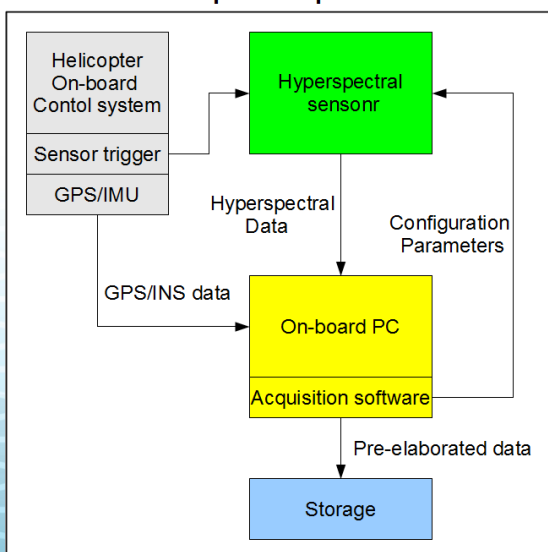




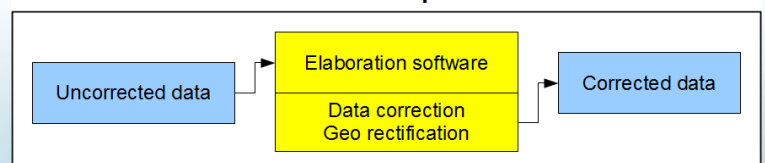
# UAV Hyperspectral system for remote sensing application

The system consists airborne imaging spectrophotometer placed on a frame suitable for use aircraft, a UAV helicopter and all components needed for correct acquisition and storing of spectral data. The acquired spectrum that covers the spectral range from 400nm to 100nm is synchronized with the navigation data, processed by a PC and through a dedicated software is stored in PC hard disk.

## Acquisition phase



## Elaboration phase



## UNMANNED FULLY AUTONOMOUS HELICOPTERS FOR CIVIL USE.

### Principles of operation

**Dimensions:** L: 2790 mm, W: 760 mm H: 860 mm

**Main Rotor (M/R) Diameter:** 3000 mm

**Tail Rotor (M/R) Diameter:** 700 mm

**Transmission:** Steel Gears in oil bath

**Tail Rotor :** Twin belt driven

**Dry Weight:** 25 kg

**Fuel Capacity:** 2 liter ( up to 18 liters conf. available )

**Engine:** 150cc, 16 HP, 2-stroke gasoline engine

**Generator:** (standard) 800 W, 24 V alternator

**Climb Rate:** 122 mpm, 400 fpm

**Maximum Speed:** Up to 60 kph

**Endurance:** Up to 5+ hours (depending on fuel tank conf. and payload)

**Maximum Payload:** 22.7 kg (depending on options, altitude, fuel load)

**Telemetry:** Many options available, including up to 50 K range with live video feed

**Operating Ceiling:** 1,500 m

**Camera Platform:** Pan and tilt with gyro stabilization available – control through ground station

**Flight Control Software:** Fully autonomous flight with auto-takeoff and landing, unlimited number of programmable waypoints “point and click” waypoints on map overlay, joystick control

**Ground Control Software:** Included with system and provides command and control and sensor data on screen with audible warning system

**Ground Station:** Options include standard laptop, ruggedized laptop or self-contained ground station in hardened case.

**Weather Resistance:** Unit can be weatherized to fly in moderate rain



### Flight Control System Specifications

**Number of Waypoints:** Depends on RAM

**Waypoint Parameters :** Altitude, Latitude, Longitude, Hold Time, Pirouetting

**Waypoint Transition Parameters:** Velocity, Heading follow point

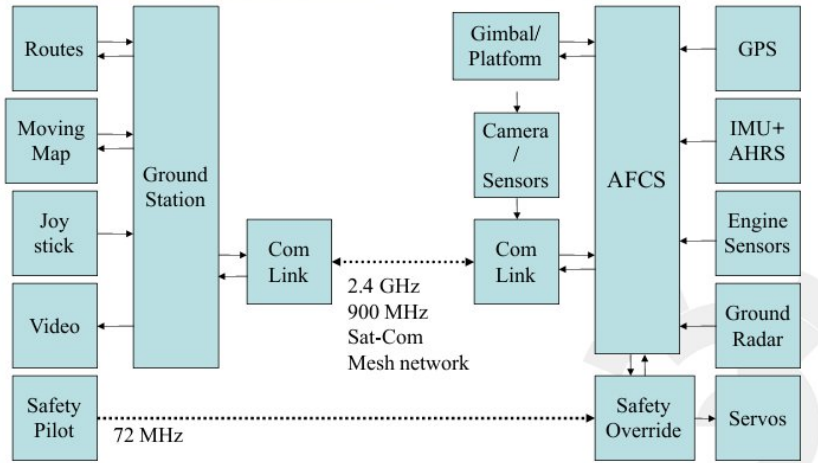
**Waypoint Accuracy :** (Light Winds, Good GPS Reception) 3 m diameter

**Altitude Hold Accuracy:** (Light Wind, Good GPS Reception) +/- .5 m

**Flight Modes:** Manual, Manual on Specific Control, Waypoint, Velocity, Command



## Systems Block



### HIPERSPECTRAL IMAGING SYSTEM VNIR [400-1000nm]

#### Imaging spectrometer

**Spectral Range:** 400-1000nm

**Spectral resolution:** 2.0nm

**Input slit:** 18 $\mu$ m x 14.2mm

**Spectral Image dimension:** spectral 6.15 mm spatial 14.2 mm

**Numerical aperture:** F/2.4

**Dimension:** max 60 x 60 x 175 mm

**Weight:** 1100g

**Body:** Anodized aluminium

**Mount type:** "C" mount

**Environmental conditions:** +5° / +40° not condensing



#### Camera

**Resolution:** horizontal/vertical 2330 pixels x 1750 pixels

**Pixel Size:** horizontal/vertical 5.5  $\mu$ m x 5.5  $\mu$ m

**Frame Rate:** 26 fps

**Interface:** Gigabit Ethernet

**Video Output Format:** Mono 8, Mono 12, Mono 12 Packed

**Pixel Bit Depth:** 12 bits

**Synchronization:** external trigger, free-run, Ethernet connection

**Exposure Control:** programmable via the camera API, ext. trigger signal

**Housing Size & Weight :** 40.7 x 62 x 62mm, 300g

**Housing Temperature:** 0 °C - 50 °C

**Lens Mount:** C-mount

**Digital Input:** 2

**Digital Output:** 4

**Power Requirements:** 12 VDC 6W

**Sensor:** Kodak KAI-4050 Progressive Scan CCD, global shutter, 1 inch CCD 12.85 mm x 9.64 mm



## Objective lens

Optimized 400-1000nm

**Focal length:** 9 [mm]

**IFOV:** 1.33 [mrad]

**FOV:** ±34,32°

**GSD [1000m]:** 1,33

**F#:** 2,4



## Enclosure

Hyperspectral chassis

**Payload up to** 10Kg

**Body:** Anodized Alluminium and painted sheet metal

**Dimensions:** mm

**Weight:** Kg

Connectors on chassis back side, seal enclosure (optional),  
mechanical shutter software driven (optional)



## STORAGE SYSTEM PC BASED

### Specifications:

**Processor:** High Performance Intel i7/i5

**Dimensions:** Small Size; 16.6mm x 15.7mm x 4.8mm

**Chassis:** Rugged Aluminum.

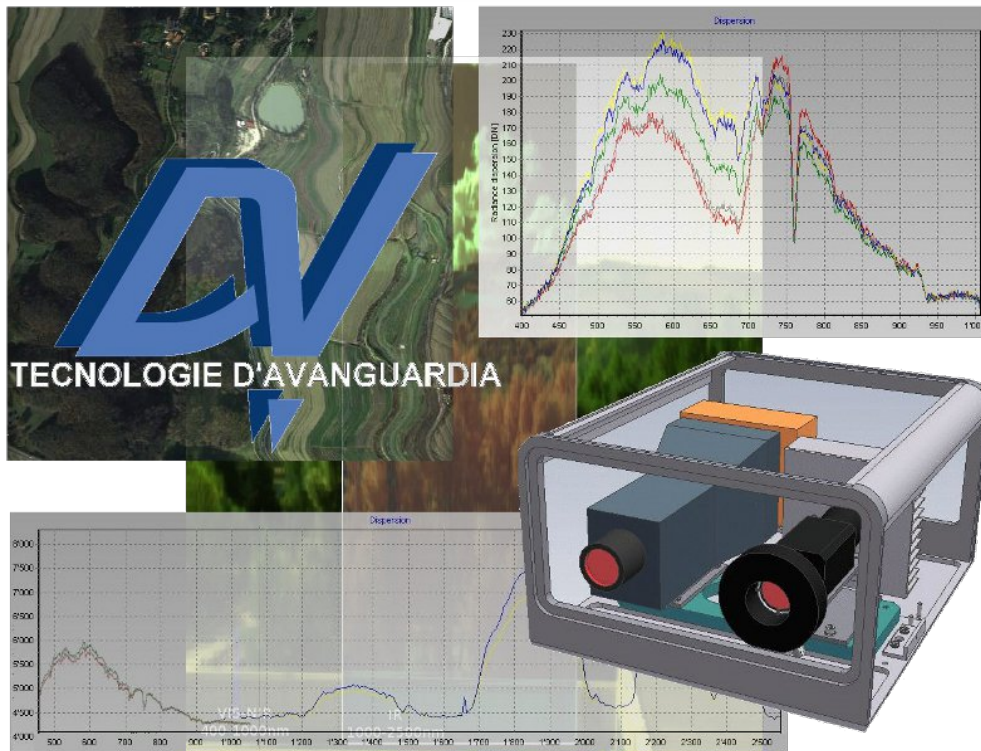
**Graphics:** 3D with 16x9 Capability

**Net and I/O:** Built-in Gigabit LAN, USB 2.0, RS232,  
Video, Audio, Serial, DisplayPort, Wireless

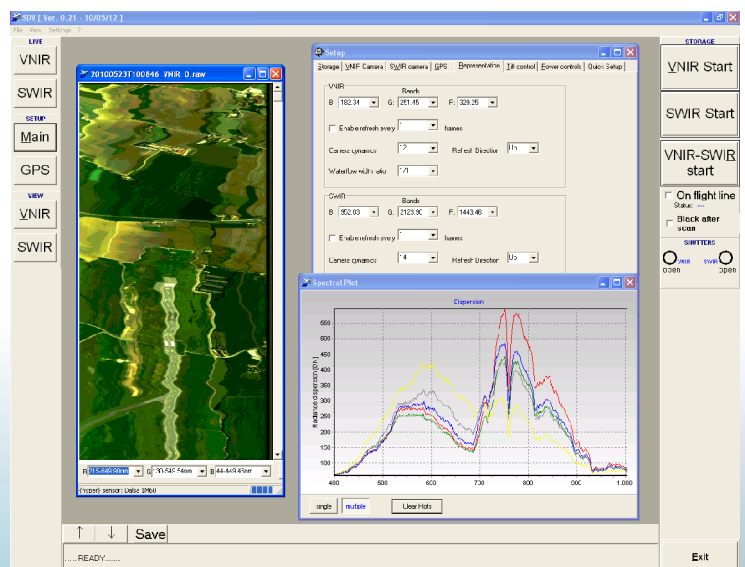
**Storage:** 750GB Internal Storage

WatchDog Timer, Low Power Consumption, Windows 7



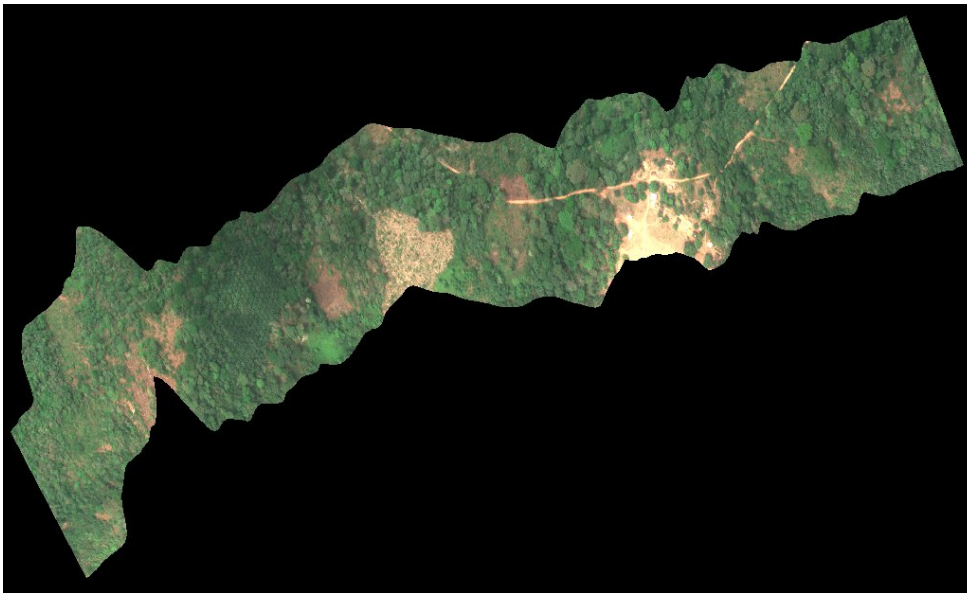


- Streaming acquisition from one or two video sources
- Pre-elaboration and and real time data storing
- Data synchronization
- 2D Image reconstruction and representation
- Video capture parameters control
- GPS/INS communication controller
- Optional hardware interface



## DV PPROJECTBUILDER: GEORETTIFICATION SOFTWARE

DV PprojectBuilder is a software application designed to process and elaborate hyperspectral data cube. Used for radiometric correction, for georectification and georeferencing.



### Characteristics

- Available for LINUX Ubuntu, Windows 32 / 64 bit.
- Command line processing (LINUX version).
- Support for all Proj.4 projections.
- BIL Spectral Image file data input (ENVI compatible)
- Navigation data supported: Applanix e Novatell sbet
- Radiometric Sensor correction
- Digital elevation model inport
- Boresight calibration using GCP and cross image methods
- Data Orthorectification.
- ENVI data format export.
- Fast data processing

