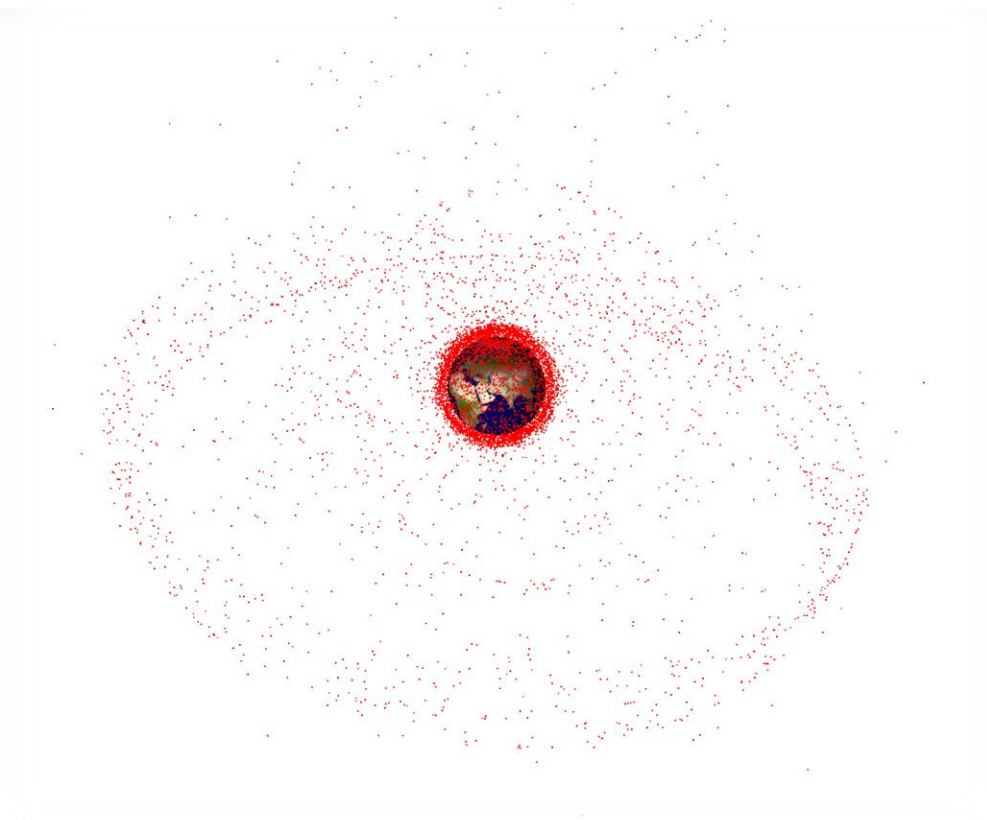


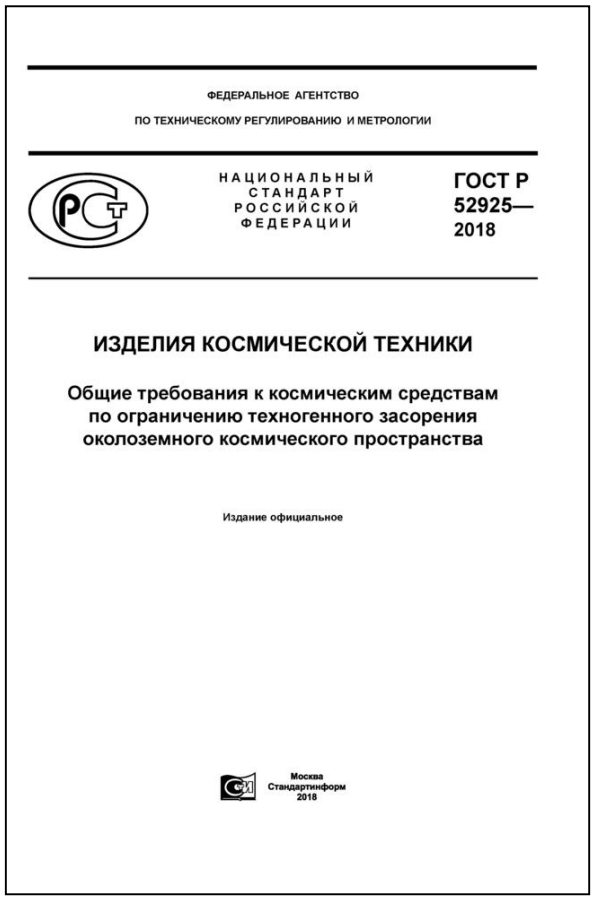
Russian Federation Space Debris Mitigation Activities in 2019

57th Session of the UN Scientific and Technical Subcommittee, Vienna, Austria,

ROSCOSMOS

February 2020

Amendment of National Standard GOST R 52925-2008



ФЕДЕРАЛЬНОЕ АГЕНТСТВО

ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

НАЦИОНАЛЬНЫЙ СТАНДАРТ РОССИЙСКОЙ ФЕДЕРАЦИИ

ГОСТ Р 52925— 2018

ИЗДЕЛИЯ КОСМИЧЕСКОЙ ТЕХНИКИ

Общие требования к космическим средствам по ограничению техногенного засорения околоземного космического пространства

Издание официальное

Москва Стандартинформ 2018

In 2019, Russian National Standard GOST R 52925-2018 "Space technology items. General requirements on space vehicles for near-earth space debris mitigation" was approved and implemented.

At the 56th Session of the UN Scientific and Technical Subcommittee, Russian National Standard GOST R 52925-2018 was included in the International Document "Compendium of Space Debris Mitigation Standards" adopted by states and international organizations (February 18, 2019).

Space Debris Mitigation Activities

The Russian Federation is running a continuous analysis of compliance with the requirements of National Standard GOST R 52925-2018 which is a national instrument to fulfill the recommendations of UN COPUOS Guidelines on space debris (SD) mitigation during development and operation of spacecrafts, launch vehicles (LV) and upper stages (US).

The space debris mitigation guidelines of the UN Committee on Peaceful Use of Outer Space are being implemented for both operational SC and those which are currently under construction, such as Meteor-M # 1, # 2, # 3 SC, Meteor-MP, Ionosfera, Ionozond-V, Kanopus-V-IK, Kanopus-V, Lomonosov small satellite, SC series Express, Resurs, Obzor-R, Bion-M, small satellite Aist, Ionosfera, Kanopus-V-IK, SC series Spektrs, Elektro-L, ARKA, Resonans, small SC for fundamental space research, Fregat upper stage, DM-02 upper stage, KVTK upper stage, Volga upper stage, Soyuz type launch vehicles.

Space Debris Simulation Activities
Computer Program

РОССИЙСКАЯ ФЕДЕРАЦИЯ

СВИДЕТЕЛЬСТВО

о государственной регистрации программы для ЭВМ

№ 2018665226

Модель для прогнозирования и анализа космического мусора - Space debris prediction and analysis (SDPA). Программа для расчета потока космического мусора относительно КА на заданной орбите

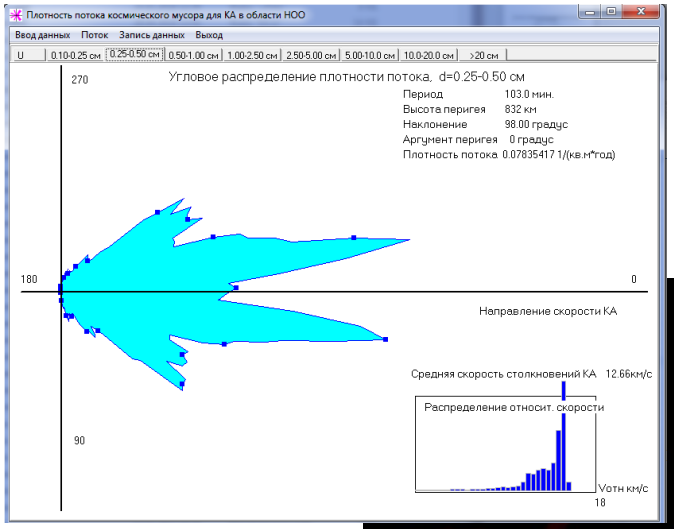
Правообладатель: *Российская Федерация, от имени которой выступает Государственная корпорация по космической деятельности «Роскосмос» (RU)*

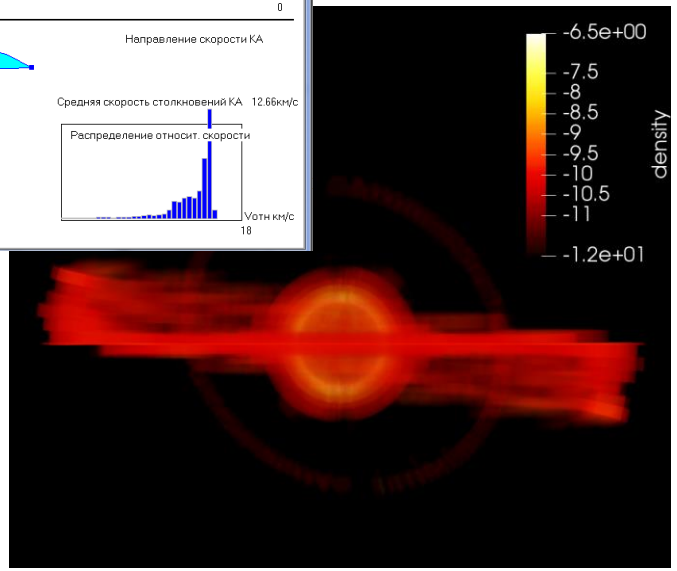
Авторы: *Степанов Дмитрий Витальевич (RU), Усовик Игорь Вячеславович (RU)*

Заявка № 2018662306
Дата поступления 06 ноября 2018 г.
Дата государственной регистрации в Реестре программ для ЭВМ *03 декабря 2018 г.*

Руководитель Федеральной службы по интеллектуальной собственности

Г.П. Ивлиев





"Space debris prediction and analysis (SDPA) model. The program is designed to evaluate a space debris flow in relation to the SC operating on the specified orbit". (Certificate of State Registration of a Computer Program No. 2018665226, right holder: the Russian Federation represented by the State Space Corporation ROSCOSMOS). It complies with the updated National Standard GOST 25645.167-2005

Space Debris Simulation Activities
Computer Program

РОССИЙСКАЯ ФЕДЕРАЦИЯ

СВИДЕТЕЛЬСТВО

о государственной регистрации программы для ЭВМ

№ 2018664690

Модель для прогнозирования и анализа космического мусора - Space debris prediction and analysis (SDPA). Программа для расчета потока метеороидов относительно КА на заданной орбите

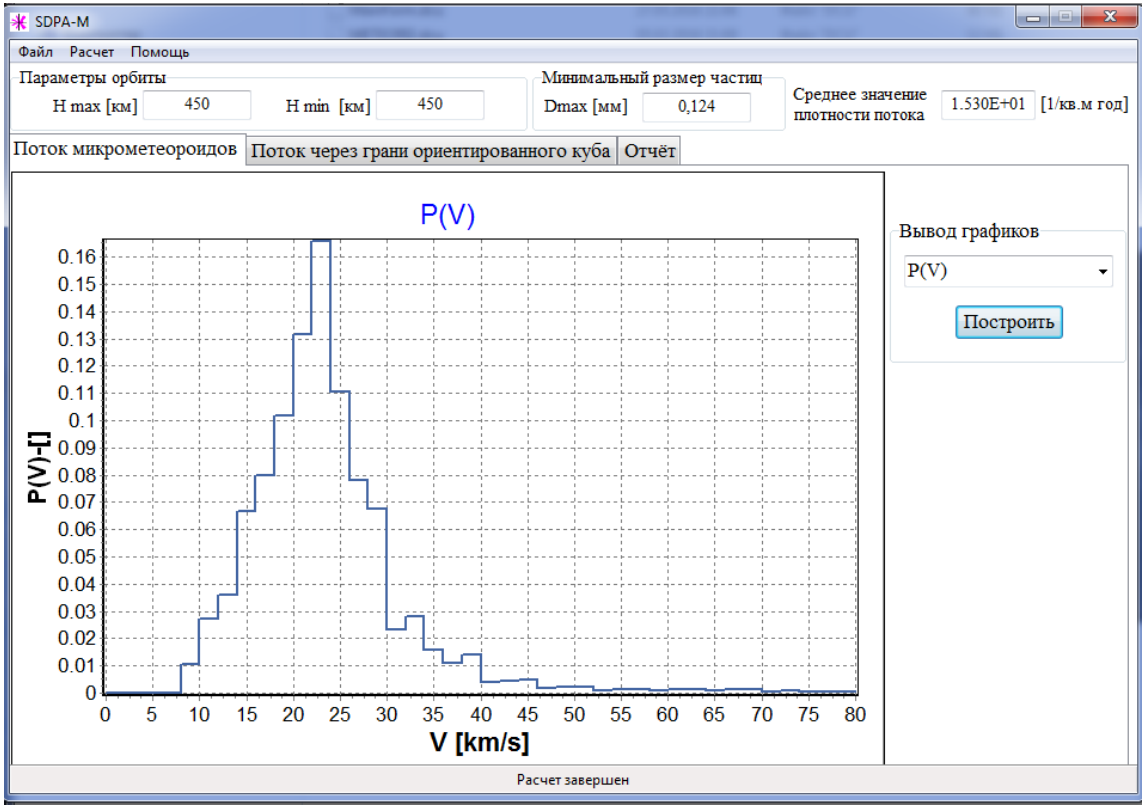
Правообладатель: *Российская Федерация, от имени которой выступает Государственная корпорация по космической деятельности «Роскосмос» (RU)*

Авторы: *Степанов Дмитрий Витальевич (RU), Усовик Игорь Вячеславович (RU)*

Заявка № 2018662322
Дата поступления 06 ноября 2018 г.
Дата государственной регистрации в Реестре программ для ЭВМ *20 ноября 2018 г.*

Руководитель Федеральной службы по интеллектуальной собственности

Г.П. Ивлиев



"Space debris prediction and analysis (SDPA). The program is designed to evaluate a meteoroid flow in relation to the SC operating on the specified orbit". (Certificate of State Registration of a Computer Program No. 2018664690, right holder: the Russian Federation represented by the State Space Corporation ROSCOSMOS").

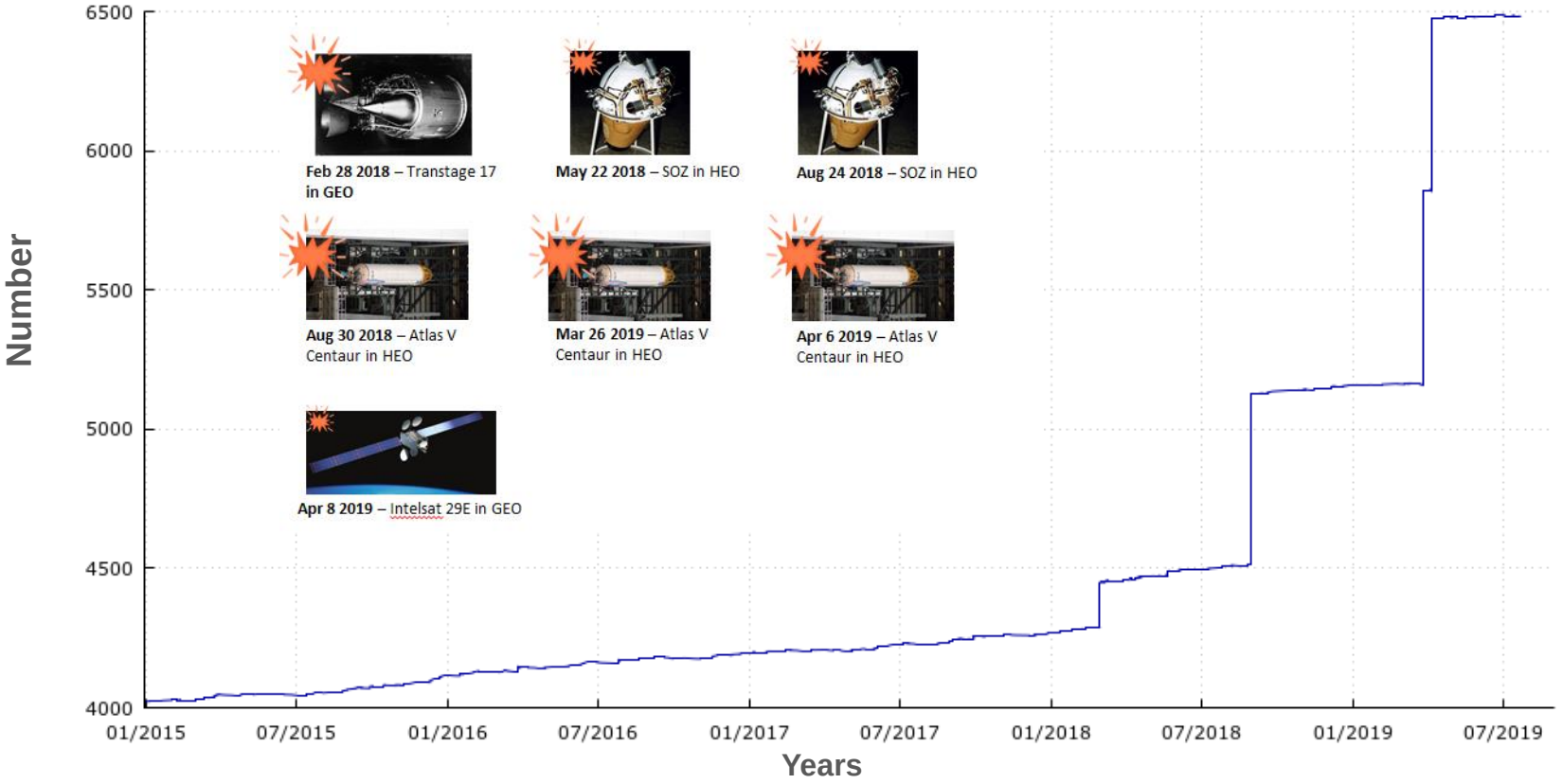
Warning of Hazardous Situations

In 2019, Automated Warning System on Hazardous Situations in Outer Space (ASPOS OKP) detected :

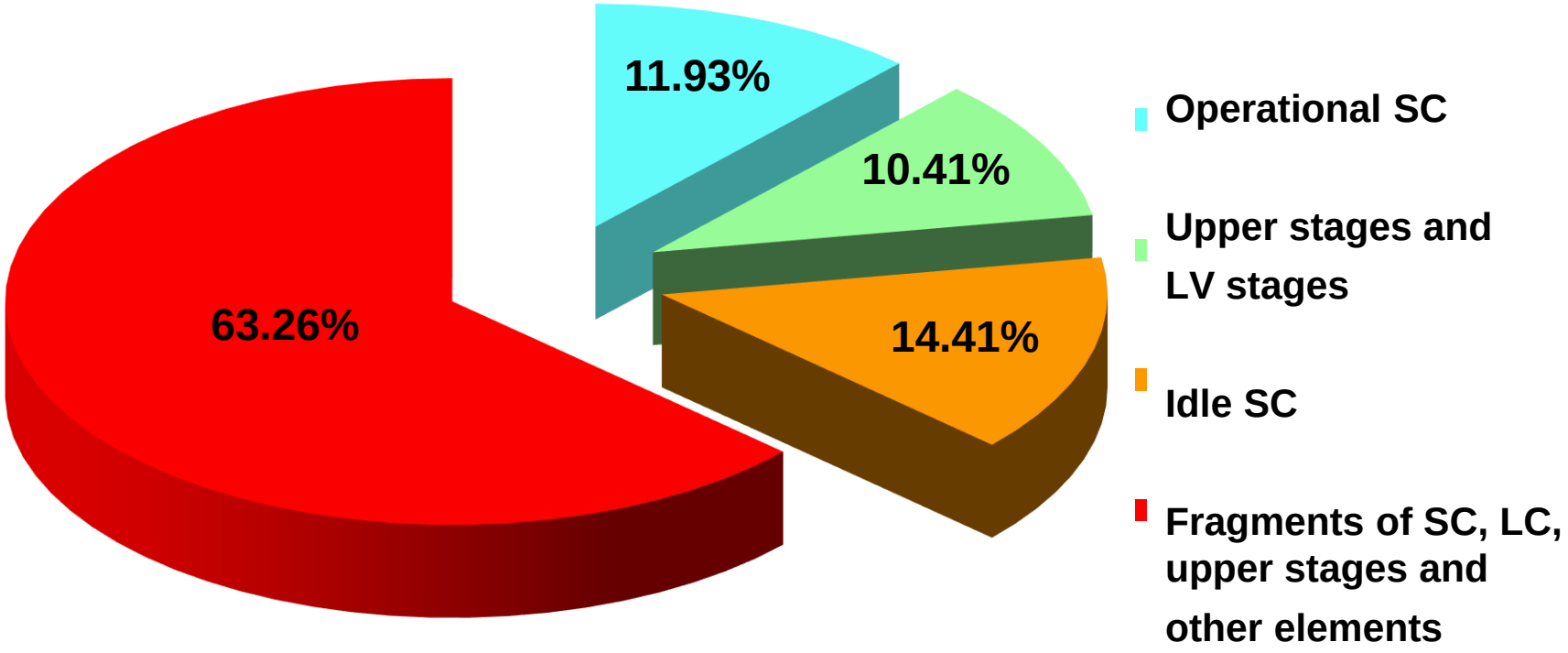
•63 identified violations of ISS 4-kilometer safety radius and 2,075 cases of dangerous fly-bys made by SD objects trespassing 1.5-kilometer safety radius of monitored spacecrafts which make part of the Russian orbital constellation
•in addition to the space objects put into orbit in 2019, ASPOS OKP detected more than 100 unknown high-orbit space debris fragments, including fragments created in the process of the US Centaur upper stages destruction (international codes 2014-055B and 2018-079B);
•in 2019, ASPOS OKP performed ballistic monitoring of 102 potentially-hazardous space objects deorbiting. The calculation data forecasting space objects impact time and area was provided to ROSCOSMOS Central Information Unit.

•In 2019, ASPOS OKP detected 9 SC deorbited to the disposal orbit (1 – US, 2 – ESA, 2 – China, 1 – Japan, 1 – Canada, 1 – Greece, 1 – Norway)

Number of High-Orbit Space Debris Objects according to measurements



Percentage Breakdown of Detected Space Objects by Type



Summary

The Russian Federation supports international efforts to mitigate space debris and takes practical steps to minimize SD growth in near-Earth space based on voluntary implementation of national instruments which comply with the UN Guidelines on space debris mitigation.

The Russian Federation is convinced that the Space Debris Mitigation Guidelines adopted by the United Nations will contribute to better mutual understanding and will help to prevent potential conflicts in space.

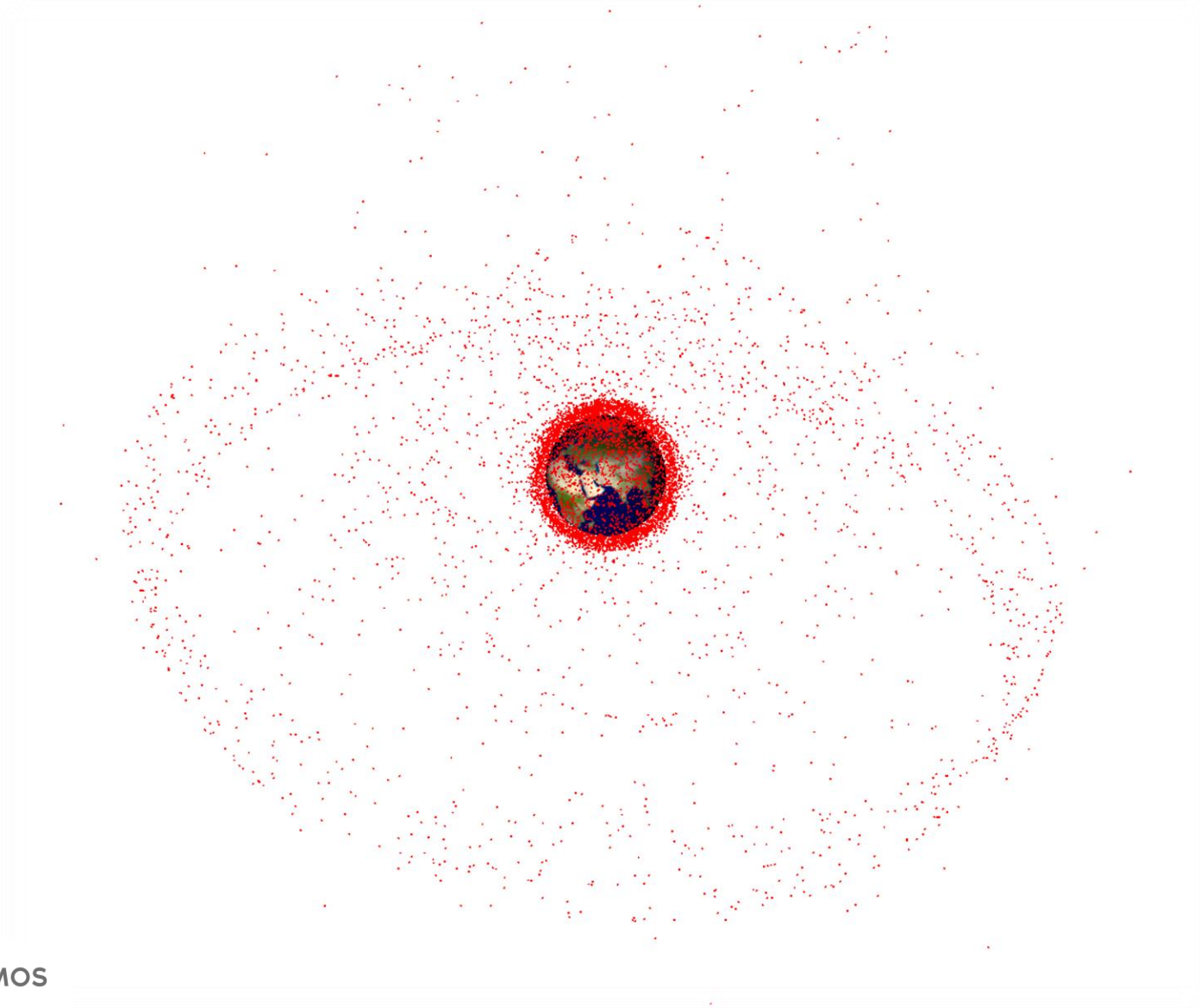
The main promising SD mitigation activities are as follows:

- **Research new methods and means to deorbit non-operational SC and discarded LV stages to disposal orbits, active debris removal methods;**

- Develop and take measures on SC and LV stages passivation along with other measures on SD mitigation;

- Enhance functionality of the Russian SDPA model and perform its continuous update.

Thank You for Your Attention!



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