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Problematic Issues of Implementing Artificial Intelligence Technologies in the Control Loop of Spacecraft

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Abstract. The problematic issues of the introducing artificial intelligence technologies into the promising control loop of spacecraft as part of multi-satellite orbital constellations are considered. The most problematic issues have been identified, for which the ways to solve them are proposed. Special attention is paid to digital twins and analytical platforms for data analysis, which can serve as the basis for the IT-architecture development of promising flight control centers.

The authors believe that the introduction of artificial intelligence technologies into the control loop of spacecraft should be focused on solving problems of a higher level of complexity than traditional control tasks, provided that the development of algorithms for the operations practiced by man based on mathematical apparatus of a different class, i.e. neural network theory, fuzzy sets, genetic algorithms and some others. The proposals formulated in the paper are of particular importance in the light of the prospective development of multi-satellite orbital constellations, the control of which involves the implementation of new technologies that take into account a qualitatively new level of the control object and its properties.

Keywords: artificial intelligence, spacecraft control, multi-satellite systems, digital twins, analytical platforms for data analysis

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