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SPECIFIC FEATURES OF TRANSPORT VEHICLE OPERATIONS PLANNING FOR STANDARD
AND FAST ISS RENDEZVOUS PROFILES**Abstract**

Standard rendezvous profile of the Russian Soyuz and Progress transport vehicles in the ISS program is two days profile with docking planned for the 34th orbit after launch.

In early 2012, a new fast rendezvous profile was developed to provide docking on the 5th orbit after vehicle launch. Some elements of the new scheme and the entire profile were validated during missions of the Progress transport cargo vehicles (TCV) with three successful fast dockings. Upon flight validation of the profile on automated vehicles, it is planned to apply new rendezvous profile to the Soyuz transport manned vehicle (TMV) flight.

The main advantage of this profile is significant saving of time required to deliver crew and cargoes to the ISS. In nominal missions, it helps to reduce duration of extreme conditions of crew space flight on the vehicle. Besides, it can be important in case of urgent need of the ISS in another vehicle arrival or specific cargoes delivery.

Dynamic aspects of the fast rendezvous profile have been considered in the papers of the previous IAF congresses. At the same time, this scheme has some specific features in comparison with the standard scheme with regard to not only flight dynamics but also to the vehicle mission planning and flight control.

Specific features of the Progress TCV flight control during mission based on the fast rendezvous profile are related to the following:

- Change of the procedures to perform in-flight tests of basic vehicle systems;
- Change of the back-up dynamic operations scheme in autonomous flight;
- Change of the joint operation sequence after docking to the ISS;
- Change of rendezvous onboard software and corresponding update of ground control software;
- Change of flight control facilities working conditions;
- Planning of the standard two days profile mission in parallel as a back-up option and others.

In addition, to plan the Soyuz TMV mission it is necessary to consider more factors:

- Crew life support requirements;
- Support of manned vehicle specific systems;
- Use of crew control possibilities;
- Need to provide readiness for urgent landing in case of dangerous off-nominal situations, etc.

The paper describes in details the changes in transport vehicles mission planning and flight control process in case of transfer to the new fast rendezvous profile, considers problems arisen and ways of their solution. The paper also considers prospects of the fast rendezvous profile use in future.