name of the unit:

DIVISION OF FLOW METROLOGY

Institute of Turbomachinery, Lodz University of Technology

symbol:

I-12

http://www.imp.p.lodz.pl

head of the unit:	potential promoters:	contact person:
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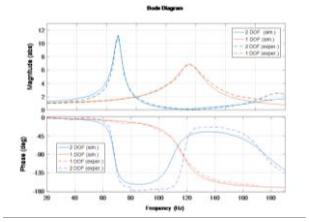
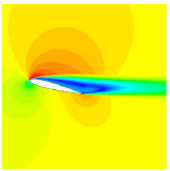
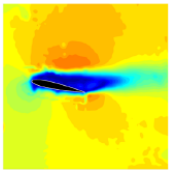
scope of activities:

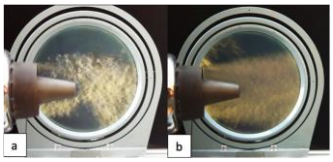
Our main areas of interest are:

- investigations of unsteady flow phenomena in pipes supplied with pulsating flow ,
- calibration of pneumatic and hot-wire probes for 1-D, 2-D and 3-D flows, methods of approximation of calibration characteristics
- Identification and correction of fast-response gas temperature sensors
- Low-speed wind tunnel testing including:
  - Flow measurements through wind turbine and drone rotors (PIV, CTA, pressure measurements)
  - Determination of rotor characteristics (through measurements of torque and rotational speed, balance measurements)
  - Airfoil characteristic determination with PIV method, balance measurements and surface pressure distribution;
- Acoustic tests of sound absorption for different types of fabrics in anechoic acoustic chamber









present activities:

- Experimental study of flow through drone rotor (in the frame of NCBiR Lider project: “Twin shrouded rotor for small aerial vehicle”;
- Investigations of flow dynamics phenomena in a system of pipes supplied with pulsating flow containing Helmholz resonator.

future activities:

- Development of flow visualization techniques based on Schlieren method (and related methods, e.g. BOS)
- Automation of the process of pneumatical probes calibration
- Development of the method of dynamical calibration of temperature transducers with use of the impulse excitation method

The portfolio of research groups was created as part of the Programme "STER" – Internationalisation of doctoral schools” as part of the realization of the project “Curriculum for advanced doctoral education & taining – CADET Academy of Lodz University of Technology”.

Publications/patents, awards, projects:

- Olasek Krzysztof, Karczewski Maciej: Velocity data-based determination of airfoil characteristics with circulation and fuid momentum change methods, including a control surface size independence test. EXPERIMENTS IN FLUIDS, 2021, vol. 62, no 5, p. 1-21, AF: I-10, DOI: 10.1007/s00348-021-03193-9.
- Pałczyński Tomasz, Kantyka Krzysztof: Experimental and Numerical Investigations of Pipeline with Resonator. Mechanics and Mechanical Engineering, 2019, vol. 23, no 1, p. 17-22, AF: I-10, DOI: 10.2478/mme-2019-0003
- Samuel Bethalihem, Barburski Marcin, Błaszczak Jarosław, Witczak Ewa, Abramczyk Katarzyna: The Influence of Yarn and Weave Structures on Acoustic Materials and the Effect of Different Acoustic Signal Incidence Angles on Woven Fabric Absorption Possibilities. Materials, 2021, vol. 14, no 11, p. 1-16, DOI: 10.3390/ma14112814.

keywords:

pulsating flow, wave propagation phenomena in pipes, wind tunnel, PIV (Particle Image Velocimetry), CTA (Constant Temperature Anemometry), flow metrology, fast response sensors

List of internship proposal in this research team:

- Identification of dynamic characteristics of temperature transducers for different flow parameters