Distributed communication or radar: the networks of the future

Background
In the future telecom standard (6G and onwards), and in the radar systems of the future, the operation will move from being based on a few large units (a base station or a monostatic radar) towards more distributed networks, where the signal from many small units (nodes or remote radios/radars) are combined into a joint radar image or communication signal. There are many advantages with the distributed topology, performance and robustness is two of them, but there are also challenges, such as synchronization of the network and information collection.

In this project, you are supposed to create a distributed network of software defined radios (SDRs), and enable them to operate jointly.

Problem description
We will use the Pluto SDRs and the Raspberry PI single-board computers (see Fig. 1) to design a network of radios that can operate together. The information that is collected at the nodes (a node consists of one Pluto and one Raspberry) will be transmitted to a central unit (a laptop) where the signal processing can occur, and the signal should combined into something useful. The work therefore consists of learning how to operate the SDRs from the Raspberries, using Python or MATLAB, and then to transmit data to the laptop (using WLAN), where we use MATLAB to process the set of signals to a radar image or communication signal.

Målgrupp: TKAUT, TKELT, TKDAT, TKTFY, TKMED, TKTMA
Gruppsstorlek: 3-6 studenter
Antal grupper: 1 eller 2 grupper.
Förkunskapskrav: Programmering av valfritt slag
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