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# Control of the manned spacecraft flight for assessing its condition and functioning

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*The current flight control scheme is analyzed. The information necessary for monitoring the state and functioning of manned spacecraft is structured. The characters of the information transferred to the spacecraft from the Earth are singled out. The advantages and disadvantages of each element of the flight control system are analyzed. The technology of the control of manned spacecraft state and functioning performed by the personnel of the operational control group using the necessary software and hardware is considered. The components of the techniques of monitoring and assessing the state of the spacecraft from the Earth are provided, and algorithms for monitoring and evaluating its state, required for automation of the control process, are selected. The algorithm for controlling the flight operation of the Soyuz spacecraft is presented. The ways of improving the technology for monitoring the status and functioning of a manned spacecraft performed by the personnel of the operational control group are specified.*

**Keywords:** *manned spacecraft, airborne systems, status assessment, information exchange, information analysis, anomaly diagnosis, operational control group*

## REFERENCES

- [1] Solovyev V.A., Lysenko L.N., Lubinskiy V.E. *Upravlenie kosmicheskimi poletami. Chast 1* [Space flight control. Part 1]. Moscow, BMSTU Publ., 2009, 476 p.
- [2] Kravets V.G., Lubinskiy V.E. *Osnovy upravleniya kosmicheskimi poletami* [Fundamentals of space flight control]. Moscow, Mashinostroenie Publ., 1983, 256 p.
- [3] Lubinskiy V.E. *Obshcherossiyskiy nauchno-tekhniicheskiy zhurnal "Polet" — All-Russian Scientific-Technical Journal "Polyot" ("Flight")*, 2004, no. 7, pp. 28–34.
- [4] Lubinskiy V.E., Solovyev V.A. *Obshcherossiyskiy nauchno-tekhniicheskiy zhurnal "Polet" — All-Russian Scientific-Technical Journal "Polyot" ("Flight")*, 2005, no. 6, pp. 3–6.
- [5] Mishurova N.V., Solovyev S.V. *Inzhenernyy zhurnal: nauka i innovatsii — Engineering Journal: Science and Innovation*, 2016, iss. 3. Available at: <http://engjournal.ru/catalog/arse/adb/1474.html>
- [6] Solovyev V.A. *Kontrol informatsii i prinyatie operativnykh resheniy pri upravlenii poletom pilotiruemykh kosmicheskikh apparatov* [Information monitoring and operational decision-making in manned spacecraft flight control]. Moscow, BMSTU Publ., 1998.
- [7] Solovyev V.A., Lubinskiy V.E., Zhuk E.I. *Pilotiruemye polety v kosmos — Manned Space Flight*, 2012, no. 1 (3), pp. 15–26.
- [8] Solovyev V.A., Lysenko L.N., Lubinskiy V.E. *Upravlenie kosmicheskimi poletami. Chast 2* [Space flight control. Part 2]. Moscow, BMSTU Publ., 2010, 426 p.

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