Geophysical Research Abstracts
Vol. 19, EGU2017-13793-1, 2017
EGU General Assembly 2017

BLUECOM+ project: Connecting Humans and Systems at Ocean Remote Areas using Cost-effective Broadband Communications field

Pedro Brito (1), Pedro Terrinha (1,2), Vitor Magalhães (1,2), Joana Santos (1), Débora Duarte (1), Rui Campos (3), and the BLUECOM+ project Team

(1) Divisão de Geologia e Georecursos Marinhos, Instituto Português do Mar e da Atmosfera, I.P.., (2) Instituto Dom Luiz (LA)., (3) INESC TEC e Faculdade de Engenharia, Universidade do Porto.

The BLUECOM + project (Connecting Humans and Systems at Remote Ocean Areas using Cost-effective Broadband Communications) aims at developing an innovative communications solution that will enable broadband, cost-effective Internet access in remote ocean areas (ideally beyond 100 km from shore), using standard wireless access technologies – e.g., Wi-Fi and LTE. BLUECOM+ is an EEA Grants PT02 project developed by INESC TEC (Institute for Systems and Computer Engineering, Technology and Science), IPMA (Portuguese Institute for the Sea and the Atmosphere), and MARLO (Transport and Logistics Consultants).
The BLUECOM+ key idea and innovation lies on deploying a long-term communications infrastructure, which will extend broadband communications from shore to remote ocean areas by leveraging (1) Helikites – a combination of a helium balloon and kite – that can be tethered to existing or new land and ocean platforms, (2) long range line of sight wireless communications using TV white spaces, and (3) multi-hop relaying techniques to further increase range.
At this stage the communications protocols were defined and tested in lab conditions and two sea trials for demonstration of the system were carried out in July/2016 and September/2016 using research vessels.
Results of the cruises:
1st cruise corresponded to the first sea-trials of the project. Single-hop communications were established between a land base station deployed at Cabo Espichel lighthouse and the Sea Station deployed in a Helikite launched from the vessel and flying at an altitude of 120m. Successful communications between the two stations were established at a maximum distance of 40km with a data rate in excess of 1Mbit/s.
2nd cruise corresponded to the second sea-trials. During this trial single-hop and two-hop land-sea communications were tested. For two-hop communications tests two Helikites were launched at 120m from two vessels. The first was launched from a vessel closer to shore; the other was launched from the second vessel and connected to the first to have Internet access. The tests were performed at increasing distances up to a maximum distance of 45km from the land station and the first hop, and up to 10km between the two Helikites.
The main results achieved were:
• Single-hop data rates in excess of 1Mbit/s up to 45km;
• Two-hop data rates in excess of 500kbit/s up to ∼55km;
• Video conference with land at 42km offshore without a glitch;
• Real-time upload of data collected by an autonomous vehicle offshore to the cloud.
A 3rd cruise will be done this year to test video streaming to shore of sea bottom images acquired from the ship with a drop down video system. This will include the integration of the BLUECOM+ network with the drop down video system, in order to demonstrate real-time underwater video transmission offshore.

Acknowledgements: This work was developed as part of the BLUECOM+ project (PT02_Aviso4_0005) funded by the EEA Grants and Norway Grants.