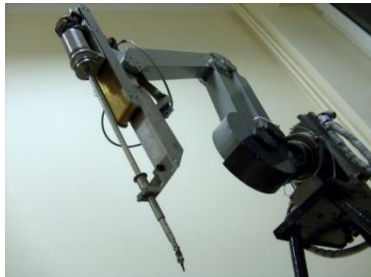
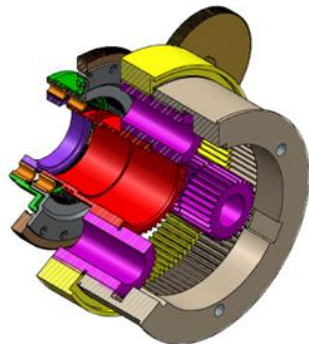




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name of the unit: DIVISION OF ROBOTICS AND AUTOMATION Institute of Machine Tools and Production Engineering, Lodz University of Technology		symbol: I-13 http://www.ioitbm.p.lodz.pl
head of the unit: prof. Leszek Podsędkowski, PhD. DSc.	potential promoters: prof. Leszek Podsędkowski, PhD. DSc.	contact person: Paweł Żak, PhD. phone: 42-631-2434 pawel.zak@p.lodz.pl
scope of activities: The main areas of our interests and research fields are those connected to implementation of automation and robotics into various life aspects: • The design, development and tests on the robot to perform the cardiosurgical operations – one of the versions of a Polish response to the similar constructions developed in the West, • The design, development and tests on the snake-like robot to perform a colonoscopy procedure – there is no similar solution available all over the world, • The development of a system and algorithms for mobile robots allowing them to build a map of their surrounding and navigate on it at the same time, SLAM, • The development of algorithms and construction of the fumes fan with an adjustable geometry of blades to be used in a powerplant		
present activities: We are developing an advanced system for an automatic procedure of fan's shafts balancing. We are focused on objects located in a harsh environment conditions, e.g. cement plants or power plants. The developed solution is to be mounted on a shaft radially. Therefore, the shaft remains mounted. Such automatic procedure provides the possibility to balance the shaft without the necessity to stop its motion. We are developing an innovative device – a measurement arm to be used during the medical procedure of the total hip replacement. This procedure common outcome is the change of patient's leg length which results in one's great discomfort. The device is capable of performing a simple and swift measurement during the operation process. It enables the surgeon to adjust the parameters of an implant. We are developing a device to be used in human jaw rehabilitation process. Around 70% of patients suffering from trismus require rehabilitation to be performed. Currently, such procedure requires a therapist to be present to perform the treatment using a simple tools, like wooden spatulas or jaw dilators. The developed device will enable the patient to perform the procedure by his own.		 
future activities: The works on currently running projects are to be continued in order to: develop the constructions, control systems, and to perform functionality tests. It is planned to continue the works on the development of the snake-like robot.		



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[publications/patents, awards, projects:](#)

- L. Podsedkowski, P. Wroblewski, L. Fraczak, A. Kobierska, E. Marciniak, G. Wrobel, A. Marciniak, K. Jozwik, A. Papierski, K. Sobczak, D. Obidowski, W. Kryllowicz, A differential planetary gear for regulation drive design and selected tests, Journal of Mechanical Engineering Science doi: 10.1177/0954406217745338,
- L. Fraczak, L. Podsedkowski, A. Kobierska, Data fusion using Fuzzy Logic techniques supported by Modified Weighting factors (FLMW), International Journal of Fuzzy Systems, 18(1), 72-80, FEB 2016; DOI: 10.1007/s40815-015-0095-3,
- L. Podsedkowski, M. Panasiuk, A. Kobierska, A. Niewola, M. Szaniewski, Device for measuring femur displacement and method of making orthopedic measurements during a surgical procedure to correct damaged hip, US2018036093, 2018

We are realising the R&D project:

- Opracowanie systemu automatycznego dwupłaszczyznowego wyważania zespołów wirujących wentylatorów, w szczególności energetycznych, w czasie ich pracy, w celu zwiększenia ich dyspozycyjności, zmniejszenia strat związanych z przy-musowymi postojami bloków i zwiększenia żywotności, POIR.01.01.01-00-0219/18, 2018-2021

[keywords:](#)

medical robot, automation of rehabilitation process, automation of balancing process, SLAM, palm rehabilitation, jaw rehabilitation, colonoscopy automation, mid-surgery measurements

[list of internship proposal in this research team:](#)

- A cooperation in research tasks on defining of active pneumatic elements parameters specification