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## **Multi-SDR MIMO ground station with over-the-air time synchronization**

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In this work we present a Multiple Input Multiple Output (MIMO) Ground Station comprising of multiple Software Defined Radio devices (SDRs) and uses a novel approach to time-synchronize them. The array employs four receiving antennas and one transmit antenna which is used for device synchronization using the long training sequence of the IEEE 802.11 protocol. The antennas are mounted on four LimeSDR-mini devices. On the software side, digital beamforming as well as interference suppression is provided by the underlying algorithms. The benefit of this approach is that the MIMO ground station is more easily constructed than a rotator and has multiple times higher signal-to-noise ratio (SNR) than a single omni-directional antenna. Furthermore, it has the ability to monitor multiple satellites simultaneously. To showcase the performance gains we present comparative results with the single-omni directional-antenna ground station as well as with the rotator setup. The MIMO Ground Station is implemented as a sub-activity of the SDR Makerspace project.

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