

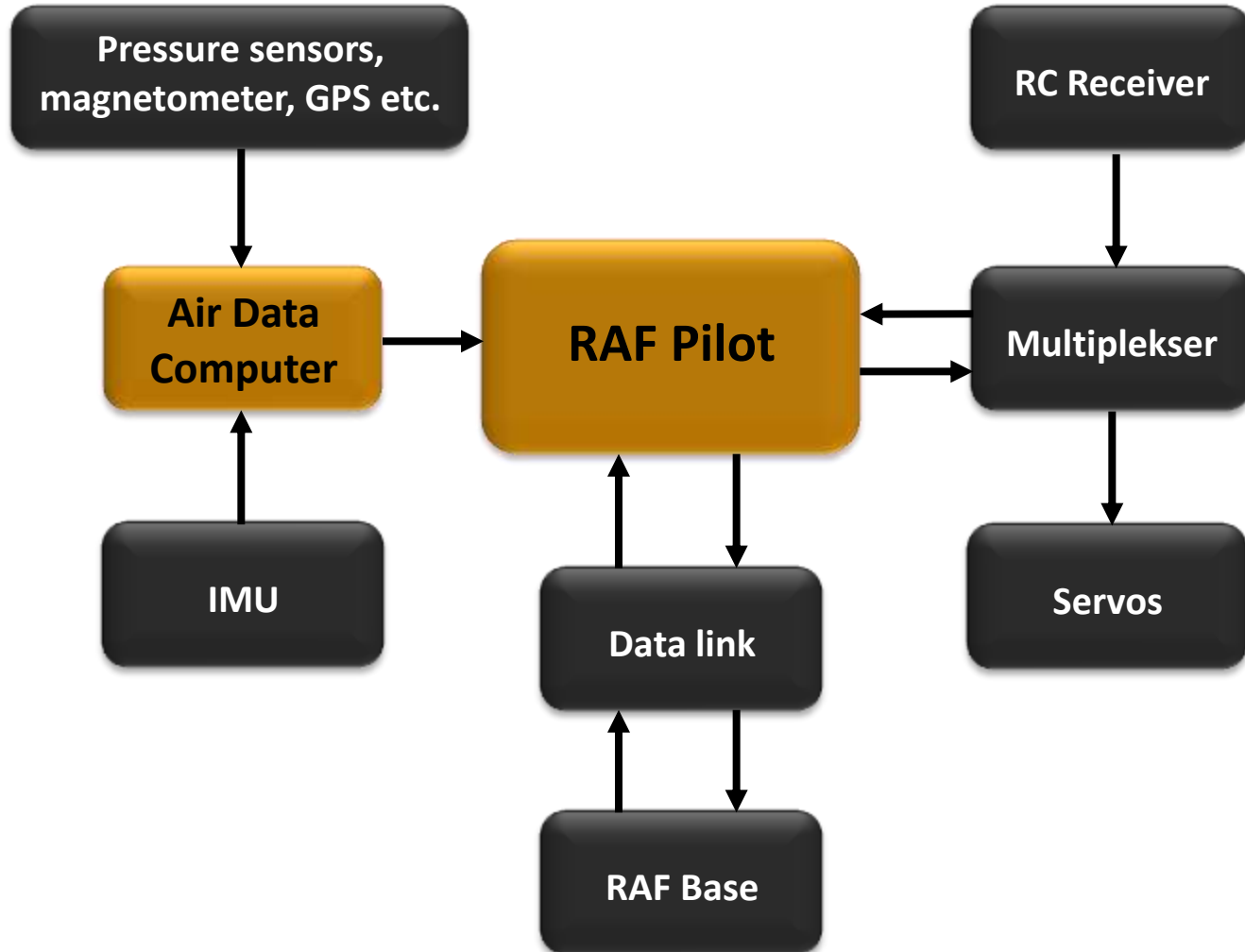
Koło Naukowe Awioniki MeAvio
Politechnika Warszawska

RAF Pilot

O czym będziemy mówić ?

- Elektronika
- INS
- Testy w locie
- Ground Control Station
- Samolot
- Gimbal

Elektronika



Elektronika

Sensors:

- 5 Hz GPS (Supporting DGPS accuracy)
- Integrated 10 degrees-of-freedom INS (accelerometer, gyroscope, magnetometer, pressure based altimeter)
- Static pressure sensor and differential pressure sensor
- Up to 4 separate sources voltage monitor
- Architecture prepared for many more sensors

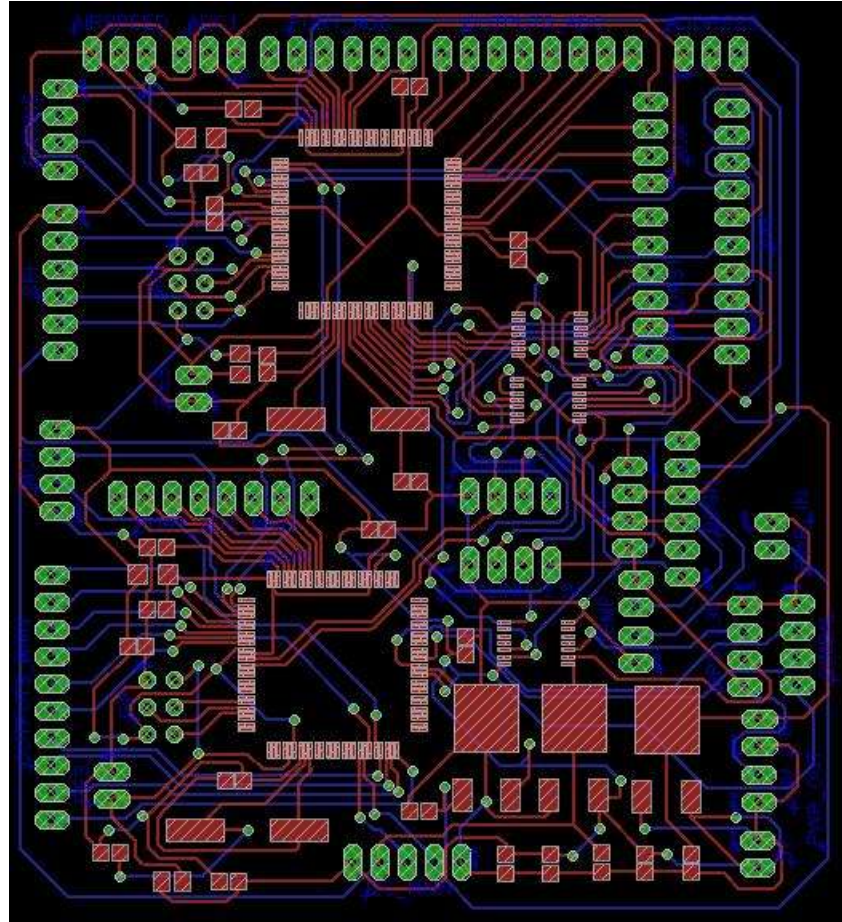
Performance:

- Independent RC switch (multiplexer) with separate power supply (provides manual control in the event of complete autopilot failure)
- Three separate CPUs on board (Air Data Computer, RAF Pilot and multiplexer)
- External extension ports (up to 3 independent USARTs, 2x 3.3V I2C bus, 2x 5V SPI bus, 20 Analog inputs and 20 digital I/Os, 1.8V USART based GPS)
- 7-12V or 5V powered
- Power output of 5V, 3.3V and 1.8V up to 1A
- ISP (In-System-Programming) capabilities
- Operates with 5V and 3.3V data links
- 8Hz ground control software update rate
- 6 servo outputs
- 8 channels input

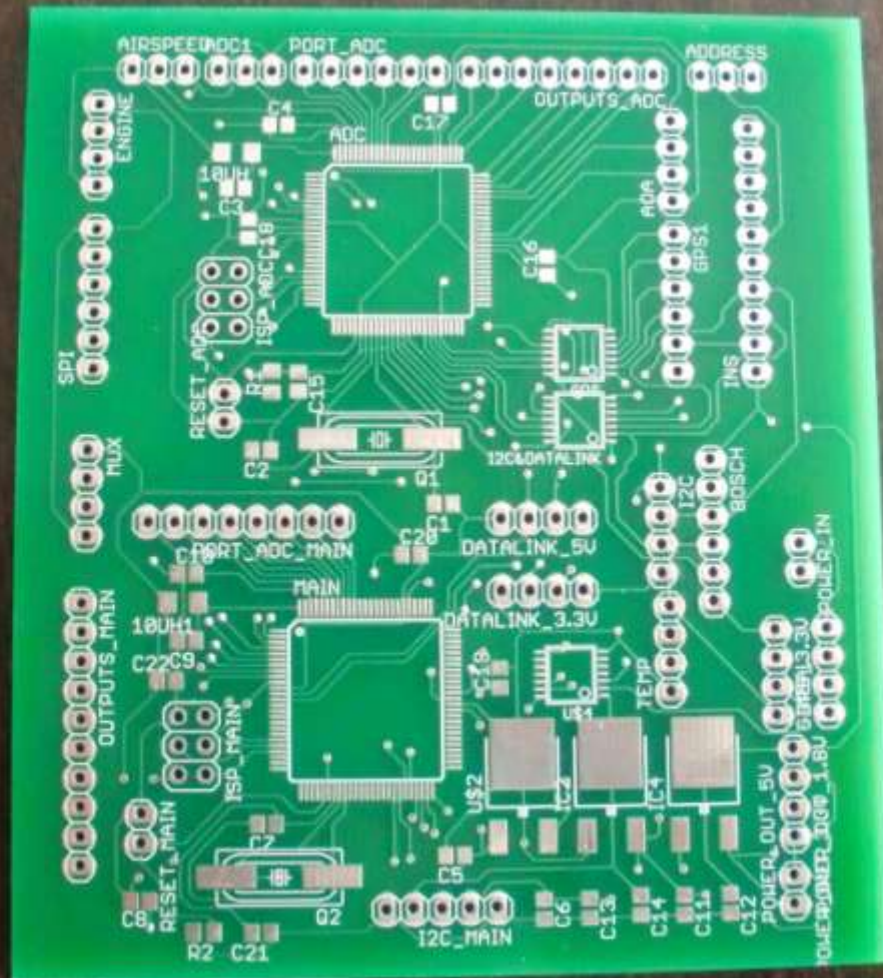
Features:

- Waypoint navigation based on GPS with altitude and airspeed hold
- Fully integrated one application ground control software (RAF Base)
- In-flight adjustable gains
- In-flight changeable waypoints
- Point-and-click route planner
- Live tracking
- Extensive PC – based logging
- Small size and lightweight

Elektronika



Elektronika



Elektronika



INS

- Complementary filter
- Kalman filter
- Texas Instruments MAGR
- Custom solution

Testy w locie



RAF Base

RAF Base

19200

Create Log

Virtual Cockpit

Tracker

Flight Modes

Set Route

PID Settings

Servo Settings

Video Camera

Exit

Virtual Cockpit

time:
lat: 0000,000
long: 0000,000

Roll: 0
Pitch: 0
Yaw: 0

Airspeed: 00,00
Speed grd: 0
Course grd: 0

Alt GPS: 0
Alt pressure: 0

Position fx: 0

le autopilot mode:0
Autopilot mode:0
Ref data:0

The Virtual Cockpit displays six instruments:

- Vertical Speed:** A circular gauge with a needle pointing to 0. The scale ranges from 1 to 6, with 'up' above and 'down' below. The unit is 1000 ft/min.
- Heading:** A circular gauge with a needle pointing to 0 (North). The scale ranges from 330 to 150 degrees, with cardinal directions N, E, S, and W marked.
- Airspeed:** A circular gauge with a needle pointing to 0. The scale ranges from 10 to 80 KNOTS. The needle is currently in the green zone.
- Altimeter:** A semi-circular gauge with a needle pointing to 0. The scale ranges from -20 to 20. The top half is blue and the bottom half is brown.
- Altimeter with Digital Readout:** A circular gauge with a needle pointing to 0. The scale ranges from 7 to 9. The unit is feet. A digital display shows 00000.
- Turn Coordinator:** A circular gauge with a needle pointing to 0. The scale ranges from L to R. The unit is 2 MIN.

Exit

RAF Base

ServoSettingDialog

Left Aileron	Travel Rate: <input type="text" value="20"/>	Servo Center <input type="text" value="20"/>	<input type="checkbox"/> Reverse	Apply
Right Aileron	Travel Rate: <input type="text" value="20"/>	Servo Center <input type="text" value="20"/>	<input type="checkbox"/> Reverse	Apply
Elevator	Travel Rate: <input type="text" value="20"/>	Servo Center <input type="text" value="20"/>	<input type="checkbox"/> Reverse	Apply
Rudder	Travel Rate: <input type="text" value="20"/>	Servo Center <input type="text" value="20"/>	<input type="checkbox"/> Reverse	Apply
Throttle	Travel Rate: <input type="text" value="20"/>	Servo Center <input type="text" value="20"/>	<input type="checkbox"/> Reverse	Apply
AUX	Travel Rate: <input type="text" value="20"/>	Servo Center <input type="text" value="20"/>	<input type="checkbox"/> Reverse	Apply

Save Load Servo Trimming ON Servo Trimming OFF Cancel

RAF Base

PIDControlDialog

Roll PID

kp 3 ki 0,1 kd 0,5 offset 0 Apply

Pitch PID

kp 3 ki 0,1 kd 0,5 offset 0 Apply

Heading PID

kp 3 ki 0,1 kd 0,5 Apply

Engine PID

kp 3 ki 0,1 kd 0,5 Apply

Altitude PID

kp 3 ki 0,1 kd 0,5 Apply

Save Load Exit

Flight Mode Select

Roll Axis

Roll Hold

Heading Hold

Turn

Apply

Pitch Axis

Pitch Hold

Vertical Velocity Hold

Altitude Hold

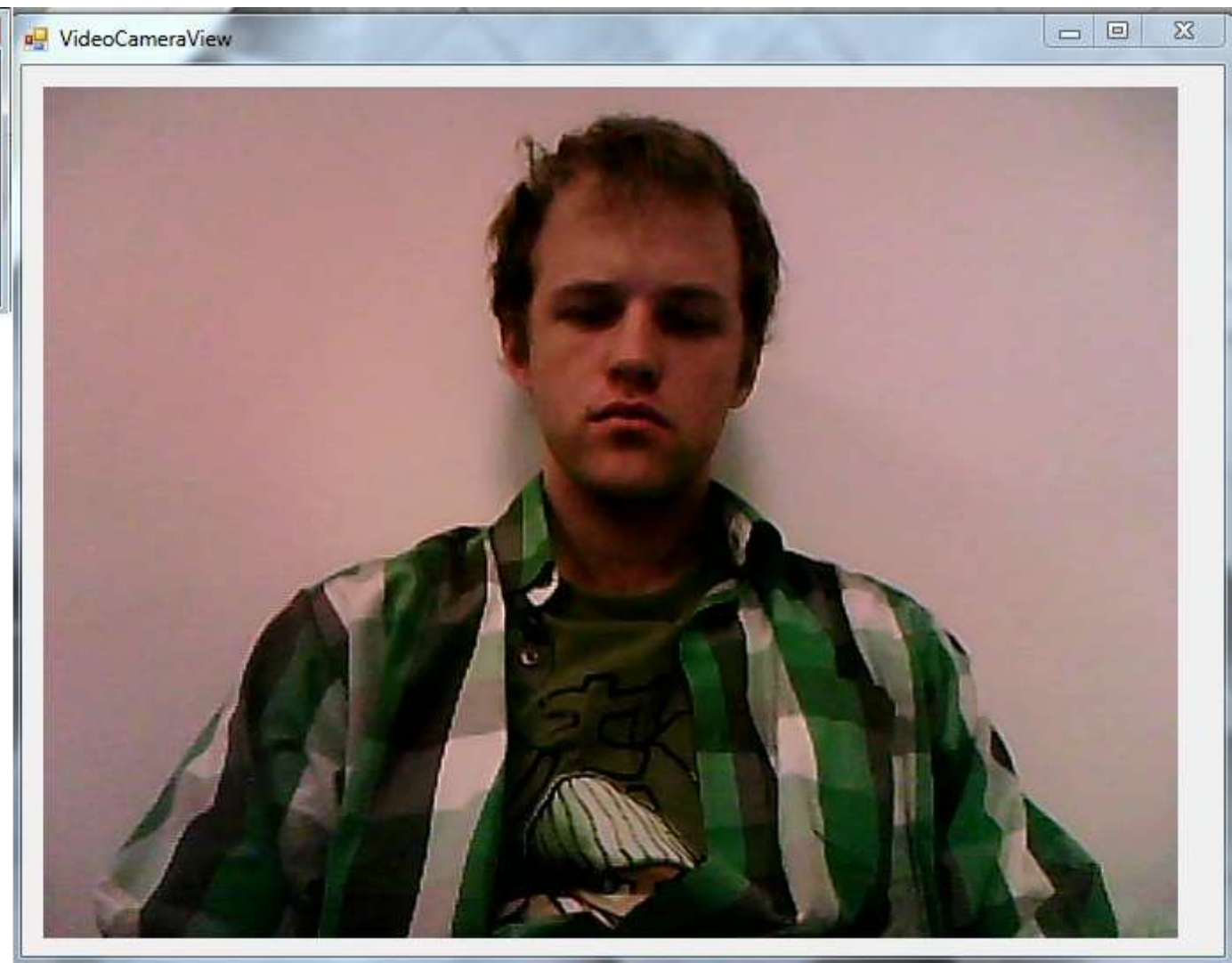
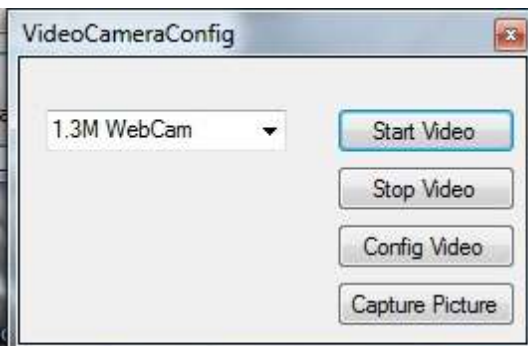
Apply

Airspeed Hold

Apply

Exit

RAF Base



RAF Base

RoutePlannerDialog

50.8259347267691
19.2041015625

Add Waypoint Remove

Insert point at 3

Altitude (meters): 300

Send Velocity

Close Route

No.	Latitude	Longitude	Altitude
1	49.468124067	22.291259765	100
2	50.310292450	18.6328125	100
3	50.833697670	19.094238281	300
4	54.367758524	18.665771484	200
5	52.247982985	21.016845703	200
6	50.028916563	22.005615234	300
7	49.468124067	22.269267109	300

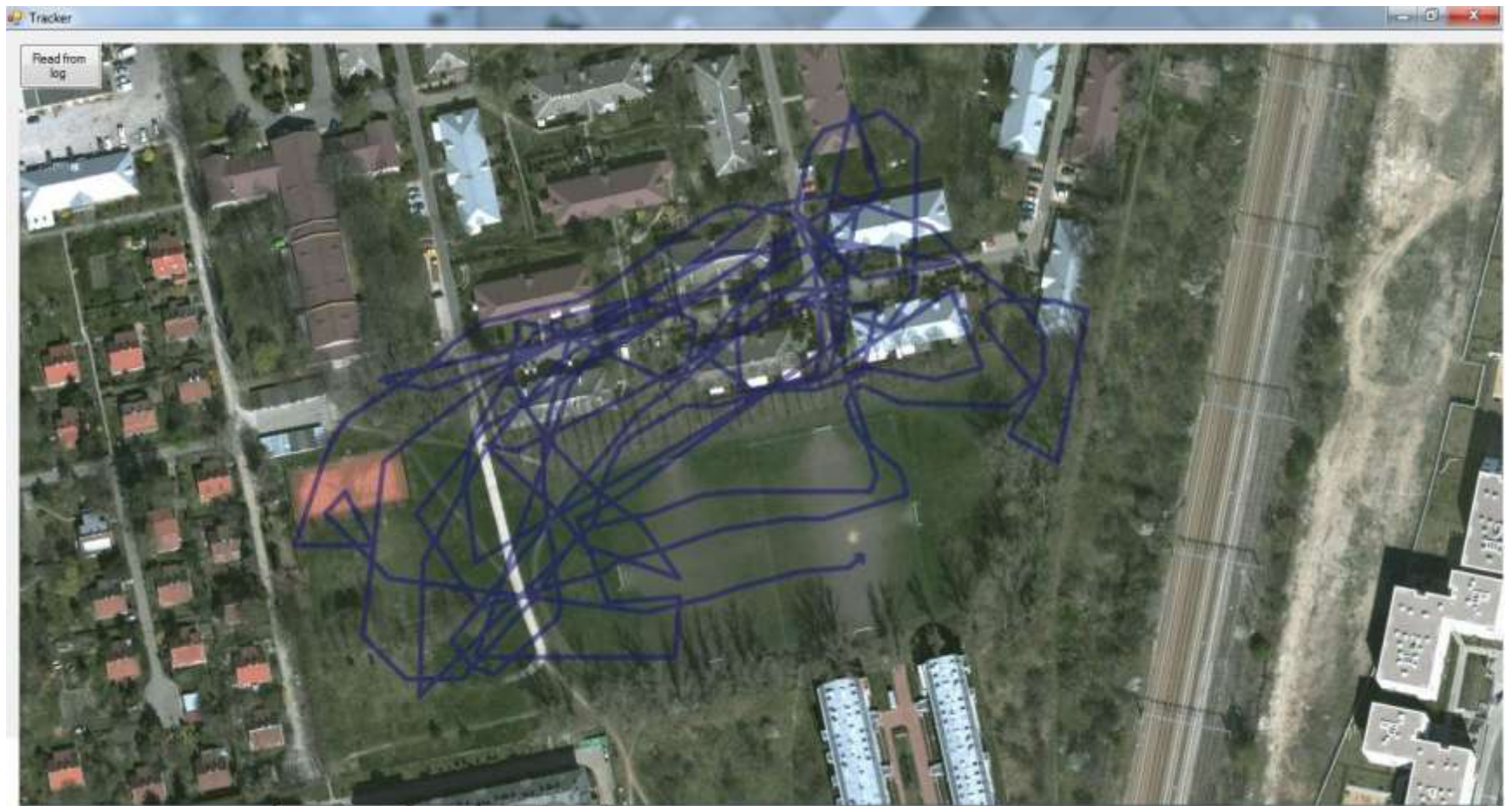
Route length: 1344.62116785295

Go to:

Send route to RAF Pilot Start autopilot mode

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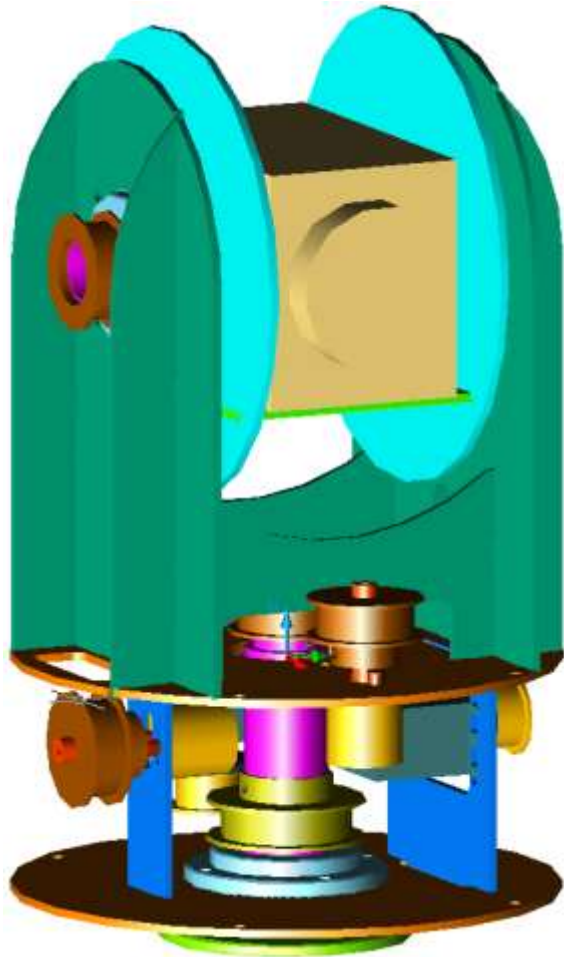
RAF Base



Samolot



Gimbal



Dziękuję

Koło Naukowe Awioniki MeIAvio
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