Russian Space Industry Still Optimistic And Creative

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Russia's Federal Space Program for 2006-2015 includes government allocations for a series of light spacecraft, so technologically advanced that, at two- to three-digit weights in kilos, they successfully do what 20 years ago only heavy satellites could.

Due to lower orbiting and production costs, these satellites can make affordable and wide-reaching orbital networks for telecommunication, Earth monitoring, and other applications.

Under the new Pragmatic Space Program, the state-owned producer NPOMash has designed a space platform with interchangeable payloads, from radars to optical-electronic Earth remote sensing systems - a profitable business as high-resolution imagery has been in great demand globally for some time.

The Russian company offers two systems based on this platform: the Kondor-E radar expected to be put into orbit late this year or in the beginning of 2007 on the back of the Strela light launch vehicle the NPOmash has converted from the decommissioned RS-18-UR-100 (SS-19 Mod.1 Stilletto) ballistic missile, and the telecommunications satellite Ruslan-MM.

Last August, a Rokot launch vehicle (also converted from a military system) orbited the Monitor-E remote sensing satellite, a spacecraft producing as good images as previous models that were larger, heavier, and thus nearly cost-prohibitive. The Monitor-E was made on the Yakhta

platform.

Khrunichev Center, the designer, is currently adapting the Yakhta for other Monitor satellites with radars, infrared, stereoscopic, and high-resolution cameras. The platform is also in use with the Dialog-E, a joint satellite effort with Russian Satellite Communications Company, aimed to create a backup force in Russia's satellite communications capability. In this project, several Dialogs will roam across the operational orbital telecoms network, ready to replace any geo-stationary Ekspress satellite in an emergency.

Intersputnik, an international telecoms operator, has placed a big order for the Dialogs to replenish its satellite workforce as a 10-repeater Dialog takes as little as six to nine months and $35mln-$40 mln to build and put on stream, compared to heavy 24-repeater Ekspress-A with its two to three years and $200 million to build.

Another competitive single space platform, Neva, has been made in St. Petersburg by the Arsenal Design Bureau. It is intended for use with the Skif air-to-space orbiting system in which a Tu-22M (Backfire) acts as a primary carrier orbiting the payload from a high altitude using a special space booster. The Neva is going to be the basis for light spacecraft under 300 kg (660 lbs) for a variety of research and commercial applications.

Like the Yakhta, Neva is conceptually a platform compatible with interchangeable task-specific modules. One example is the Sever, an Arsenal spacecraft with a synthesized aperture radar. Primarily designed to monitor ice movements in the Arctic, the Antarctic, and freezing seas of moderate zones, it will also yield valuable remote sensing data in other domains. The onboard imagery processing capability enables it to transmit data directly to downlink facilities originally designed for the heavy Resurs-DKs, Monitors, and Kondors. Preliminarily, one

550x550km image is going to cost $300 to $600, chicken feed compared to a Canadian $3,000 low-resolution RodarSat image.

The Pulkovo Observatory is to come up with a Neva-based solar telescope shortly to study processes inside the Sun as part of the Geliometriya project, the ever-first effort to reach as deep as the core of the Sun. The Sun will also be under tight scrutiny from the Permanent Space Solar Patrol, Russia's main stake to secure global leadership in the monitoring of solar activity to gain invaluable insight into relationship between the Sun and the Earth, "space weather" forecasts, and, ultimately, possibly into some key causes of the ongoing global climate change.

Another prominent Neva-compatible project, UFIKT (disabbreviated from Russian as "UV/IR telescope"), is expected to help study the Earth's atmosphere, ionosphere, and mineral deposits, and support routine and disaster environmental monitoring.

All in all, Neva has been adopted as the basic platform for a dozen projects. Spacecraft of this class can be orbited by all launch vehicles currently operational with the Russian Space Agency - heavy rockets could orbit more than one satellite at a time - but will mostly be launched either on the back of a heavy aircraft or by a converted military missile. (One such spacecraft will be the Sever, orbited with a Start rocket converted from the formidable Topol/Topol-M, a.k.a. the SS-27 Sickle.) The original five-year life cycle could be extended to seven years, the designers have promised.

Single-platform light spacecraft are very important to the Russian space industry today because Earth remote sensing has become a profitable and well-marketed business all over the world but, strangely enough, not yet in a country that has a cutting-edge technology for space high-resolution photography. They are seen as one of the few opportunities

that help realize Russia's rich and so far untapped potential in a new free-market environment amid severe government underfunding.

Though most of the latest successful orbitings - the "high-school project" Kolibri-2000, several Mozhaiets's (Mozhaisky Space Force Academy), Tatyana (Lomonosov Moscow State University), Baumanets (Bauman Technological University), and the forthcoming Chibis (Space Research Institute) - have all stemmed from civil initiatives, rather than consistent target-oriented commercial programs, the space research community is still optimistic about the future and - which its newest offers undoubtedly demonstrate - as creative as ever.

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