CST
Center of Space Technologies

institute of aviation
warsaw, since 1926

AVIONICS DIVISION

research for future

AVIONICS DIVISION

The Division carries out scientific and research works and design and engineering works, as well as small series production of avionics systems and devices, measurement and diagnostics devices, and electrical installations and systems for planes, helicopters and unmanned aerial vehicles. The Division is also equipped with a certified Laboratory for Environmental Research.

The Division takes part in Polish and European grants (ERA, EPATS, SOFIA, Super SKYSENSE, CESAR).

The Division is also approved as a Production Organization and a Maintenance Organization.

The Production Organization of the Aviation Institute, approved by the Civil Aviation Authority (Urząd Lotnictwa Cywilnego) by Regulation 216/2008 of the European Parliament and by the European Council and European Commission Regulation 1702/2003 under Part 21, Section A, Subpart G, is authorized for production of the products, parts and appliances listed in its approval list, and for issuing an approved production organization authorized release certificate EASA FORM 1 form.

Design and Construction Works

The Division offers design and construction works as follows:

- systems involved in airplane and RPAS movement in civil airspace, in all flight stages,
- avionics systems, especially stabilization and classical, indirect and automatic steering of airplanes, RPAS, satellites and other steering systems,
- avionics devices for movement measurement (a.o.: CDA, radio-altimeter), spatial position (a.o.: INS, AHRS) and operational values (a.o.: fuel meters),
- mathematical modelling of aircraft flight dynamics,
- design of microprocessor systems as conversion devices dedicated for measurement systems and devices, stabilization, control and diagnostics systems, especially for ariplanes, RPAS, satellites avionics equipment, and also for other devices and system elements that demand the use of a computing platform for implementation of numerical algorithms,
- fast prototyping of avionics devices, their assembly and certified production for the commercial user,
- testing the resilience and strength regarding mechanical conditions (vibrations and hits) and climatic conditions (ambient temperature, increased moisture, low pressure) of technical devices and installations, aerostructures and avionics, and also other devices and system elements designed in the Institute of Aviation, which demand such testing.

The test bed for calibrating the BPM-1 measuring and diagnostic system

Stand for calibrating the PPM-1 fuelmeter system

TIRA - shock 4110 shock vibrator

Expertise & Experience

The Division is capable to conduct and supervise technical investigations and tests of systems and aircraft equipment and is entitled to issue statements of compliance with RTCA, ARINC, MIL and TSO standards and aircraft requirements.
The Division has the potential to manufacture prototypes and carry out short-run production of smart systems aimed at precise measurement and diagnostic & indicating tasks. Our laboratories are equipped with the necessary test beds and measuring systems to carry out the complex analysis of products.

Examples of systems designed and manufactured in the Avionics Division, which are installed in Polish aircraft, as well as used in laboratories:

- rudder trim controller for the „Orlik" airplane,
- fuel gauging systems (capacitive type) for the I-22 „Iryda", the PZL M-28 „Bryza" and the „Skytruck" airplanes and the W-3 „Sokol" helicopter,
- radioaltimeter the RWL-750M, used as avionic equipment in the I-22 „Iryda", the PZL M-28, the „Bryza" airplanes and the „Anakonda" helicopter,
- torquemetering system used in the W-3 „Sokol" helicopter,
- lighting regulator and warning systems for the I-22 „Iryda" and the PZL M-28 „Skytruck" airplanes,
- telemetric data transmission system for an unmanned aircraft,
- autonomous control system for an unmanned aircraft RAC analog/digital data recorder designed for data acquisition, storage and playback,
- GPPA-3, GPPA-4 generators and the GWE-2 electrostatic discharge generator,
- AROS - an autonomous fatigue loads data recorder,
- testing instruments:
  - TRS 6113-2 for on-board radio-transceivers,
  - TPPM-1 for fuel gauging systems,
  - T4S for radioaltimeters,
- UD-100M for torquemeters,
- MRT-3 for radio/navigation systems.

Environmental Laboratory

The Laboratory acquired Testing Laboratory Certificate No. AB 132, issued by the Polish Center for Accreditation in February 2005, in compliance with PN-EN ISO/IEC 17025:2005 standard requirements. The scope of this certificate covers tests of resistance to mechanical hazards, climate stresses and functional inspection of products.

Capabilities:

- strength and resistance to sinusoidal vibrations for objects of a mass up to 400 kg, with a frequency range of 5 - 2500 Hz, acceleration amplitude up to 900 m/s^2, displacement amplitude up to 25 mm,
- broad band vibrations for objects of a mass up to 400 kg, with a frequency range of 5 - 2000 Hz, acceleration amplitude 0.3 - 240 m/s^2, spectral density from 0,004 to 45 $(m/s^2)^2 \times Hz^{-1}$,
- strength and resistance to repeated mechanical shocks for objects of a mass up to 400 kg, acceleration up to 3200 m/s^2, frequency up to 3 Hz, and on impulse duration range of 1 - 30 ms,
- resistance to high and low temperatures, in a temperature range of -80°C - +180°C,
- resistance to cyclic temperature changes within the range from -80°C to +180°C,
- resistance to a high level of humidity within the range from 20% to 98%,
- resistance to low pressure from atmospheric pressure to 60 hPa,
- frost and moisture resistance.

Laboratory Equipment

Climatic chamber Climats Excal 7728-HE:
- temperature range: -90°C to +200°C,
- temperature variation rate: 1°C/min (within the range: -55°C to +180°C),
- humidity range: 10% to 98%,
- dimensions of the test section: 900x950x900 mm (770 dm^3).

Climatic chamber Weiss SB2/300/80:
- temperature range: -60°C to +180°C,
- humidity range: 10% to 98%,
- dimensions of the test section: 680x540x820 mm (300 dm^3).

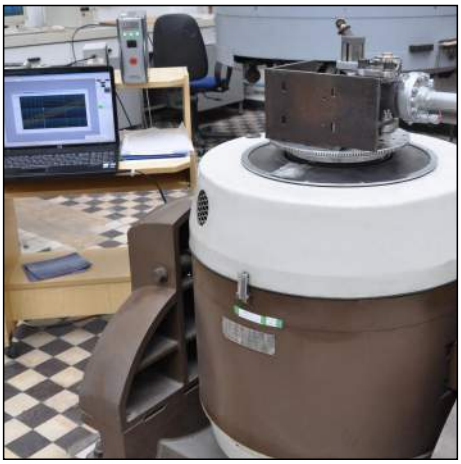
Temperature/pressure/humidity test chamber: BRABENDER TBSE 3000/70E:
- temperature range: -50°C to +100°C,
- pressure range: from atmospheric to 60 hPa,
- dimensions of the test section: 1900x1250x1500 mm (3500 l).

Shock vibrator TIRA-Shock 4110:
- max. acceleration: 3200 m/s^2,
- shock impulse duration range: 1 - 30 ms,
- shock frequency: up to 3 Hz,
- max. mass of tested object: 400 kg.

Vibrator Derritron VP180/6000WT (sinusoidal and random vibrations):
- max. acceleration: 200 m/s^2,
- frequency range: 5 - 2500 Hz,
- max. mass of tested object: 40 kg.

Vibrator Ling Electronics D390 (sinusoidal vibrations):
- max. acceleration: 200 m/s^2,
- frequency range: 5 - 2000 Hz,
- max. mass of tested object: 20 kg.

Vibrator IMV i250/SA4M-CE (sinusoidal and random vibrations and shocks):
- frequency range: 5 - 2500 Hz,
- max. acceleration: 66 - 2500 Hz,
  - for sinusoidal vibrations - 900 m/s^2,
  - for random vibrations (rms) - 640 m/s^2,
  - for shocks - 1828 m/s^2,
- max. mass of tested object: 400 kg, (max. acceleration for 400 kg - 100 m/s^2),
- additional equipment:
  - slight table dimensions: 750 x 750 mm,
  - head-expander: diameter 610 mm.



DERRITRON VP 180/600

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