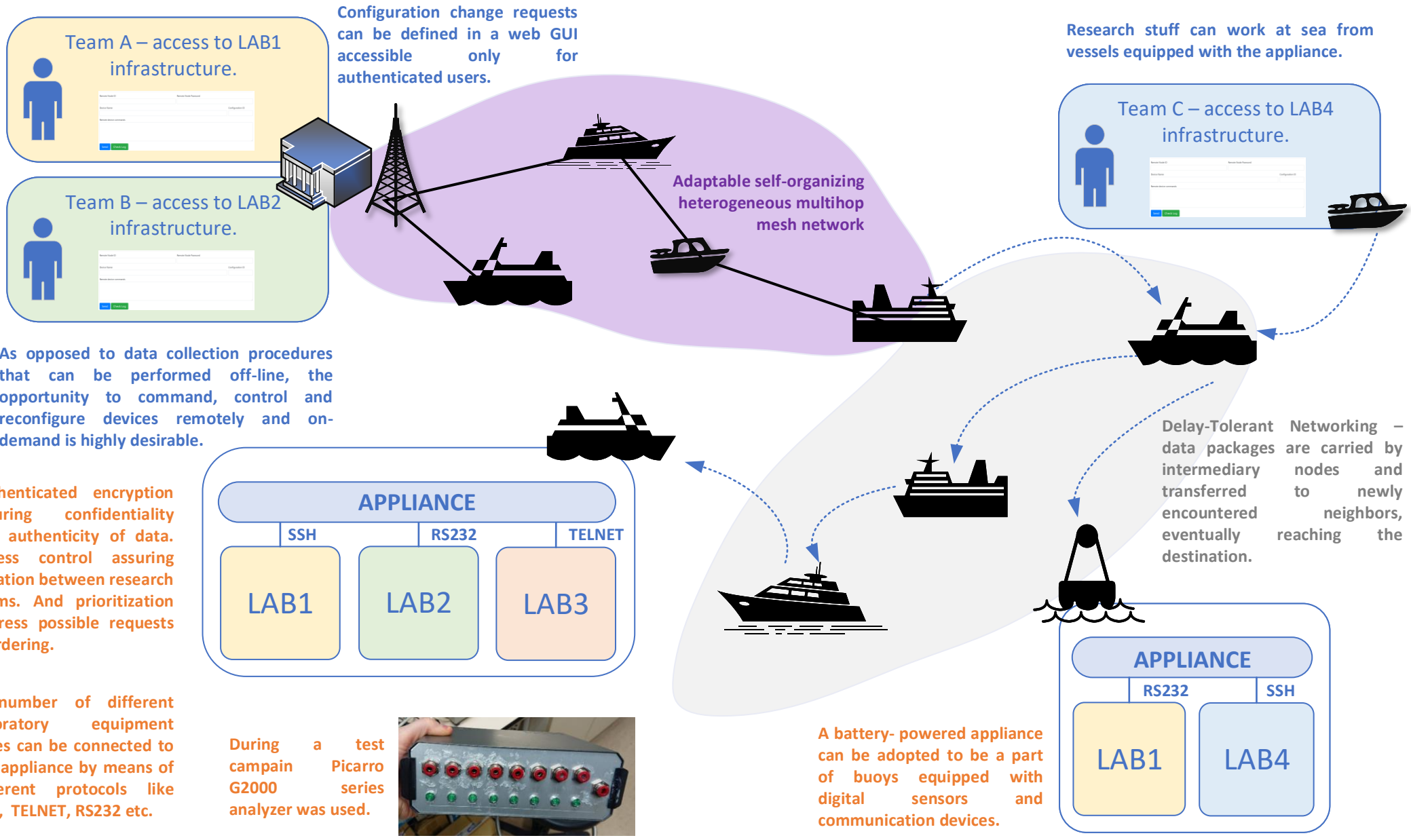
Remote command and control capabilities for data acquisition systems provided by delay-tolerant network mechanisms

Michał Hoeft, Krzysztof Gierłowski - Gdańsk University of Technology (Poland)
Marcin Wichorowski, Institute of Oceanology PAS (Poland)

The presented remote device reconfiguration service has been implemented as a part of a communication appliance dedicated to marine data transfer in off-shore and open sea areas. The service has been successfully deployed and validation test have been completed. The practical use-case has been defined as remote access to the equipment operating onboard RV "Oceania" during cruise on Southern Baltic Area. Selected data acquisition processes have been used as the test case for this infrastructure's capability measurements. Sensors used for data acquisition should be controlled and underway data should be delivered and published in NRT mode. The measurements ongoing during cruises cover Temp, Sal, Oxy, pH and pCO2 parameters.



Event-driven simulations of the proposed system have been conducted using vessel mobility traces obtained from a real-world AIS dataset aggregated by VTS. A reconfiguration request (marked as blue triangle) is generated on-shore, in Sopot (Poland) – at the location of the Institute of Oceanology Polish Academy of Sciences. The request has been sent at the beginning of the simulation to be disseminated using DTN principles. The amount of time necessary to deliver the request to recipients in the particular area. Recipients in white areas did not receive the message before requested time (12 hours) for delivery void.

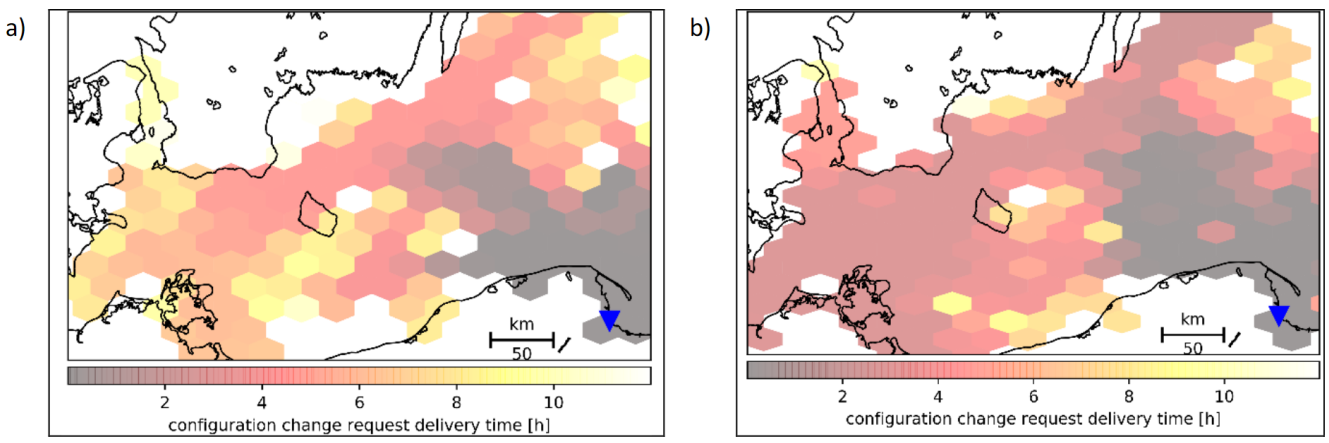


Figure 1: Visualizations of the minimum time required to deliver a re-configuration request to remote location for radio communication range: a) R_c=10km; b) R_c=15km.

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