narda
Safety Test Solutions

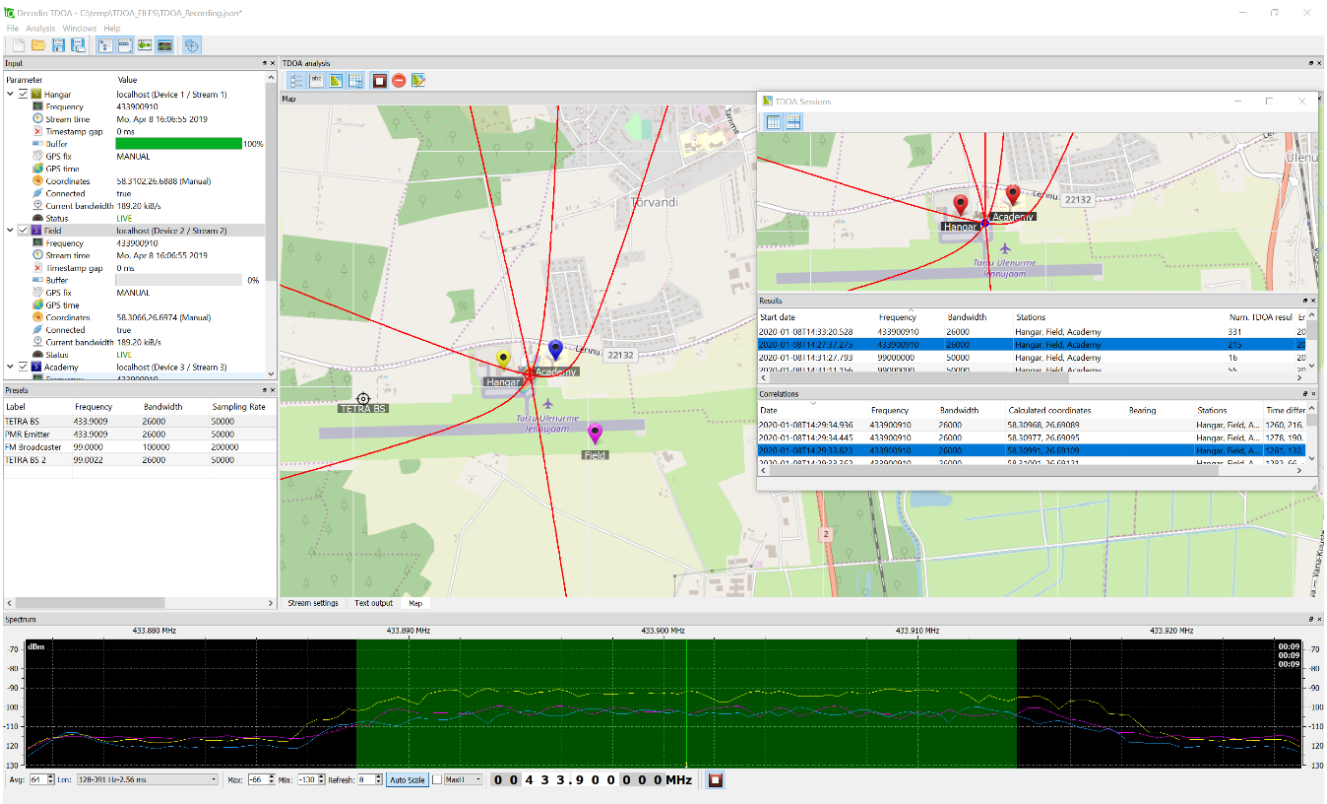
Flyer | SignalShark and Decodio TDOA

AOA and TDOA, Hybrid RF Emitter DF

Mobile or fixed site emitter localization

Localization of emitters using

- TDOA, AOA and hybrid solutions
- Live and offline operations
- Optimized for slow data connections
- Flexible architecture for scalable systems



Narda and Decodio present a highly-capable, flexible, and powerful emitter localization solution based on proven systems and software. Forming the foundation, Narda “SignalShark” receiver is a highly sensitive measuring receiver, allowing ITU compatible measurements on radio signals up to 8 GHz. Its 40 MHz real time bandwidth enables wideband signal capture despite its very compact size. When paired with a Narda Automatic Direction Finding Antenna (ADFA), it forms a powerful AOA (Angle of Arrival) direction-finding and localization measuring system. Additionally, the SignalShark generates VITA49-compatible IQ streams with high precision timestamps. Decodio brings valuable analytical capability to the Narda architecture through its powerful Localizer and ReX Software, enabling realization of the TDOA (Time Difference of Arrival) method in addition to their AOA features, and a hybrid network by combining AOA and TDOA.

The SignalShark receiver is available in three different models, e.g.:

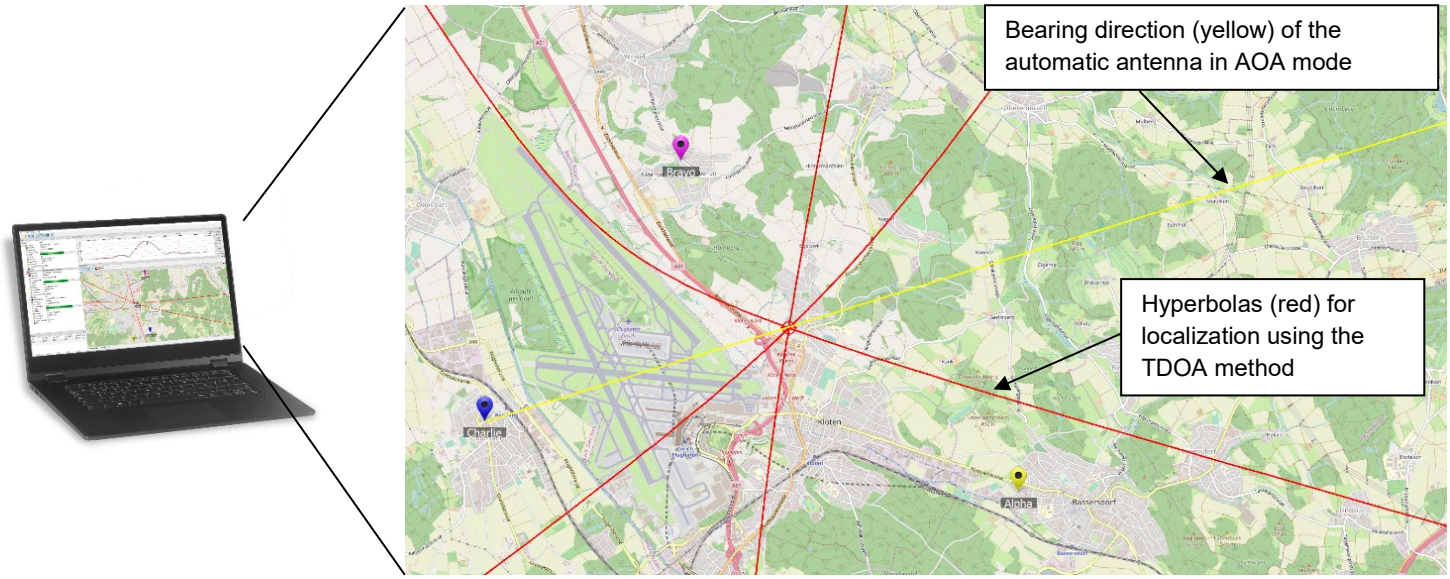
- A light yet robust battery-operated Handheld Unit ideally equipped for the harsh conditions of outdoor use.
- A very compact, low power consumption Remote Unit that is ideal as a “left behind” device or which can be integrated into a 19" rack.
- An Outdoor Unit with power over Ethernet or from a solar panel, which is perfectly equipped for 24/7 operation in all weather.

Regardless of the type chosen, the SignalSharks imbedded with DECODIO software serve as intelligent sensors. Each equipped with an omnidirectional or a directional antenna, that captures the signal, converts it to VITA49 I/Q data streams furnished with high precision timestamps, and then transmits this information to a central PC running DECODIO Localizer. Communication and data transfer is organized by the DECODIO ReX software, which is directly on the SignalShark’s built-in Win10 computer. Therefore, an external PC is not required at the sensor locations, saving customers time, expense, and complexity.

If a Narda Automatic Direction Finding Antenna (ADFA) is used as the sensor antenna, it not only captures the signal using its omnidirectional element, but adds its direction finding characteristics in combination with the SignalShark receiver to determine the direction of the emitted signal, thus enabling a hybrid TDOA/AOA system.
Practically any communication method from LTE to microwave, to private LAN networks, can link the sensor locations to the central computer running DECODIO Localizer. The refresh rate for the localization is automatically adjusted to suit the available data rate of the network, meaning this system can operate with slower data rates.

Controlling the system is simple, as one operator uses the DECODIO Localizer application at the central station to control the remote ReX/SignalShark locations. No manual entry of parameters is needed at the sensor locations. Power / pulse detection and other techniques are used to synchronize the received data streams and determine the possible location of the emitter. A heatmap based on several measurements is superimposed on a map.

Example of a hybrid system:



Central computer: PC
- Internet connection
- Decodio Localizer software
- Decodio ReX software

Station 1 & 2 (Alpha and Bravo)
SignalShark Handheld Unit
Omnidirectional antenna
LTE modem
Decodio ReX software

Stations 3 (Charlie), fixed installation
SignalShark Outdoor Unit
Automatic Direction Finding Antenna ADFA
LTE modem
Decodio ReX software

The SignalShark-based sensors for a TDOA system are easy to manage, e.g.:

In the standard configuration, SignalShark Outdoor Units are usually installed at fixed locations. These are equipped with either an omnidirectional antenna (shown left in the figure), a directional antenna for increased antenna gain, or an automatic DF antenna ADFA (shown right). The weatherproof design of the Outdoor Unit allows the receiver to be mounted directly below the receiving antenna. This reduces cable losses to a minimum. The SignalShark can take full advantage of its high sensitivity in this arrangement, while maintaining large signal immunity because of its high dynamic range.

Decodio Software Highlights

Decodio software enhances the usability and analytical capability of the SignalShark product lines. Below are some highlights.

- Display TDOA parabolas on custom map options (street, topo, air, maritime)
- Display AOA lines of bearings on custom map options (street, topo, air, maritime)
- Easily capture map coordinates lat/long
- Place unlimited custom markers and labels on the map.
- Records entire emitter localization map and data for playback
- Monitor health and status of remote sensor locations inside one window.

Other setup variants

The fixed network installation can be expanded if required by means of mobile TDOA or AOA stations. This is illustrated here by fitting an omnidirectional antenna onto the roof of an automobile by means of a magnetic base. The SignalShark Remote Unit is fitted in the trunk. This setup is also excellent for independent spectrum monitoring or coverage measurements.

The SignalShark is equipped with an external GPS antenna and a modem for use as a TDOA sensor. No PC is required and no settings need to be made on the instrument itself. All of this can be accomplished conveniently by remote control.

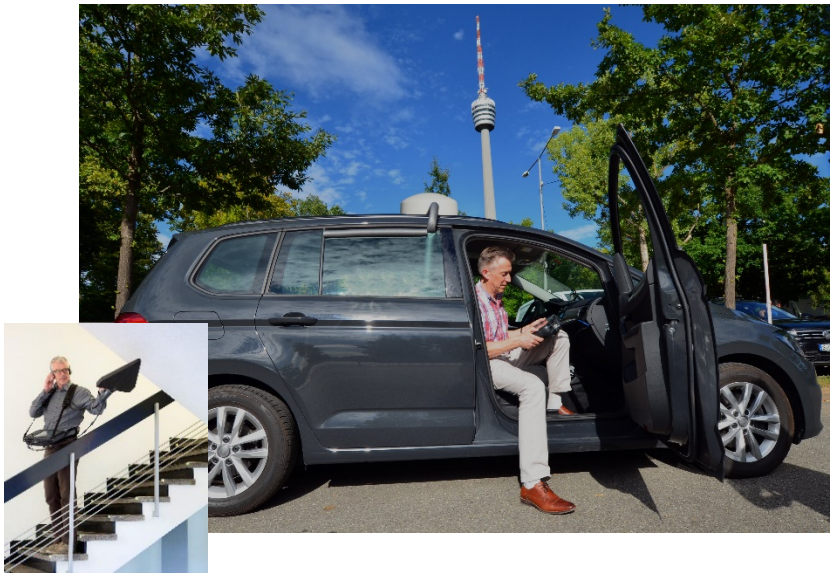
Even more mobile (weight < 5 kg):

The SignalShark Handheld with LTE modem and omnidirectional antenna can be powered using the SignalShark's internal batteries. The sensor can thus be operated from a backpack, for example. This could e.g. be used to discreetly follow a protest march and ensure that the communications for security forces and other agencies are not disrupted.

If the vehicle is equipped with an ADFA antenna with a magnetic base, either the SignalShark's internal heatmap-based bearings can be used, or it can be linked into the TDOA/AOA/hybrid network. The on-site team can thus decide whether to be directed from the central station or to operate independently.

The SignalShark model required can be a Handheld model. This would then mean that the equipment needed for homing, i.e. finding the location of an interference source on food within a building, would also be "on board' and ready to use.

SignalShark is available worldwide from Narda's Sales Partners: Narda Safety Test Solutions GmbH (narda-sts.com)



All the information about the products can also be found here:

- SignalShark Handheld (narda-sts.com)

- SignalShark Remote Analyzer (narda-sts.com)

- SignalShark Outdoor Unit (narda-sts.com)

along with the matching antennas:

- ADFA 1 & ADFA 2 DF Antenna (narda-sts.com)

Details of the Decodio software are available directly from Decodio
You will also find a complete description of the individual components and their possible enhancements on these Internet pages.
Not sure which solution is ideal for your needs? Please contact your local sales partner, he will be happy to help you.

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