows the contents of the 'ground' folder, including 'docs', 'gcs', 'uavobjects', 'uavobjgenerator', and 'ground.pro'. An arrow points from the 'ground' folder in the left panel to this panel.
- Right Panel (mydRonin > build):** Shows the contents of the 'build' folder, which contains numerous sub-folders for different drone models, such as 'bl\_aq32', 'bl\_brain', 'bl\_cc3d', 'bl\_discoveryf4', 'bl\_flyingf3', 'bl\_lux', 'bl\_pipxtreme', 'bl\_quanton', 'bl\_revolution', 'bl\_sparky', 'bl\_sparky2', 'bu\_aq32', 'bu\_brain', 'bu\_cc3d', 'bu\_discoveryf4', 'bu\_flyingf3', 'bu\_lux', 'bu\_pipxtreme', 'bu\_quanton', 'bu\_revolution', 'bu\_sparky', 'bu\_sparky2', 'ef\_aq32', 'ef\_brain', 'ef\_cc3d', 'ef\_discoveryf4', 'ef\_flyingf3', and 'ef\_lux'. A yellow lightning bolt graphic is positioned between the middle and right panels.
- Bottom Panel (shared > uavobjectdefinition):** Shows the contents of the 'uavobjectdefinition' folder, which contains various XML files for drone configuration, such as 'acceldesired.xml', 'accels.xml', 'accessorydesired.xml', 'actuatorcommand.xml', 'actuatordesired.xml', 'actuatorsettings.xml', 'airspeedactual.xml', 'airspeedsettings.xml', 'altitudeholddesired.xml', 'altitudeholdsettings.xml', and 'altitudeholdstate.xml'. An arrow points from the 'shared' folder in the left panel to this panel.

Below the middle panel, the text '470k' is displayed. To the right of the middle panel, the text 'Make' is displayed, followed by the commands: '>make ?', '>quanton', and '>make gcs'.

# Ajout d'un capteur Pression

- Copier le code du GIT dans un dossier local
- Installer les outils (MingW32, Python, QT, ARM-SDK, OpenSSL)
- Définition des paramètres communs (uavdefs..)
- Prévoir un Switch pour l'activer (pios\_config.h)
- Ajouter le code qui permet de sélectionner le capteur dans l'interface graphique si nécessaire (ground)
- Modifier le code 'airspeed.c' qui contient l'activation dans le drone
- Ajouter le code dans la bibliothèque des modules 'MS4525.c'
- Ajouter le code dans la liste des objets à compiler 'make.mk'

# Démo Cleanflight

**CLEANFLIGHT**  
CONFIGURATOR 1.2.2

Port: /dev/rfcomm0 Manual Selection  
115200  
Auto-Connect Connect

2016-05-21 @ 00:24:27 -- Running - OS: Windows, Chrome: 50.0.2661.102, Configurator: 1.2.2 Show Log

CF Welcome

- Documentation & Support
- Firmware Flasher

Welcome to  
**CLEANFLIGHT**

Welcome to **Cleanflight - Configurator**, a utility designed to simplify updating, configuring and tuning of your flight controller.

**Hardware**  
The application supports all hardware that can run cleanflight (SPRacingF3, Vortex, Sparky, DoDo, CC3D/EVO, Air Hero 32, Flip32+/Deluxe, DragonFly32, CJMCU Microquad, Chebuz F3, STM32F3Discovery, Hermit, Naze32 Tricopter Frame, Skyline32, Naze/32/Mini/Pro/Blackbox etc)

The firmware source code can be downloaded from [here](#)  
The newest binary firmware image is available [here](#),  
development builds available [here](#)

Latest **CP210x Drivers** can be downloaded from [here](#)  
Latest **STM USB VCP Drivers** can be downloaded from [here](#)  
Latest **Zadlg** for Windows DFU flashing can be downloaded from [here](#)

**Contributing**  
If you would like to help make Cleanflight even better you can help in many ways, including:

- Answering other users questions on the forums and IRC.
- Contributing code to the firmware and configurator - new features, fixes, improvements
- Testing **new features/fixes** and providing feedback.
- Helping out with **issues and commenting on feature requests**.
- Donating, buying a T-Shirt or buying an SPRacingF3 board

**Open Source / Donation Notice**  
This utility is fully **open source** and is available free of charge to all **cleanflight** users.  
If you found the cleanflight or cleanflight configurator useful, please consider **supporting** its development by donating.

[Donate](#)

SPONSORS

MassiveRC Armattan Quads Bungeecow Multirotors Immersion RC RadioC  
MultiWiiCopter OverSkyRC Multi Rotor Mania Scorpion Power Systems MultiGP MakeltBuildt

Port utilization: D: 0% U: 0% Packet error: 0 I2C error: 0 Cycle Time: 0 1.2.2

# Questions & Réponses

# Matériel nécessaire

Avion, drone, racer

+ Contrôleur (Naze, Sparky,...)

+ Logiciel (cleanflight, taulabs)

+ Accus

+ Radiocommande (Graupner, FrSky,...)

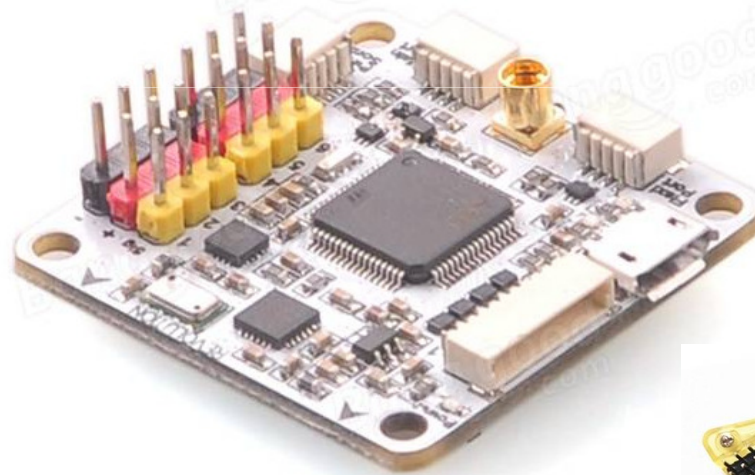
- Achat d'un ensemble complet ([immersionrc.com](http://immersionrc.com))

- Montage de sa propre configuration (Hobbyking)



# Matériel

- Cartes disponibles dans les shops spécialisés
- En ligne Hobbyking, Banggood
  - Naze32\*
  - Sparky32
  - Quanton\*
  - Revo
  - Brainfpv \*
  - CC3D



Cartes disponibles sur internet ou dans des magasins spécialisés

# Logiciel Opensource

- Cleanflight -> courses, relativement simple
- Taulabs -> Pilotage automatique (waypoints)
- Openpilot -> Freepilot (solution commerciale)
  
- Migrations,
  - Cleanflight + Baseflight (Fork GIT)
  - Taulabs devient dRonin (GPS, plan de vol,,)
  - Openpilot devient FREE Pilote

**r1** ! Les solutions open-software sont toutes disponibles sur GIT, on peut donc voir des solutions qui migrent (fork) vers de nouveaux produits dès qu'ils sont trop difficile à réintégrer (merge).



## Slide 24

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r1

Certaines solutions ont disparu depuis 1 année, le marché du Matériel étant pris d'assaut par les sociétés de distribution chinoise, le suivi de chaque produit est très délicat.

rolf; 14.05.2016

# Coupe du monde FPV

[Championnat du monde 2016](#)

[Demo course de drones FPV](#)

[Dubai champion chip 2016](#)

