GK LAUNCH SERVICES

GK Launch Services

February 2019
Moscow, Russia

GK LAUNCH SERVICES - OPERATOR OF SOYUZ-2 COMMERCIAL LAUNCHES FROM RUSSIAN SPACEPORTS

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

Date of foundation - 25 April 2017

MAIN SUBCONTRACTORS FOR COMMERCIAL LAUNCHES:

GK LAUNCH SERVICES

PROGRESS ROCKET & SPACE CENTRE

Manufacturer of SOYUZ-2 LV

NPO LAVOCHKIN

Production, tests and adaptation of FREGAT upper stage

FSUE «TSENKI»

Provider of ground infrastructure facilities at Russian spaceports for launches

SOYUZ IS NOT JUST A ROCKET

RELIABILITY

1890 Soyuz-family rockets launched

UNIQUE

Soyuz - the only rocket, which carries humans into space

LAUNCH FREQUENCY

3 cosmodromes for launching Soyuz-2. We can launch as often, as you need

UNIVERSAL

Deploying satellites to 3 different orbits within one mission

ORBIT PHASING

Orbit phasing capability, e.g. 3 SC in 1 orbit

MULTITASKING

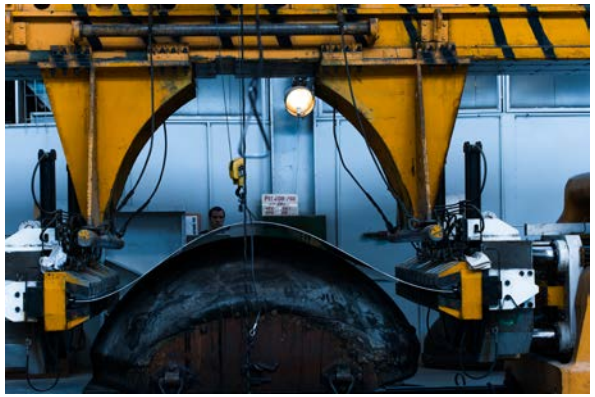
Realizing missions from low-earth and geostationary orbits to escape trajectories to deep space missions to other planets and asteroids

ADAPTABLE

Launch Vehicle can be used with various upper stages or solely: we will select launch configuration for your mission

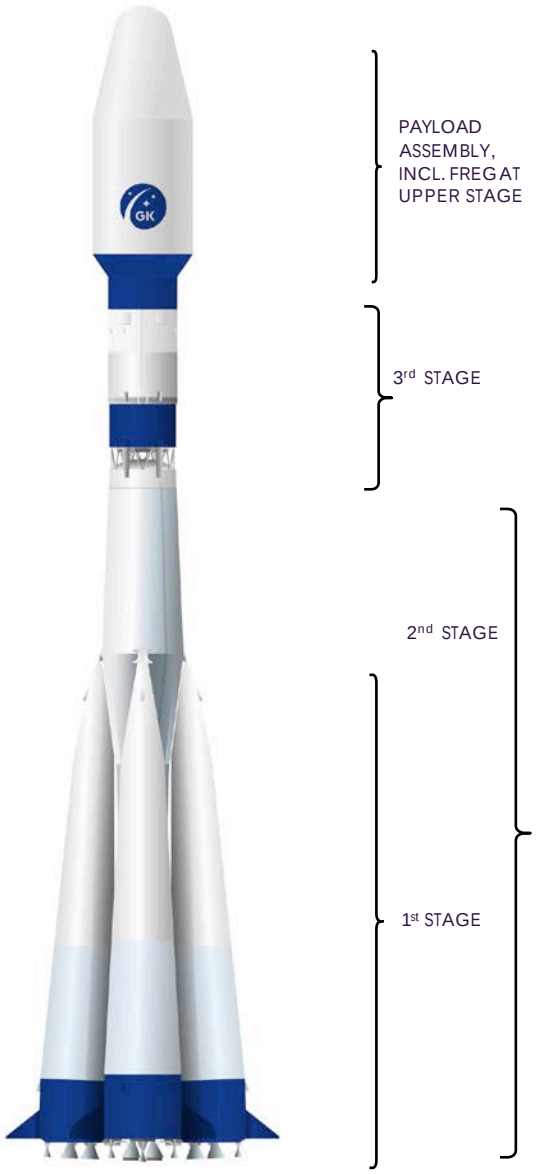
NEED A RIDE?

We launch **dedicated** and **cluster** missions.



SOYUZ PRODUCTION

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	313000
Fuel	
· I stage	LOX/kerosene
· II stage	LOX/kerosene
· III stage	LOX/kerosene
Fregat upperstage	N2O4/UDMH
Flight Heritage	
· Soyuz LV (launches)	more than 1890
· Soyuz/Fregat (launches)	more than 70
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)

Current baseline price of an entire launch in SOYUZ-2.1/FREGAT configuration
$ 48,5M

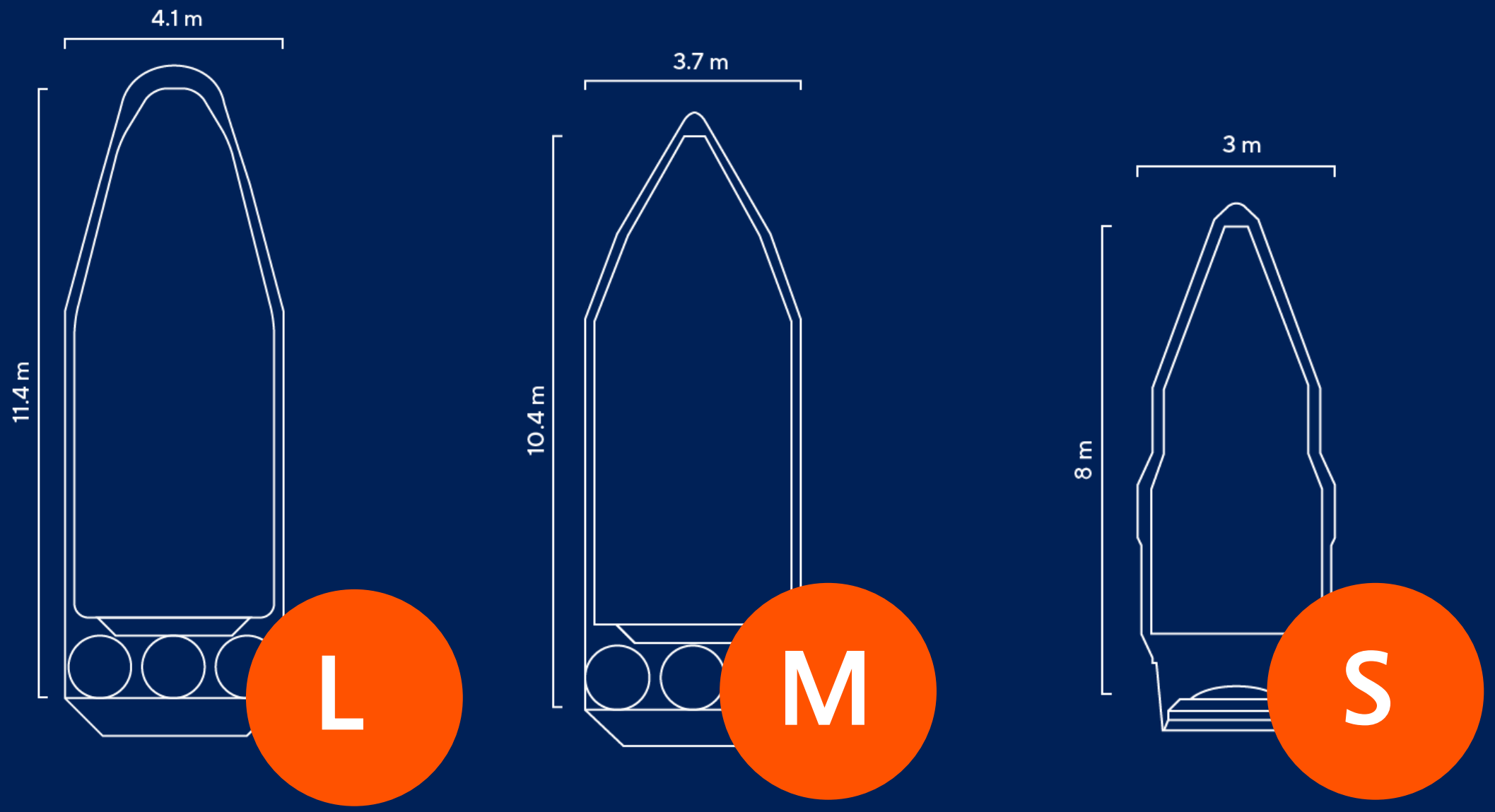
SOYUZ-2 LAUNCH SITE LOCATIONS

PLESETSK
Launch site

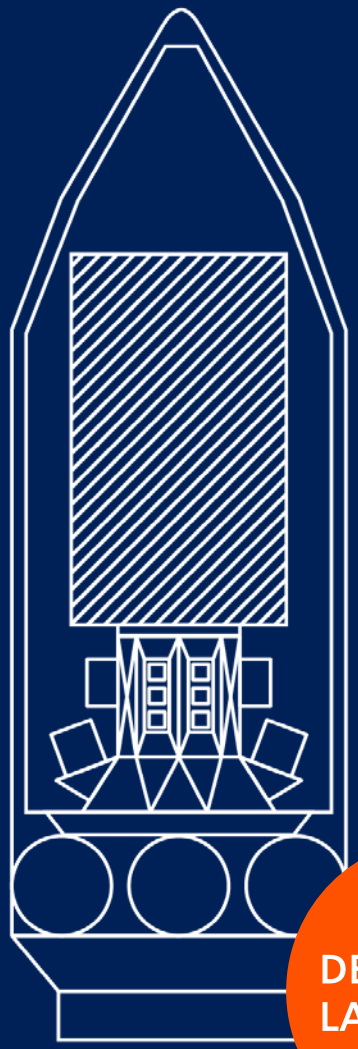
BAIKONUR
Launch site
The Republic
of Kazakhstan

VOSTOCHNY
Launch site

FAIRING OPTIONS:



LAUNCH OPTIONS:

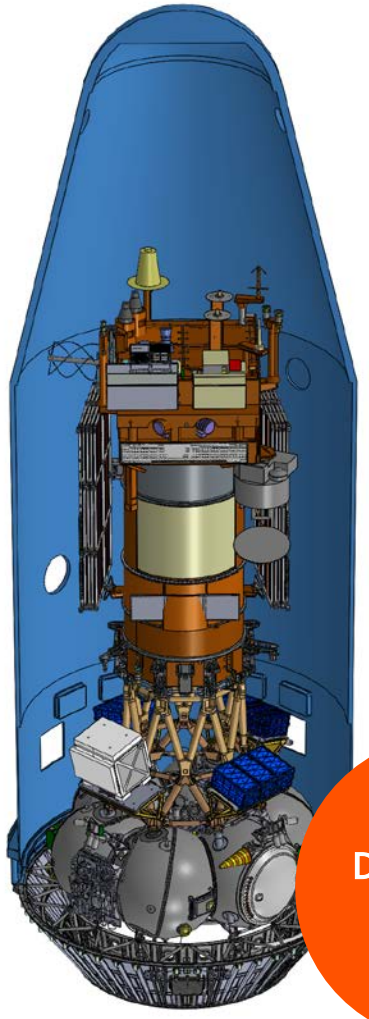


DEDICATED LAUNCH

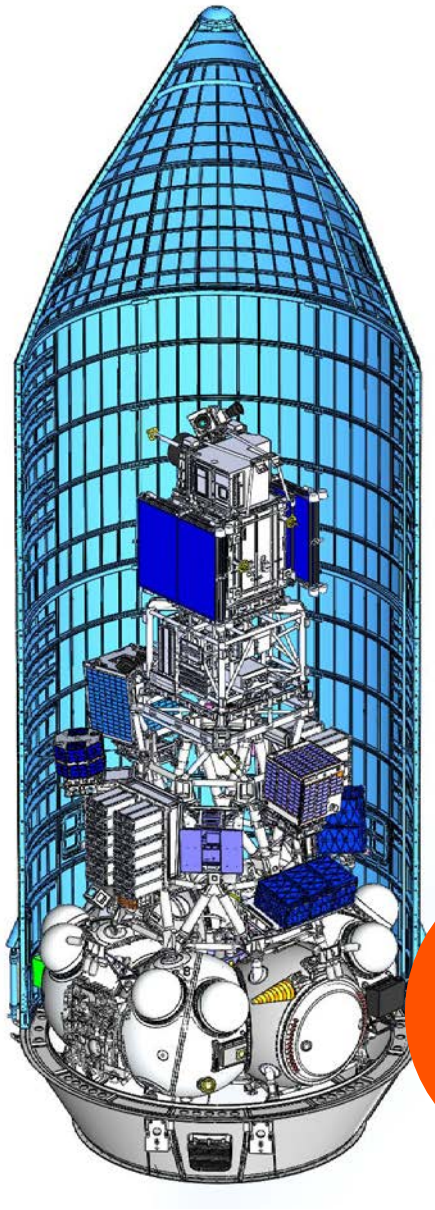
CLUSTER MISSION

TWIN «TANDEM» LAUNCH

TYPICAL LAUNCH OPTIONS

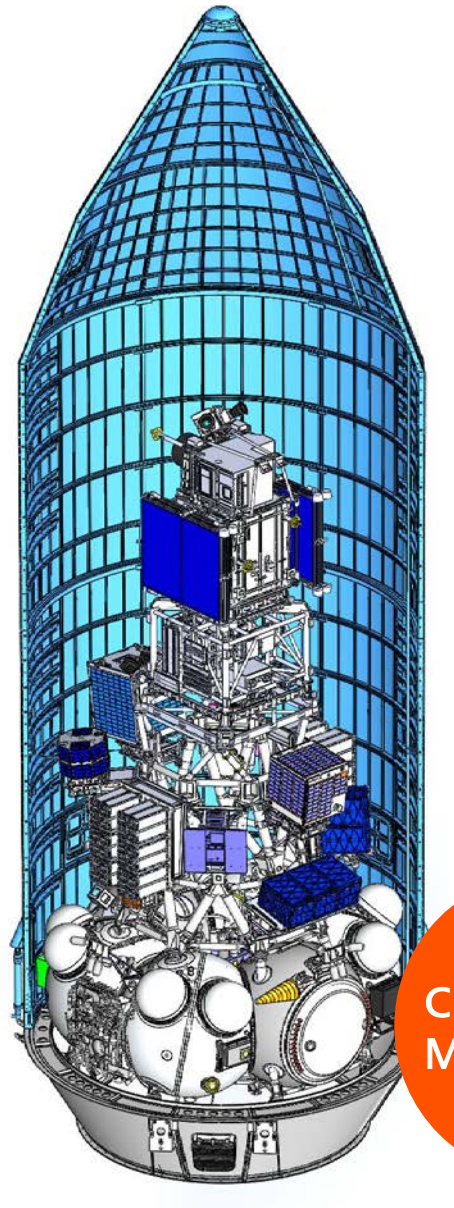


DEDICATED LAUNCH

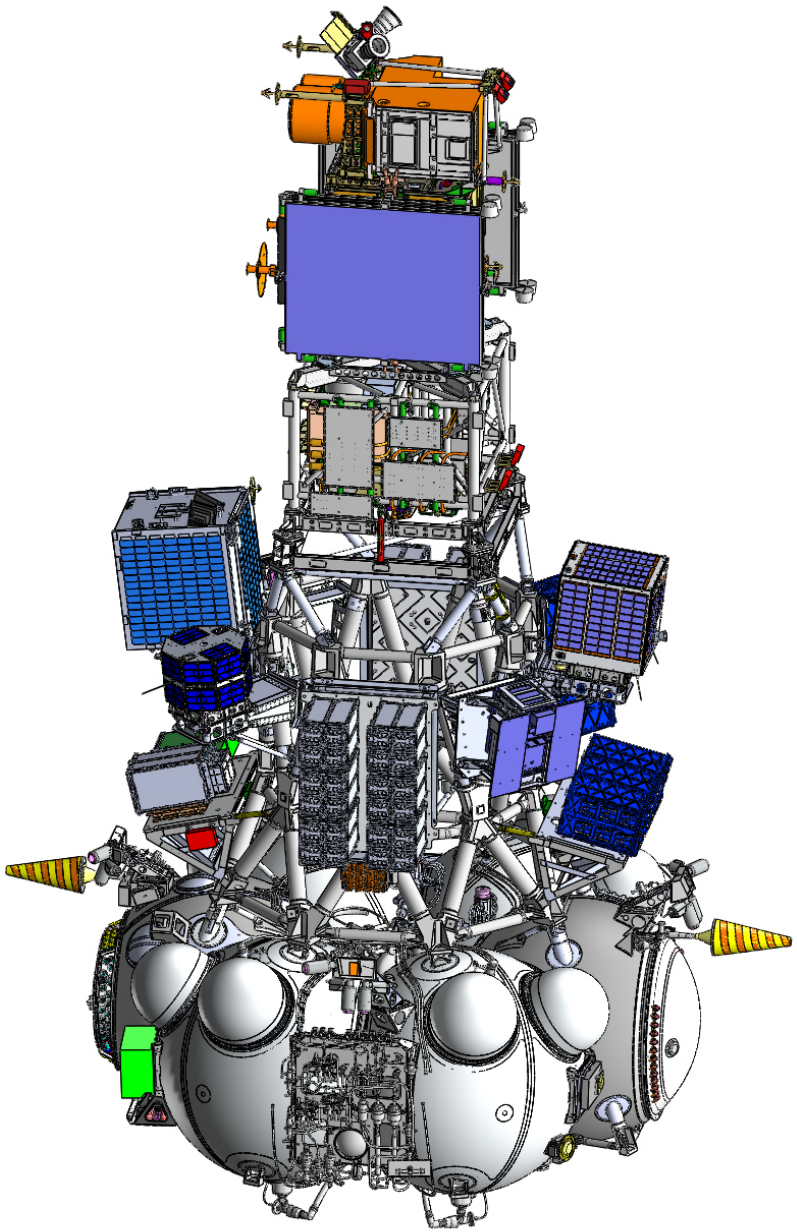


CLUSTER MISSION

TYPICAL CLUSTER MISSION PROFILE



CLUSTER MISSION



GENERAL INFO ON FREGAT :

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

Universal

Is used in medium- and heavy- class launch vehicles

Robust

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

Precise

Ensures high precision of SC injection into their target orbits

Optimal

Multiple restart capability to ensure optimal injection into several orbits

Self-Contained

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

Multipurpose

Any type of orbits

Up to 7 ignitions

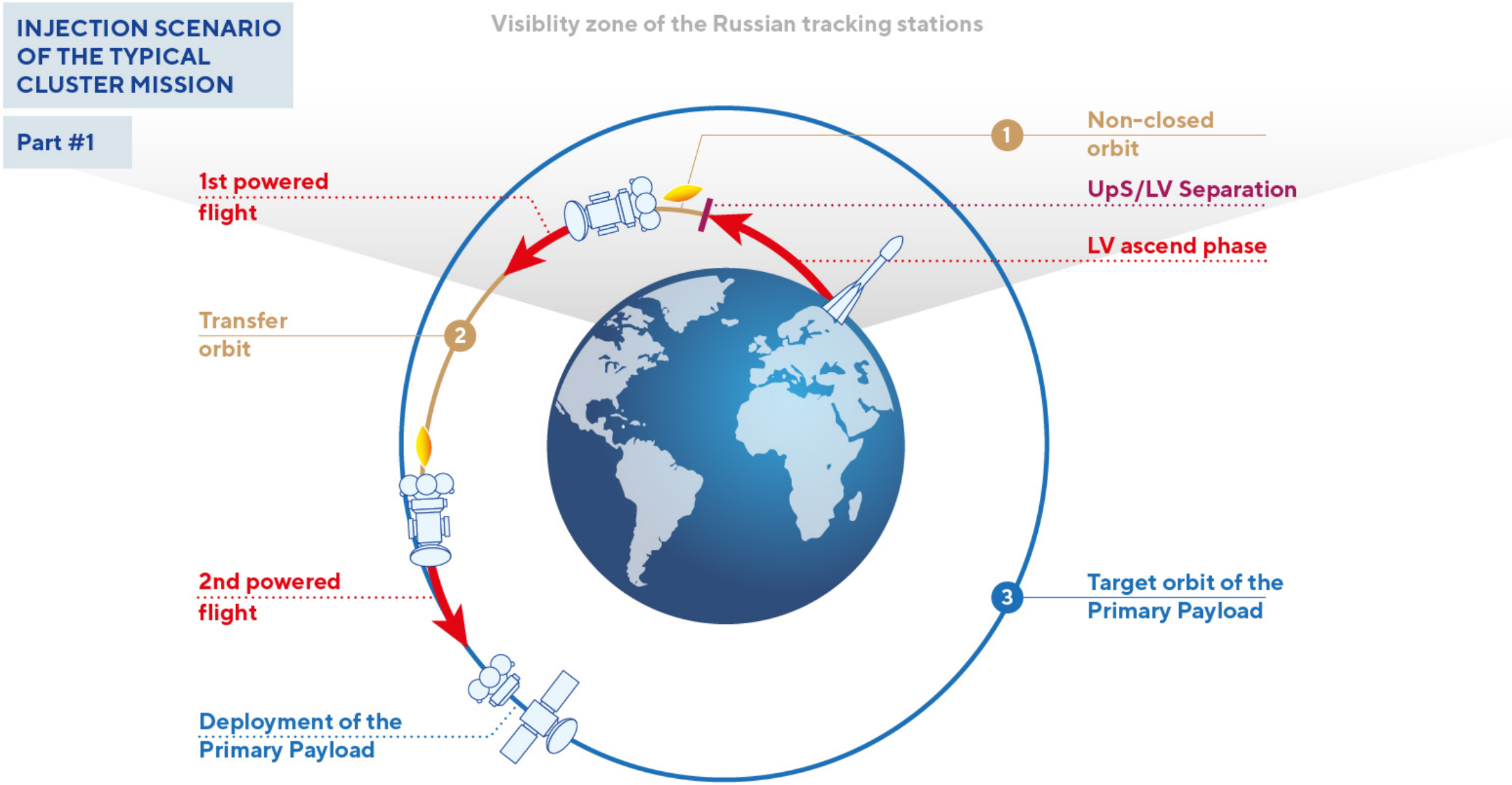
18 years

>70 launches using Fregat

> 200 SC launched

FREGAT PRODUCTION

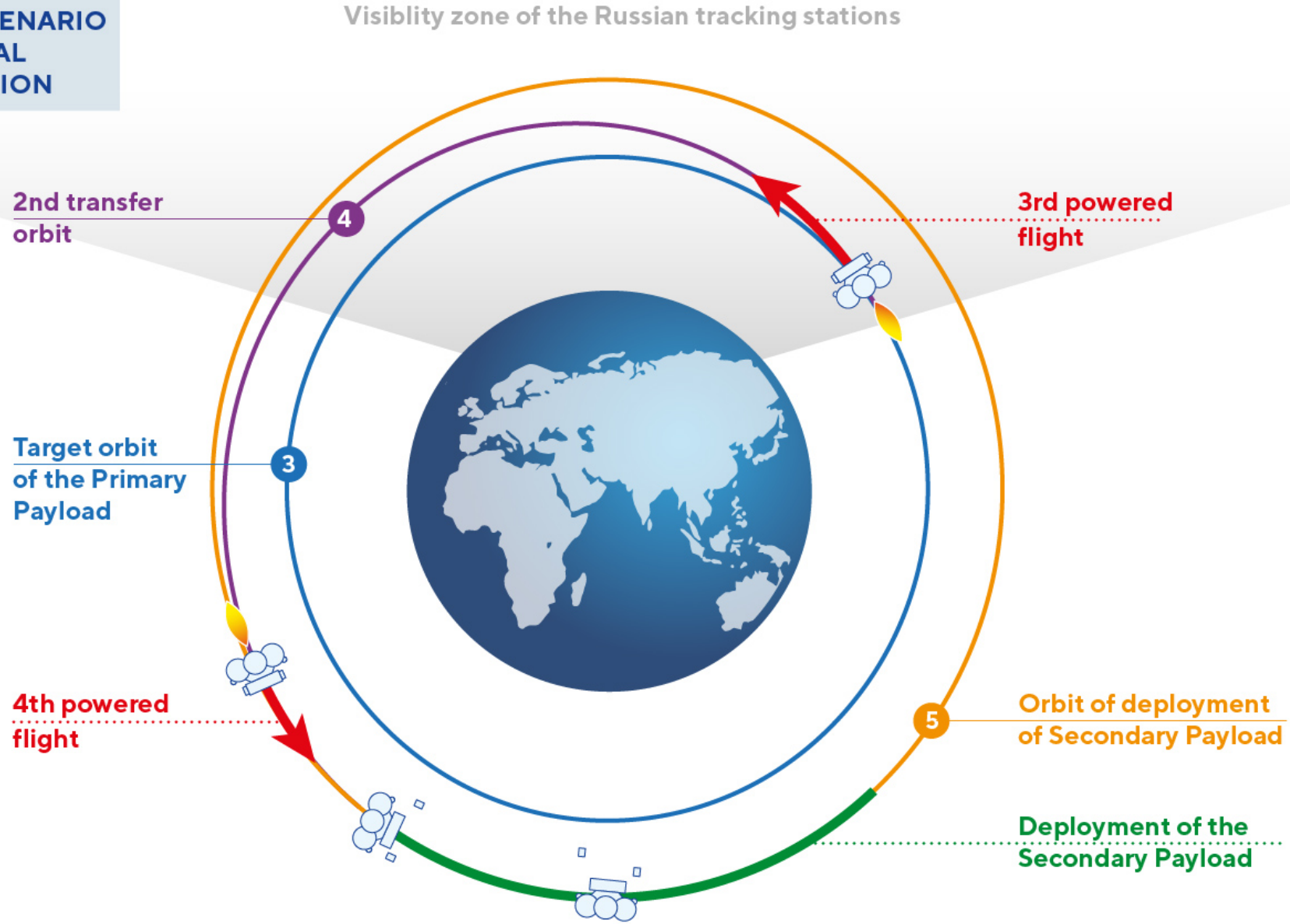
INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION



INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

INJECTION SCENARIO OF THE TYPICAL CLUSTER MISSION

Part #2



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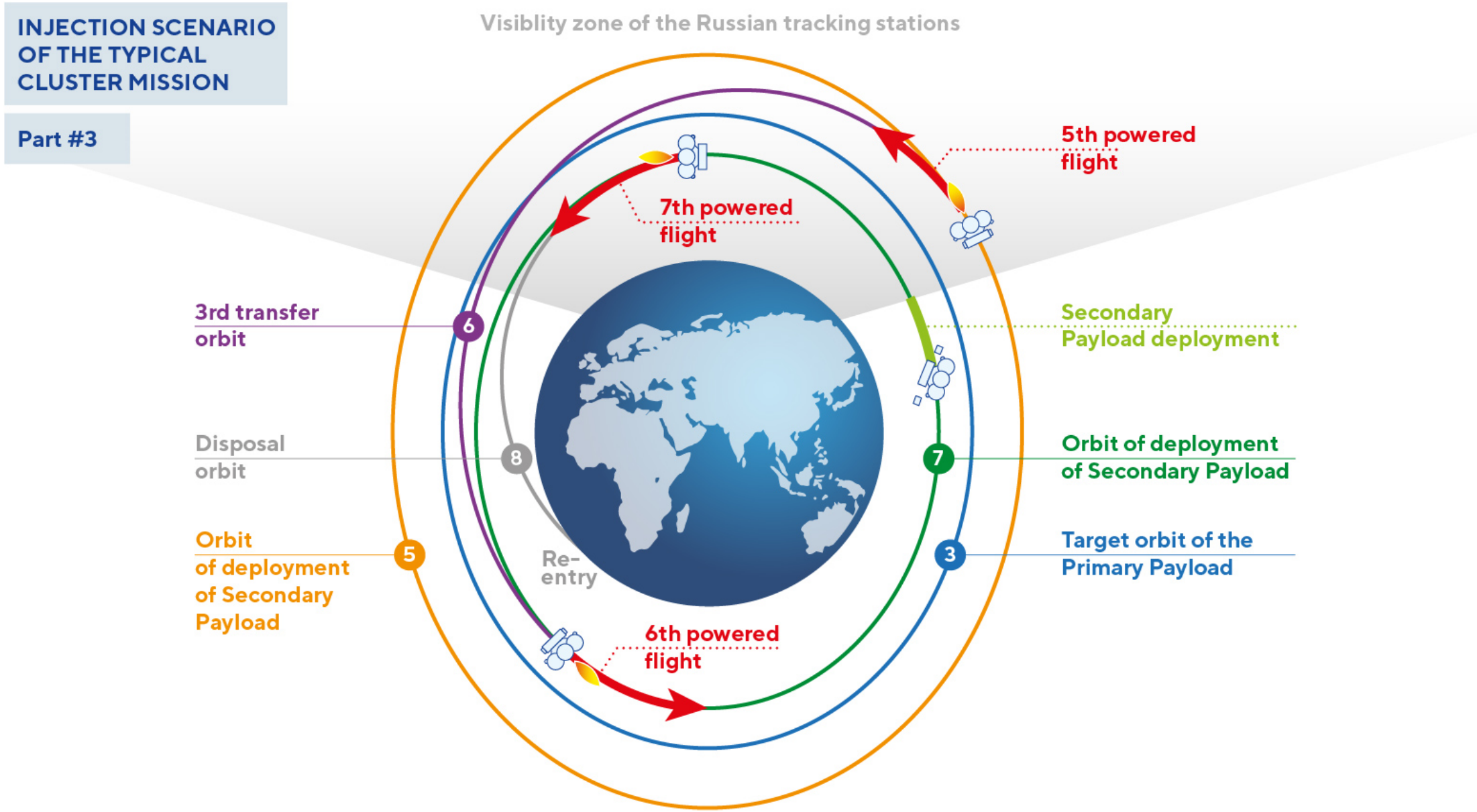


LAUNCH OF KANOPUS-V 5/6 SPACECRAFT FROM VOSTOCHNY COSMODROME

Date: 27.12.2018 Time: 05:07:18/11:07:18

Soyuz-2.1a LV Fregat Upper Stage No 122-06

Payload: Kanopus –V 5/6+26 small satellites

LV flight timeline			
Time from lift-off/ event	Sec .	Min. sec.	Current
Lift-off	0	0	05.07.18 11.07.18
1st stage separation	117.767	1.57.77	05.09.16 11.09.16
Fairing jettison	222.883	3.42.88	05.11.01 11.11.01
2nd stage separation	287.251	4.47.25	05.12.05 11.12.05
3rd stage lower skirt jettison	289.051	4.49.05	05.12.07 11.12.07
Shut-down of 3rd stage main engine	525.235	8.45.24	05.16.03 11.16.03
Nose Module (Fregat + SC) separation	528.535	8.48.54	05.16.07 11.16.07

KANOPUS-V 5/6
- 522 km SSO

1st group of piggybacks
– 585 km SSO

2nd group of piggybacks
– 495 km SSO

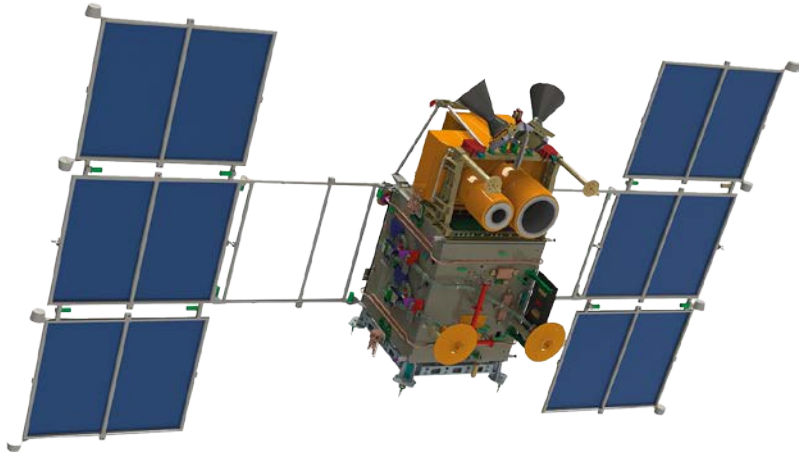
KANOPUS-V

Operative Monitoring:

Man-made and natural emergencies (including natural hydrometeorological phenomena)

Land management, agricultural activities

Operational observation of specified regions of the Earth’s surface



Natural resources

Fire detection

Large environmental pollution emissions

Update of topographic maps

26 PIGGYBACK SATELLITES

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LAUNCH SERVICES
ECM
www.ecm-space.de

planet.

12 **DOVE** Cubesats

D-STAR ONE (isat) &
D-STAR ONE (sparrow)

ISL

LUME-1

8 **LEMUR-CLASS** satellites

ZACUBE-2

UWE-4 satellite

ASSEMBLING OF THE SOYUZ-2.1A SPACE HEAD MODULE (SHM) WITH THE RUSSIAN KANOPUS-V-5/6 SATELLITES AND FOREIGN PIGGYBACK SMALLSATS

FEEDBACK FROM VOSTOCHNY PRESS TOUR PARTICIPANTS

«The Soyuz-2 launch complex is operational, and will be the heart of Vostochny for some time and these facilities are significantly more modern than those seen at Baikonur, reflecting Russia's extensive experience in designing cosmodromes. Much of the complex is an evolution of the facility Russia built at the ESA spaceport in French Guiana. Operational know-how from Baikonur melds with design experience from French Guiana at Vostochny».

- **Mattew Bodner for SpaceNews**

The experience the staff bring to Vostochny shows when the Soyuz rocket is rolled out to the launch pad, and then quickly lifted onto the stand. During the Apollo and Space Shuttle programs, NASA took days to move their vehicles from the assembly building to the pad. Roscosmos does this in about an hour or two. Much of the process happens the same way it does at Baikonur.

- **Mattew Bodner for SpaceNews**

"Soyuz is definitely one of the more competitively priced launchers. And Russian launchers have such incredible heritage. When it comes to reliability, in most cases, Russia presents a very strong case compared to a new launch provider just getting off the ground."

- Mike Safyan, VP, Launch at Planet

FEEDBACK FROM VOSTOCHNY PRESS TOUR PARTICIPANTS

The spaceport has about 1,000 employees. Local technical training has been handled by Amur State University in Blagoveshchensk since 2009. About 150 graduates now work at Vostochny. Students from the university have their own satellite control center and have developed their first microsatellite, in cooperation with China's Harbin Polytechnic University. It is expected to be launched in 2020 and will be used for Earth observation.

- **Maksim Pyadushkin for Aviation Week**

For the first time in Russia, the Vostochny's launchpad has a mobile service tower, similar to the Soyuz launchpad at Arianespace's Guiana Space Center near Kourou, French Guiana. The tower is 171 ft. tall, and features seven access levels for engineers to work on the vehicle, even in adverse weather. In preparing the Soyuz rocket for launch on Dec. 27, workers faced Arctic-like temperatures of -36F (-37.7C) .

- Irene Klotz for Aviation Week


ТЭМ7А
0523


3.4

NEXT MISSION FROM VOSTOCHNY COSMODROME

Meteor-M 2-2 SC is a part of Meteor-3M **hydrometeorological and oceanographic satellite system** within the framework of the Federal Space Program

Tentative date of launch is **Q2, 2019**
The primary payload will share ride with co-passengers

Meteor-M 2-2 SC will be injected into **832km** SSO
1st group of **piggybacks** - into **580 km** SSO
2nd group of **piggybacks** – into **530 km** SSO

UPCOMING COMMERCIAL LAUNCHES

ENTIRELY OPERATED BY GK

1. MULTIPLE SATELLITE MISSION
Launch period: Q2 2020
Orbit: SSO, 500-600 km, LTAN 11:00
Launch configuration: Soyuz 2.1a/Fregat

2. MULTIPLE SATELLITE MISSION
Launch period: Q4 2020
Orbit: SSO, 500-600 km, LTAN 11:00
Launch configuration: Soyuz 2.1a/Fregat

UPCOMING RIDE SHARE LAUNCHES

OPERATED BY ROSCOSMOS, PIGGY BACKS BY GK:

2.. Meteor-M 2 -1
Launch period: Q2 2019
Launch configuration: Soyuz 2.1a/Fregat

Price per kilo
20-30k

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