

FOAM

Trust Zone



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FOAM Location

FOAM is a blockchain-based network for crowdsourced maps and decentralized location services, including **secure location verification and localization** for IoT devices and product tracking from supplier to customer.

FOAM Location stack consists of the Localization Algorithms, reference design hardware, cryptographic location certificates on Ethereum blockchain, and relies on a new generation of radios, LPWAN.

Software

Software standards enabling Time Synchronization, Fine Time Stamping, Localization Algorithms and Cryptographic location certificates

Hardware

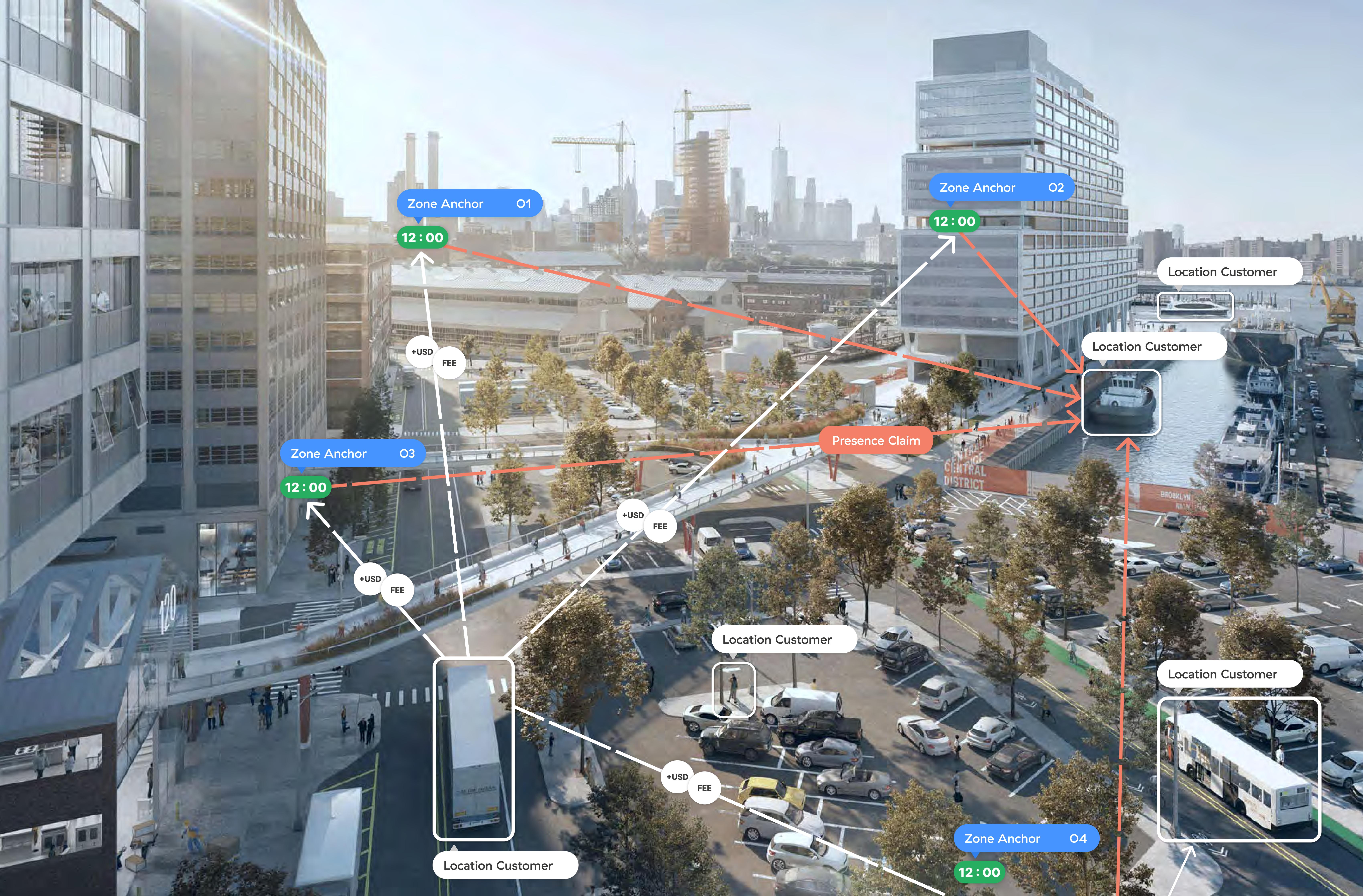
Reference design hardware built with Software Defined Radios and FPGAs for high-precision localization

Radio

A new generation of radios allowing for rapid deployment with wider coverage at low cost and power consumption such as LPWAN

Blockchain

An immutable and decentralized network allowing for information and value exchange



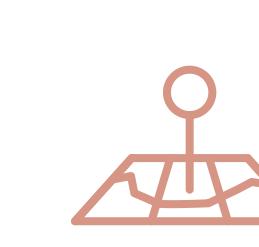
Trust Zone Program

Trust Zone is the first Tier program where select Location Service Providers can operate a Zone(s), complete tasks, and provide feedback to improve the FOAM Location.

The goals of the initial Trust Zones are to run the FOAM Location in diverse geographical environments and test different zone configurations while operating the current prototype of the FOAM radio.

Participants will run localization experiments and submit the results for evaluation.

Program Objectives



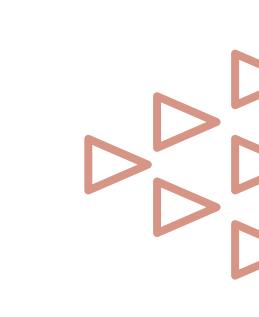
Locations

Test the zones performance in different geographic locations



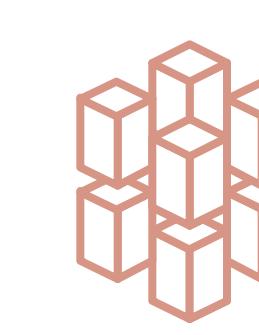
Traction

Collect more data to improve the algorithm



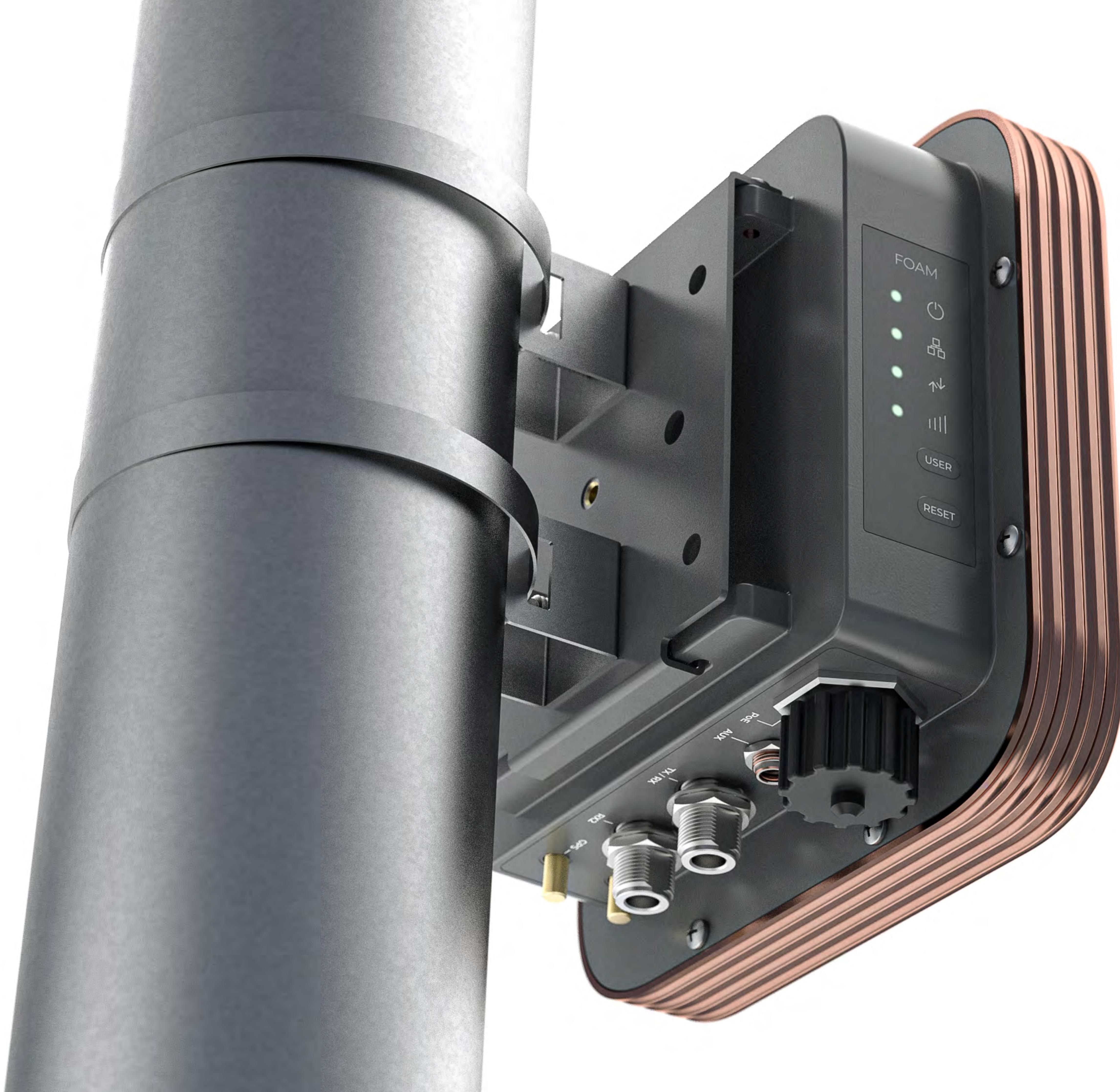
Data and Feedback

Receive feedback on the full experience and improvement proposals



Community

Establish network of trusted zone operators



FOAM Radio

FOAM Location network consists of the Zone Anchors (ZA). These remotely-controlled radio nodes are coordinated to transceive LoRa packets to and from one another and configured to log those packets to a remote data store such as blockchain.

The Zone Anchor consists of the PCB stack, battery, LTE Modem, and two antennas. To perform the localization, the ZA needs to be placed outdoors. For the early stage of the program, the radio node assembled from off-the-shelf components will be used.

The Zone Anchor with the custom-designed hardware and enclosure is under development.



Trust Zone



The FOAM Location protocol requires at least four Zone Anchor radios to form a zone. The program participants would need to scope and test locations for all four radios.

After the radio nodes are set up, the visibility test would need to be performed to assess the viability of the location. Material and support will be provided on how to approach building owners to allow permission to use their building. Once permanently installed, your Zone will be up and running and eligible for participating in multiple kinds of location tracking use cases and stress testing of the protocol.

The screenshot displays the FOAM mobile application interface. On the left, a sidebar menu includes 'Zones' (selected), 'Nodes', 'Transactions', and 'Settings'. The main area features a 'Map view' showing a street map of Brooklyn, New York, with several red dots indicating anchor points. A detailed modal window titled 'Edit anchor point' is open, containing fields for 'Node name', 'ID', 'IP', 'Description' (with placeholder 'Enter a description...'), and 'Included in zone(s)' (with checkboxes for 'orange', 'bny', and 'valley'). The bottom of the screen shows a legend for 'NODES' with entries: 'dynamic_john_001' (green), 'dynamic_oscar_001' (green), 'static_zone_orange_016' (red), and 'static_anchor_node_001' (red). The bottom right corner shows the user's name, Michael Netsky, and email, michael.netsky@foamspace.com.

Brooklyn Navy Yard Zone

The first operational Zone is deployed at Brooklyn Navy Yard (BNY) to test in a dense, urban setting and serves as an ongoing sandbox environment since June 2020.

The installation hosts four radio nodes (Zone Anchors) across three rooftops with good visibility between themselves. Unlike tests done in an ideal environment such as an open field, the BNY installation has radio nodes at different altitudes that range from 10 m to 60 m and the largest distance between them is 1000 m.

The radio nodes currently tested are the latest developer prototypes assembled from off-the-shelf components provisioned through a remote management system developed at FOAM. The daily experiments include the localization of the static nodes on the rooftops one by one and the dynamic node, which we do with a person walking with a radio node as well as on bicycles and vehicles.

