



**GK LAUNCH
SERVICES**

GK LAUNCH SERVICES

MOSCOW | 2017



GK Launch Services is a joint venture of GLAVKOSMOS, a subsidiary of ROSCOSMOS State Space Corporation, and INTERNATIONAL SPACE COMPANY KOSMOTRAS.

GK Launch Services is a commercial operator authorized to conclude contracts for rendering commercial launch services to satellites with the use of Soyuz-2 family launch vehicles from the Russian launch sites. Along with that, the company is involved in potential return of Dnepr LV (converted RS-20 rocket) to the commercial market.

GK Launch Services represents a new level of public-private partnership for business in Russian space domain. Such cooperation is aimed at development of commercial launch services, promotion of Russian launchers on the world market, and strengthening the positions of Russia as the most competitive launch service provider.



PROGRESS ROCKET & SPACE CENTRE

Developer and manufacturer of
the Soyuz-2 rocket



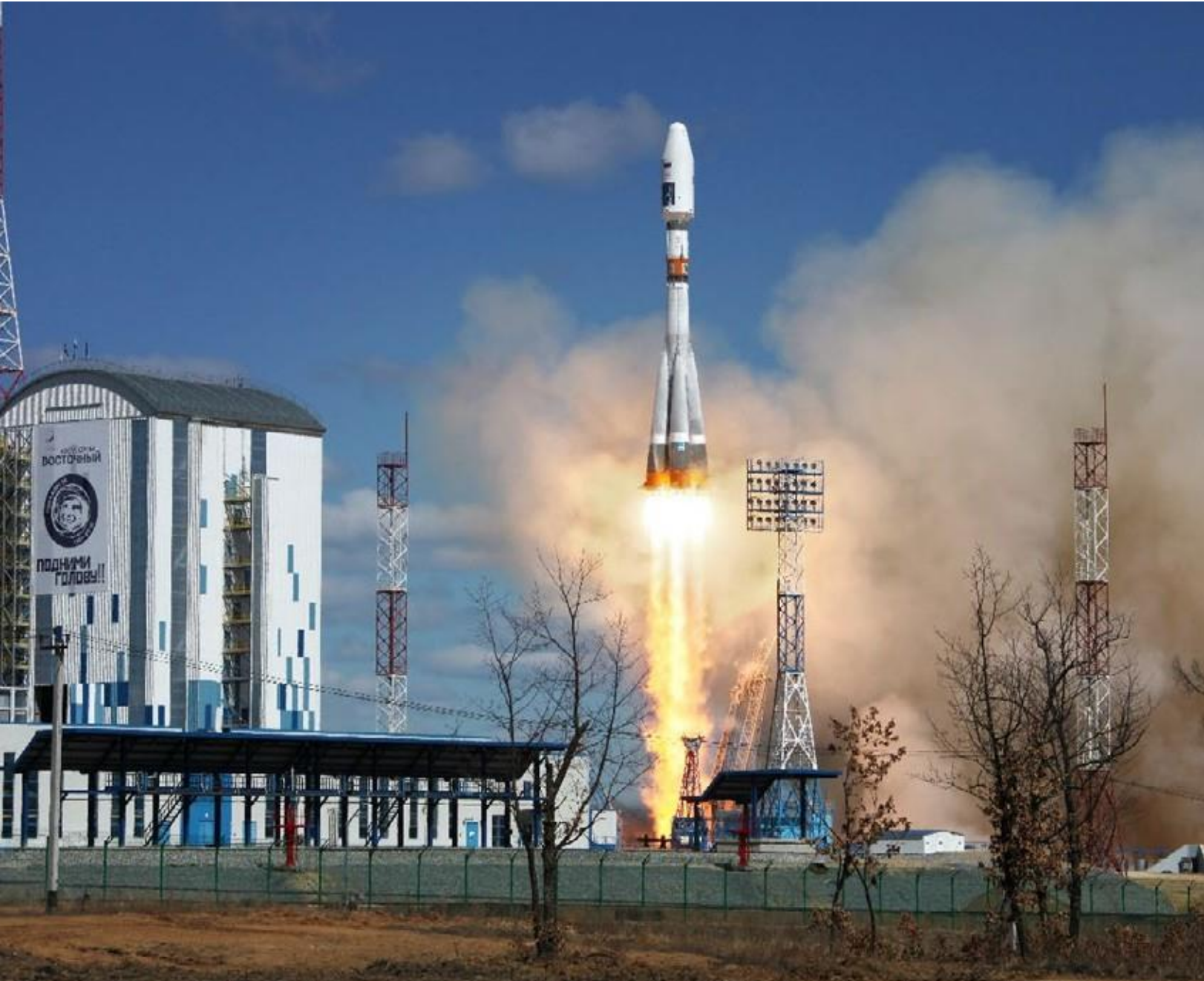
NPO LAVOCHKIN

Developer and manufacturer
of Fregat upperstage



FSUE «TSENKI»

Provider of ground infrastructure
facilities at Russian spaceports
for launches



COMPANY'S GOALS:

Leadership in launch services for light and middle class satellites and satellite constellations

Further evolution of Soyuz-2 launchers to meet commercial market requirements and to provide even better efficiency for the international customers' missions

Building of a standard system for dual and multiple launches of satellites with different sizes to be delivered to several orbits within one mission

Cost effective launch solutions to customers (orbital injection of various types of spacecraft with the mass ranging from 1kg to 6 metric tons into the most popular orbits)

Development and adaptation of the Russian spaceports to meet the requirements of international customers; an increase of the workload of the Russian ground facilities with more commercial missions.

SOYUZ 21A

4800 KG

20—24 MONTHS

FREGAT

TO SSO

FOR CUSTOMER MISSION
REALIZATION

UPPER STAGE

SOYUZ 21B

5500 KG

880 KG

1900 KG

20—24 MONTHS

TO SSO

TO GEO

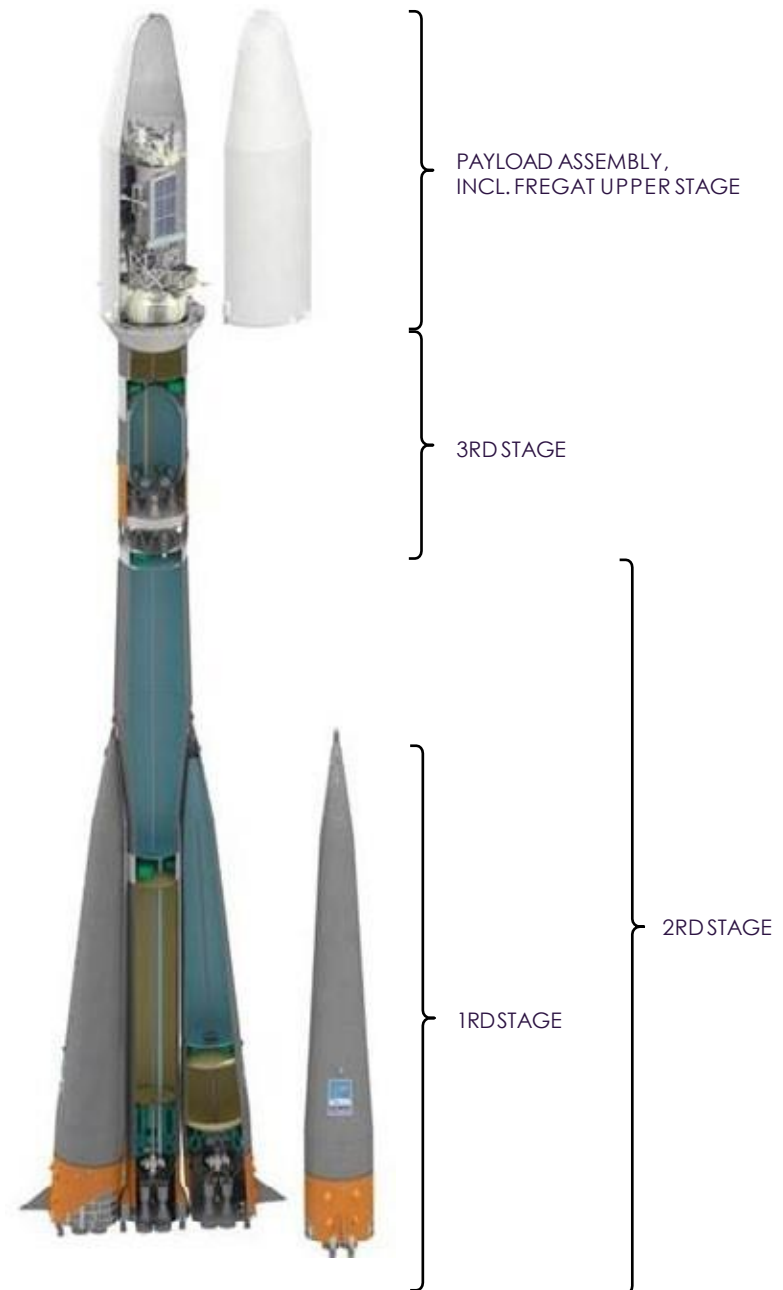
TO GTO

FOR CUSTOMER MISSION
REALIZATION

UPPER STAGE

FREGAT

0,999 - Soyuz LV established reliability





Soyuz-2.1a / Fregat

SOYUZ-2.1A / FREGAT BASIC SPECS

LV description

Type of the LV

Middle Class

LV dimensions

- length, m
- diameter, m

51,1
10,3

Number of stages

4

Lift-off mass, kg

313 000

Fuel

- I stage
- II stage
- III stage
- IV stage
(Fregat upper stage)

LOX/kerosene
LOX/kerosene
LOX/kerosene
N₂O₄/UDMH

Capacity, kg (500 km, SSO)

4900

Flight Heritage

- Soyuz LV (launches)
- Soyuz/Fregat (launches)

1869
57

Launch site

Vostochny, Baikonur, Plesetsk

SOYUZ-2 LAUNCHERS:

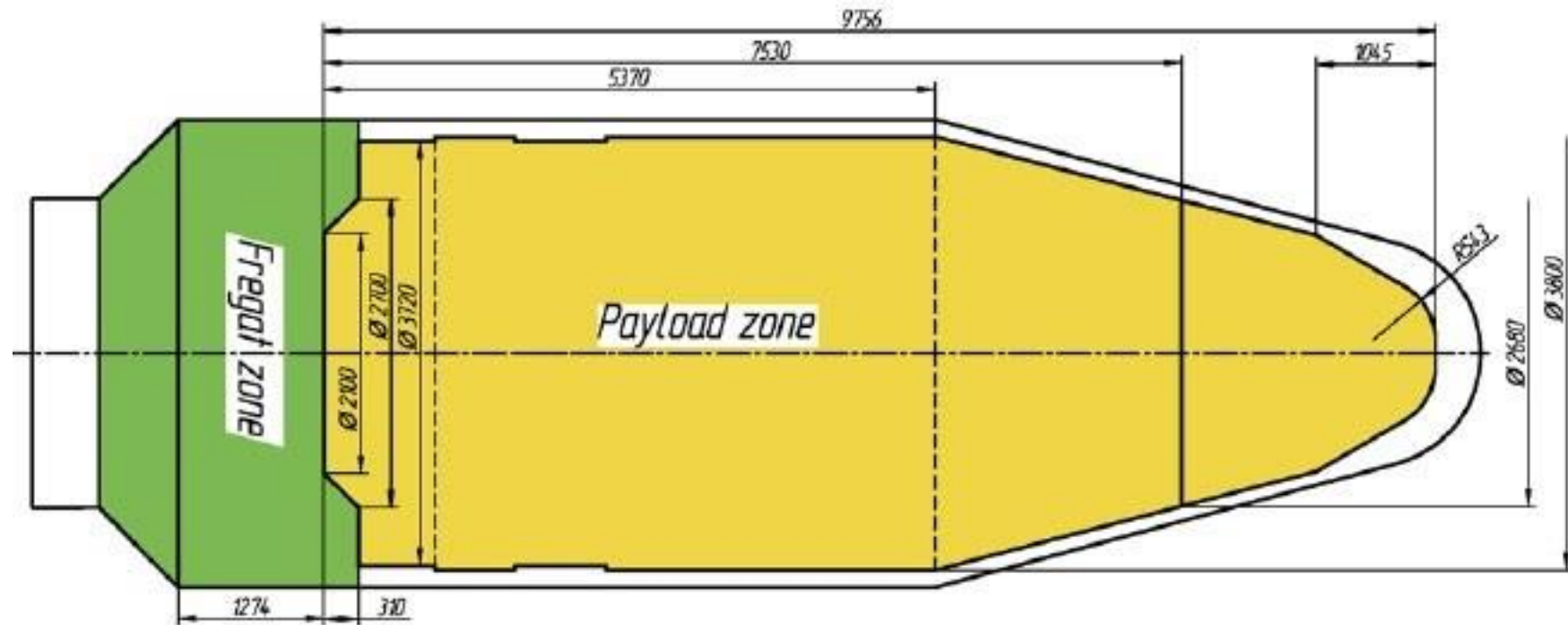
Soyuz-2 is a new generation of medium-class launchers based on the world's longest operating civil Soyuz launcher. The new launcher incorporates innovative solutions and national achievements in launch vehicle building. Soyuz-2 features an increased uplift capacity, modern control system and eco-friendly propellant.

ACCESS TO VARIOUS ORBITS

Soyuz-2 launcher with the Fregat upper stage provides payload injection into the most demanded orbits today: a low-Earth orbit, a sun-synchronous orbit, a geostationary transfer orbit, a geostationary orbit, and interplanetary orbits.

Soyuz-2 / Fregat launch system provides launching of satellite constellations and their further delivery to various orbits.

SOYUZ-2 PAYLOAD ZONE

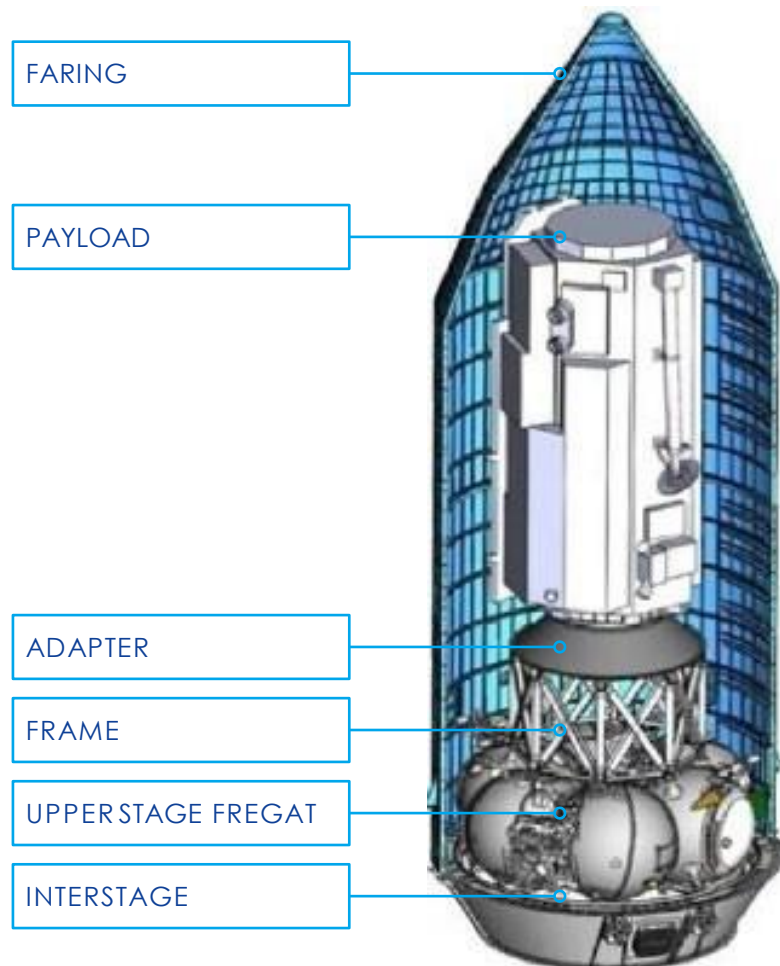


Note: Dimensions are given in *mm*.

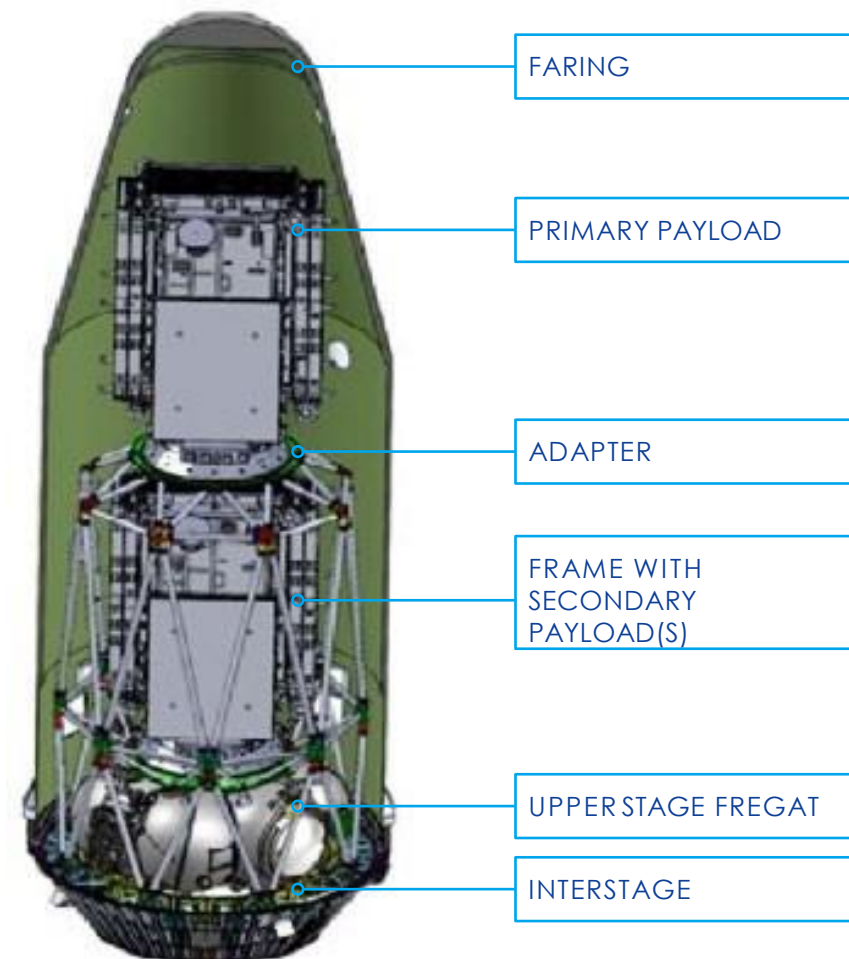
PRIMARY CUSTOMER BENEFITS:

- control of the mission's orbital parameters (altitude, inclination, LTAN)
- control of launch schedule and launch window
- lower launch price compared to a dedicated launch aboard light-class LV

DEDICATED LAUNCH

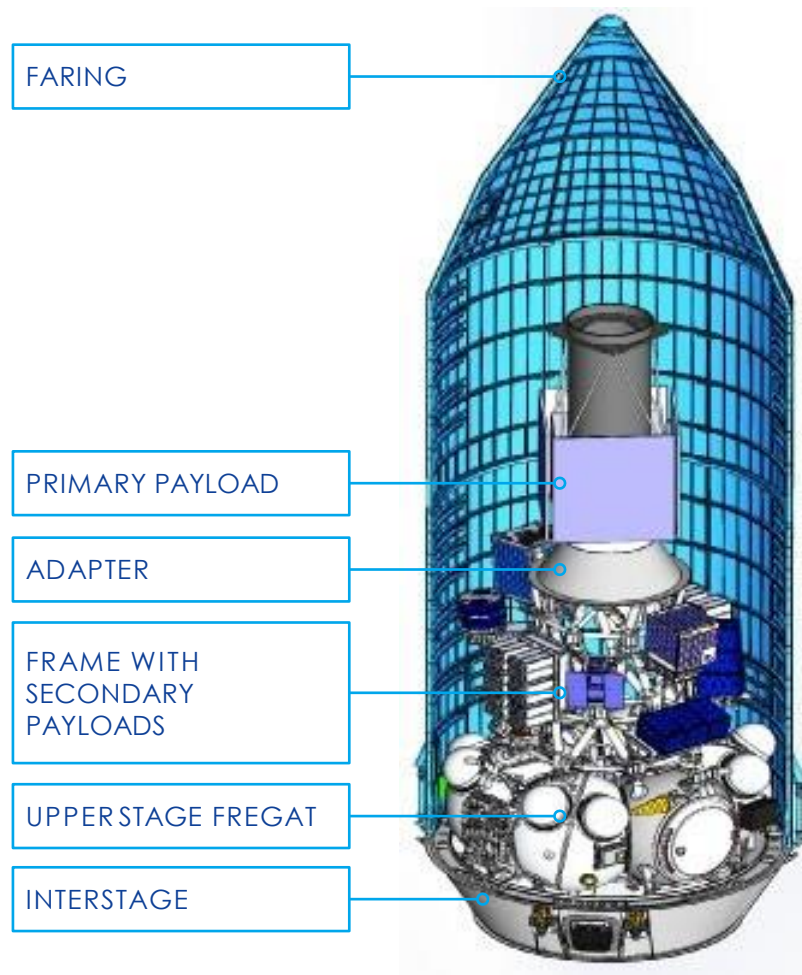


TWIN («TANDEM») LAUNCH

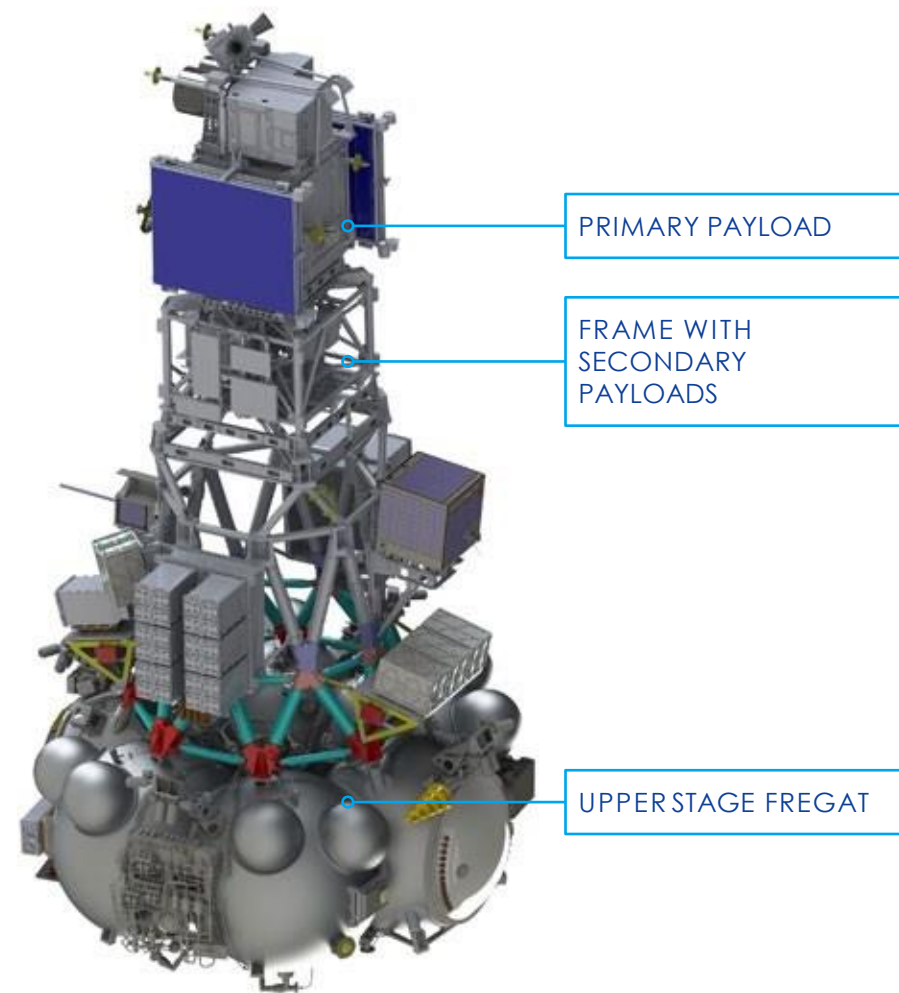


SOYUZ-2 CLUSTER MISSIONS FOR SMALL, MICRO AND NANOSATELLITES

CLUSTER MISSION



MISSION KANOPUS-V-IK

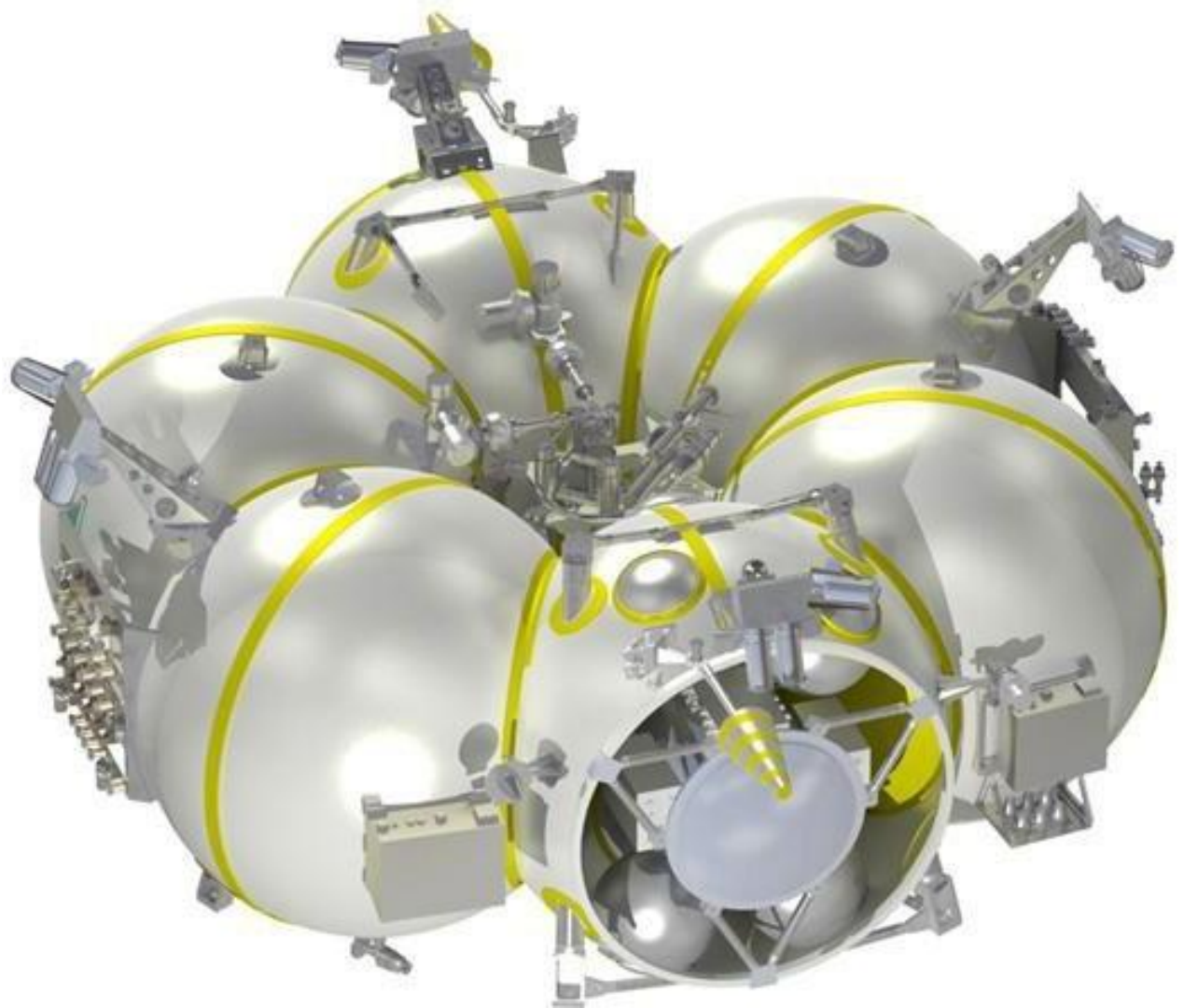


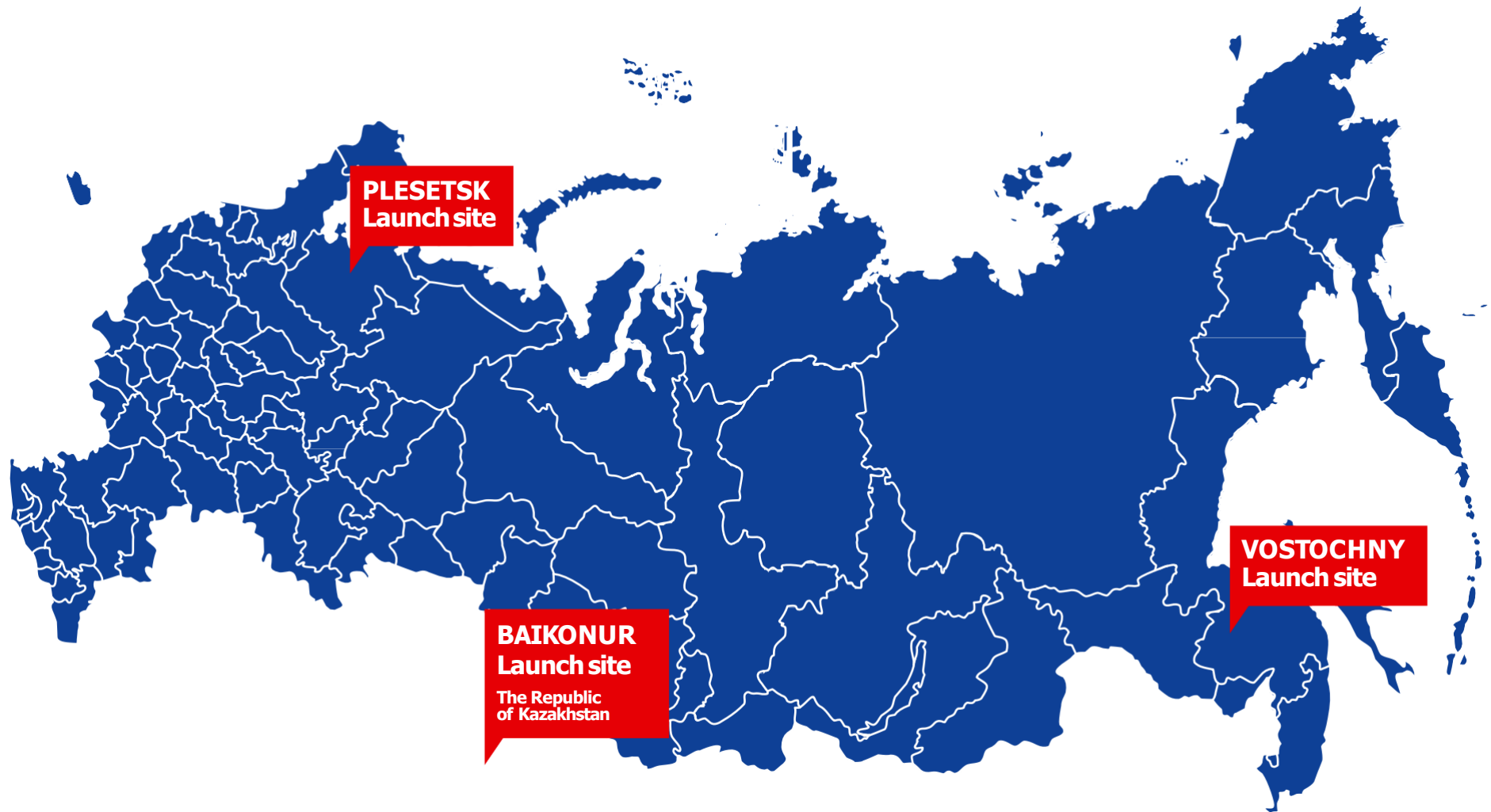
FREGAT IS KNOWN FOR ITS LONG SUCCESSFUL FLIGHT HERITAGE AND ORBIT INJECTION ACCURACY

The Fregat provides injection of SC into the desired orbit from orbit formed by Soyuz LV.

Under one mission apart from separation orbit of the primary payload, Fregat is capable of forming several different orbits for secondary payloads

Proven reliability, advanced technical capabilities and unprecedented injection accuracy of Fregat are unique for launch services market and attract interest of most satellite developers looking for launch opportunities.







VOSTOCHNY

Vostochny is a Russian first civilian space center:

- The area is 700 km².
- The first launch on April, 28, 2016.

Facilities:

- Launch Complex 1S for light- and medium-class Soyuz-2 launchers;
- Assembly and Test Complex for launch vehicles, spacecraft, upper stages, and fairing.



BAIKONUR

Baikonur is the world's largest cosmodrome and a leader in space launches.

- The area is 6,717 km².
- The first launch on October 4, 1957.

Facilities:

- 12 launch pads (including six currently functioning);
- Launch sites for Soyuz-U, Soyuz-FG, Soyuz 2.1a, Soyuz 2.1.b;
- 39 complexes for assembly, integration, tests, and pre-launch processing of launch vehicles, upper stages, and spacecraft.



PLESETSK

A former military center Plesetsk. The space center is now used for spacecraft launching and missile system testing.

- The area is 1,762 km².
- The first launch on March 17, 1966.

Facilities:

- Launch complexes (launch pads for Soyuz-2 launch vehicles);
- Pre-launch processing complexes for launch vehicles, upper stages, and spacecraft.

Main halls of test and assembly facilities



Vostochny cosmodrome



Baikonur cosmodrome

1. MULTIPLE SATELLITE MISSION

Launch period: Q4 2019 –Q1 2020

Orbit: SSO, 500-600 km, LTAN 10:30-11:00

Primary payload contracted

Remaining capacity **available for sale**

2. MULTIPLE SATELLITE MISSION

Launch period: Q3 –Q4 2020

Orbit: SSO, 500-600 km, LTAN 10:30-11:00

Primary payload contracted

Remaining capacity **available for sale**

GK is also in pursuit of a number of launch missions with launch periods in late 2019 –end of 2021

Information on available capacity expected in December 2017– early 2018

Orbits:

—SSO with morning & afternoon crossing times, dawn-dusk;

—Escape trajectories





**GK LAUNCH
SERVICES**

HAVE A NICE SPACE!

For any questions or launch inquiries, please, contact:

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