



GLONASS and SDCM Status, Development and Use

ROSCOSMOS State Space Corporation

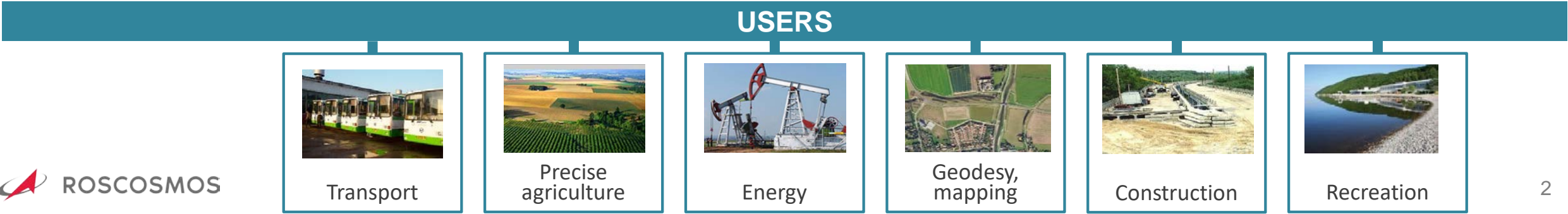
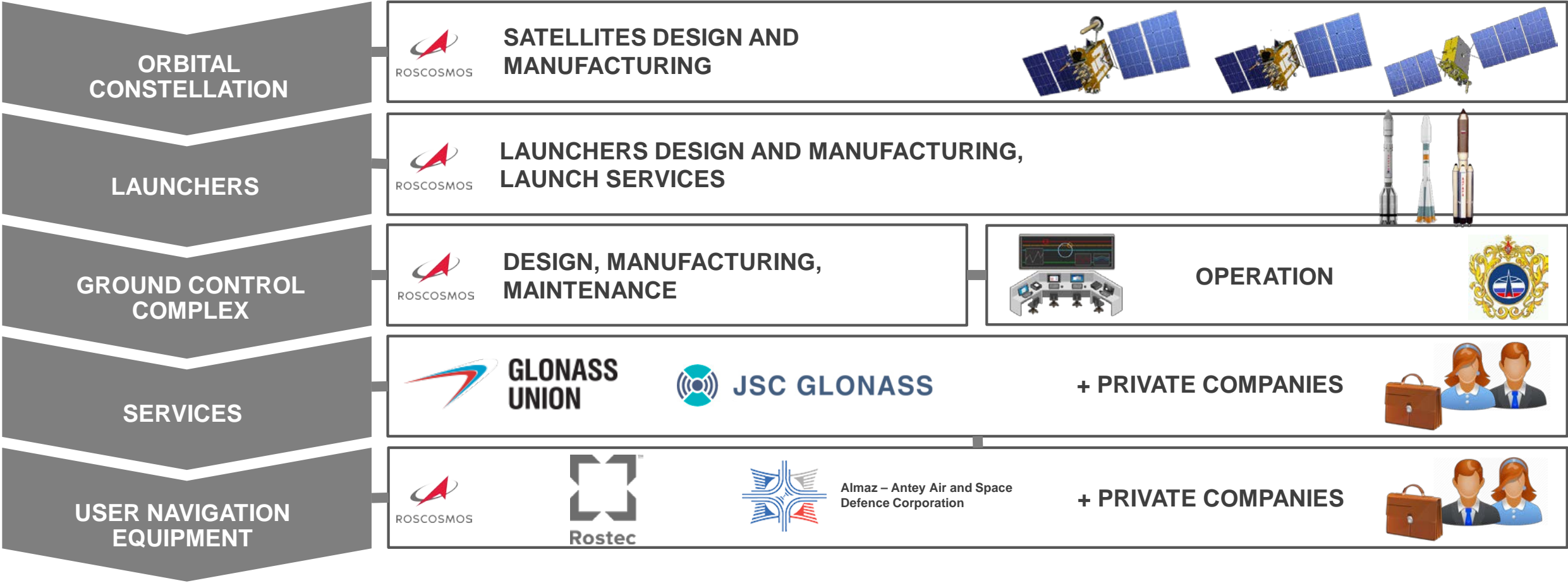
Ivan Revnivykh

Head of GLONASS Application Division

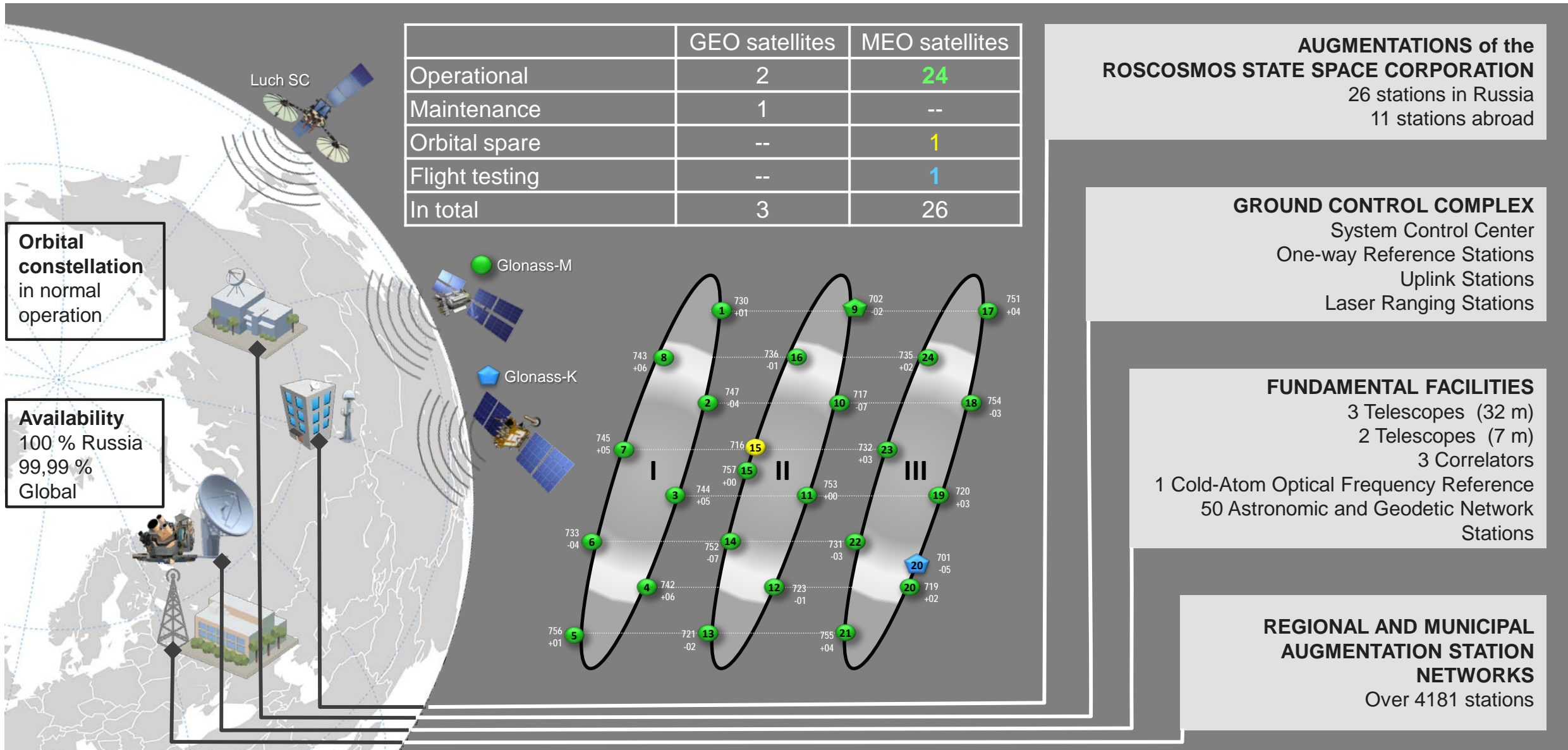
Munich, Germany

March 25-27, 2019

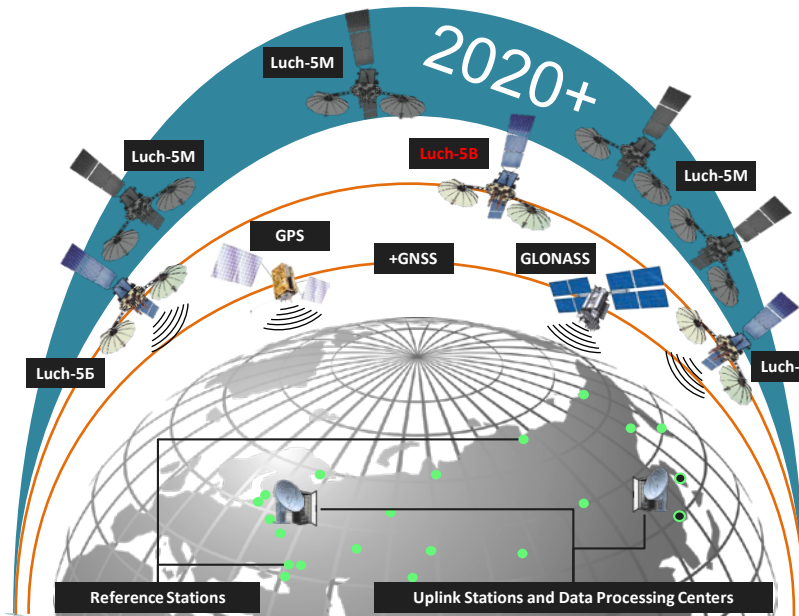
PROVIDING USERS WITH GLONASS-BASED SERVICES



GLONASS STATUS (as of 26.03.2019)



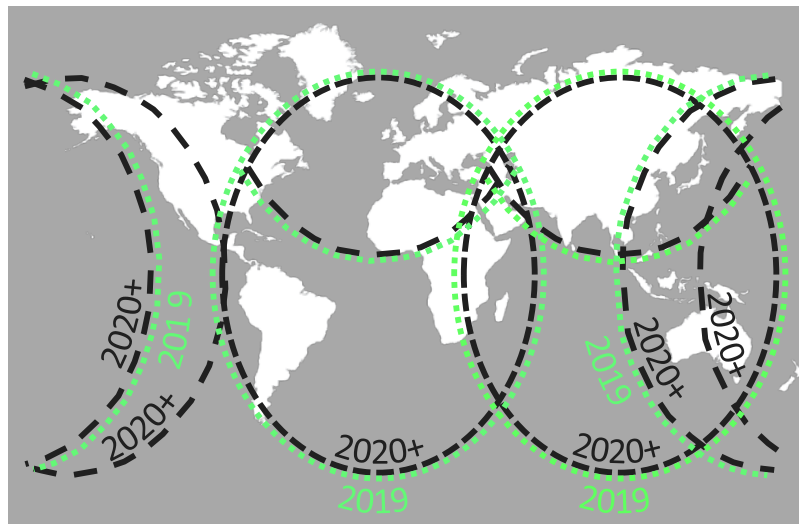
SYSTEM for DIFFERENTIAL CORRECTION AND MONITORING



- ✓ SDCM testing is completed;
- ✓ System is at the initial stage of certification

Modernization:

- Stations network expansion;
- Broadcasting SBAS information in GPS L1 and L5 ranges via Luch-5M geostationary satellites



	2019			2020+			
Stations	19 in Russia 6 abroad			45 in Russia 12 abroad			
Coverage	Russian Federation + CIS countries						
Systems	GLONASS, GPS, Galileo, BeiDou						
Correction signals	L1			L1, L5			
Luch SC	5A* 167E	5B 16W	5B 95E	5M 16W 95E 167E 160W			
Integrity	6 seconds						
Accuracy	Horiz. 0,5	Vert. 0,79	3D 0,93	0,5			

GLONASS CIVIL SERVICES

Services

Users

Characteristics

Means

BASIC OPEN SERVICE

Navigation in absolute regime using open signals code measurements

Personal navigation

Transport monitoring

Mobile communication

Energy

Emergency services

Internal water ways

Aviation

Import maneuvering

Railroad

Toll collection systems

LBS-services

Intelligent insurance

Dredging

Precision agriculture

Construction

Geodesy

Cartography

Complex structures monitoring

Precision engineering

ERS

Unmanned transport

SERVICE OF IMPROVED RELIABILITY AND ACCURACY

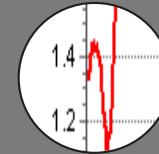
Navigation in absolute regime using code measurements and information from wide area, regional and local augmentation systems

RELATIVE NAVIGATION SERVICE

Navigation in relative regime using phase measurements and a reference receiver (reference station)

HIGH-PRECISION SERVICE

Navigation in absolute regime using phase measurements (PPP) on a commercial basis



Daily RMS SISRE, m
www.glonass-iac.ru

1 m

0,03 m

0,1 m

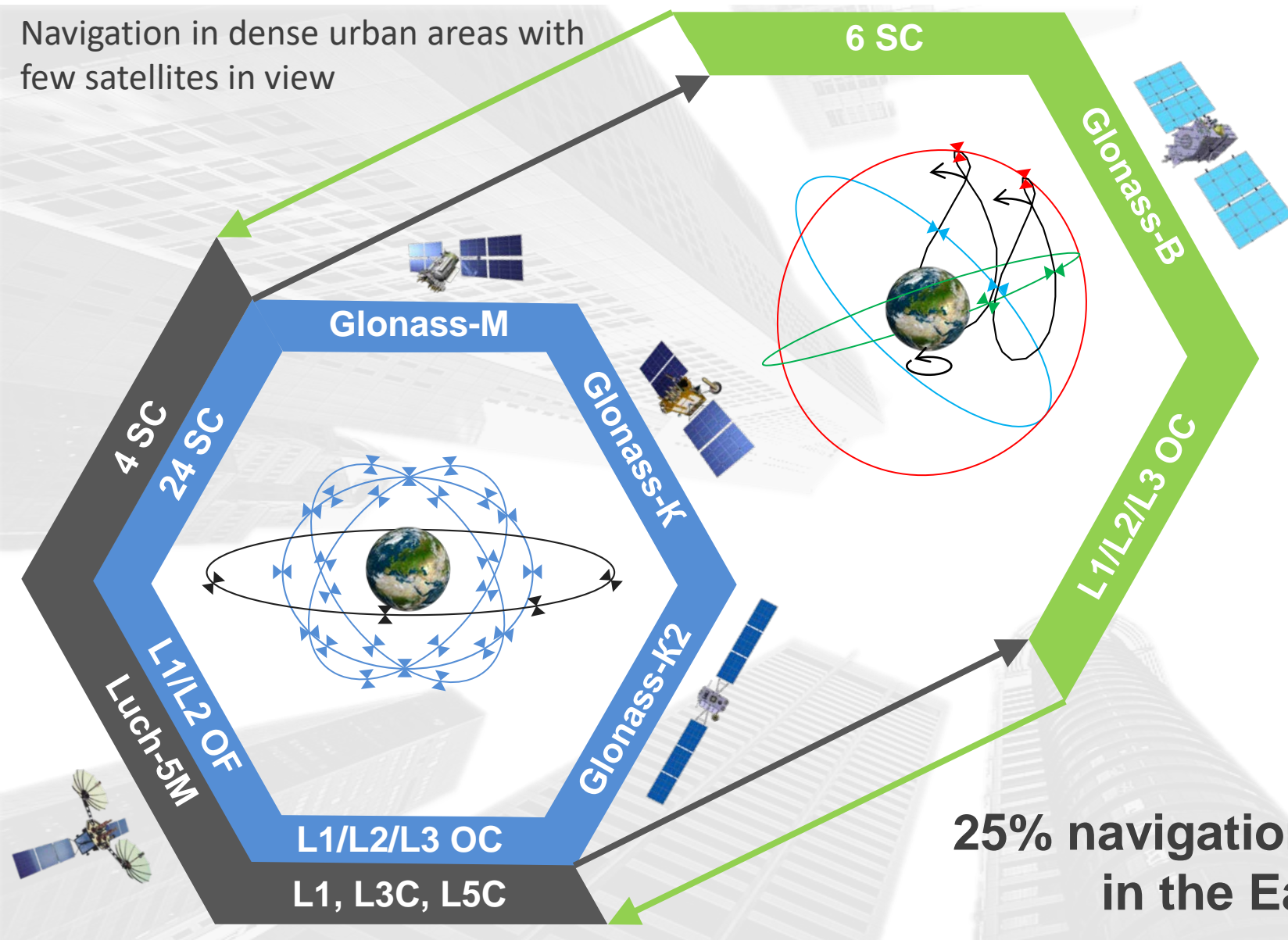
SPACE SEGMENT

SYSTEM FOR DIFFERENTIAL CORRECTION AND MONITORING

NATIONAL SYSTEM FOR HIGH-ACCURACY POSITIONING

HIGH-PRECISION SYSTEM FOR NAVIGATION AND EPHEMERIS-AND-TIME INFORMATION

HIGH ORBIT GLONASS



Initial design	2019
SC platform	Glonass-K
Number of SC	6
Orbital planes	3
Ground traces	2
Inclination	64.8°
Eccentricity	0.072
Revolution period	23.9 h
First launch	2023
Signals	L1 OC, L2 OC, L3 OC
Constellation deployment	By the end of 2025
Launch method	Dual (in batch)
Launch vehicle	Angara-A5
Launch sites	Plesetsk, Vostochny

**25% navigation accuracy improvement
in the Eastern hemisphere**

INTERNATIONAL COOPERATION

GLONASS Compatibility and Interoperability

TARGET



MULTILATERAL

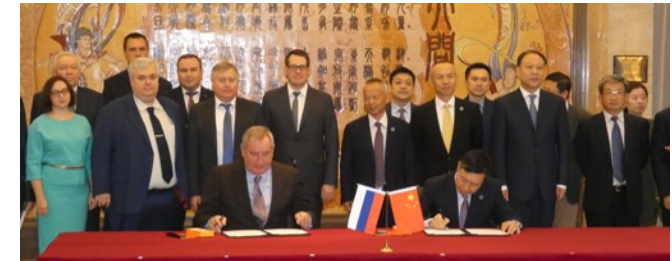
**13th Meeting of the
International Committee on
Global Satellite Navigation
Systems**
Xi'an, China,
November 4-9, 2018



5th Meeting of the Russia-China Project Committee on Strategic Cooperation in Satellite Navigation
Beijing, China, September 26-28, 2018

4 Working Groups, 10 joint projects in:

- Compatibility and operability of GLONASS and BeiDou
- Augmentations and measuring stations
- GNSS characteristics monitoring and assessment
- GNSS technologies application



BILATERAL



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