

Satellites to battle the digital divide

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A Franco-Finnish consortium developed a new generation of satellite technologies to deliver fast Internet to remote communities. Six publications and two patents demonstrate the scientific quality of the research performed.

Researchers at Thales Alenia Space and some of its Finnish suppliers spotted the potential of High Throughput Satellite (HTS) more than six years ago. They gathered an impressive European consortium for Euripides project MM WIN to develop the first building blocks for use in a [new generation](#) of products.

"MMWIN can be seen as a technology tool box to pave the way for future high capacity satellite services," says Olivier Vendier, project coordinator for Thales Alenia Space. "Doctors in rural areas who need high amounts of data could get that even in places where there isn't good

telecoms coverage."

The project included members from the entire European supply chain, from French industrial giant Thales through to French and Finnish small-and-medium-sized companies and research institutes.

With capacity being stretched on the Ka-band, frequently used by satellites, the partners researched ways to reuse frequencies and to design, manufacture and test products to be used in "transponders" – devices that receive radio signals and transmit another signal - on the Q/V band, which is between 40-50 GHz.

While Thales Alenia worked on the [satellite](#) converters and amplifiers, the Finnish companies led by VTT focused on short point-to-point radio. The group had to research ways to limit problems such as unwanted radiation and damage to some of the materials used in the components. At one point, cracks appeared in some of the ceramic connectors developed. They had to change their composition as a result.

Through painstaking cooperation, the team of 25 engineers, technicians and marketing people managed to develop products for their companies. Vendier estimates that the validated solutions could be ready for commercialization by 2018-2020. "We've developed a toolbox for the next generation of satellites. We've moved from 3 or 4 on the Technology Readiness Level to 6 or 7," he says, with a maximum of 9 denoting a product ready to launch.

The partners are convinced the development wouldn't have happened as fast as four years without the exchange of valuable expertise. Their regular teleconferencing and six-month meetings in different parts of France and Finland expanded everyone's horizons and even forged friendships. "The only place we never met was the north of Finland: too cold!" laughs Vendier.

The companies hope they can sell into a growing market. A [report](#) by market researcher Research&Markets estimates total HTS capacity lease revenues will hit about €5 billion by 2025, generating over €30 billion in aggregate revenues from 2017-2025.

MM WIN has laid the basis for a full European value chain gathering SMEs and a large industrial group capable of delivering innovative inter connexions systems and passive components for strong value-added products in land and space telecommunications applications.

More information: Dominique de Caro et al. Colloidal Solutions of Organic Conductive Nanoparticles, *Langmuir* (2013). [DOI: 10.1021/la401371c](#) V. Laur et al.

Study of a low-loss self-biased circulator at 40 GHz: Influence of temperature, *2016 IEEE MTT-S International Microwave Symposium (IMS)* (2016). [DOI: 10.1109/MWSYM.2016.7540159](#)

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