



GK LAUNCH SERVICES: **SOYUZ-2** LAUNCH CAPABILITIES FOR SMALL SATS and CUBESATS

January 2020

GK Launch Services is a commercial operator authorized to conclude and implement contracts for rendering launch services with the use of **Soyuz-2** family launch vehicles **from Russian spaceports**. Established in 2017.

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



GLAVKOSMOS

1985-2019

Glavkosmos promotes Russian space technologies and services worldwide and manages challenging space projects

Satellites launched from Russian spaceports in 2009-2018 **90+**

International contracts **120+**



1999-2015

Kosmotras – provider of Launch services using Dnepr Launch Vehicle

22 Dnepr commercial launches

128 Payloads inserted into their orbits



GK LAUNCH SERVICES



SUBCONTRACTORS' TEAM:



PROGRESS ROCKET &
SPACE CENTRE

**DESIGNER AND
MANUFACTURER OF
SOYUZ-2LV**



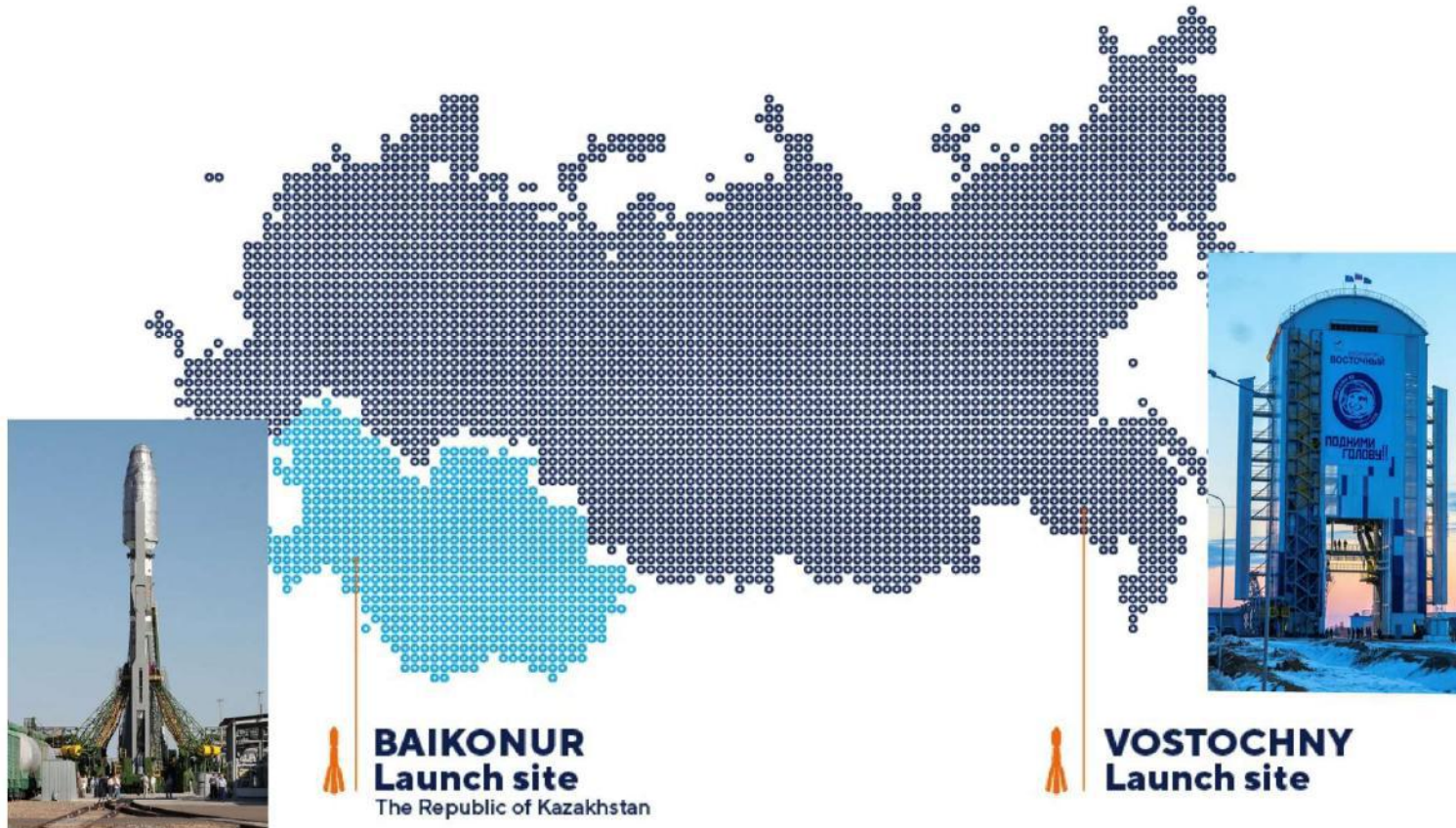
NPO LAVOCHKIN

**DESIGNER AND
MANUFACTURER OF
FREGAT UPPERSTAGE**



**PROVIDER OF GROUND
INFRASTRUCTURE FACILITIES AT
RUSSIAN SPACEPORTS FOR
LAUNCHES**

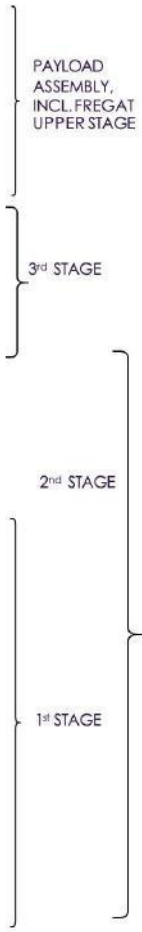
SOYUZ-2 LAUNCH SITES LOCATION for GK MISSIONS



DATA SHEET of SOYUZ-2.1 with FREGAT Upper Stage



Soyuz-2.1 / Fregat



Soyuz-2.1 SPECIFICATIONS	
Type of the LV	Medium Class
LV dimensions	
·length, m	51,1
·diameter, m	10,3
Number of stages	3
Lift-off mass, kg	313 000
Fuel	
·I stage	LOX/kerosene
·II stage	LOX/kerosene
·III stage	LOX/kerosene
Fregat upper stage	N2O4/UDMH
Flight Heritage	
·Soyuz LV (launches)	more than 1900
·Soyuz/Fregat (launches)	more than 77
Launch site	Vostochny, Baikonur

SOYUZ 2.1a	
4200 KG	TO SSO
FREGAT UPPER STAGE	
SOYUZ 2.1b	
4800 KG	TO SSO
880 KG	TO GSO
1900 KG	TO GTO
FREGAT UPPER STAGE	

SOYUZ-2.1.b - a NEW more powerful 3rd stage ENGINE (RD-0124)



SOYUZ PRODUCTION



FREGAT PRODUCTION

GENERAL INFO ON FREGAT:

FREGAT IS KNOWN FOR IT'S LONG SUCCESSFUL FLIGHT HERITAGE AND ORBIT INJECTION ACCURACY

Universal

Is used in medium- and heavy- class launch vehicles

Precise

Ensures high precision of SC injection into their target orbits

Self-Contained

Ensures the entire PL injection process without operators' interference from the Earth

Robust

Logic of Fregat operation provides for a way out of potential contingencies

Optimal

Multiple restart capability to ensure optimal injection into several orbits

Multipurpose

Any type of orbits

Up to
7
ignitions

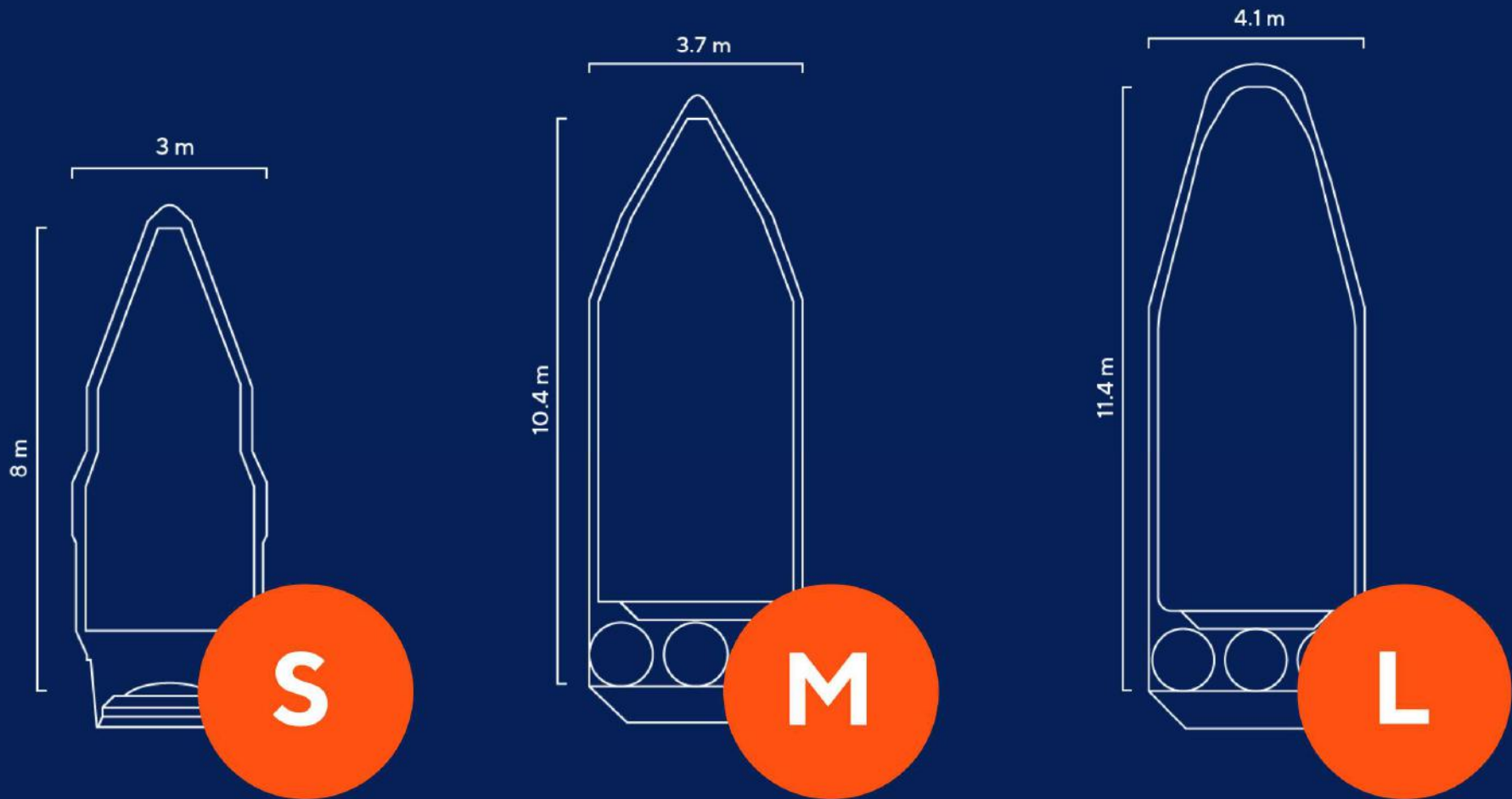
20 years

> 77 launches using Fregat

> 219 SC launched



FAIRING OPTIONS:



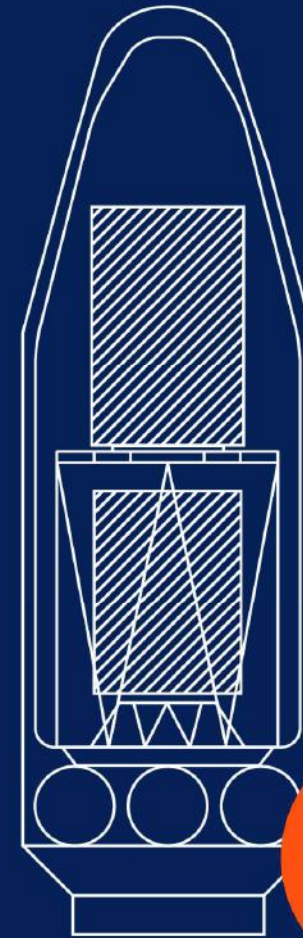
LAUNCH OPTIONS:



**DEDICATED
LAUNCH**

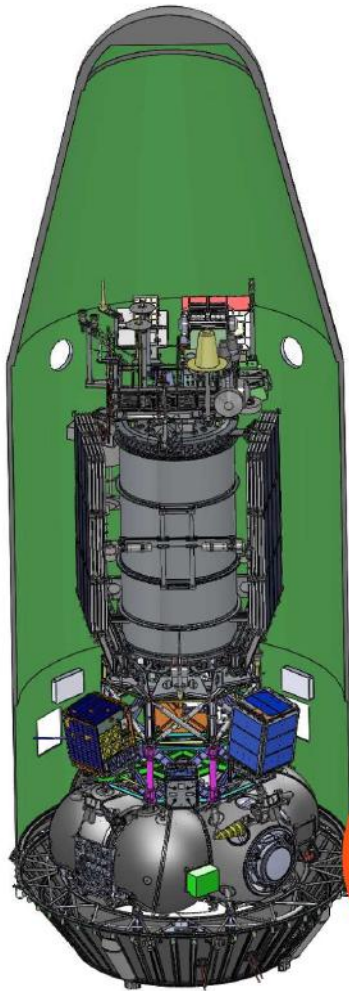


**CLUSTER
MISSION**

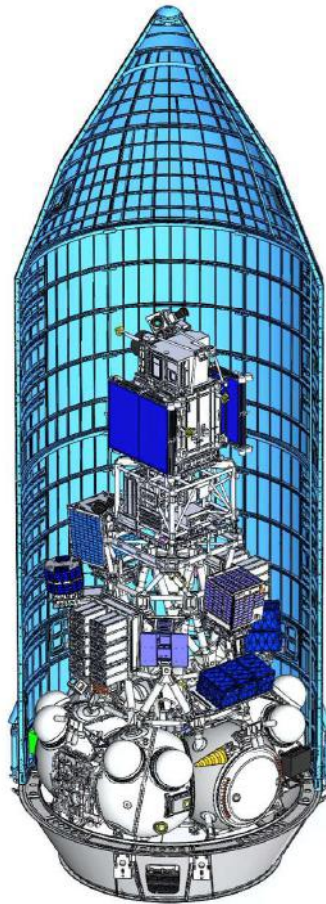


**TWIN
«TANDEM»
LAUNCH**

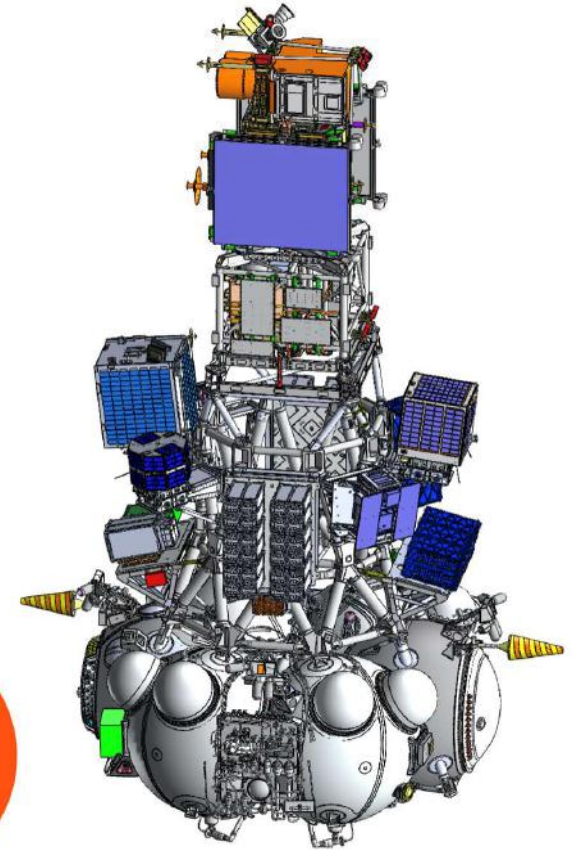
TYPICAL LAUNCH OPTIONS



**DEDICATED
LAUNCH**



**CLUSTER
MISSION**



SOYUZ-2 LV HERITAGE IN CLUSTER MISSIONS

EXAMPLES OF DEPLOYERS ARRANGEMENT
ON FREGAT UPPER STAGE

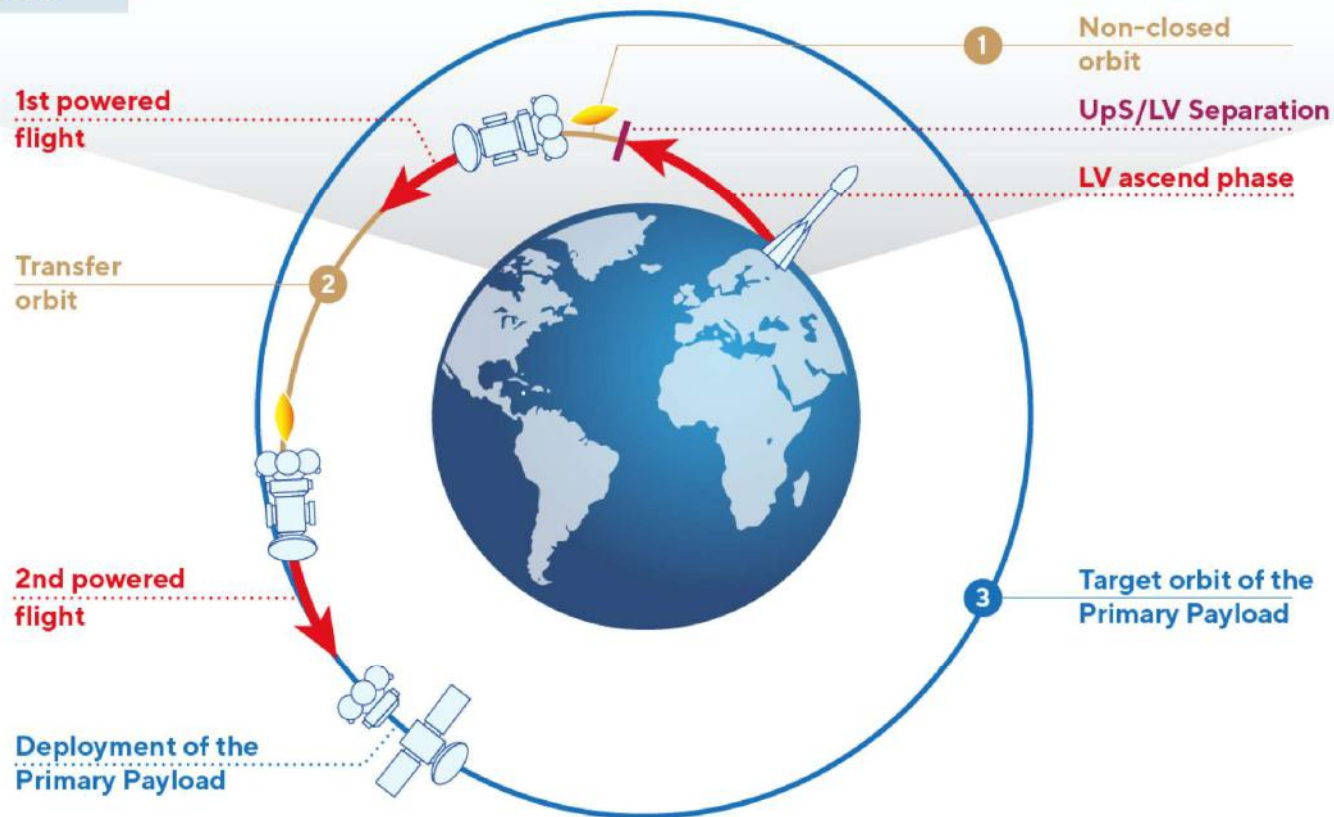


INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

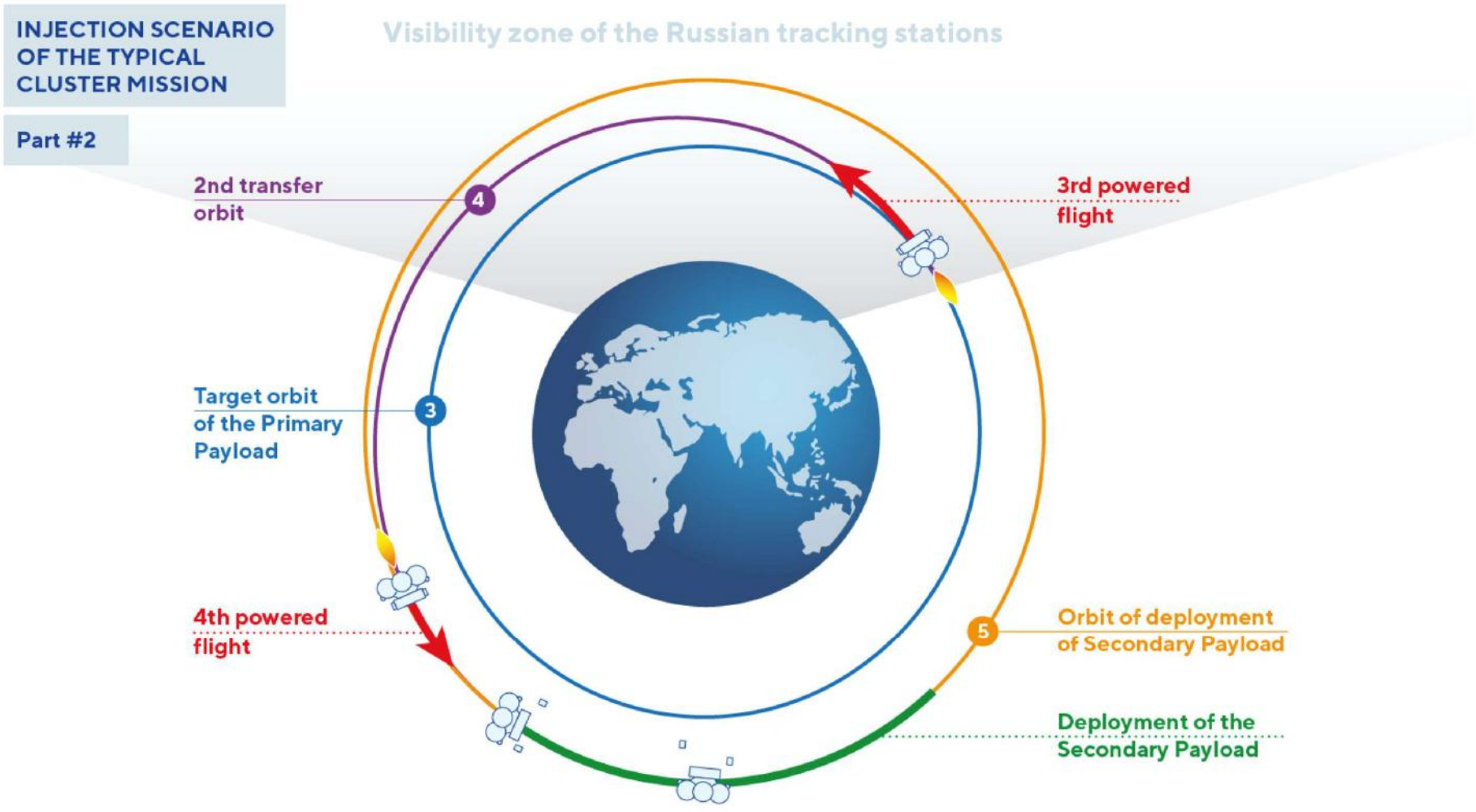
INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

Part #1

Visibility zone of the Russian tracking stations



INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION



INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

Part #2

2nd transfer orbit

3rd powered flight

Target orbit of the Primary Payload

4th powered flight

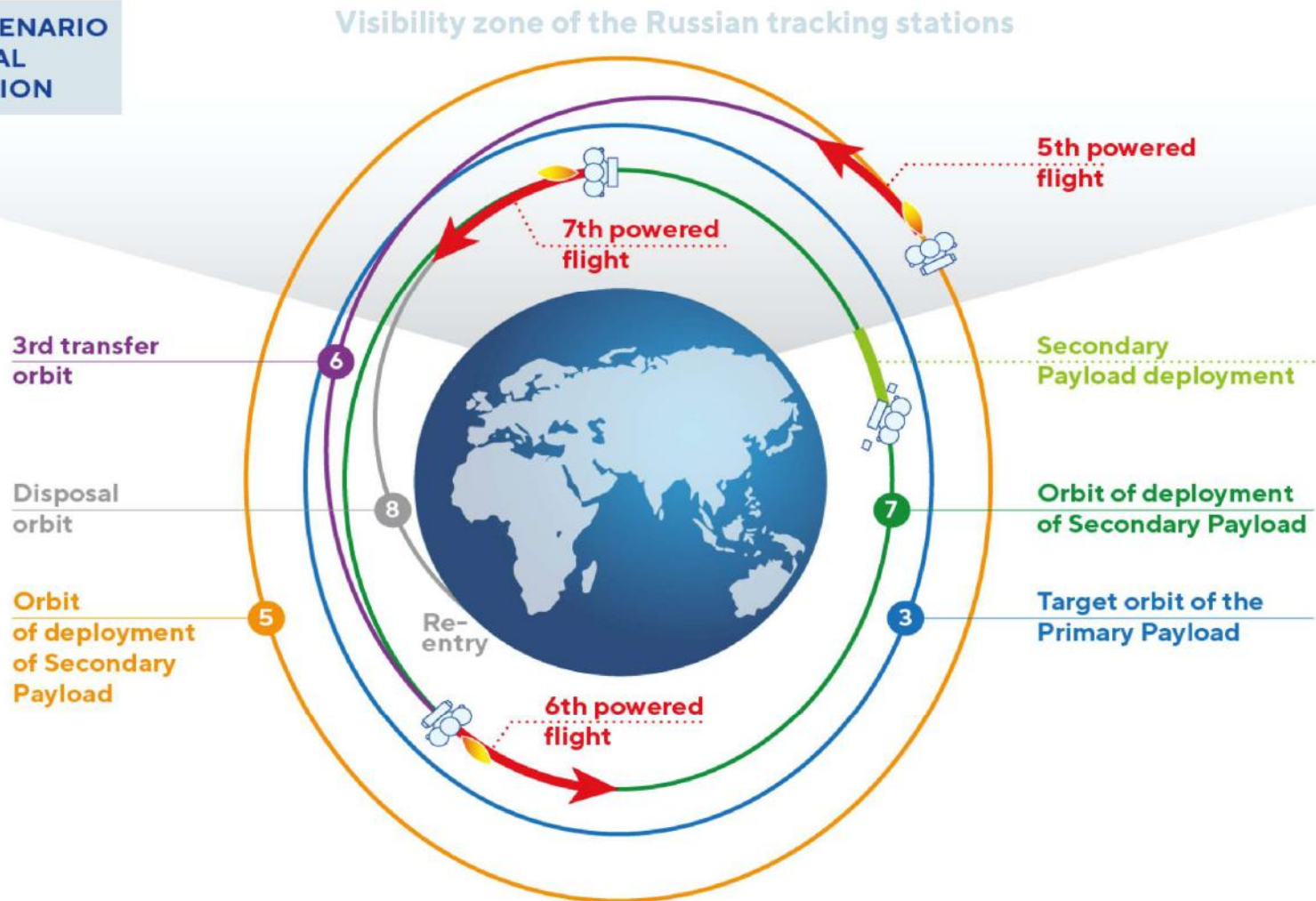
Orbit of deployment of Secondary Payload

Deployment of the Secondary Payload

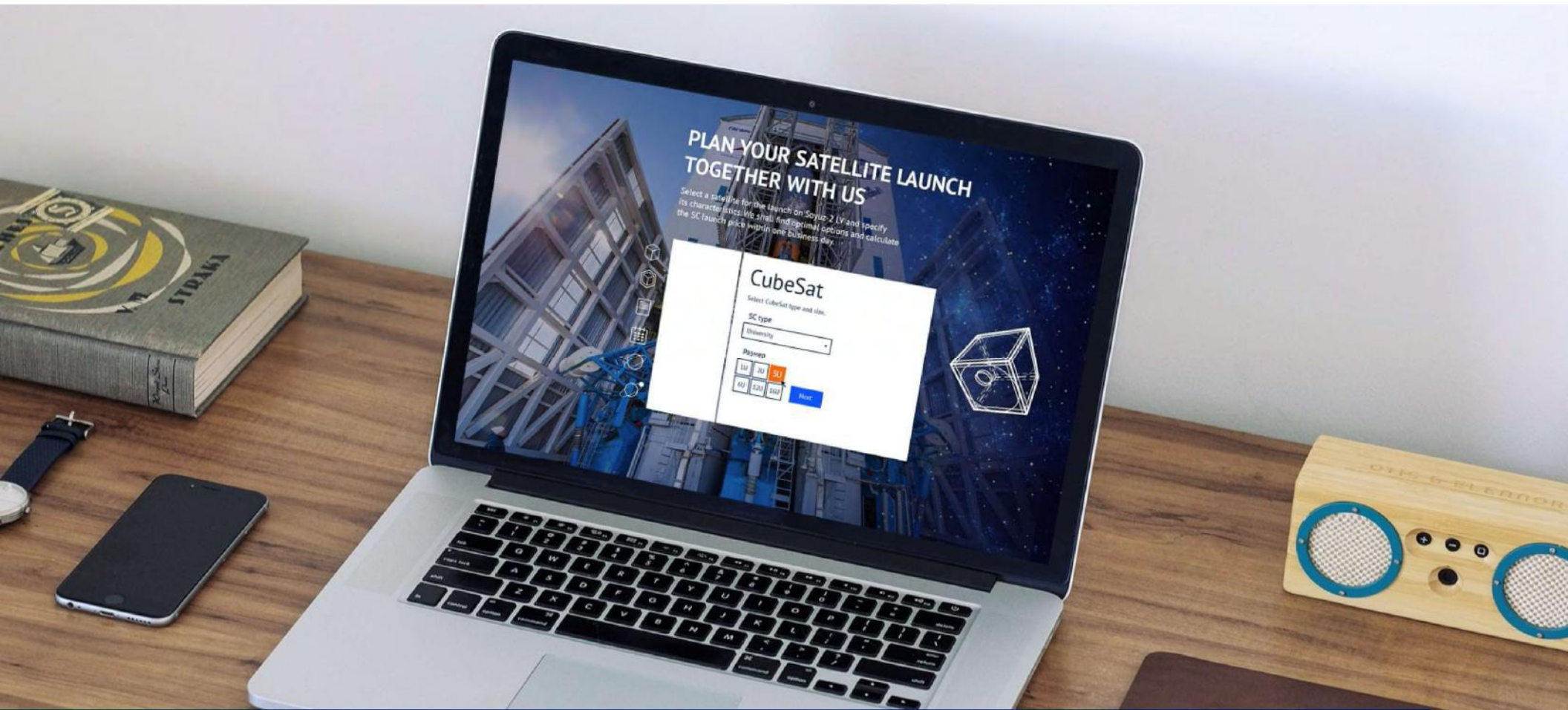
INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

Part #3







Check launch price calculator for cubesats and smallsats
on our website www.gklaunch.ru

1
WORK DAY

SPECIFIC FEATURES OF LAUNCH PRICING

LAUNCH PRICE FOR A CUBESAT OR SMALLSAT OF MASS UP TO 120KG CAN BE PROVIDED WITHIN 1 BUSINESS DAY



**PLAN YOUR SATELLITE LAUNCH
TOGETHER WITH US**

Select a satellite for the launch on Soyuz-2 LV and specify its characteristics. We shall find optimal options and calculate the SC launch price within one business day.

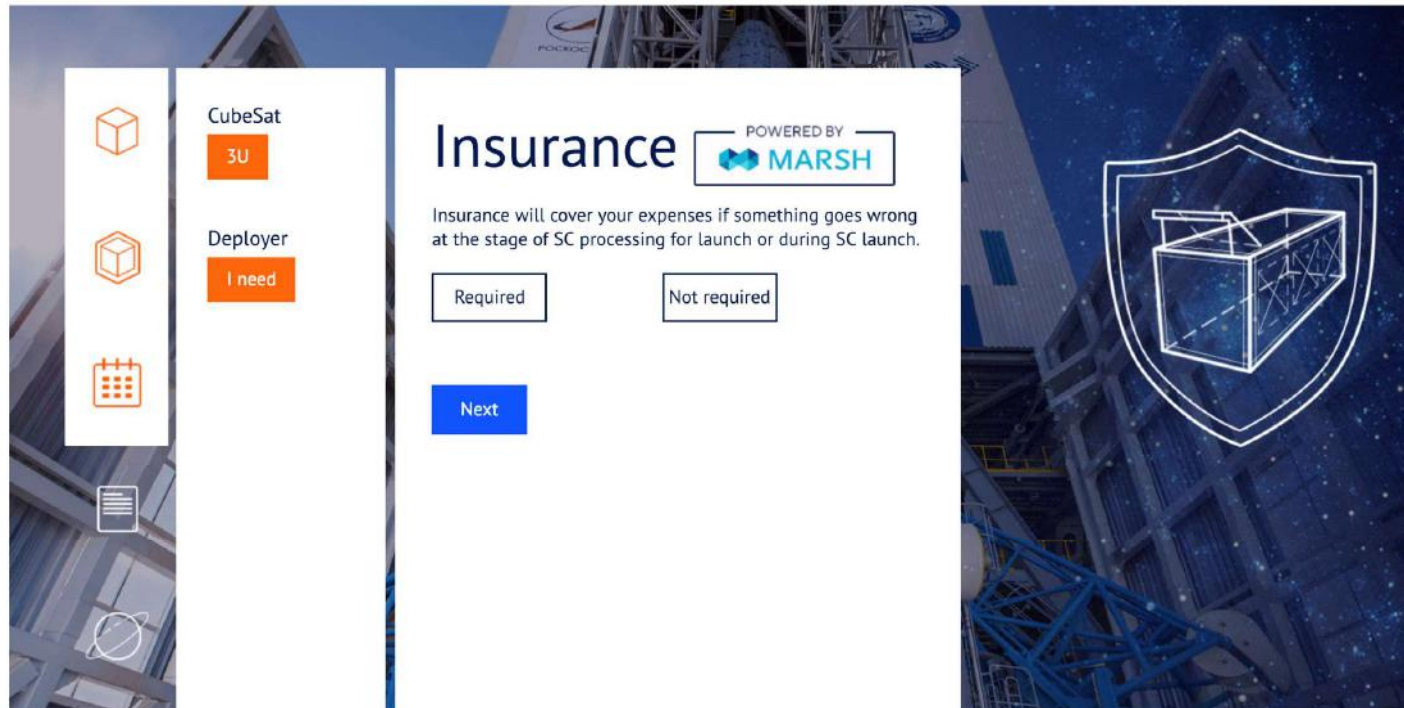
CubeSat **SmallSat**

The image shows a Soyuz-2 LV rocket on a launch pad. Two wireframe satellite models are overlaid on the image, one labeled 'CubeSat' and the other 'SmallSat'. The background is a dark blue sky with stars.



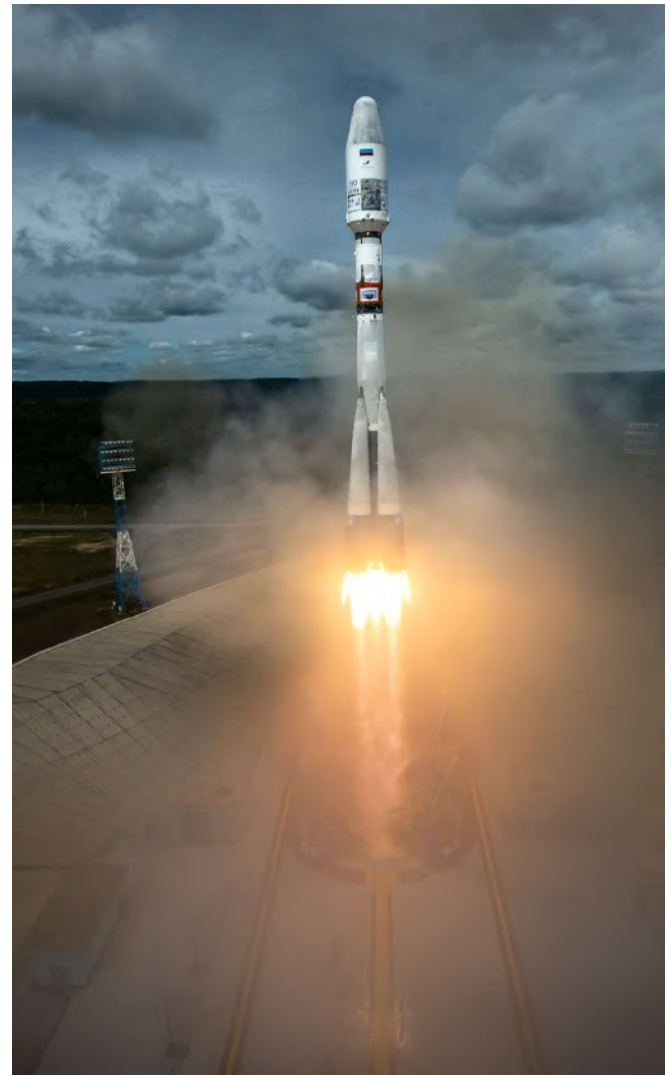
SPECIFIC FEATURES OF LAUNCH PRICING

COMPREHENSIVE INSURANCE PROPOSAL





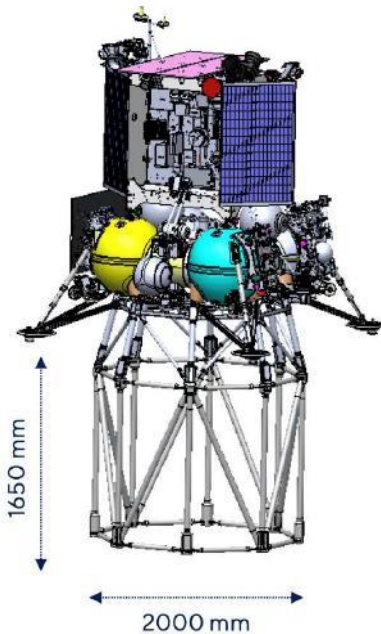




RIDESHARE LAUNCH OPPORTUNITY WITH LUNA-GLOB MISSION



Mass of Luna-Glob
1540 kg



Launch period
end of **2021** early **2022**

Net mass of secondary payload(s) to lunar escape trajectory without interface hardware & sep system

1 x 200kg
if installed inside
the frame

**up to
200kg**

2 x 100kg
if installed on the
two outer sides of
the frame

Maximum envelope for installation of secondary payload(s):

1000x1000x1000mm
if installed inside the frame

700x700x700 mm
if installed on one side of the
frame

**Parameters of lunar
escape trajectory:**

semi-major axis – 202,000 km;
eccentricity – 0,96813;
inclination – 51,7°;
longitude of ascending node ~319°;
argument of pericenter ~325°;
Argument of latitude ~29°;

SOYUZ-2 COMMERCIAL LAUNCH MISSIONS

operated by GK Launch Services and Roscosmos federal launch missions, on which GK Launch Services can install secondary payloads



Launch mission	Launch #1	Launch #2	Launch #3	Launch #4	Launch #5	Launch #6	Launch #7	Launch #8
Launch period	Q3 2020 (GK commercial mission)	Q1-Q2 2021 (GK commercial mission)	Q4 2021-Q1 2022 (GK commercial mission)	Q4-Q1 2022 (Roscosmos mission)	Q1-Q2 2022 (Roscosmos mission)	Q4 2022-Q1 2023 (GK commercial mission)	Q1-Q2 2023 (Roscosmos mission)	Q3-Q4 2023 (GK commercial mission)
Launch Vehicle	Soyuz-2/Fregat	Soyuz-2/Fregat	Soyuz-2/Fregat	Soyuz-2/Fregat	Soyuz-2/Fregat	Soyuz-2/Fregat	Soyuz-2/Fregat	Soyuz-2/Fregat
Payload class	Rideshare	Rideshare	Rideshare	Rideshare	Rideshare	Rideshare	Rideshare	Rideshare
Primary Launch Site (Back-up Launch Site)	Baikonur (Vostochny)	Baikonur (Vostochny)	Baikonur (Vostochny)	Vostochny -	Vostochny -	Baikonur (Vostochny)	Vostochny -	Baikonur (Vostochny)
Altitude (km)	500-600	500-600	500-600	Trans-lunar Trajectory (semi-major axis: 200 000 km)	500-600	500-600	500-600	500-600
Inclination	SSO, depending on orbit altitude	SSO, depending on orbit altitude	SSO, depending on orbit altitude		SSO, depending on orbit altitude	SSO, depending on orbit altitude	SSO, depending on orbit altitude	SSO, depending on orbit altitude
LTAN/LTDN	LTAN 11:00	LTAN 11:00	LTDN 10:30		LTAN 21:00	LTAN 10:30	LTAN 15:00	LTDN 10:30

**SPECIAL PRICES FOR CUBESATS
ON THE 1ST COMMERCIAL MISSION
in Q3 2020**

Need a ride?

> *GK Launch Services*

ANY MISSIONS BY THE
WORLD'S MOST RELIABLE LAUNCHER*

*The human transport to space

INNOVATIONS BASED ON HERITAGE

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