



Odin F-50 router from Forsway



Merging satellite with mobile

Located in the Gothia Science Park outside Gothenburg, Sweden, Forsway delivers solutions designed as an extension of terrestrial broadband networks from the sky, utilising satellites for the delivery of broadband to subscribers and terrestrial networks. The company now has supplied more than 50,000 terminals to various markets around the world, with the newest roll-outs across the African continent and the Philippines. Tobias Forsell, Forsway's Managing Director, provides an overview of the company's capabilities and market presence.

Question: Can you provide an overview of Forsway's capabilities and expertise?

Tobias Forsell: Forsway is an innovative technology company formed from former employees of Nokia Home communications for set top boxes, and former employees from Ericsson and other Swedish technology companies. Together, we make up the core team.

Over the years we've built a hybrid connectivity system from scratch, which is based on our own work. We have received support from the European Space Agency (ESA), and input from customers.

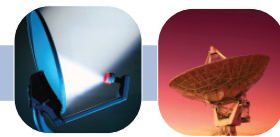
It's always been our mission to utilise existing infrastructure to create cost-efficient solutions. When we started out, that infrastructure was satellite and dial-up to deliver

connectivity. Over the years, as dial-up faded out, we looked for other technologies to tap – evolving into a combination of satellite and mobile and then also using TV towers. Now we're using several technologies. Today, Forsway's unique technology combines simple mobile networks with satellite to provide cost-efficient broadband, using existing infrastructure (mobile networks, satellite TV dishes) to provide or enhance connectivity.

Forsway provides the Odin F-50, a highly cost-effective, high-performance satellite router for hybrid Internet over satellite services. DVB-S2 is used for the downlink and can be combined with a variety of terrestrial return channels. Depending on the method used for the return channel, Odin will either use a mobile network interface (USB dongle

for mobile data) or an Ethernet connection. Odin is designed to operate with broadcasting satellites; it is equipped with a state-of-the-art DVB-S2 demodulator and advanced IP over satellite optimization tools. The principles of its implementation make Odin the most flexible and cheapest hybrid broadband modem in the market.

While traditional services like underperforming 2.5G/3G mobile data or ADSL are not enough to bring adequate broadband to many markets, other solutions, like VSAT, fibre or 4G, are too costly to deploy and may never be installed in such areas. Forsway's innovative hybrid technology uses less satellite capacity than VSAT (savings on satellite capacity) and cheaper CPE's that also are simple to install, reducing total cost of ownership for operators.



Tobias Forsell, Forsway's Managing Director

Question: Which markets are key to Forsway's business, and how have they evolved over the years?

Tobias Forsell: Forsway started out in rural Europe, where we looked for consumers who were not well connected. Today, it's still our aim to identify markets where people are poorly connected. From Europe, we moved into the rural Americas. After that, we moved into Africa, and most recently we've been active in India, Latin America and Southeast Asia. The geographic aspects aren't important to us; wherever we go, there is always a target audience, i.e. people who want to have a better connectivity experience.

Forsway has followed technology trends as they've advanced over the years, to ensure we can deliver the best connectivity experience. We have pretty high expectations for ourselves going forward, as demand for connectivity is expected to increase dramatically. When the less advantaged populations become connected, the speed at which they will want to access more and more data will be much higher than today. For us, it's a great opportunity to be able to provide that connectivity in an economical way, and it's important to use existing technologies. We can't only rely on building fantastic new technologies, as it is too costly for effective use in the less developed parts of the world.

Question: The digital divide has become an increasingly pressing issue in recent years, so much so that many satellite operators and service providers are investing

heavily to even up socioeconomic opportunities. What's your assessment of this challenge, and how is Forsway involved?

Tobias Forsell: There are a lot of challenges in this area and many big initiatives trying to get involved in bridging the digital divide. It is vital that it's done in a financially sustainable way. Sure, if you have funding, you can throw a lot of money at it, but to be able to do something that really makes sense and

makes a difference to peoples' lives, you need to use tools that people in local markets can use, manage and support. It's important not to rely on sending engineers from Europe or the USA to explain how to use it and maintain a solution. These solutions will need to be technically simple to manage and maintain for customers.

The people who stand to gain from bridging the digital divide need to be able to build sustainable business around these new solutions - to create new future-oriented opportunities. Tapping existing satellites, TV dishes and mobile infrastructure will provide a lot of new job opportunities, and that's essentially how we're helping bridge the digital divide.

We're quite focused on distance learning and e-health initiatives. By delivering connectivity to rural schools and small medical sites, we can provide a significant improvement to rural communities and make a huge difference in the day-to-day lives of local populations. In Brazil, we're delivering the same content to several schools following the same curriculum, which enables a synchronised learning experience. We also recently announced, in collaboration with DIGISAT MEDIA in Spain, that we have



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successfully supplied more of equipment to deliver video content to children's hospitals.

India is another market with a significant digital divide. There are approximately 900 million mobile subscribers there, yet only 120 million have a reliable data service. We've recently implemented a community service and connected various government offices in rural regions in India in a first step to bring about change and opportunity. Meanwhile, up in the Himalayas of Nepal, our technology is being run via solar power, enabling connectivity in areas where there is only 2G mobile coverage. This means that people in those areas can move on from a few 10's of kbps data speeds, which only really enables voice communications, to 512kbps via satellite, enabling a broadband-like service.

Question: Let's talk a little more about your new router, the Odín F-50; what can you tell us about the router, and how it compares with competing technologies?

Tobias Forsell: The Odín F-50 is more affordable for our clients; that's the main advantage of this new router. However, it's not only just that it's available at a lower cost, it also offers more capabilities from a technical point of view. It provides not only a connection point, but can also deliver video or data content, store it, and transmit later. All the F-50s are equipped with Wi-Fi

hotspots, and there's also the possibility to connect several channels, e.g. satellite in, mobile in, ADSL in, and those technologies can be merged. That goes for both incoming and outgoing traffic.

Notably, the Odín F-50 also makes it possible to merge two different mobile networks; data can be received via high throughput satellites (HTS), and for the return traffic two different mobile networks can be used to merge and aggregate the data, which means that you can have higher speeds and better performance. That provides a lot of value to the end user.

Latency is always an issue when it comes to satellite; if you compare Forsway with a two-way VSAT system, where there are two sets of latency - one for the downlink and one for the (return) uplink - we only have one set of satellite latency. The mobile networks have lower latencies, and if you have two different mobile networks connected to the router, you can utilise the one with the lowest latency, which also means you get higher throughput from the satellite.

Question: Can we expect to see any other new products in the near future? Is there a market opening on the horizon?

Tobias Forsell: We have recently launched the Odin F-50 and we have two other products in the pipeline.

The F-52 is similar to the F-50, using DVB-T2 instead of satellite, so we use

TV towers for receiving the broadband connectivity. That means that with a standard TV antenna, you can receive 10 or 20Mbps of data. We expect the F-52 to be available at the start of 2019.

In a continuation of the F-50, we also have the F-55, which has two tuners, so we can independently have a connection point such as a wireless access point for data, as well as the possibility to have satellite TV. We think this product will be great for rural locations. The F-55, which we call Freya, should be available in the first half of 2019.

Question: What are your expectations for Forsway for 2019 and beyond?

Tobias Forsell: Our biggest focus and challenges are rolling-out Forsway solutions on a larger scale. There are numerous opportunities and projects ongoing at the moment, and we've already completed several small and mid-sized deployments. The big challenge is to scale this up. It's what we're gearing up for in 2019.

Finding the best regional partners (satellite operators, distributors and broadband providers) will be key to our success in bridging the digital divide in the broadband market. We are already working with an array of technology partners and continuously looking to foster new relationships with additional players that can provide complementary solutions and services for tapping the potential in these vast markets. ■



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