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GLONASS

Expert Advice - GLONASS Business Prospects

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Similar in many aspects to GPS, GLONASS has performed much less successfully on a commercial scale, failing — so far — commercialization of GLONASS has taken a new and more promising direction, receiving strong encouragement from the Rus restored to its full operational capabilities within the next few years, and we are certain that this time GLONASS will create succ

Why did GLONASS fail to create a worldwide business opportunity in the past? First, many GLONASS satellites of the first ge This coincided with a difficult period for the Russian economy, after the collapse of the Soviet Union and much of its infrastruct GLONASS, but other space programs that were temporarily frozen. Many companies that had started to work on combined GF time.

The other reason for GLONASS's halting commercial history is in its frequency division multiple access (FDMA) signal structur with GPS, and now Galileo. FDMA, though more immune to interference, results in bulkier user equipment. Today the situation introducing CDMA within GLONASS. Second, and even more important, today GNSS user equipment progresses toward mult Galileo, L1, L2, and L5. It will ultimately boost the technology, and even multifrequency and wide-band RF components will be

All these considerations allow us to confidently foresee exceptional opportunities for GLONASS-related business tomorrow.

Policy. Today, GLONASS is required for social infrastructure within Russia for all federal users. President Vladimir Putin has p completion of the system ahead of the original plan.

As expected, three more GLONASS-M satellites were launched by the end of 2007, and have since been declared operationa years, that is, the lifespan of these satellites runs until the year 2015.

There is also a new generation of satellites, GLONASS-K. This upcoming modification represents an entirely new concept bas GLONASS-K satellites has been increased to 10–12 years, and the spacecraft will carry an additional third civilian L-range frec

GLONASS-K is smaller and considerably lighter than previous models, allowing the use of a wider range of launch vehicles an GLONASS-K satellite falls to 700 kilograms instead the of 1,415 kilos of previous satellites. After the complete constellation is constellation in full.

We expect that at least six GLONASS-M satellites will be launched in 2008, and six more in 2009. There will also be two GLOI three-year lifespans will be decommissioned.

Altogether, there should be 24 satellites in near-circular orbits with 64.8-degree inclination in three orbital planes. Initially, syste attention from the Russian government, the system may be deployed in full scale by the end of 2009.

Interoperability. Moving as planned toward interoperability with GPS and future Galileo, the GLONASS coordinate frame had decree issued on June 20, 2007, the improved version of the national geocentric coordinate system "Earth Parameters 1990" between PZ-90.02 and the International Terrestrial Reference Frame ITRF2000 contains only origin shifts along X, Y, Z by –3(GLONASS Interface Control Document has already been published and made available trough the Internet. The update to ICD is available from the Information-Analytical Center (IAC) (see Table 1).

Orb. pl.	Orb. slot	RF chnl	# GC	Launched	Operation begins	Operation ends	Life-time (months)	Satellite health status		Comments
								In almanac	In ephemeris (UTC)	
I	1	07	796	26.12.04	06.02.05		37.6	+	+ 23:45 11.02.08	In operation
	4	06	795	10.12.03	29.01.04		50.1	+	+ 02:30 12.02.08	In operation
	6	01	701	10.12.03	08.12.04		50.1	+	+ 05:01 12.02.08	In operation
	7	05	712	26.12.04	07.10.05	04.02.08	37.6	-	- 05:45 04.02.08	Maintenance
	8	06	797	26.12.04	06.02.05		37.6	+	+ 05:00 12.02.08	In operation
II	9	-2	722	25.12.07	25.01.08		1.6	+	+ 23:15 11.02.08	In operation
	10	04	717	25.12.06	03.04.07		13.6	+	+ 01:00 12.02.08	In operation
	11	00	723	25.12.07	22.01.08		1.6	+	+ 02:45 12.02.08	In operation
	13	-2	721	25.12.07	08.02.08		1.6	+	+ 05:00 12.02.08	In operation
	14	04	715	25.12.06	03.04.07		13.6	+	+ 05:00 12.02.08	In operation
	15	00	716	25.12.06	12.10.07		13.6	+	+ 05:00 12.02.08	In operation
III	17	-1	718	26.10.07	04.12.07		3.6	+	+ 05:04 12.02.08	In operation
	19	03	720	26.10.07	25.11.07		3.6	+	+ 00:00 12.02.08	In operation
	20	02	719	26.10.07	27.11.07		3.6	+	+ 01:44 12.02.08	In operation
	23	03	714	25.12.05	31.08.06		25.6	+	+ 05:00 12.02.08	In operation
	24	02	713	25.12.05	31.08.06	08.02.08	25.6	-	- 11:30 08.02.08	Maintenance

TABLE 1. Official GLONASS constellation status

Worldwide Use

All restrictions on positioning service in Russia were lifted in January 2007, including a restriction on allowed positioning accura commercialization in the past.

Today, GLONASS plus GPS user equipment appears more and more frequently in stores in Russia. It is now necessary and h surveyors, mapping applications, and so on.

What advantages does GLONASS offer to worldwide users who already have GPS? Due to its orbit inclination, GLONASS pro 1). It was designed for use in the territory of the former Soviet Union and Europe. The combined usage of the two systems allo

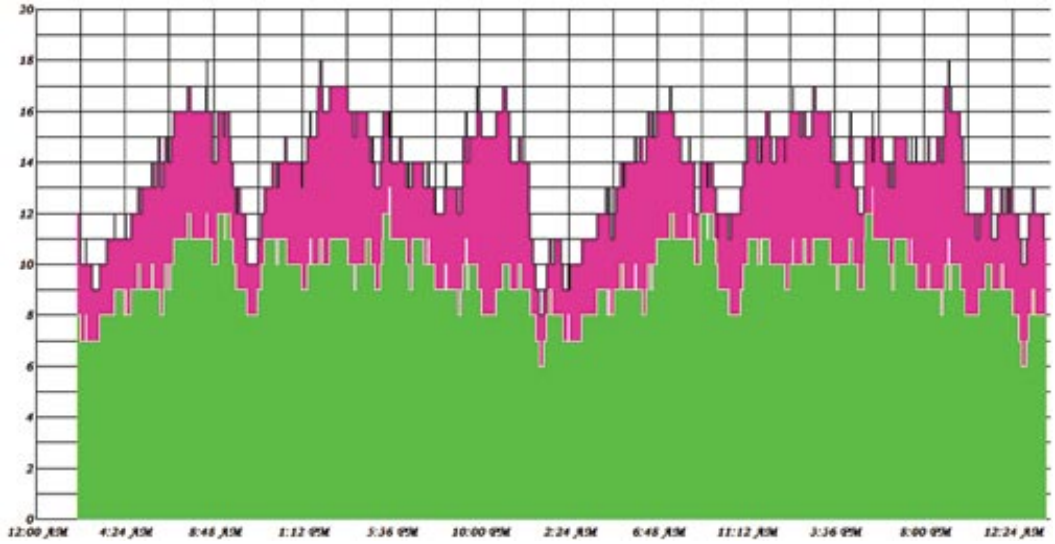

FIGURE 1. GPS (green) and GLONASS (pink) constellation visibility in Tokyo for 48 hours. Note that GPS visibility picture repeat itself every 24 hours, and GLONASS visibility changes. It also illustrates why GLONASS satellite orbits are less affected by gravitational filed irregularities.

Further, more systems mean more reliable service. Healthy competition will only benefit users. Compatibility of the systems ha provide higher accuracy and higher integrity.

The international GLONASS market can increase due to the fact that countries that do not own their satellite navigation system implement GNSS from different owner/operators. This, however, becomes less important as other navigation satellite systems users, who operate in urban or other obstructed environments.

Accuracy. It has been generally accepted that the real-time accuracy of GLONASS is less than that of GPS. The main source clock parameters. For many users, it is possible to use precise ephemeris, freely available on the Internet from, for example, t GPS Service, a voluntary federation of more than 200 worldwide agencies that pool resources and permanent GPS and GLO products.

We also have analytical centers similar to, and some within, the IGS. Four analytical centers within the IGS are estimating GLO clocks. The accuracy of precise GLONASS ephemeris are within 4 centimeters, 1 sigma.

Using precise ephemeris, or differential service, a GLONASS user can mitigate the above-mentioned error sources and enjoy global network, even a commercial one, can further benefit GLONASS in terms of higher real-time accuracy.

Summarizing, we expect the GLONASS market worldwide to grow, though less rapidly than the internal market in Russia. We s GLONASS, GPS, and Galileo, to the global market of GNSS users worldwide. The standard for navigation systems in the futur are well on the way to meeting this standard.

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IVAN PETROVSKI is NVS director. Among his numerous responsibilities, he is in charge of resear
VALERY BABAKOV is co-founder and general manager of NAVIS. Babakov explains, “Our compa supplier of GLONASS receivers in Russia. NAVIS itself is about a 300-person company. The main timing equipment, based on GLONASS/GPS signals.
“We produce technologies and equipment that use GLONASS and GPS signals, including navigat devices of time-and-frequency synchronization for communication systems, and GPS, GLONASS, Galileo simulators.Our current GPS/GLONASS receiver Navior seems to present interest to a wide market, we are covering all components of user service starting from conceptual engineering, to te and launching of equipment, and finally providing users with training, technical support, and maint
“As part of the process of integration of our technologies into the worldwide GNSS market, NVS Te Technologies is a new company, which aims to bring a wide range of GNSS products to the marke

Russian NAVIS and NAVIS Ukraine in GPS and GLONASS user equipment development with Swis
“Our company group now is not only engaged in the GLONASS business, but also looking forwarc
We are participating in the Galileo Integrated Receiver for Advanced Safety of Life Equipment (GIR
Thales Aleniaspace. Our part in the GIRASOLE project is to provide the Galileo L1/E5 simulator. T
Galileo prototype receiver, which can acquire and track the GIOVE-A signal. Working with our SN3
positioning. In November 2007 our engineers conducted a three-day tutorial on our GNSS simulato

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