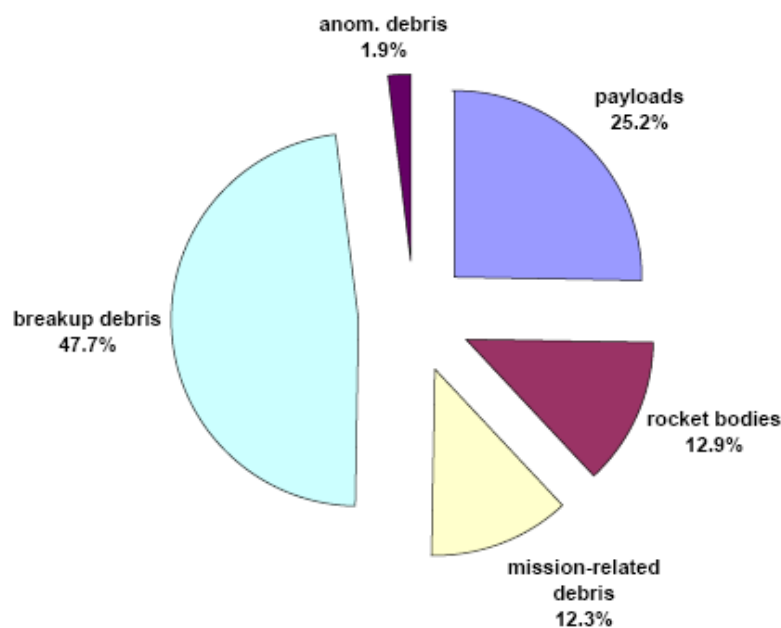


**International exchange of information on predictable dangerous situations in outer space as a new possible transparency and confidence-building measure in space activities**

Traditionally, the Russian Federation has been seeking to ensure security in outer space, while transparency and confidence-building measures (TCBMs) in outer space activities are an important element of this policy. TCBMs create an atmosphere for promoting a draft Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects (PPWT), tabled on 12 February 2008 by the Russian Federation and the People’s Republic of China for the consideration of the member–States of the Conference on Disarmament. In this regard, the Russian Federation has annually proposed to the UN General Assembly a draft resolution on “Transparency and confidence-building measures in outer space activities”. Its purpose is to encourage States to submit to the UN Secretary General their specific proposals on international outer space TCBMs.

Certainly, these measures are not an absolute. On the contrary, we proceed from the fact that they must evolve according to the current situation in outer space. This understanding is reflected in all resolutions on TCBMs.

Recently, we have faced quite a complicated situation in outer space. Space is becoming an environment increasingly congested with space vehicles, upper stages of carrier rockets and boosters, operational elements serving for on-orbit placement of space vehicles, fragments of space debris etc.



**Picture 1. Composition of space debris**

Nowadays, outer space control systems track up to 20 000 objects in the near-Earth space orbits. There are also dozens of thousands of smaller objects (whose size is between 1 and 10 cm) and several million objects of less than 1 cm. Space debris grow in number very rapidly. A space debris field has formed around the Earth becoming an integral part of outer space environment.

One of the features of man-made pollution of the near-Earth space environment is that the highest density of space debris is in the areas of the most trafficked space orbits of the Earth's artificial satellites.

The most problematic areas are: 350-450 km – altitudes of manned flights, 700-1500 km – actively trafficked altitudes, and, finally, altitude of geostationary orbit.

Such situation in outer space creates conditions for dangerous incidents, including collisions of space vehicles with one another and with space debris.

The issue of the International Space Station's security requires particular attention. The Russian Space Agency detected in 2008 about 80 dangerous approaches of the International Space Station to man-made space objects at a distance of less than 30 km. In 2006 were prevented 8 dangerous approaches, in 2007 – 11, and in 2008 – 41. On 12 March 2009, the 18<sup>th</sup> International Space Station crew had to temporarily stay in the Soyuz Space vehicle attached to the Station, because of the threat of collision with a fragment of space debris which passed the station at a distance of 4.5 km.

According to some experts' estimates, the level of man-made pollution of outer space has already reached a critical point and the situation on the near-Earth orbits may lead to an uncontrolled growth of space debris that would continue even if all space launches were stopped.

We all witnessed a space collision between the Russian satellite "Cosmos -2251" and the American space vehicle "Iridium – 33" that happened on 10 February.

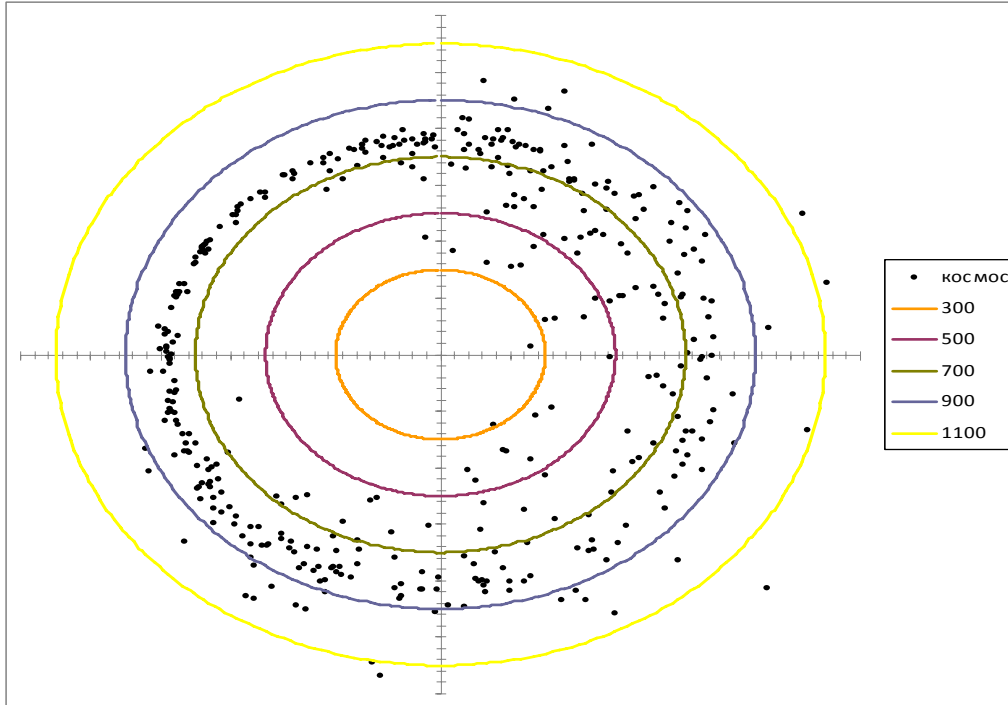
**Table 1. Technical data on the collision of space vehicles  
"Cosmos-2251" and "Iridium-33"  
(10 February 2009)**

Technical data	Space vehicle "Cosmos-2251"	Space vehicle "Iridium-33"
Country - owner	Russia	USA
International registration number	93036001	97051003
Date and place of launch	16 June 1993, Space Center "Plesetsk"	14 September 1997, Space Center "Baikonur"
Mission	Communication satellite with military purpose	Commercial satellite ensuring mobile telephone service
Total weight, kg	900	680
Orbital parameters (as of 10 February 2009):		
Orbital period, min.	100	100
Orbit inclination, deg.	74	86
Apogee altitude, km	830	800
Perigee altitude, km	790	790
Geographical coordinates of the collision point:		
Longitude	97 deg. 55 min. of eastern longitude	
Latitude	72 град. 30 min. of northern latitude	
Geographical area	Taimyr Peninsula, 150 km to the north-west of Khatanga city	
Number of fragments	505	194
	(concentrated in two separate debris fields)	
Technical data	Space vehicle "Cosmos-2251"	Space vehicle "Iridium-33"
Orbital parameters of space vehicle's fragments:		
Orbital period, min.	96-107	99-103
Orbit inclination, deg.	73,9-74,2	86-87
Apogee altitude, km	763-1437	790-990
Perigee altitude, km	369-788	660-790
Additional information	In February 1995, after its scheduled mission was over, was removed from the list of Russian orbital space assets	Operational at the moment of the collision. Carried engines and a fuel tank on board to make space corrections.

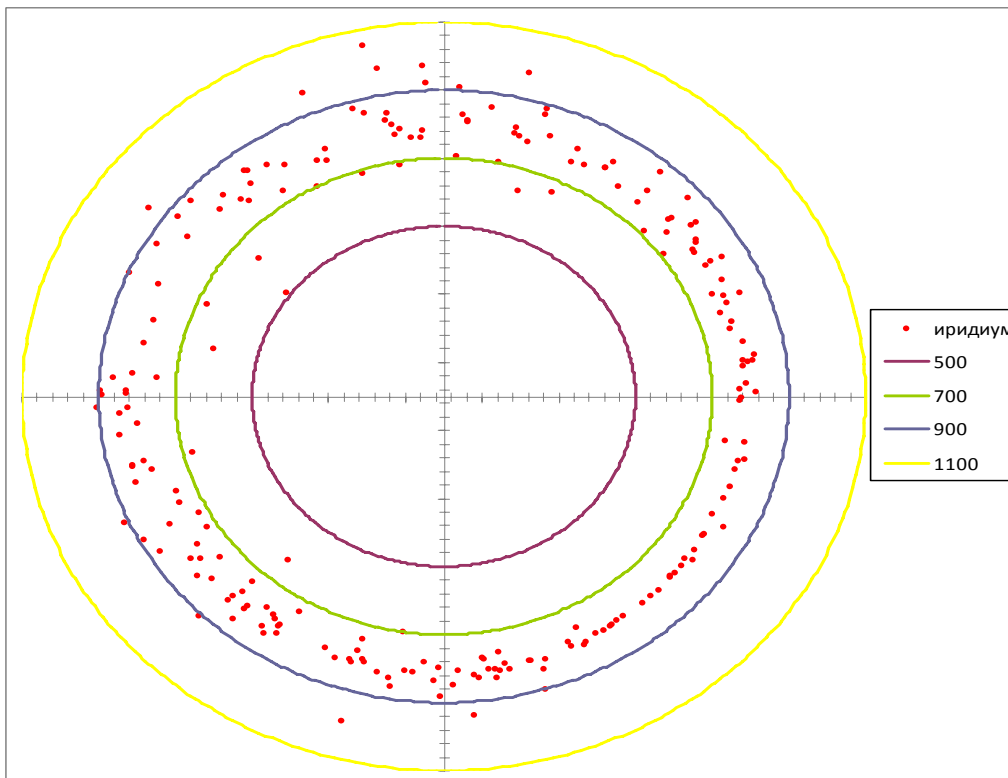
The American commercial satellite "Iridium – 33", whose purpose was to ensure mobile telephone service, was launched on 14 September 1997 from "Baikonur" Space Center. Its weight was 680 kg. The satellite carried the necessary equipment on board to make space corrections. So we may presume that there was a possibility to promptly avoid the collision. However, it is known that this satellite was not included in the list of the American space objects which the US space control system uses to track dangerous approaches.

The Russian space vehicle "Cosmos – 2251" was a communication satellite used for military purposes. Its total weight was 900 kg. It was launched on 16 June 1993 from "Plesetsk" Space Center. In February 1995, after its scheduled mission was over, the satellite was removed from the list of Russian orbital space assets and switched off.

The Russian outer space control system detected up to 700 fragments generated after the collision and destruction of these satellites.



**Picture 2. Distribution of identified "Cosmos-2251" fragments in the orbital plain**



**Picture 3. Distribution of identified "Iridium-33" fragments in the orbital plain**

The described incident was not the first collision of space objects in the near-Earth orbit.

The emergency incidents that have already happened or may occur in future are the following: atmospheric re-entry followed by the ground impact of large pieces of space vehicles, unauthorized placement of a space vehicle in outer space posing a threat to other countries' space vehicles, space vehicle's drifting from the control area (e.g. into a geostationary orbit), collision of an active satellite with a non-operational one or with a space debris fragment, collision between space debris fragments.

This revealed urgent necessity to strengthen control and prediction of the situation in the near-Earth space environment, including prediction of dangerous incidents, as well as the importance of involving into this process as many space-faring nations as possible. There are only two systems in the world capable of monitoring quite effectively the situation in outer space - outer space control systems of the Russian Federation and of the United States of America. The third system – of the European Union – is currently being created.

A number of States – Norway, Finland, Switzerland, Germany, France, Great Britain, Chili, Brazil - do not have their own outer space control systems but possess some surveillance capabilities. Combining surveillance data received from different countries could considerably enhance the volume and accuracy of the important information on the situation in outer space.

Some emergency situations simply couldn't be successfully resolved without sharing measuring data. History proves efficiency of such cooperation carried out, for example, while tracking atmospheric re-entry of space vehicles followed by ground impact of large pieces of space debris.

Taking into consideration the above-mentioned and in the implementation of the UN General Assembly resolution 63/68 the Russian side is preparing a new proposal on TCBMs in addition to those earlier submitted to the UN Secretary General. We consider the following additional measure to be helpful – international exchange of information on predictable dangerous situations in outer space. The implementation of such measure could include, among other things, informing the interested States and international space institutions about the current situation in outer space, dangerous incidents predicted for a certain time period like approaches and possible collisions of space objects, their uncontrolled de-orbiting, pre-planned maneuvers of space objects. This information could be provided on the basis of an appropriate exchange mechanism in agreed volume and format and, if necessary, could be corrected in a prompt manner. Later, in case the Russian proposal is approved for implementation at the international level, the question would come up of possible sources, volumes and formats of the information provided, mechanism of information exchange, etc.

Therefore, we hope that the international community will support this new proposal.