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Military Metrology Service in Polish Armed Forces

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Introduction

Structure of Metrology Service

Secretary of State in Ministry od Defense

Military Centre of Metrology

Central Military Centre of Metrology

Specialized Military Centre of Metrology

1st Military Centre of Metrology Gdynia

2nd Military Centre of Metrology Bydgoszcz

3th Military Centre of Metrology Oleśnica

4th Military Centre of Metrology Radom

Main tasks of Military Centers of Metrology

- A) performing metrological services;
- B) providing legalization services within the scope of the authorization and calibration of the obtained accreditation;
- C) maintaining measurement consistency of own measuring instruments;
- D) adjusting the scope of activities to the needs of military units, in terms of metrological support;

Main tasks of Military Centers of Metrology

- E) cooperation with metrologists in the field of metrological support tasks;
- F) providing technical advice to military units;
- G) agreeing on the technical requirements for the measuring equipment planned for purchase by the military branch office (WOG), implemented in decentralized mode for the needs of military units;

Main tasks of Military Centers of Metrology

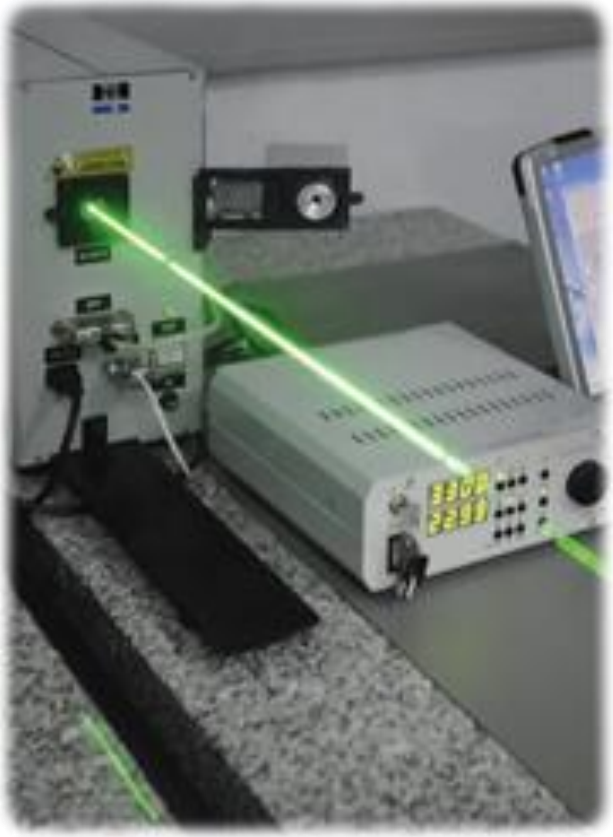
- H) collection and processing of information concerning the supervision and operation of metrological support of military units;
- I) cooperation with other metrology laboratories

History

1960

Technical capability

Patterns of the measurement units



Technical capability

The basic patterns include:

- Frequency master station (launched in 2004),
- Measuring stations for microwave measuring instruments (2007),
- Measuring benches for longitudinal patterns (2004),
- Test benches for torque converters (2009),
- Measurement stations for relative and absolute pressure measuring instruments (2009).

Technical capability

Stations for instruments calibration

Technical capability

The most modern stations are:

- The stand for control and measurement equipment (2010)
- The stand for calibration of torque wrenches and strain gauges (2000),
- The stand for checking and calibrating the laser rangefinder, tachymeter, theodolite and testing equipment (2008),
- The stand for calibration of chemical detection devices (2009),
- The stand for calibration of ionizing radiation dosimeters (2007).

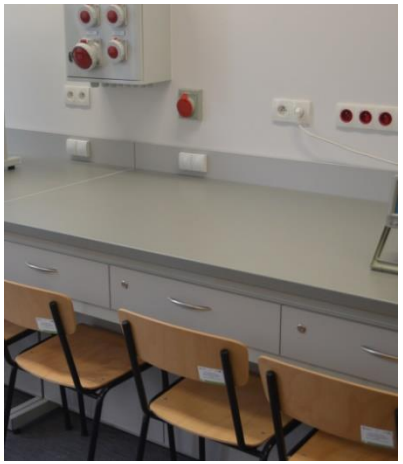
Technical capability

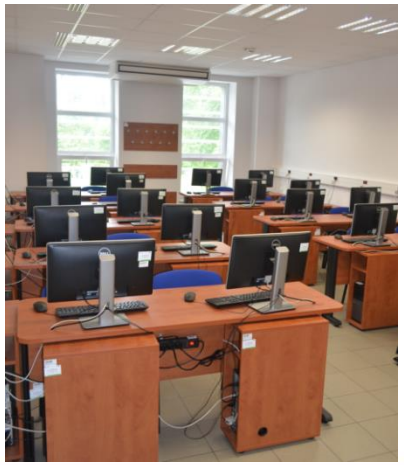
Mobile metrology laboratory

Laboratory of Avionics and Air Armament

Workshops:

1. Aeronautical Measurement Systems Laboratory
2. Aerospace Control Systems Laboratory
3. Aiming and Actuating Systems Laboratory
4. Avionics and Computer Systems Laboratory
5. Navigation Systems Laboratory
6. Measuring Systems and Automation Laboratory
7. Control Systems Laboratory
8. Display Systems and Simulators Laboratory
9. Electro-energetic Systems Laboratory



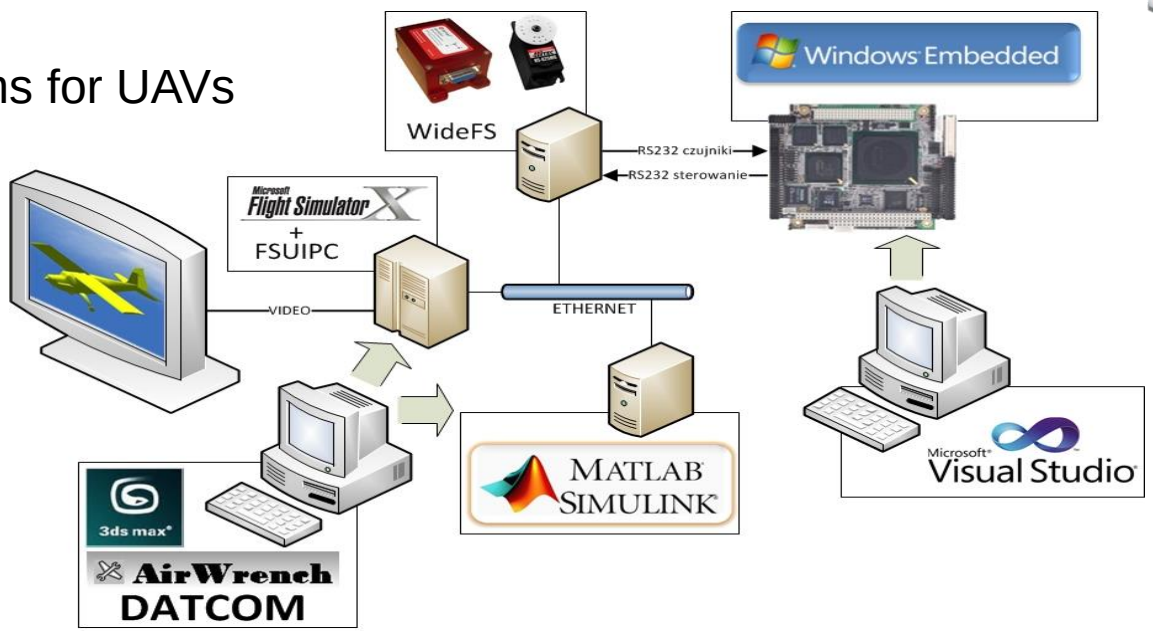


Current Research

Current research:

1. Design and construction of avionics equipment for UAVs - sensors, air data computers, navigation systems, flight recorders

2. Control systems for UAVs

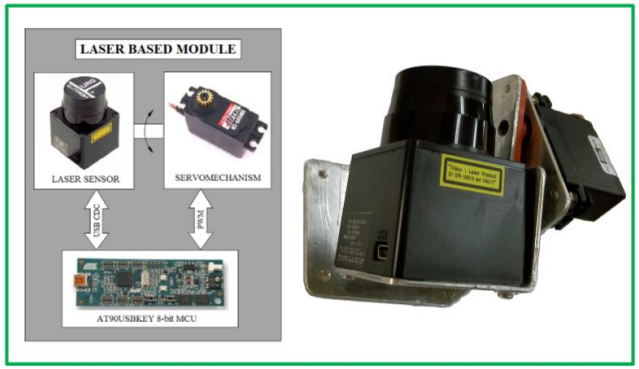


Current Research

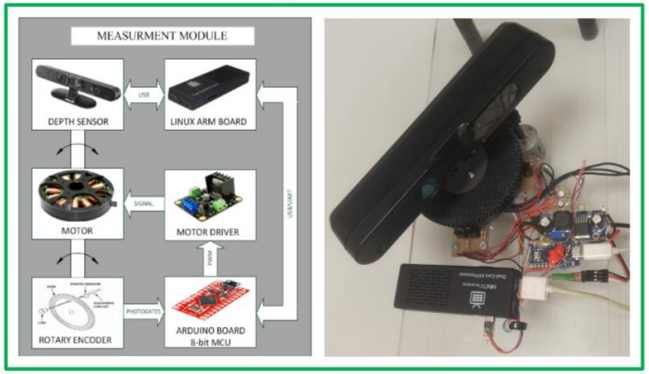
3. Innovative autonomous navigation for UAVs

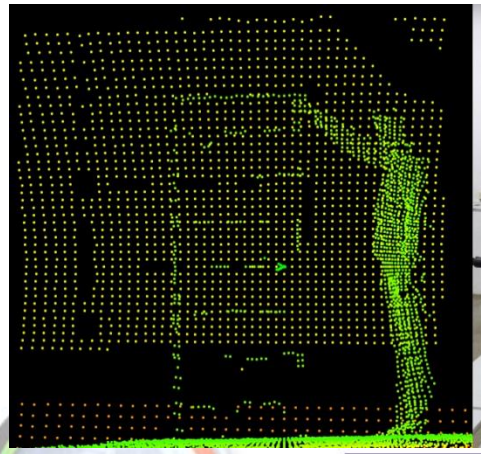
Visual

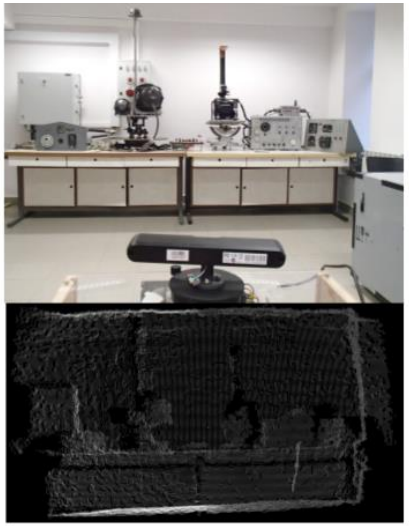
Laser based module



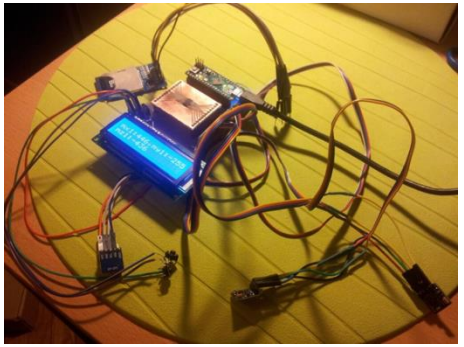
Structured light based module

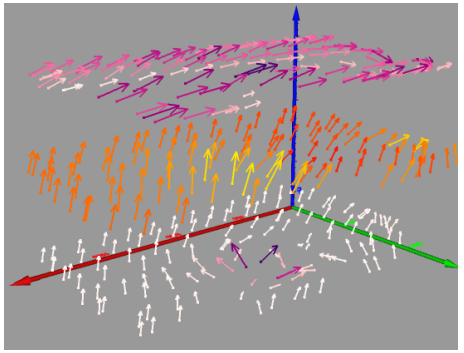






Magnetic



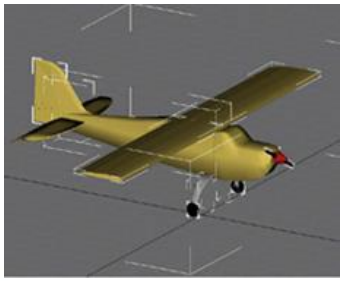


Current Research

4. Flight simulators construction for Boeing 737NG, F-16 multirole fighter and UAV

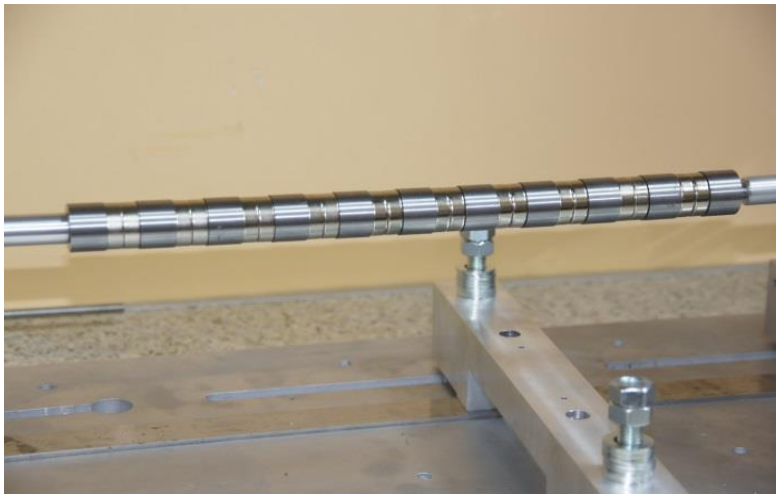


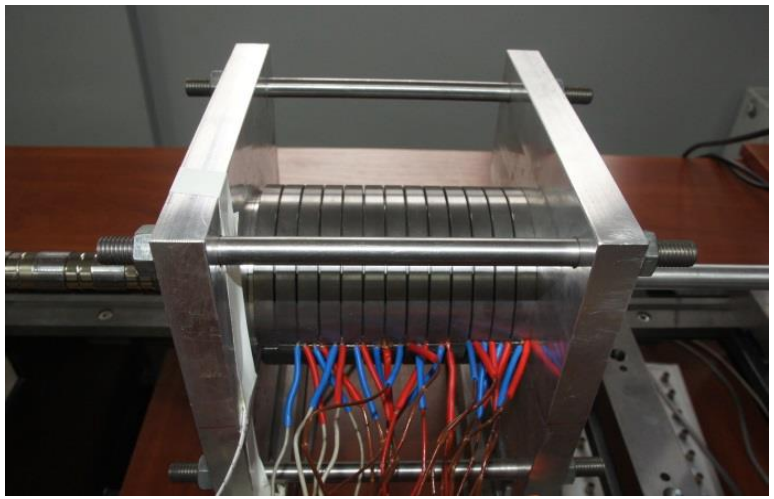
5. Flight dynamics modelling for simulators purposes

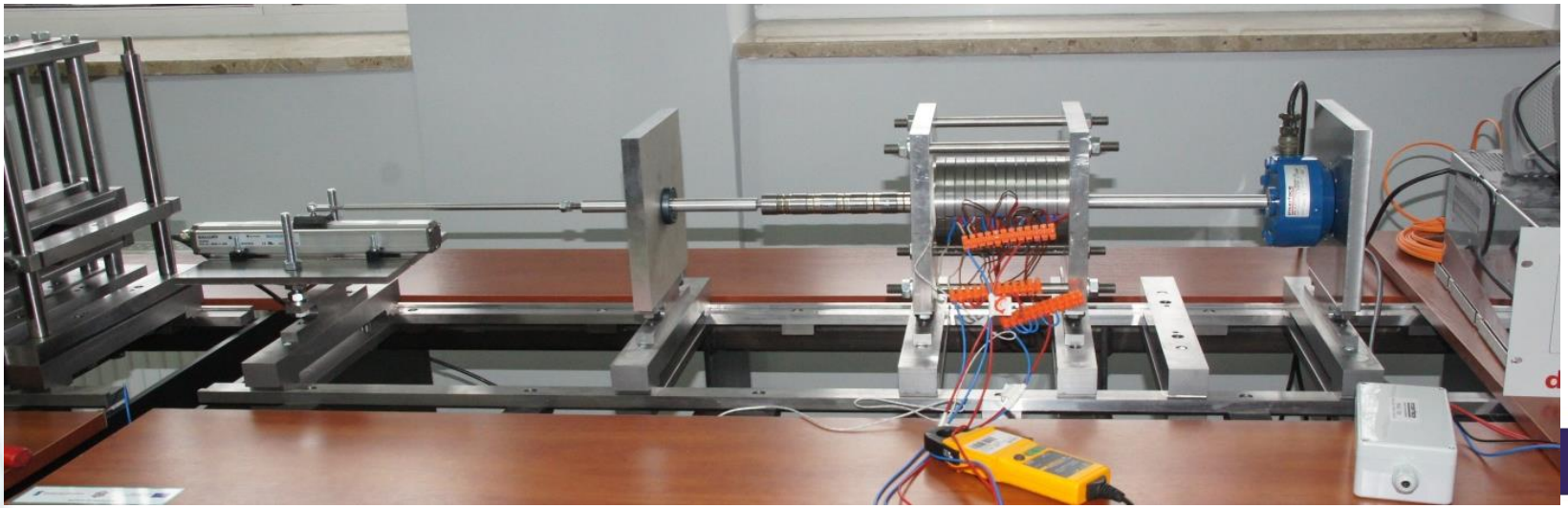


Current Research

6. Actuation system with linear electric drive for aircraft

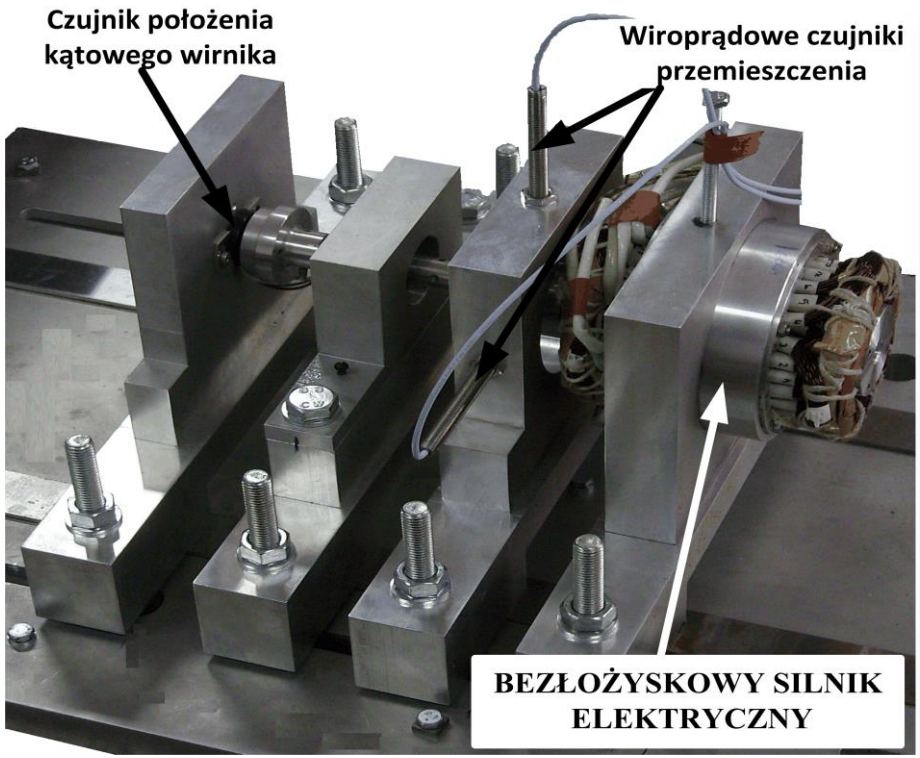


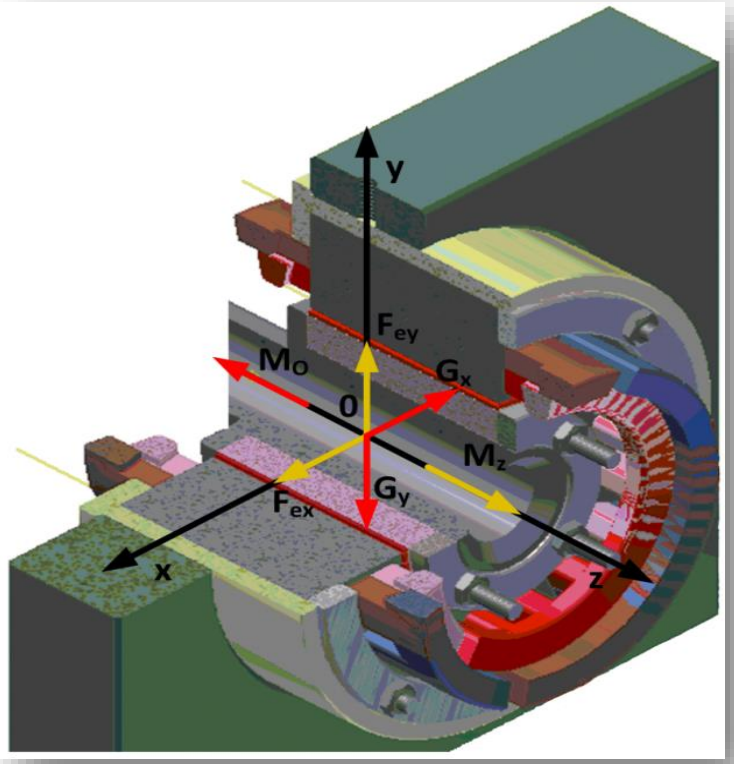




Current Research

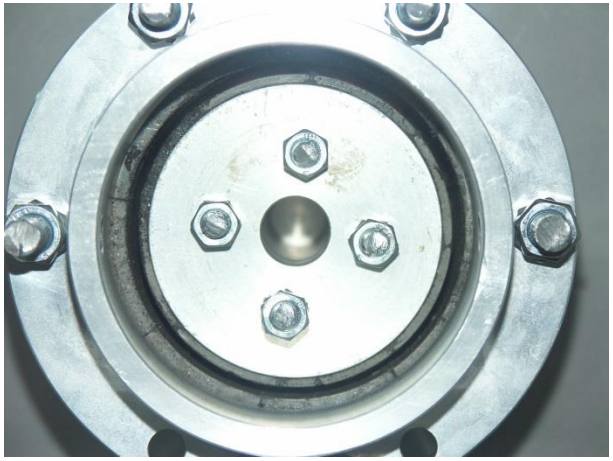
7. Bearingless electric drive

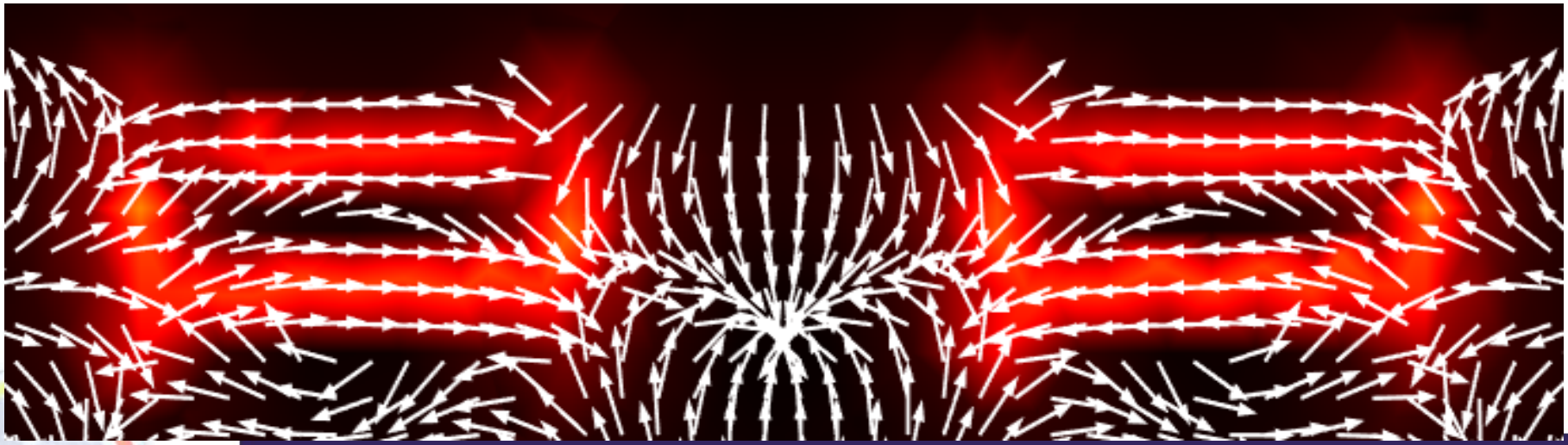




Current Research

8. Passive magnetic bearings





Laboratory of Avionics and Air Armament

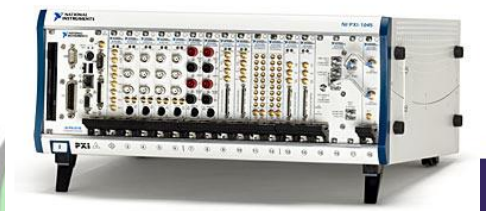
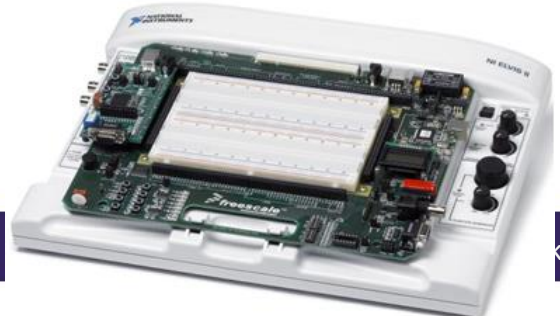
Facilities:

1. Measuring devices
   - Multimeters,
   - Frequency counters,
   - Function generators,
   - Power supplies,
   - Oscilloscopes,
   - Spectrum analysers.





2. Equipment for Automation and Control Systems
- Operator panels,
- myDAQ, myRIO,
- ELVIS II+ modular platform,
- PXI Rapid prototyping and measurement data acquisition system,
- PACSystem RX3i set of industrial controllers.

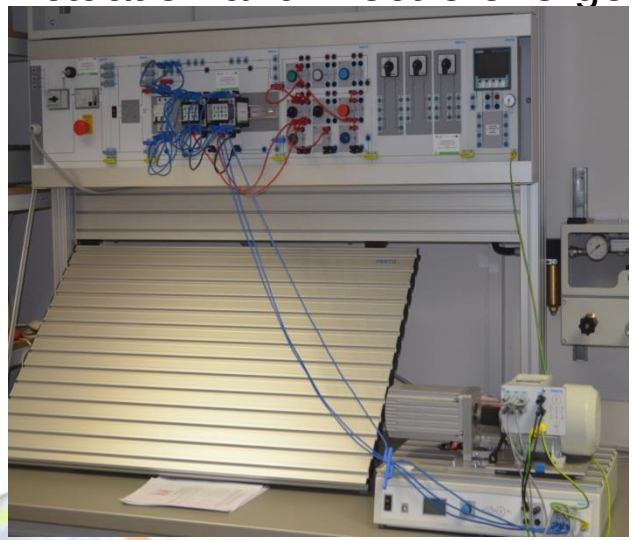

Laboratory of Avionics and Air Armament

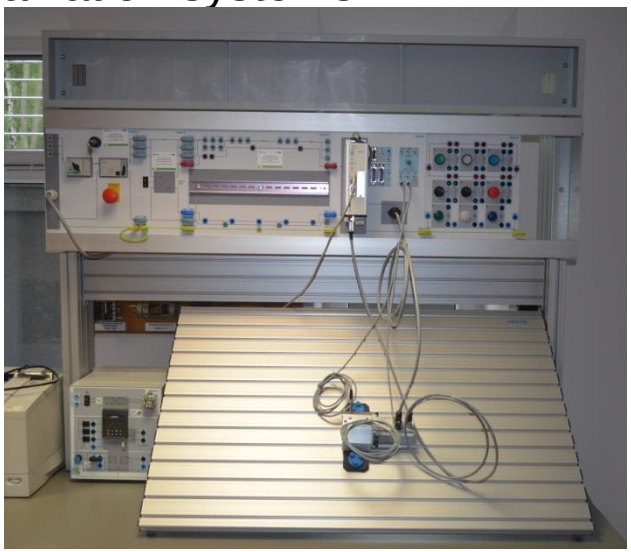
Facilities :

2. Equipment for Automation and Control Systems

- 3DOF Helicopter,
- 2DOF Helicopter,
- Inverted Pendulum,
- Double Inverted Pendulum,
- Gyro/Stable Platform.

3. Actuation and Electro energetic aviation systems





Laboratory of Avionics and Air Armament

Facilities :

4. Simulators

- Boeing737NG,
- Airbus A320,
- General Aviation,
- F-16,
- Garmin G1000.

Laboratory of Avionics and Air Armament

Facilities :

5. Microcontroller kits and FPGA

- Atium NanoBoard 3000 – FPGA,
- Atmel (8-bit):
  ATXMEGAA3BU-XPLD, ATXMEGAC3-XPLD, ATXMEGAE5-XPLD,
- Texas Instruments (16-bit):
  MSP-EXP430F5438 , MSP-EXP430G2, EX430-F2013, EX430-T2012,
- Texas Instruments (32-bit):
  EKK-LM3S1968, TMDSSK3358, EK-TM4C123GXL, EKS-EVALBOT,
- PC104, FriendlyARM, Odroid, BeagleBone, Arduino.

6. Navigation equipment

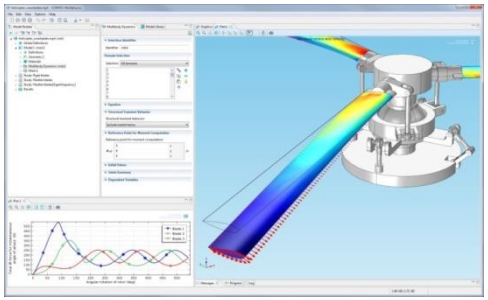
- INS: VectorNav VN-200,
- GPS: uBlox EVK-6R , EVK-7C, PAM-7Q.

Laboratory of Avionics and Air Armament

Facilities :

7. Aviation Power Supplies
- DC: 28 [V],
- AC: 3x36 [V] 400 [Hz], 115 [V] 400 [Hz].

8. Software
- MATLAB,
- MultiSim,
- LabView,
- AltiumDesigner,
- FluidSIM,
- COMSOL,
- VisualStudio.



9. Workshop equipment
- Lathe,
- Milling machine PCB ProtoMat E33 LPKF,
- Others...

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THANK YOU FOR YOUR ATTENTION

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