

International Cooperation for Space Exploration (1)  
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EMERGING TECHNOLOGIES AND GROUNDBREAKING INVENTIONS OF JSC RKTS PROGRESS  
- TENETS OF REPORT

**Abstract**

Progress Space Rocket Center is one of the global leaders in building and operation of light- and medium-lift launch vehicles, Earth remote sensing space systems and application-level automatic spacecraft. For more than 120 years the enterprise has been a leading aerospace developer and manufacturer, starting from Farman-IV airplane at the beginning of XX century, Il-2 attack plane during the World War II, later it produced jets and heavy bombers to crown it all with design and production of space-rocket hardware. Samara has built and launched more than 1930 launch vehicles and 900 spacecraft since 1958. 2021 has plenty of memorable dates both for our enterprise and space industry in general. First of all it is the 60th anniversary of the first human space flight. As well, this year marks memorable dates related to products of our space-rocket center including modern front-end developments: -55 years since the first legendary Soyuz flight, which became the blueprint for multiple modifications (Soyuz-U, Soyuz-FG, Soyuz-2); -20 years since the Soyuz-FG flight, which used to be the only means for astronauts transportation to ISS for many years; -15 years since the first Soyuz-2-1b flight; -10 years since the first Soyuz-ST flight from French Guiana; -5 years since the first Soyuz-2-1a flight from Vostochny cosmodrome. A game-change in space is impossible without global close research and engineering interaction. Intergovernmental agreements governed cooperation of our enterprise with foreign companies in the 70s to the 90s of the past century. In the 90s the international cooperation in the sphere of launching foreign satellites entered a new stage of development due to establishment of Starsem, a French-Russian company, which has been promoting interests of Samara space center in the international market of commercial launch services. More than 70 American and European satellites were launched within the frames of that cooperation from 1999 to 2013. At present the Soyuz family known throughout the world is represented by launch vehicles of medium- and light-lift class. They are the proven Soyuz-2-1a, Soyuz-2-1b launched from cosmodromes of Plesetsk, Baikonur and Vostochny. This is also the Soyuz-ST vehicle to launch satellites from the launch site in French Guiana. And it is the light-lift Soyuz-2-1v launch vehicle.