FUTEBOL: Federated Union of Telecommunications Research Facilities for an EU-Brasil Open Laboratory

Results in Brief

Enhancing communication technologies in an increasingly connected world

The need for improved communication networks and technologies has never been higher. FUTEBOL has created its own infrastructure to allow collaborative innovation that spans the globe.
The world has never been more connected than it is today. Aside from the smartphones many of us use every day to communicate, a whole new set of services is on the horizon, such as Industry 4.0 massive connectivity of sensor and actuator devices, and autonomous and connected vehicles. The communication networks that span the globe are made up of a combination of wired and wireless systems, fibre optics, and cloud-based infrastructure. As the need for faster, more reliable and more effective communications continues to rise, technological development must keep pace.

As wireless technologies innovate further, new problems and challenges arise that require the integration and cooperation of optical and wireless network architectures. These new challenges are particularly acute in developing and emerging economies such as Brazil. Enhancing these connections and fostering technological improvements would also aid established markets such as the EU, which is seeking to re-establish its position at the forefront of telecommunication technologies.

This requires sharing knowledge and expertise at an international level, something the Horizon 2020-funded FUTEBOL project has been working to bolster. FUTEBOL established its own communication infrastructure to be used by academic researchers and industry worldwide to evolve the state-of-the-art in optical and wireless technologies.

The FUTEBOL infrastructure lets users test applications from industrial robotics to the Internet of Things. “FUTEBOL allows experiments to combine networked devices across three countries in Europe and three states in Brazil, so we can experiment with the effects of connectivity over long distances,” says FUTEBOL project coordinator Professor Luiz DaSilva, from Trinity College Dublin.

Forming new connections

The idea was to establish a communication and experimentation facility to design, prototype and test the next generation of networked services. FUTEBOL created a collaboration system between Europe and Brazil that can be accessed by users to experiment and conduct industry-informed research.

The distributed research infrastructure allows remote users to access the facilities and test new devices or experiment with existing ones, drawing on a heterogenous set of computing, wireless and optical resources.
For example, FUTEBOL worked with experts in cloud robotics who wanted to test the feasibility of controlling a moving robot over a pre-specified route, with the processing running in the cloud. The experiment used wireless connectivity for precise localisation of the robot in real time and sophisticated processing for movement control and correction.

Another example is in the area of cloud radio access networks, a key component of incoming 5G Networks. Mobile network operators can deploy simpler (and less expensive) antennas and use the abundant processing resources available in the cloud for most of the signal processing required for communications. To build the infrastructure for testing solutions in this space, FUTEBOL brought together experts in wireless networks, optical networks and cloud computing.

A global resource

The infrastructure is now available to researchers all over the world and is also being used for higher education. Since the project finished, FUTEBOL has continued to expand and evolve, through another programme known as FIBRE, based in Brazil.

“The level of collaboration across academic and industry partners in Europe and Brazil was truly amazing. The experiments and all the software development in the project were the result of collaboration between multiple partners. That we were able to work together, across long distances, to produce infrastructure and research results that will have a lasting impact is something that we are really proud of,” says Prof. DaSilva.

Keywords

FUTEBOL, communications, 5G, infrastructure, experiment, state-of-the-art, optical, wireless

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**Project Information**

**FUTEBOL**

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