## Autonomous platforms in civil engineering practice

Á. Barsi<sup>1</sup>, J. M. Lógó<sup>2</sup>

 <sup>1</sup> Dept. Photogrammetry and Geoinformatics, Budapest University of Technology and Economics, barsi.arpad@emk.bme.hu
<sup>2</sup> Dept. Photogrammetry and Geoinformatics, Budapest University of Technology and Economics, logo.janos.mate@emk.bme.hu

## Abstract

Autonomous platforms generally have the ability and the necessary technical instrumentation to perform environmental observation, process these data to extract information about the objects and their states, and have suitable control tools (algorithms and actuators) to decide in various situations and continuously govern the behavior of the platform. Speaking about vehicles, this definition is easy to interpret: a car equipped with cameras, LiDARs, radars, and similar sensors to monitor its neighborhood, which evaluates these observations and have corresponding data processing and decision making systems and controls the car's movement to reach the expected traveling goal with safety and effective fuel use. The described phases are based on sensory and algorithmic developments, where most experts agree that artificial intelligence must be embedded into the onboard automotive workflow. The smooth and reliable working requires enormous computing power both onboard and off-board as well as effective communication among other vehicles in motion and service providers. Civil engineers haven't been limited to transportation vehicles, but further mobile platforms can be understood within autonomous systems, like robots and similar machines. Autonomously moving and acting platforms must not be limited to road and railroad traffic but can play a role in water and air circumstances (transportation). More interestingly, surveying and inspecting platforms are also useful devices that help maintain pipe networks, complex steel and concrete structures (traverses, towers, bridges, and similar structures). These robots have proper moving (climbing, rolling, crawling, etc.) mechanisms and are equipped with data collection tools (measurement instruments, sampler units, cameras, etc.). Data are stored onboard and/or transferred immediately via an adequate communication channel. Civil engineers expect - of course - builder robots from the near future development; robots that participates in the construction workflow. One can order disaster mitigation devices (rescue robots after earthquakes or water floods) also into the civil engineering system category.

## Acknowledgements

The authors are grateful for the financial support received from the joint grant of the Hungarian and the Polish Academy of Sciences and the Hungarian Ministry of Human Resources (ÚNKP-21-3-II-BME-26) as well as from the project "Development of regional network on autonomous systems for structural health monitoring" financed by the Visegrad Fund.