Office of Naval Research

# ONR Global

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## Russian Regional Discipline Team
## Newsletter No. 1

**St. Petersburg Shipbuilding and Science Institutes**
**International Maritime Defense Show**
**John Paul Jones Memorial Ceremony**

**Authors:** **CAPT James Campbell, Commanding Officer**
**James DeCorpo, Associate Director, Policy**
**Raymond Greene, Intellectual Property Counsel**
**Kyrill Korolenko, Associate Director, Sensor Technology**
**Howard Marsh, Associate Director, Information Technology**

*These reports summarize global activities the Office of Naval Research Global (ONRG). The complete listing of newsletters and reports are available under the authors' by-line on the ONR Global homepage:* http://www.onrifo.navy.mil *or by email to respective authors*

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## Keywords

*Krylov Shipbuilding Research Institute, MORPHYSPRIBOR Underwater Technologies, St. Petersburg Institute for Informatics and Automation, International Maritime Defense Show, hydrodynamics, acoustics, sonar, torpedoes, sensors*

# Summary

The Commanding Officer lead a seven-member team of key ONR Global staff members to St. Petersburg, Russia as an initial effort to establish contacts and liaison for an ONR Global presence in Russia. Visits were completed to several scientific facilities in St. Petersburg, Russia including ***KRYLOV Shipbuilding Research Institute***, ***MORPHYSPRIBOR Underwater Technologies***, and ***St. Petersburg Institute for Information and Automation***. During the trip, we attended the ***International Maritime Defense Show***, held 25-29 June, meeting with numerous high-level military and civilian leaders. The Show displayed extensive Russian technology, some not previously publicly released, such as the ***Shkval*** supercavitating missile/torpedo advertised to have an underwater velocity of 100m/sec. In view of the technological expertise in the former Soviet Union and Admiral Cohen's intent to open up lines of communication, we made an initial evaluation of a follow-on to the current "virtual Russian office". We also attended the dedication of the ***John Paul Jones Memorial***. Admiral John Paul Jones served in both the US Navy during our Revolution and thereafter in the Russian Navy, the only person to hold the rank of Admiral in both nations.
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# Introduction

The Office of Naval Research Global is in the process of expanding operations to include additional areas and locations, and in particular, with the Russian Federation. As a first step, this summer we will establish a "virtual" Russian office, headed by COL John O'Neil, USMC (ret.) aimed at further cooperation with the Russian Federation. This trip was an initial visit for liaison and coordination with several research institutes and scientific facilities in St. Petersburg. Additionally, initial contacts were established at the International Maritime Defense Show (IMDS) with senior Russian military officials and senior scientific personnel. Additional contacts were made with Embassy personnel and Attaché personnel in both St. Petersburg and Moscow. Also contacts were made with ROSBORONEXPORT, the agency approving (or disapproving) the import and export of dual-use technology and equipment. It should be noted, however, that MORPHYSPRIBOR and KRYLOV Institute are Government Laboratories (as opposed to Academic institutions), and as such require prior government permission for to visits.
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# MORPHYSPRIBOR Institute

Morphyspribor Underwater Technologies is a specialty research institute focusing on sonars, underwater surveillance systems, and similar technologies. A briefing on the Morphyspribor mission and capabilities was provided by the Director, Y.A. Korykin. Most of the department heads attended the briefing, which was detailed and followed by a tour of the test facilities, including the world's longest tow tank. A similar, but smaller, facility in the US is the David Taylor Research Center at Carderock. Morphyspribor personnel were helpful and enthusiastic at the prospect of future collaboration with US scientists. Morphyspribor has been instrumental in the development of numerous systems, a sampling of which include:

Dr. Y.A. Korvkin

- High-precision ultrasound level gauge for sealed tanks
- Active and passive sonar systems, ships and subs (incl. towed arrays, thick and thin)
- High-precision ultrasound level gauge, operating through the 40-50 mm wall with temperature correction
- System of control of liquid and liquefied products on oil & gas and by-product production facilities, storage and quantity indication, port terminals and also control of residue of liquid and liquefied products on railway car re-assembly junctions
- System of control oil & gas products in the tanks during their storage and supply
- Flow meter, operating under high pressures
- System of combined acoustic action on productive zone of oil & gas wells
- Devices for search and control of the leakage of gas and liquids in underground pipelines, and
- Underwater surveillance system with transponders

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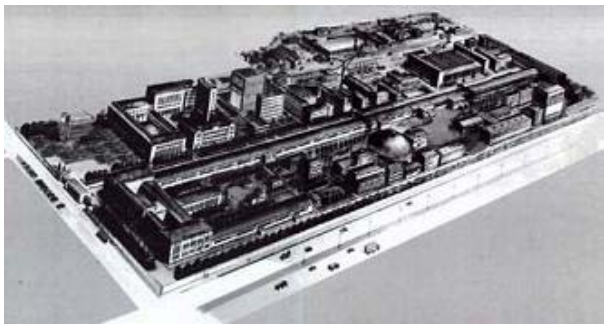
# KRYLOV Shipbuilding Research Institute

**The Director:** The Krylov Institute was established in 1894 as Russia's first hydrodynamic tow tank facility. Dr. A. N. Krylov was appointed the Superintendent in 1900 and the Institute was named after him in 1944. We met with the current director, ***Science Principal and Director Valentin Mikhailovich Pashin***. He is a member of the Russian Academy of Sciences, Doctor of Technical Sciences, Professor, State Prize Laureate, Hero of the Russian Federation. Dr. Pashin graduated from the Leningrad Shipbuilding Institute in 1960 and has since risen from an engineer to the KSRI Director in 1990.

# KRYLOV Shipbuilding Research Institute

**The Institute**: The site covers an area of about 200 acres with approximately 100 buildings housing and a large number of experimental test facilities. Krylov principals provided a familiarization tour of the main features including:

1. Large ***hydrodynamic model tanks*** with the total water volume of 250,000 $m^3$. The world's longest tow tank runs left to right roughly along the centerline of the graphic to the right. The rotating-arm basin, 70 m, in diameter was also demonstrated with a ship-hydro ski arrangement on a model approximately 16 ft. long.



2. Also in the facility is an ***ice model basin***; a 70 m - long ***vacuum tank*** for study of cavitation phenomena on hydrofoil fins and ship appendages that can not be modeled in conventional tanks, etc; cavitation and water tunnels for testing propeller and hydrofoil models; wind tunnels including low-noise (low turbulence with primarily laminar flow in the test section) for testing such devices as the ***Wing-in-Ground Effect*** vehicles; and test machines with loading capacities up to $3 \cdot 10^6$ kg for studies on the structural strength of ship materials and hull details.

3. ***Fatigue testing*** and cyclic load effects can be evaluated in a 48x24x15 meter test station to determine service life. Ultimate strength static tests can be conducted up to $1.5 \times 10^7$ kg with stress measurements taken at up to 8,000 points, simulating single and repeated dives to the maximum ocean depths.

4. A ***summary*** of the main R&D activities includes (a) ship hydrodynamics, (b) ship structural strength and vibration, (c) marine power plants, (d) nuclear, radiation and environmental safety, (e) ships acoustics, power plants and machinery, (f) electromagnetic and hydro-physical signatures and stealth technologies, (g) design search and automation. For additional information, please see www.ksri.ru/main.html.

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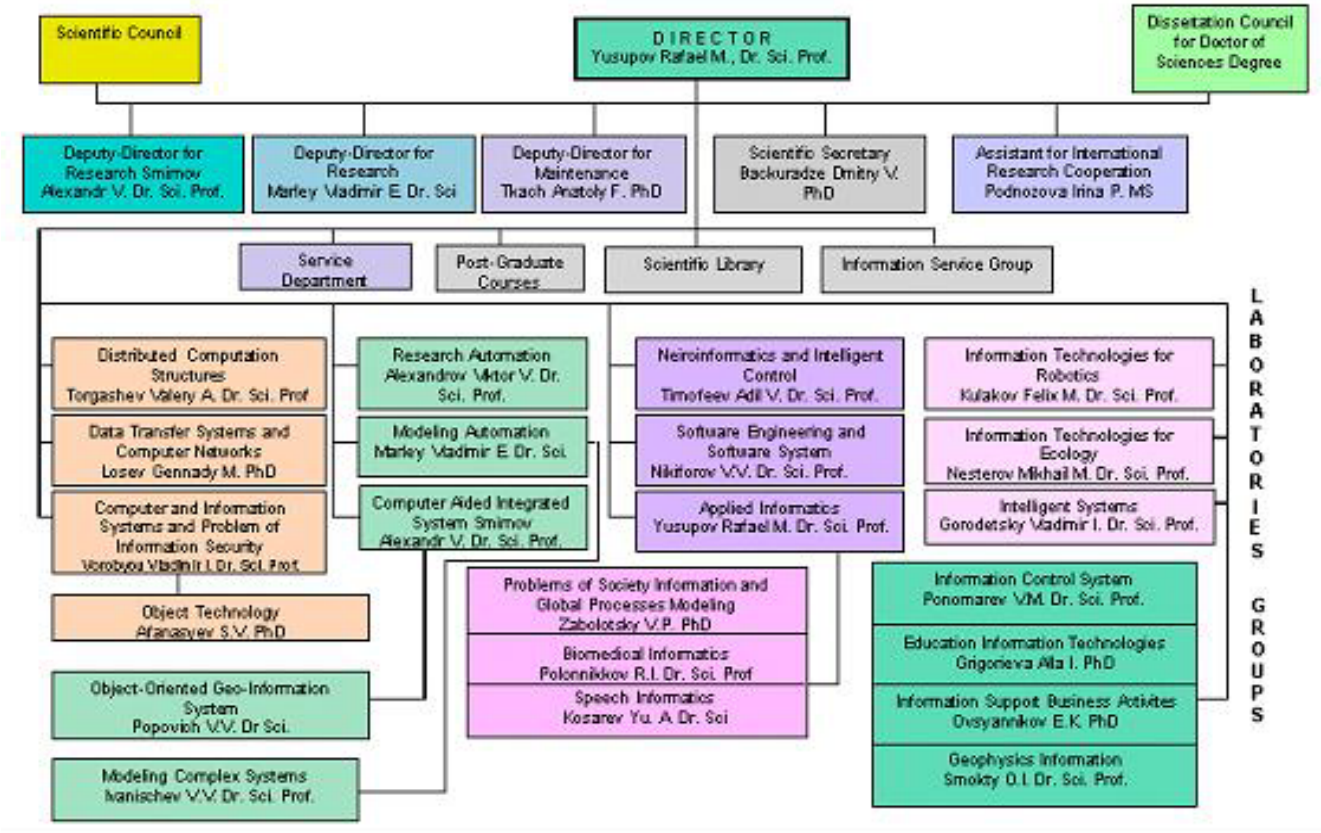
# St. Petersburg Institute for Informatics and Automation

**The Institute:** ***St. Petersburg Institute for Informatics and Automation*** of the ***Russian Academy of Sciences*** (SPIIRAS) was founded in 1978 with Professor V. M. Ponomarev as the institute founder and first director. We had an extended meeting and conference with the current Director, Professor Rafael M. **Yusupov**, Doctor of Engineering Sciences and the Honored Scientist of the Russian Federation and head of the Institute since 1991. A biography is available at:
http://www.spiiras.nw.ru/eng/about_us/director.html

SPIIRAS has had several notable achievements and seems to be a commercially viable operation. As examples, SPIIRAS developed (for the Norwegian State company, ***Stat Oil***) a radar system for surveillance and monitoring of oil drilling sea platforms; a system for automatic recognition of hand-written bank checks (for Laboratory of Research Automation); a system for "informatization" of the city of St. Petersburg and North-West region of Russia development. SPIIRAS has established worldwide contacts and collaborative ventures, including projects with EOARD (European Office of Aerospace Research and Development) and ONR Global. The principal managers and team leaders are shown below (viewable in *print preview* mode). (Return to Table of Contents)

**Organizational Structure**



# International Maritime Defense Show

The International Maritime Defense Show, held in St. Petersburg, Russia from 25-29 June 2003 in conjunction with the 300th anniversary of the city of St. Petersburg, was the first show of this type within the Russian Federation. A full range of maritime weapons and systems was displayed or demonstrated, some of which had not been released to the public before. Companies from all over the world involved in naval activity including research, design, manufacture, upgrading and service as well as suppliers of various systems, equipment, materials and services for Navy, maritime and defense industry provided displays covering:

**CAPT Campbell Aboard Russian Hovercraft**

- Naval shipbuilding
- Weapons, armament and weapon control systems
- Combat control systems, communication aids, electronic, radar and sonar equipment
- Propulsion plants, ship systems, equipment and gear
- Naval aviation (fleet and shore-based aviation)
- Navigation hydrography and weather support of the Navy operations
- Weapon systems of the Navy shore-based units and marines
- Infrastructure of the Navy support services
- Equipment for search and rescue operations
- Education and personnel training

The Show had exhibitions from over 320 exhibitors with 15 countries providing delegations and over 200 representatives from companies outside Russia. The ONR Global delegation met with many senior and VIP participants including General Director of the Russian shipbuilding agency, V. J. Pospelov.

We also were able to visit various ships and craft, high-speed beach landing craft, frigates, and the recently completed Indian frigate, *Trishul*.

# Visit to Indian Frigate, *Trishul*

ONR Global Staff members were afforded a tour and briefing on the systems aboard the Indian Ship, ***Trishul,*** courtesy of Captain Kreema, Indian Navy. The ***Trishul*** is the second of the three frigates, which the Baltiisky Shipyard is building for the Indian Navy. Final commissioning and hand-over was taking place during our visit.

The ship's length is 124.8 meters, width - 15.2 meters. The 4,035-ton-displacement frigate is capable of steaming at speeds up to 30 knots. It is armed with the Klab-N anti-ship missile complex with 8 self-homing missiles, an artillery complex, the Shtil-1 multi-channel naval middle-range anti-aircraft complex, the Kashtan anti-aircraft gun and missile complex, eight Igla portable anti-aircraft complexes, two torpedo launchers and a twelve-barrel bomb launcher. In addition, the frigate can carry one Ka-28 or Ka-31 naval helicopter.

***Trishul*** **in the Harbor at St. Petersburg**

Electronic equipment aboard the Trishul was stated to be of Indian origin. The electronics suite appeared modern (and miniature by comparison to older systems). A third ship, the ***Toofan***, is under construction.

The Baltic Shipyard is also in the process of building two destroyer-class ships for the Peoples Republic of China and is apparently conducting negotiations with Norway. Further information on the Trishul and other Indian Ships may found at www.bharat-rakshak.com/NAVY/Talwar.html

**ONRG Staff Tours the *Trishul***

# Russian Airfield Visit

Following a series of fly-bys with a variety of aircraft, and aerobatic demonstrations by the Russian Knights Aerobatic Team, IMDS participants were provided transportation to a nearby airfield where static aircraft displays were available. We also had a chance to talk to the Knights' aircrews and aircrews from the static displays.

***Russian Knights Aerobatic Team***

A large variety of aircraft participated in the IMDS. Among these aircraft were Russian naval aviation aircraft and other types, such as the Bear, several fighter aircraft, sea and land-based helicopters.

Static displays available at the show ground included numerous naval gun and Missile systems, electronic systems and the ***Shkval*** super cavitating underwater missile. This missile with a reported speed underwater in excess of 100 meters/sec. had been recently the focus of Russian security issues. (Particularly, retired USN Captain Ed Pope was convicted of espionage for collecting information on this system).

***Hi-Speed Anti-Ship Missile***

# John Paul Jones Memorial

***John Paul Jones Memorial***

The John Paul Jones Memorial Fund was established by Alexander Petrovich Poddubny, member of the Duma and others to recognize services of Admiral John Paul Jones in both the American and Russian Navies. Admiral Jones was one of the most famous American who lived in Russia in the 18th century, described as the "Father of the U.S. Navy." The American Encyclopedia called John Paul Jones the first and most outstanding hero of the American and Russian Navies. On April 4, 1788 following his services in the American Revolutionary Navy, Catherine II conferred the rank of the rear admiral to John Paul Jones to serve in the Russian Black Sea Fleet.

***Admiral Fry dedicating John Paul Jones Plaque***

At the dedication ceremony, conducted in conjunction with the ***International Maritime Defense Show***, a miniature of the planned memorial statute was presented to Vice Admiral Scott Fry, Commander of the US Sixth Fleet, for display at the U.S. Naval Academy. Russian dignitaries and the U.S. Navy Honor Guard attended the ceremony at the St. Petersburg home of John Paul Jones; a historical plaque was dedicated and attached to the home.

***U.S. Navy Honor Guard***

Preceding the dedication, ONRG Captain Campbell, Mr. Greene and DAO Staff attended a dinner meeting with Vice Admiral Scott Fry.

# Visit to the Marble Palace

Heads of the delegations to the ***international Maritime Defense Show*** were honored guests at the Marble Palace restored to pristine condition by President Putin. The visit included a reception at the palace, a presentation of formal traditional dance and an opportunity for informal meetings.

***Marble Palace***

Delegations heads from approximately 30 countries typically flag rank and above attended the ceremony at the Marble Palace.

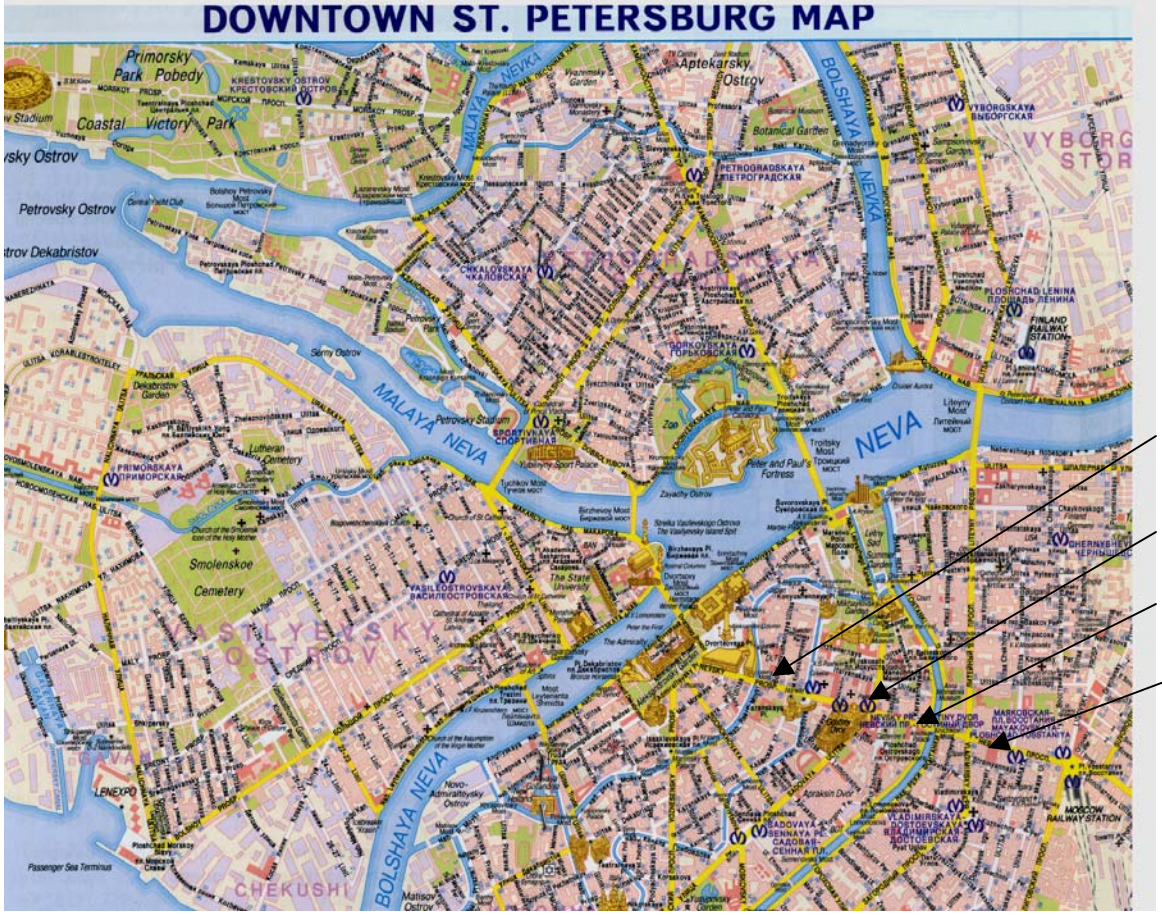
***Formal Traditional Dance***

Although, the event was a social function, interaction with VIP's and dignitaries from these countries was an excellent opportunity for establishing liaison and contacts across the entire region and beyond.

As the US did not have a flag officer available for this event, Captain Campbell was the senior US representative and established first liaison with a great number of senior civilian and military leaders. A partial list, showing the extensive nature of the contacts, is located on the following page

***Marble Palace Reception***

| CAPTAIN CAMPBELL VIP CONTACTS IN RUSSIA, JULY 2003 | |
|---|---|
| 1. | **Mr. Kasyanov, Prime Minister of Russian Federation**. Introduction only. |
| 2. | **Mr. Mikhail Motsak (VADM, ret), First Deputy of the President of the Russian Federation**, Northwest Federal Circuit. Informed him that ONR wishes to increase scientific R&D cooperation with Russia. He expressed great interest in cooperation on R&D, particularly to support countering terrorism. |
| 3. | **VADM Krepchenko, current Deputy Chief of Russian Navy**. Discussed cooperation on technology for countering terrorism. I invited the Admiral to visit CNR in D.C. and he said he would look at his schedule. |
| 4. | **VADM Kasatonov (ret.), immediate past Deputy Chief of Russian Navy**. Discussed cooperation on technology for countering terrorism, and for dealing with radioactive contamination/pollution issues, including AMEC program. |
| 5. | **VADM Prakash, Commander of Indian Western Fleet**. Discussed cooperation on Naval S&T; very interested in results of CNA study on Indian S&T opportunities; arranged tour on newest Russian-built Indian frigate, "Trishul." |
| 6. | **VADM Panitini, Head of Procurement, Italian Navy**. Discussed his experience with securing cooperation with Russian bureaucracy. |
| 7. | **Mr. Vladimir Yakovlev, Governor of St. Petersburg**. Discussed development of scientific cooperation between USN/ONR and St. Petersburg R&D community. |
| 8. | **RADM Kudryavtsev, Chief of Staff, Leningrad Area Russian Fleet**. Discussed cooperation on countering terrorism. |
| 9. | **Alexander Poddubny, Member of Russian Duma**, and Chair of ADM John Paul Jones Society. Discussed US-Russia cooperation, highlighting dual-Navy service (American and Russian) of ADM John Paul Jones. |
| 10. | **Mr. Vyacheslav Ruksha, First Deputy Minister**, and Head of State Maritime Administration. Discussed cooperation on ship systems technology, including navigation and propulsion systems. Key POC for all major shipping operations in Russia. |
| 11. | **VADM Kornilov (ret.), President, International Kronshtadt Development Project** (associated with ADM John Paul Jones Society). |
| 12. | **Dr. Pruskin, Director, Gidropribor**. Discussed scientific R&D cooperation on ASW defense; torpedo and mine technologies. |
| 13. | **Dr. Peshekhonov, Director Electropribor**. Discussed scientific R&D cooperation on integrated and inertial marine navigation systems. |
| 14. | **Dr. Koriakin, Director, Morphyspribor**. Discussed collaboration on underwater technologies (sonar). |
| 15. | **Dr. Pashin, Director Krylov Shipbuilding Institute**, and Member of Russian Academy of Sciences. Discussed cooperation on sonar technologies for navigation, and countering terrorism. |
| 16. | **RADM Lurie, Head of Operations, Israeli Navy**. Discussed Kilo class Russian submarines, and joint US-Israeli interests in Naval R&D. |
| 17. | **BGen Kevin Ryan, US Defense Attaché Moscow**. Discussed support of ONRG in Russia, and OSD policy implications of ONR increasing scientific cooperation with Russia. Also discussed US interest in Russian nuclear issues, both strategic (subs) and environmental (research; AMEC). |
| 18. | **RADM Al Marar, Commander United Arab Emirates Navy**. Discussed UAE interests in cooperation with USN/ONR in Naval R&D. |
| 19. | **Dr. Rafael Yusupov, Director, SPIIRAS**. Discussed informatics and automation, I.T. |




1. Astoria Hotel
2. U.S. Consulate Commercial Office and 30 Newsky
3. Grand Hotel Europe
4. Radisson SAS Royal Hotel

# Assessment

Under the existing 10-year Umbrella Agreement on S&T Cooperation between the Russian Federation and the United States, which expires 15 December this year, many cooperative programs have been established, including programs from the Office of Naval Research, London and Washington. A meeting was held last year in Washington DC, the *US-Russia Joint S&T Committee Meeting*, during which Dr. Norman Neureiter, S&T Advisor to the Secretary of State addressed several important aspects of US-Russian cooperation including extending the Umbrella Agreement.

Science and technology are integral elements in the shaping of our foreign policy. As stated by Under Secretary of State for Global Affairs, Dr. Paula J. Dobriansky, "A strong partnership between American science and American statecraft is increasingly critical to addressing the global challenges of the 21st century -- whether the issue is terrorism, homeland security, … in my view, science, technology and foreign policy form an essential triangle." As such, an important part of the ONRG mission, in addition to identifying emerging technology and facilitating scientific collaboration, is to provide contacts and climate for international cooperation in policy matters relating to science and diplomacy. One such aspect is the partnership approach to sharing of intellectual property as appropriate.

ONRG Associate Director John O'Neil accompanied the recent congressional delegation lead by Congressman Curt Weldon and four other members of Congress to the Russia Federation and established further ties to senior officials across the Russian Federation. ONRG's current posture along with funding additions already provided by the Chief of Naval Research will allow immediate, in-depth engagement and scientific collaboration in this region.

This trip was highly productive in review of state-of-the-art Russian maritime technology and was well received by the various institutes, all of which indicated a strong interest in participating in collaborative projects with the US scientific community. Lack of military funding, the primary funding for the institutes during the Soviet Union era, forced them to look at commercial market, now the major source of business. In order of enthusiasm, SPIIRAS was the most interested, followed by Krylov and the Morphyspribor. We had also visited GIDROPRIBOR but apparently challenges remain at that institute. Contacts made on this visit will be helpful in providing a running start for the ONRG Russian Office.
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# Contacts

**MORPHYSRIBOR**


Dr. Stanislav Smirnov
Deputy Director R&D Doctor of Science
St. Petersburg, Russia
Tel: +7(812) 238-7502
Mailto:mfp@mail.wplus.net

Ms. Alla Kalyaeva
Head of Foreign Relations Department
St. Petersburg, Russia
Tel: +7(812) 235-3592
Mailto:mfp@mail.wplus.net

Aron Dimshiz
Chief of R&D Department
Sonar Systems
St. Petersburg, Russia
Tel: +7(812) 230-8298
Mailto:mfp@mail.wplus.net

Konstantin Polkanov
First Deputy Director-General
St. Petersburg, Russia
Tel: +7(812) 235-0838
Mailto:mfp@mail.wplus.net

Alexandr Vasiljevich Sapega
Deputy Principal Coordinators of
Foreign Projects
St. Petersburg, Russia
Tel: +7(812) 235-9289
Mailto:mfp@mail.wplus.net

Konstantin Stephanov
Deputy Chief of Department
St. Petersburg, Russia
Tel: +7(812) 235-4994
Mailto:mfp@mail.wplus.net

Valeri Yurechenko
Deputy Director, (Legal?)
St. Petersburg, Russia
Tel: +7(812) 238-7502
Mailto:mfp@mail.wplus.net


**HOTEL/Rental Contact Numbers**

Radisson SAS Royal Hotel
49/2 Newsky Prospekt
St. Petersburg, Russia
Tel: +7(812) 322 5000
www.radissonsas.com

Grand Hotel Europe
Newsky Prospekt
St. Petersburg, Russia
Tel: +7(812) 329 6603
www.grandhoteleurope.com

Business Center ***"Newsky 30"***
Lev Sergeevitch Karapetian
Tel: +7 812 315 4989
Mailto:uralhudson@peterlink.ru

## KRYLOV


Valentin Mikhailovich Pashin
Director, Krylov
St. Petersburg, Russia
Tel: +7(812) 123-66-23
Mailto:krylov@krylov.spb.ru

Aleksander Petrovich Pylaev
Deputy Director for Marketing and
External Affairs
St. Petersburg, Russia
Tel: +7(812) 127-96-47
Mailto:krylov@krylov.spb.ru

Konstantin Sergeevich Novoghilov
Marketing Administration Manager
St. Petersburg, Russia
Tel: +7(812) 127-96-47

Vladimir L. Semenov
Manager, Translation & Interpretation
St. Petersburg, Russia
Tel: +7(812) 127-93-48
Mailto:albert@krylov.spb.su

Sergey V. Kaprantsev
Head of Propulsion Laboratory
St. Petersburg, Russia
Tel: +7(812) 127-96-47

Evegeny I. Lapin, Head
Foreign Relations Department
St. Petersburg, Russia
Tel: +7(812) 127-9348


## SPIIRAS


Dr. Rafael M. Yusupov, Director
SPIIRAS
St. Petersburg, Russia
Tel: +7(812) 328-33-11
Mailto:yusupov@iias.spb.su

Irina P. Podnozova
Foreign Relations Adm.
St. Petersburg, Russia
Tel: +7(812) 328-44-46
Mailto:ipp@iias.spb.SU

Alexander v. Smirnov
Deputy Director for Research
St. Petersburg, Russia
Tel: +7(812) 328-2073
Mailto:smir@iias.spb.su

Igor V. Lyssenko, Leading Researcher
Applied Informatics Laboratory
St. Petersburg, Russia
Tel: +7(812) 328-33-11
Mailto:spiiran@iias.spb.su

Vladimir Gorodetsky
Chief Researcher
St. Petersburg, Russia
Tel: +7(812) 323-35-70
Mailto:gor@mail.iias.spb.su

Vasiliy V. Popovich
Head of the Computer Software Group
St. Petersburg, Russia
Tel: +7(812) 328-807
Mailto:popovich@mail.iias.spb.su

## Embassy & Diplomatic

Carl Ronald Inman
Commander, United States Navy
USA Embassy, Moscow, Russia
Tel: +7 095 728-5323
Cell: +7 095 139 1472
Mailto:inmancr@state.gov

Col. Karel Kotek, Defense Attaché
Embassy of the Czech Republic
Moscow, Russia
Tel: +7 095 250 0209

Ms. Nathalie Jobic, Consular
Embassy of France
Moscow, Russia
Tel: +7 095 937 7373

CAPT Tetsuya Masuda, Naval Attaché
Embassy of Japan
Moscow, Russia
Tel: +7 095 960 2179

Mr. Morris (Rusty) N. Hughes
Consul General – US Consulate
St. Petersburg, Russia
Tel: +7 812 331 2600
Mailto:hughesmn@state.gov

Mr. William Czajkowski
Commercial Officer – US Consulate
St. Petersburg, Russia
Tel: +7 812 331 2560
Mailto:william.czajkowski@mail.doc.gov

Mr. Mikhail V. Motsak, First Deputy
Plenipotentiary Representative of the
President of the Russian Federation
St. Petersburg, Russia
Tel: +7 812 323 7116

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