Doctoral School of Information and Biomedical Technologies
Polish Academy of Sciences (TIB PAN)

SUBJECT: Magnetic anomaly-based navigation and control of unmanned systems: Development and implementation

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DESCRIPTION OF THE SUBJECT:
Thanks to development of sensing systems and embedded computers the field of alternative navigation and detection methods is being extended. One of very promising technologies is magnetometry using unmanned platforms, especially unmanned aerial vehicles. Significant advantage of magnetic anomaly-based methods is possibility to elaborate a passive system for both positioning/navigation and detection. Such features are desired in real-life implementations since communication with external systems and satellites can be jammed or spoofed. Research done so far revealed possibility to obtain good performance of magnetic anomaly-based systems and a number of research challenges have been identified. Within the thesis problems of data fusion and processing have to be solved. In further step algorithms for assumed unmanned system missions will be developed and implemented using demonstrator tested in flight. Except optimization challenges a number of control problems will be consider to address the subject in a comprehensive way and provide best possible performance of the system.

REQUIREMENTS:
- Analytical skills, solid mathematical foundations and ability to write and test algorithms
- Good programming skills (C++, Python, or Matlab)
- Desire to implement methods on embedded systems for in-flight demonstrations