SATELLITE
Markets & Research

Satellite *TECH*Briefs

Software Modem Technology

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by Virgil Labrador

Satellite ground systems are an integral part of the satellite ecosystem. Without reliable ground systems, hevry investements in space space infrastructure can come to naught. There is also a well-known truism that your hardware is only as good as your software. Thus, it is all important to pay close attention to your software provider.

Amphinicy Technologies, a satellite software company from Zagreb, Croatia and Luxembourg, recently released a cloud-native distribution of Blink, an ultra-fast satellite modem for Earth observation and space science. Blink is a software product for modern satellite ground stations. It is a real-time, high data rate, software-based satellite modem designed to run on standard servers. It moves digital signal processing from high-maintenance hardware to software. It can run on bare metal such as standard servers or laptops, as well as virtual and cloud environments," said Frane Milos, CEP-Luxembourg of Amphinicy.

"With the rise of the Ground Station as a service (GSaaS) offerings and with the trend of moving telecommunications from hardware into the virtual domain, especially with 5G, we're now one of the leading companies in the digital transformation of the Ground Segment for Satellite communication. We see ourselves as a company with a big competitive advantage in that market with our two products Blink (virtualized software modem) and Monica (M&C and orchestration system for Ground Segment). On top of that, we made significant growth in our Luxembourgish office - especially in providing engineering support for the flagship European Space projects. In addition, in Luxembourg, we're now focusing on innovations in ground segment virtualization for the SatCom industry," said Frane Milos, CEO-Luxembourg of Amphinicy.

Blink

Amphinicy has developed Blink Modem to enable anyone interested in Earth observation and space science to receive satellite payload data in real-time - reliably, efficiently and conveniently. Blink Amazon Machine Image (AMI) is a distribution of Blink Modem which allows operators to use their own orchestration systems. They can start and stop modem instances and other related infrastructure, minimizing cost and maximizing scalability.

Blink can bring previously impossible missions to life and make missions generally easier to manage, more productive and cheaper to set up and evolve.

Blink is a real-time, high data rate, software-based satellite modem designed to run on standard servers. It moves digital signal processing from high-maintenance hardware to software. It can run on bare-metal (e.g., a standard server or laptop) or virtual and cloud environments. Blink can bring previously impossible missions to life and make missions generally easier to manage, more productive and cheaper to set up and evolve.

"We have started developing the core of Blink eight years ago while we were working on a project for a client. Our main goal was to speed-up one small piece of the satellite data acquisition chain," says Tomislav Nakić-Alfirević, Solutions Manager at Amphinicy Technologies. "Today, Blink is a full-featured software-based modem. It fits perfectly in the new software-based ground station paradigm," he added.

Blink AMI is an ideal choice for satellite operators who prefer to integrate a software modem with their existing cloud orchestration systems to receive, process and store satellite data in a reliable, efficient, and convenient way. They can start using Blink in just a few clicks on the AWS console through the product listing.

Ground station services existed before, but nothing even close to an on-demand, pay-per-minute service such as that provided by a cloud-native ground station network with antennas all around the world." says Tomislav Nakić-Alfirević, Solutions Architect at Amphinicy Technologies. "When AWS announced AWS Ground Station in 2018, we were al-

ready developing Blink, a wideband signal processing solution built in software, which fits perfectly in the new ground station paradigm."

"With Blink, the need for custom hardware in Earth Observation (EO) payload acquisition is reduced to the bare minimum. A commercial-off-the-shelf RF digitizer/SDR and a server with Blink software is sufficient. The freedom in hardware upgrades and replacements and the overall evolution ease and speed of such a software-based system is incomparable to what the industry was used to by now." said Irena Kos, Product Manager at Amphinicy Technologies.

Blink is all about high-performance computing: work on improving processing speed and scaling never stops. The engineering team has been busy making use of multiple graphics cards in the same server to process wideband signals and our working prototype now reaches over

The Blink AMI HTML report is a rich, self-contained and interactive document. It provides intuitive summaries and low-level, per-event insights.

2,7 Gb/s, up from the previous record of 1.2 Gb/s. The processed signal was a DVB-S2 32APSK signal with 9/10 coding, or in other words, the modem is now capable of processing channels over 700 MHz wide! This kind of capability is an absolute prerequisite for advanced, demanding EO missions to be able to use pure-software modems and in doing so, be able to enjoy all the benefits that come with that: unprecedented agility, lead times, cloud d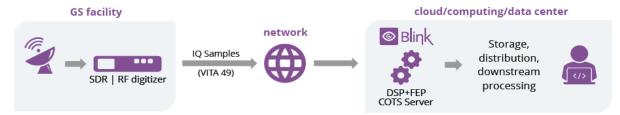eployment, hardware vendor independence, advanced ground segment architectures, licensing flexibility, including per-minute billing and many, many more. As amazing as 2.7 Gb/s throughput is, it is a step along the way: stay tuned for updates over the next few months!

Assembly, Integration, Verificiation,and Testing

Blink detects 50+ types of reception events and generates HTML &
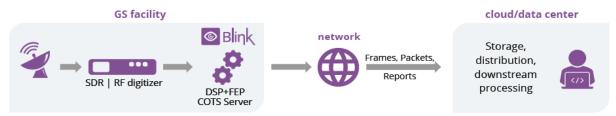
Deployment to cloud

It is really easy to deploy Blink to a public cloud. Machines are active only during a satellite pass, minimizing cost. Blink receives a digitized signal and processes it in real time, sending output directly to downstream processors or to storage.

Deployment to typical ground stations

Blink works at existing ground stations. A server equipped with a digitizer and running Blink software is deployed to the ground station instead of a conventional modem. Users get the benefit of an extremely flexible solution: **short lead times, quick and easy updates, rapid evolution and competitive costs**.

Frane Milos
CEO, Luxembourg Office-Amphinicy Technologies

After over 20 years in the business, how do you see Amphinicy's position in the industry and in the markets that you serve?

During the more than 20 years that we've been in business, we were mostly providing engineering services to the Satcom industry - big operators like SES, institutions like ESA and UN, as well as partnering with VSAT providers like iDIrect, Newtec, etc... Around 10 years ago, we also entered the Earth Observation (EO) domain, mostly providing AIV services for the Copernicus mission (Sentinel fleet). For all these reasons, we have accumulated vast industry expertise. At the same time, we have managed to keep all our senior engineering and management staff in the company.

With the rise of the GSaaS (Ground Station as a service) offerings and with the trend of moving telecommunications from hardware into the virtual domain (especially with 5G), we're now one of the leading companies in the digital transformation of the Ground Segment for Satellite communication.

We see ourselves as a company with a big competitive advantage in that market with our two products Blink (virtualized software modem) and Monica (M&C and orchestration system for Ground Segment). On top of that, we made significant growth in our Luxembourgish office - especially in providing engineering support for the flagship European Space projects. In addition, in Luxembourg, we're now focusing on innovations in ground segment virtualization for the SatCom industry.

What are your key achievements and milestones as a company?

About 5 years ago, we started the first serious development efforts on our Blink modem - moving the high-datarate DSP (Digital Signal Processing) and FEP (Front-End Processing) from typical FPGA-based hardware boards into the software domain. Today,

Frane Milos

we have by far the fastest, fully software-implemented, modem in the world - achieving +4 Gbps of real-time processing speeds.

Such a performance was extremely well accepted by the GSaaS and Cloud providers. We are partnering with

leading Cloud Service providers in bringing Cloud as close to the antenna as possible. At the moment we are involved in a number of PoCs for already established, as well as for some NewSpace EO operators and service providers.

With Monica, our M&C solution, we have traditionally been focusing on an institutional market - integrating it as an M&C and orchestration tool for huge governmental projects. A few years ago we have decided to make it more commercially available, and now we already have a signed-contracts, typically in the broadcast market. The last big RFP we won, and that we're proud of, was using Monica as a baseline M&C system for Telenor Satellite broadcast teleports.

In the Luxembourg office, we made significant growth in supporting the flagship EU Space projects (especially in the domain of secure and quantum communication), but have also secured funding for the development of PoCs in the domain of the SatCom Ground Segment virtualization (e.g. the ViSAGE project). We're refocusing on the virtualization of not just the SatCom modem, but the Ground segment orchestration as well.

What differentiates Amphincy from your competitors? What value-added benefits do you provide your customers?

We're experts in both the software and the satellite domain. We will always try to move as many solutions for the Satellite industry as possible into the software. We see this as a big competitive advantage, now when the trend of moving from hardware to software is obvious (just look at the NFV concept in terrestrial communications).

Five years ago we've started this virtualization trend in EO data acquisition with Blink, and that's why, with Blink, we're an order of magnitude faster than the rest of virtualized software modems.

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A similar story is with Monica, - it brings unparalleled flexibility, scalability, and performance into the ground segment M&C, as our engineers are experienced enough to bring the latest, high-performant technologies into the quite conservative market.

Being on a software side brings extra benefits to the customers - we can customize our solution to their needs very fast, come with a PoC showing that it works on their mission, and then enter into the commercial deal. During operations, we can also provide maintenance, and upgrades very quickly. Such a reaction and lead time is unimaginable in the hardware world.

Having an office in Luxembourg, the centre of Europe, and one of the growing space hubs, also brings the benefits of providing on-site support to our customers.

At the Satellite show in Washington, D.C. what products and services will you be showcasing?

At the Satellite 2023 conference this year, we will show you Blink and Monica solutions. We are also looking forward to the discussion on our ViSAGE concept, focusing on the virtualization of SatCom.

Therefore, please come and visit us at booth #2451.

JSON reports.

The HTML report is a rich, self-contained and interactive document. It provides intuitive summaries and low-level, per-event insights.

A glance at the summaries is enough to know that reception went well. The details provided are a treasure trove helping to diagnose issues, which is particularly important during satellite development.
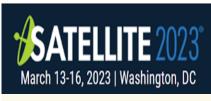
Customer Support

"We are dedicated to offer the best support to our clients. With Blink at AWS Marketplace, our solution will

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be available to even more engineers and communities. We are here to support them." says Toni Jelavić, CEO at Amphinicy Technologies.

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cial deal. During operations, we can also provide maintenance, and upgrades very quickly. Such a reaction and lead time is unimaginable in the hardware world," added Frane Milos.

For more infomation on Blink Wideband Software Modem go to: **https://blink.amphinicy.com**

Virgil Labrador is the Editor-in-Chief of Los Angeles, California-based Satellite Markets and Research which publishes a web portal on the satellite industry www.satellitemarkets.com, the monthly Satellite Executive Briefing magazine and occasional industry reports called MarketBriefs. Virgil is one of the few trade journalists who has a proven track record working in the commercial satellite industry. He worked as a senior executive for a teleport in Singapore, the Asia Broadcast Center, then-owned by the US broadcasting company CBS. He has co-authored two books on the history of satellite communications and satellite technology. He holds a Master's in Communications Management from the University of Southern California (USC). He can be reached at virgil@satellitemarkets.com