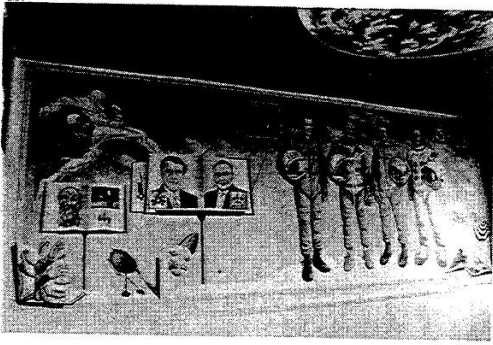
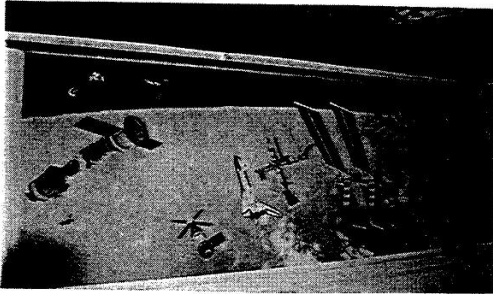


From Competition.....



....To Cooperation



MURALS FROM THE RCC "U.S. & RUSSIA SPACE LIBRARY"  
TO BE OPENED BY VALENTINA TERESHKOVA AND RUSSIAN &  
AMERICAN ASTRONAUTS AND OFFICIALS, SEPTEMBER 19, 2001

The Russian Cultural Center is an agency of the Russian Government and is created pursuant to a bilateral agreement between the U.S. and Russia, providing for cultural centres in both countries. The Friends of the RCC is an American 501(c)(3) nonprofit supporting organization.



«ГОДАМИ» - «LET'S GO!» YURI GAGARIN, APRIL 12, 1961

1961 - 2001

Russian Cultural Centre and Friends of the RCC  
Present

From Competition to Cooperation:  
U.S. and Russia Achievements in Space

April 25, 2001

Embassy of Russia ♦ Washington, D.C.

This event made possible in part by the generosity of TYUMENAVIATRANS



#### ROUNDTABLE AGENDA

### From Competition to Cooperation: US and Russia Achievements in Space

In commemoration of the 40<sup>th</sup> Anniversary of the Flight of Yuri Gagarin

Embassy of the Russian Federation  
Wednesday, April 25, 2001, 4-6:30 PM

Welcome: His Excellency, Yuri Ushakov,  
Russian Ambassador Award to US Astronaut  
Dr. Michael Foale

Conference moderator: Dr. Peter Rollberg  
The George Washington University

- I. Mankind's Breakthrough Into Space: From Gagarin's Pioneering Flight to the ISS  
Dr. Nikolai Anfimov  
Director TsNIIMASH

US-Russian Cooperation and  
Development of the International Space Station  
Dr. John Schumacher  
NASA Deputy Administrator

- II. Space Stations: The Scientific Vision  
Dr. Georgy Karabaedzhak  
TsNIIMASH

*Intermission*

⌘

Remarks: Natalie Batova  
Director, Russian Cultural Centre  
Lloyd Costley  
Chairman, Friends of the RCC

- III. Mir Space Station Deorbit Strategy  
Dr. Andrey Tsvetkov  
Deputy Director TsNIIMASH  
Visual screen presentation

- IV. Challenges for Globalization and Commercialization of  
Astronautics  
Dr. Bohdan Bejmuk  
Boeing SeaLaunch Program  
Dr. Andrey Tsvetkov  
Deputy Director, TsNIIMASH

- V. Questions from the audience and the press

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*Under the Gracious Patronage of  
Russian Ambassador Yuri V. Ushakov*

*Participants are Cordially Invited to*

*The Ambassador's Reception*

*Immediately Following the Roundtable*

⌘

# The Challenge for Commercialization and Globalization of Astronautics.

## View from Russia ■

Dr. Andrey Tsvetkov,  
Member of Russian Academy of Cosmonautics  
Deputy Director General, TSNIMASH-Export

### 1. Introduction

Space technology is a very young area of mankind activity. It was born just 50 years ago and it is not surprising that the world society still does not have a clear notion about present potential and future of Astronautics, about its real impact to Mankind evolution.

Let's remember the past experience of the space history. The first artificial satellites, the first manned flights to the space orbit and to the Moon, the Solar system unmanned exploration and many other projects were performed by the two main space powers the USA and the USSR. However both countries have concentrated their efforts mainly on the national pride projects to achieve the priority in the scientific, technical and military fields at any cost .



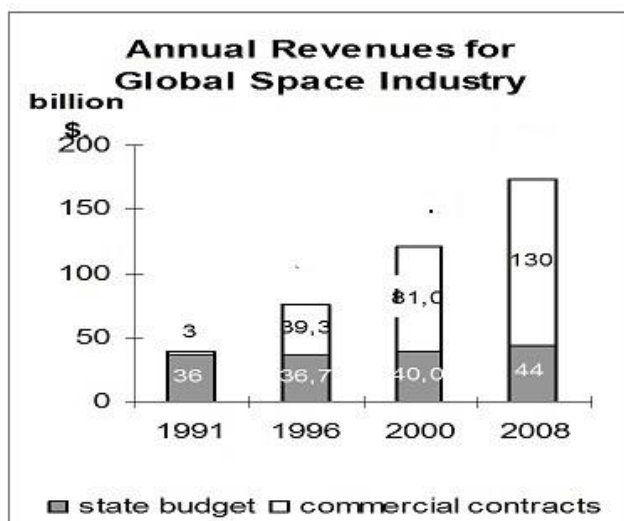
The disintegration of the Soviet Union in 1991 led to the fundamental changes having the system nature, which are caused by the cardinal changes of the world political and economical climate.

Due to these changes the tight international cooperation in space, commercialization and globalization of space activity became an everyday life reality.

Ten years have passed from 1991 but we still do not have an answer on actual question - what is commercialization and globalization of Astronautics – is it a new progressive phase of Astronautics evolution

directed to provide Mankind sustainable development or is it a Pandora's box which is available to destroy our Civilization in future?

In spite of the first step to Global space market was made by the USA as early as 60-th years in telecommunication area (Telstar and Intelsat satellites) and later on in 80-th European launch vehicle Arian has opened successfully the commercial launch service market, just last decade became a real explosion of Global Space Market. From 3 B\$ to 81 B\$ - this is an incredible annual growth of commercial revenue for last ten years with 130B\$ forecast at 2008.



The Astronautics becomes rapidly the world-wide economic branch of the naturally function, which is subjected to its main laws and tendencies. Certainly, commercialization of a former government driving branches and also the globalization processes actually are the most important tendencies in global economy and particularly in Astronautics as well. The commercialization processes stimulates the space branch economic activity and becomes the powerful engine of the Astronautics progress directed to develop the commercial programs as well as the governmental programs.

Total revenue	~1500 billion \$.
ISS constr.& maint. (Until 2014.)	~ 100 billions.
Launch service	40 billion\$.
Spacecraft manufacturing	100 billions.
All types of on-ground facilities, infrastructure	300 billion \$.
Information & technical services	960 billion\$.

The role of the state influence at the Astronautics development turns from the total directive control to the functions of a strategic coordinator, R & D works accelerator, customer of services which can be provided by independently developing space industry.

The forecast of Global Space Market for next ten years shows that revenue can be assessed at 1500 billion USD. Millions of high educated scientists and professionals, the best human resources from different countries are involved and will be involved to the Space Activity.

The analysis of the positive and negative experience of the commercial space projects shows that first of all the success comes not from completely new markets but in case the space technologies are able to be built into the existent and developing markets as a natural addition. The development of the space segment of the global information infrastructure based on convergence of the different information flows like communication, Earth observation, positioning, digital DTH radio and TV, voice and visual telephony, Internet etc. into multimedia trunk will be the space market driving force in the next 10 years.

Exactly the servicing have to be the main generator of Space Industry income (about 60% of total). The added value at this market segment can be generated with the minimum risk, minimum power and material-consuming but with the maximum profit. Space industry hardware (launch vehicles, satellites, ground facility etc.) will be not the main share of future income but it will be a bridge to a future revenue of space servicing global market. The incredible institutional processes inside of the global space industry starting from huge merging up to non-convenience acquisitions by space industry leaders of software producer's can be explained by a strategy to loop and to optimize the space product and added value making from hardware to servicing and to provide the best competitive positions not so much at national as global level.

Nevertheless the above business forecast for the space industry is just the top of the Iceberg, because indeed the space related segments of economy can not be assessed properly right now. However it is absolutely clear that in future the Mankind economy will be not restricted by Earth borders only.

People feels squeezed on Earth right now, and solar system economy will be not a short-term but a mid- and long-term future.

The further perspective of space business undoubtedly have to be the development of commercial programs in the space manufacturing, space power engineering, extraterrestrial raw material resources extraction and remaking, space entertainment business etc.

It is evident, that the further successful large-scale space program development needs the investment of the enormous scientific and technical, economical, intellectual etc. resources is impossible if there is no effective international cooperation organization, which is, as it shows the experience of last ten years, the more progressive form of the space project performance.

## **2. The general analysis of problems of international cooperation.**

In spite of evident advantages of International cooperation, the future of space market is a big question. How long we can work together successfully and reliably?

I'd like to remind just one well-known problem of Mankind sustainable development which is coming soon.

As far as 30 years ago our world got the first signals from famous scientists about coming depletion of raw and energy resources, drastically growth of ecology problems while the world population have to increase (It is enough to remind you the famous report to the Club of Rome "The limits of Growth").

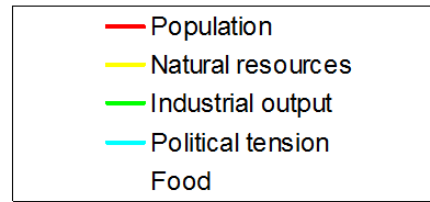
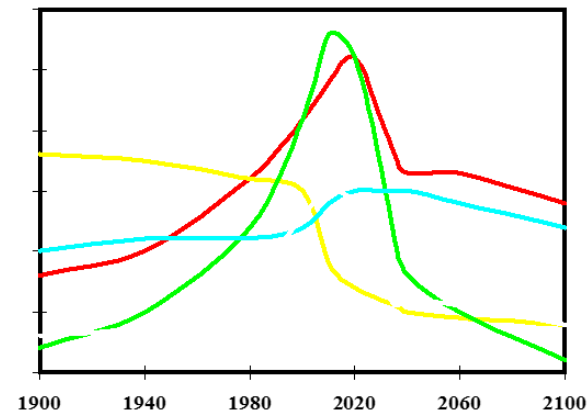
According to "Meadows world development models (world 3-91)", which was improved by scientists from Russian academy of Sciences, the period of drastic crisis phenomena's growth should come after 2020. This forecast is a very reliable because the simulation is based first of all on world population growth, which can be predicted very well.

This forecast is not a theoretical discussion anymore, it becomes a basic statement for elaboration of National and Global Security policies in all leading countries, and international organization, including United Nation.

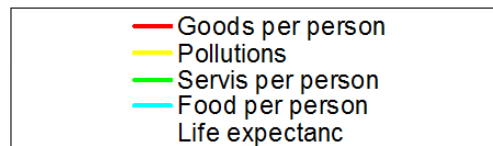
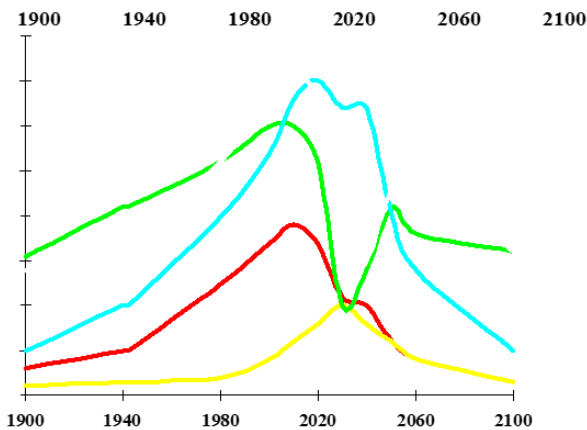
In accordance with the forecasts not more 1 billion of future 8 billion world population in period after 2020 can be supplied with the people life requirements complied to technology ability. It's so called the problem of "Golden billion" of world population. But who wants to be outside of "golden billion"? – United States, Europe, including Russia, or China, India, Asia – Pacific region countries which have more than billion or closed to billion population right now.

Therefore the problems of natural limit of biosphere and natural resources, man-caused impact to the Nature, presence of different countries development disparity is growing up very fast and they cannot be overcome easily.

## Forecast of Global crises growth (2020-2030)



Meadows Model World 3-91  
(improved version, RAS, 1995)



It seems that at present time Mankind stays in the face of bifurcation of solution – either harmonized Mankind sustainable development or geopolitical confrontation of multi-polar world with the threat of global conflict. In both cases the Astronautics and space technology can play the key role.

At the first case the Space technology can provide us with a breakthrough technology for economy, new energy and raw resources from space, ecology monitoring and management from space, utilization of hazard vests into space, placement of dirty production like metallurgy, power stations and some others beyond the Earth and so on. In this case the space market will be really boundless.

At the second case the commercialization of Space technology becomes like Pandora's box, because military application of Space technology will create the unachievable illusion of a super power and will provoke finally the global conflict.

To restrict any big conflict impossible at the local level, because we live in the single world with the common atmosphere, biosphere, water resources, techno sphere, including global information space and so on.

International cooperation in space, first of all the international cooperation of leading space countries as not only USA, Russia, European Community, Japan but also China, India and many other country in the frame of crucial large scale commercial and non-commercial space projects presents as a most important basement for non-proliferation of nuclear and rocket space technology, for improvement of affordability of space projects due to reduction of project risks. International Space Station is a first pilot Large Scale space project. New reusable space transportation systems, global multilevel multimedia space informational trunk, developing of Moon resources, Mars exploration, Space tourism industry have to be the next international large scale projects in XXI century.

What is the main problems of International cooperation?  
 Mainly it is not technical but humanitarian problems.

**First of all** these are the problems of the development of the principles of the partnership with equal rights, harmonization of the principles and standards in business technology, space economics, legislation, technical standards. Some difficulties are also in culture and language differences.

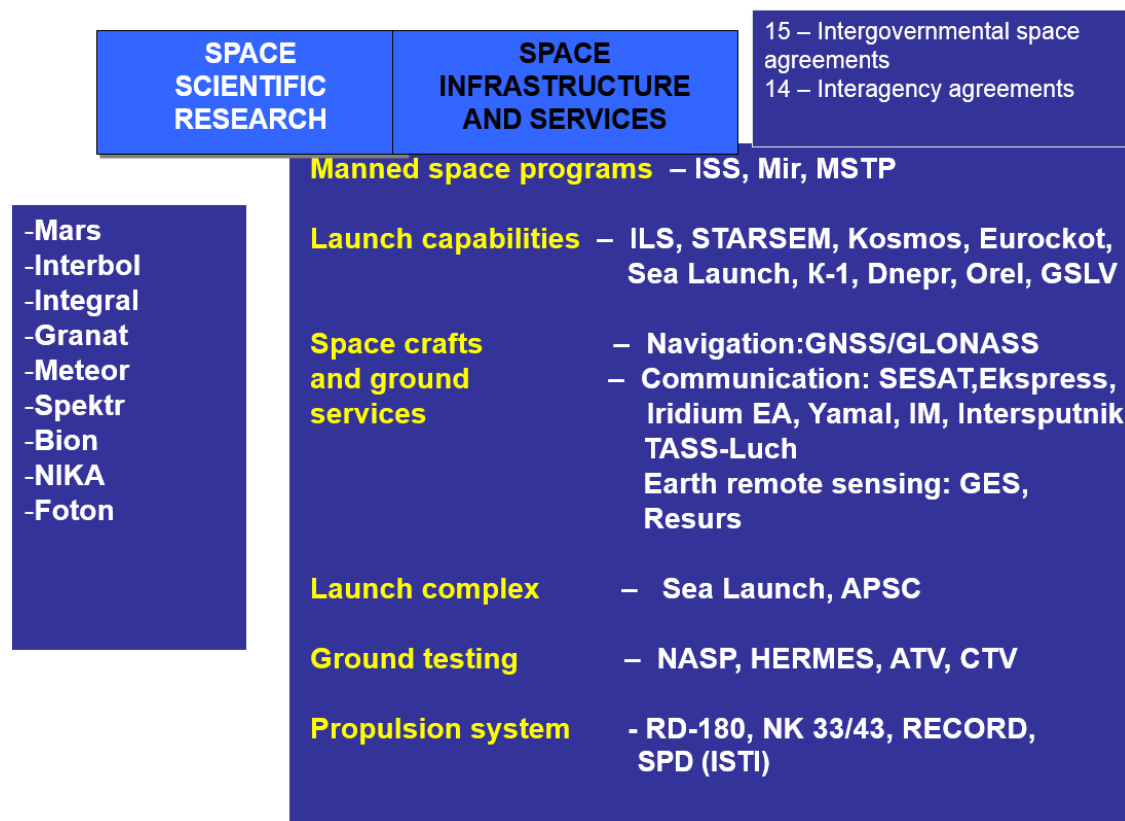
**The second** large package is made by the problems of the missile technology proliferation control and also of the dual use technology control.

### 3. The Russia cosmonautics integration into the international space market. The assessment of results and perspectives.

In spite of the last ten years difficulties we believe, that Russia keeps sufficiently powerful scientific and technical potential and a high competitive level in the key space technologies field continuing the investigation and development in all main space activity branches as before. The involvement of Russian enterprises and organizations into many widely known space programs and projects confirms those.

In the frame of international cooperation Russia has got opportunity not only to survive but to improve its competitive advantages in all key direction of space technology: manned flights, new generation of long-life and power satellites, new generation of launch vehicles, ground stations, development of experimental ground base, new scientific fundamental and applied research.

## INTERNATIONAL COOPERATION OF RUSSIA



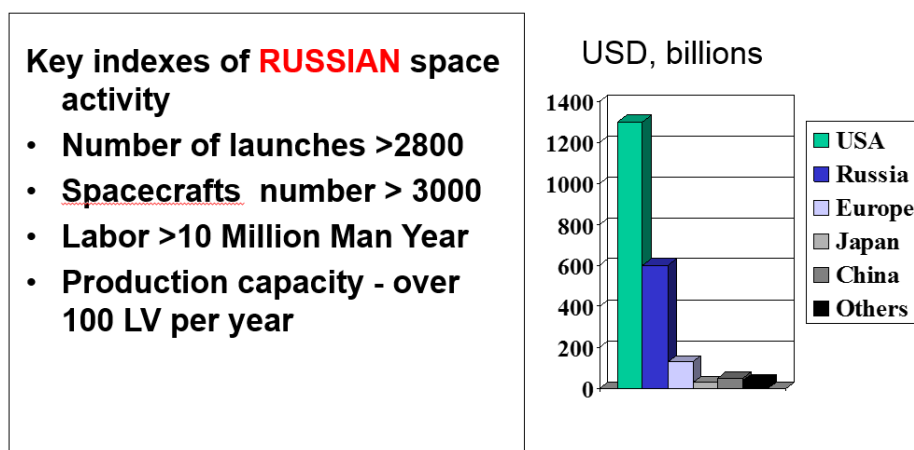
What can be the commercial future of Russian space industry?

According to our system analyst's data only two countries in the world Russia and the USA have as before the scientific and technical and industrial potential and the all necessary technologies to realize the space projects in any space activity branches.

The scientific and technical achievements of the Russian cosmonautics during its more than 50 years development history are well known enough and perhaps need no detailed commentary.

It is less known, that the Russian economists value the laboriousness of the national space potential creation in Russia over 50 years, including the costs for the science, technology development, R & D work, production and technological and experimental base creation, its operation, education and investments in people. That work investment assessment allows to evaluate the total input in Russian cosmonautics estimated in 2000 USD around 600 billion USD. The evaluation of the investments in the US cosmonautics shows the analogous order of costs.

## ASSESSMENT OF WORLD SPACE LEADERS EXPENSES ON COSMONAUTICS, USD 2000 (cumulative expenses since 1960)



10 years ago just a couple tens of countries had a space budgets. Right now more than 150 States have expenditures for space activity in their budgets. 10 countries have independent access to Space.

Today the USA is a main commercial partner of Russia. However looking to the figures of Russian expenses, 30 % of which are the R&D results in space technology, patents, know-how and other non-material assets, and comparing it with the size of space expenses in other countries we can be sure, that most of countries presents a very prospective commercial market for space technology, especially on “key turn” terms.

However it's evident for us that those prospects cannot be realized without mitigation of international cooperation risks, connected with such fundamental risk categories as technical, economical, commercial and political risks. We have to add the missile technology illegal proliferation to this list specially.

Risk mitigation policy based on general improvement if Russian economical and political stability, quality of management, advanced management technology implementation right now are the key tasks of Russia's integration into the global space market

10 years experience of our international cooperation, filled in not only with successes but also with the big mistakes and losses give us the confidence in future prospective of Russia as a part of a world family of nations, which is responsible for mankind sustainable development.

## CONCLUSIONS

### VIEW OF RUSSIA ON THE BENEFIT OF INTERNATIONAL COOPERATION

International cooperation is the most progressive and prospective form of the commercial and joint space projects performance, which rising up their economical feasibility, affects on scientific and technical progress of project participants, promotes the political stability of the world. Russian space potential is the appreciable contribution to the world space market buildup.

However the International cooperation risk mitigation needs to harmonize the national principles and standards in project management, space economics, technical standards, MTCR improvement.