

# Mobile Turnkey EW/SIGINT SOLUTION HUGIN 304DF

DATA SHEET



# Mobile Turnkey EW/SIGINT Solution | HUGIN 304DF

## INTRODUCTION

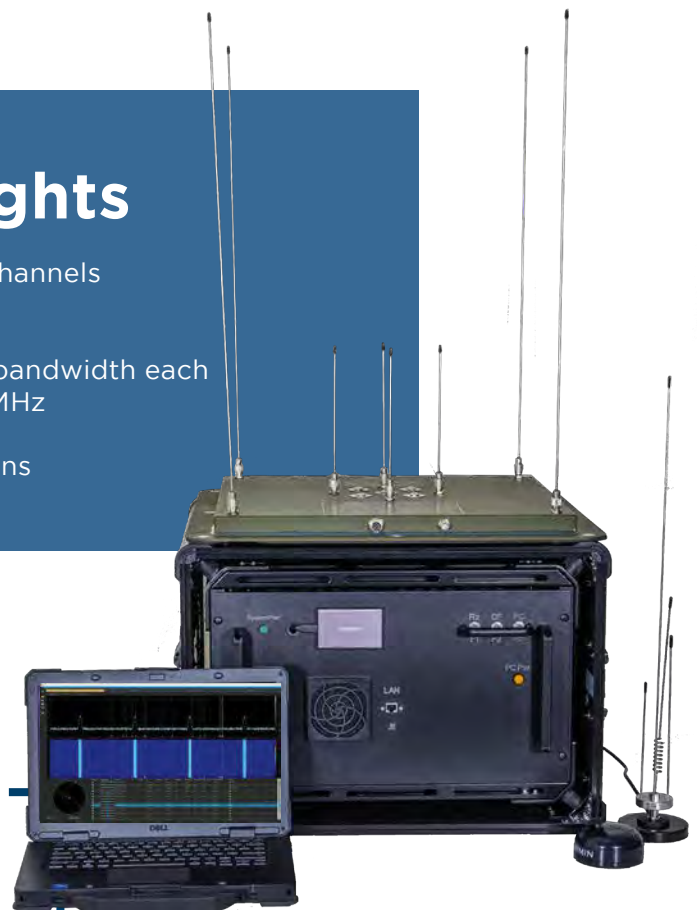
HUGIN 304DF is Novator Solutions' tactical turnkey EW/SIGINT system for signal interception and direction finding. It provides 64 channels enabling simultaneous monitoring, listening, and recording of analog clear voice Push to Talk (PTT) communication using FM, AM or SSB modulation. HUGIN 304DF provides the signals intelligence picture together with line of bearings in one view.

## HUGIN 304DF Highlights

- Simultaneous monitoring and recording of 64 channels
- Automatic direction finder
- Intuitive command-and-control software
- 4 individual tuners with 80 MHz instantaneous bandwidth each
- Monitoring & DF frequency coverage: 20- 520 MHz
- Optional 0,5 – 6 GHz (Monitoring)
- Compact & rugged design for mobile applications
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### HUGIN 304DF in brief

The EW/SIGINT system is an out-of-the-box solution for operations on the move. HUGIN 304DF is optimized for quick deployment in any vehicle platform without preparation. It comes with temporary mountable antennas, a main processing unit which can be placed in the hatch-back of any vehicle, and an intuitive command-and-control software installed on a rugged laptop.

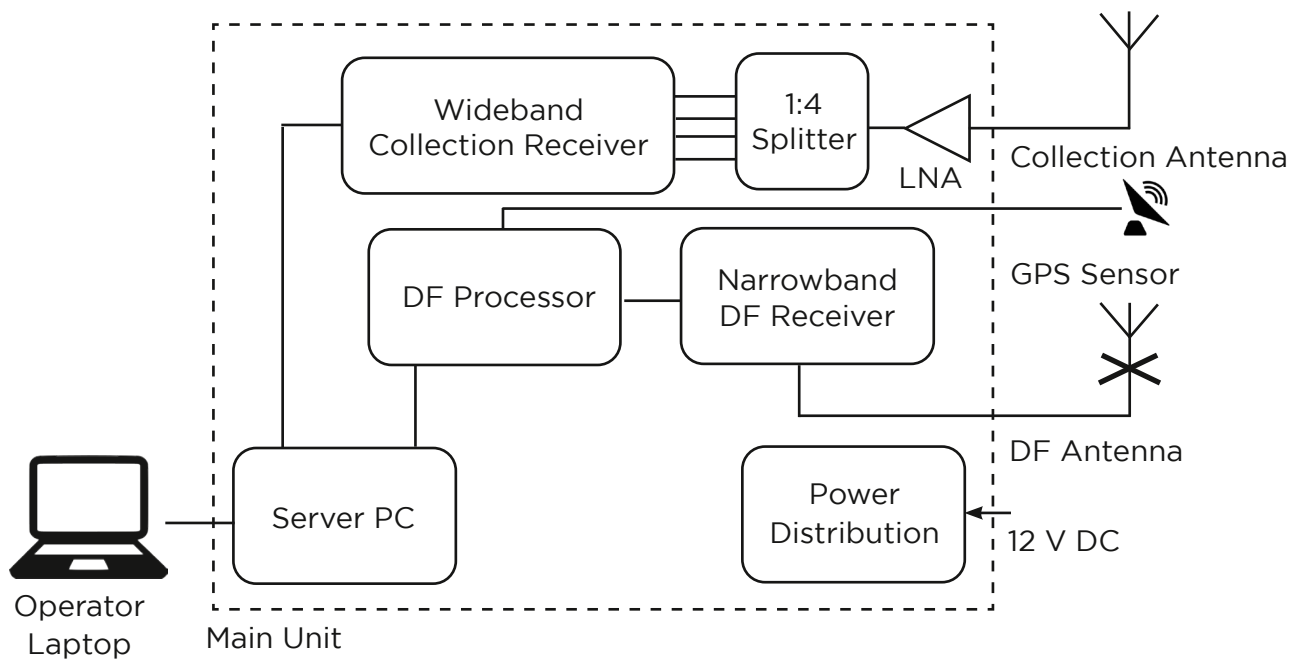


# HUGIN 304DF

## Functionality

HUGIN 304DF is designed for tactical EW/SIGINT applications. All functions are accessible via the intuitive command-and-control client application on a single screen providing good situational awareness.

The operator controls all aspects of the collection receiver and assigns the digital drop receivers (DDRs) to any active emitters of interest. The voice traffic channels can be played back in near real-time via the built-in audio device or attached headphones. 4 additional DDRs can be assigned for recording digital signals. The recordings are stored in a non-destructive IQ-file format that can be used for post-mission signal analysis. The DF processor automatically calculates the line of bearings of active interceptions. By moving the collection asset, it is possible to get multiple line-of-bearings to geolocate the target emitters. The mission database stores all interceptions incl. frequency, line of bearing, TOI, and the GPS-position of the collection asset.



# HUGIN 304DF

## Software

The command-and-control software (C2) has a back-end server responsible for processing heavy tasks. It manages all subsystems, audio & IQ recordings and automatic direction finding processing. The C2 software includes a thin client application with an intuitive user interface. Via a single laptop, screen, operators control all four 80 MHz band-segments and can monitor live activities on the wideband power spectrum. All assigned digital drop receivers (DDRs) are highlighted in the waterfall and power spectrum display. DDRs can be managed graphically via the power spectrum display and via a list view. All settings including center frequency, bandwidth and analog modulation are configured individually and independent from each other in real-time. Operators can load pre-configured frequency lists. The client software presents all line of bearings (LOBs) including the position of the collection asset (vehicle) on a map. In addition, a polar display shows all LOBs in reference to the heading of the collection asset (vehicle). A situational awareness display provides an overview of all recorded interceptions per channel/frequency versus time. Via this display the operator gets easy access for replaying any audio channel in near real-time. Audio replay is synchronized with the map display.

## Back-end server

The back-end server runs as a service on the industrial PC. All necessary services start automatically in the background. It integrates and controls all subsystems and manages all processing & data intensive tasks.

### Manages

- Collection receiver incl. DDRs
- Direction Finder subsystem
- Position from GPS sensor or manual overwrite
- Recorder plug-in

### Audio

- All audio channels stream continuously to recorder plug-in
- 0.5 to 2 seconds pre-buffer for audio streams
- Recording format: 8 kHz, 16-bit samples
- Triggered recording based on squelch level
- Balance control (5 steps) when listening

### IQ recording

- One IQ channel per tuner, configurable bandwidth
- IQ data streams continuously to recorder plug-in
- Operator starts and stops IQ recording manually

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## Client Application

### Controls

- All four wideband tuners and displays real-time wideband spectrum
- Audio channels graphically via power spectrum or parametrically via list view
- Audio playback via situational awareness display

### Map display

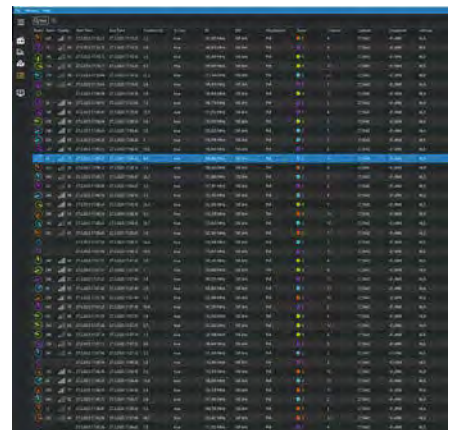
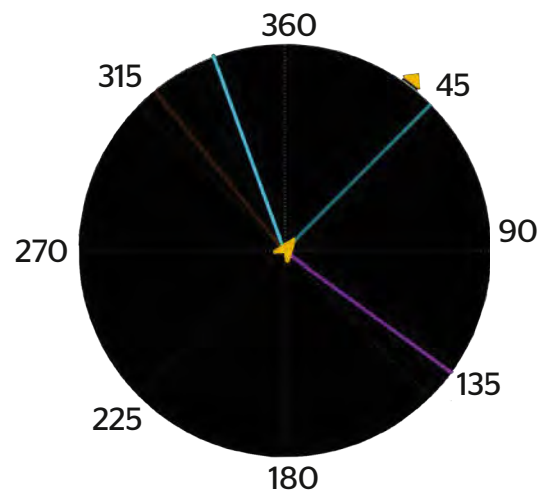
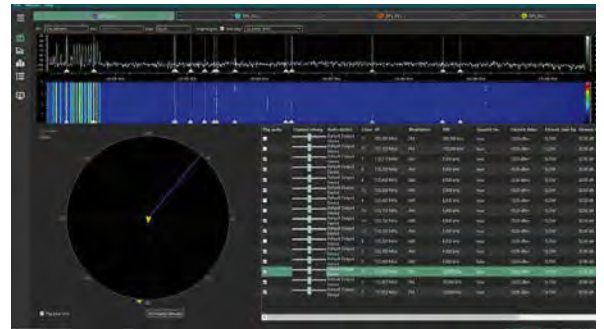
- Map data is pre-loaded with static images
- Possibility to load additional map images
- Displays own location & line of bearings (LOBs)

### Polar display

- Displays LOBs in reference to the heading of the collection asset
- Gets orientation from GPS subsystem
- All LOBs are displayed with corresponding frequency information
- Displays history of LOBs

### Interceptions

- Activity detection based on squelch level
- List view with meta data
- Situational awareness display
  - Channel/frequency versus time
  - Synchronized audio replay with LOBs on map display



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## Hardware

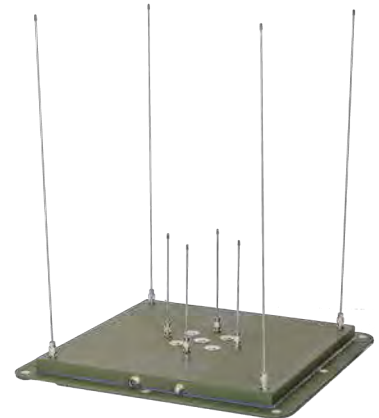
HUGIN 304DF incl. antennas is designed for temporary use with any vehicle. It has three subsystems and a client PC which are described in more detail below. The subsystems are a collection receiver with 4 tuners, a narrowband direction finder and a server PC. All subsystems are installed in a single 6U 19" main unit that operates with 12VDC. The main unit comes in an environmental case for easy and safe transportation. The case is primarily designed to be placed in the hatchback of a car. HUGIN 304DF can also be used with other moving platforms, like helicopters or naval ships.

## Direction Finder (DF)

The direction finder subsystem is based on the single-channel 2-phase Adcock/Watson-Watt method. It provides wide coverage from 20-520 MHz in four bands. The rugged, compact, lightweight, and weather-sealed DF antenna unit is designed for mobile applications. The antenna array is easily installed on vehicles or helicopters which have a sizeable metallic ground plane. Nylon mounting straps and rain-gutter hooks are supplied for temporary mounting to vehicle roof-tops. A small magnet-foot GPS-antenna is directly connected to the direction finder processor.

## Server & Client PCs

A Windows server PC is the main backend processing unit. It takes care of all processing intensive tasks like the recording plug-in. All user data, system files and recorded mission data are stored on a single removable solid state disk (SSD). HUGIN 304DF command & control client application is optimized for use on a single laptop screen. The system comes standard with a rugged laptop with a 14" screen and high brightness enabling viewing in direct sunlight. The laptop can be connected via a LAN-cable or Wi-Fi to the main processing unit.



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## Collection Receiver

The collection receiver has 4 wideband tuners with 80MHz instantaneous bandwidth each, providing a total of 320 MHz monitoring bandwidth. The default frequency range is 20 to 520MHz. A magnet-foot collection antenna feeds the RF signal to all 4 tuners. One tuner can optionally be used as a collection receiver (without DF), supporting 150 MHz - 6 GHz frequency range. This option provides additional insight of activities in the upper frequency band.

## Main Unit & Environmental case

The 6U 19" main unit operates with 12VDC, optionally with 24VDC. It comes ready-installed in an environmental case (IP54) for easy transportation. The case has shock absorbers protecting all electronics during transport and operation from shock and vibrations. Operators get easy access to connect all antennas and power by removing the front and back lids of the case. It also ensures cooling of the main unit during operation. The SSD is mounted via strong Velcro to the main unit. Operators can remove the SSD within seconds to secure the data.



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## Product Specifications

Collection Receiver	
RF receiver channels (Rx)	4
Instantaneous bandwidth	4 x 80 MHz
Input Impedance	50 Ohm
Max Input Power	+10 dBm
Frequency range	20 - 520 MHz Optional: 0,5 - 6 GHz on Tuner 4
Receiver architecture	Two-stage superheterodyne
ADC resolution	14 bit
Noise Figure	< 5 dB
Linearity	IP3 +2 dBm
Frequency accuracy	2.5 ppm
Residual Spurs	-95 dBm (non-input related)
SFDR	88 dB
Number of DDR's (DDC's)	64; 60 audio channels & 4 IQ channels
Demodulation modes	AM, FM, SSB, IQ
Demodulation bandwidth AM	6/10/20 kHz
Demodulation bandwidth FM	10/20/50/200kHz
Demodulation bandwidth SSB	3 kHz
IQ recording	1 channel per tuner
Direction Finder (DF)	
Frequency range	20-520 MHz (Ground plane required)
DF Technique	Single-channel 2-phase Adcock/Watson-Watt (derived sense)
Bearing Accuracy	3 deg. RMS (Max) 1,5 deg RMS typical (VHF)



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DF-bands	20-60/60-200/200-300/300-520 MHz
Bearing resolution	0.1 deg
Bearing Integration time	45 - 400mS Typical 200mS
DF Bandwidth	6/15/30/200 kHz
Polarization	Vertical
<b>Server PC</b>	
Operating System	MS Windows 10 professional, 64-bit
CPU	Intel core I7-12700TE
DRAM	32GM DDR5
Hard drive	500GB SSD, quick removable
Network interface	1x2.5 G Ethernet by I225 (RJ-45) Wi-Fi: 802.11a/b/g/n
<b>Client/Operator Laptop</b>	
Operating System	MS Windows 10 professional, 64-bit
CPU	Intel core I5-1135G7
DRAM	16GB DDR4
Hard drive	256GB M.2 SSD
LCD	14" Touch 1100 nits WBA FHD (1920x1080) sRGB Anti-Glare, Outdoor Viewable
Network interface	1x Gigabit Ethernet by I219LM (RJ-45) Wi-Fi: 802.11ax
Keyboard	English US RGB backlit sealed internal keyboard
Internal loudspeakers	2, high definition audio, 2W
External audio interface	3.5 mm headset-port
Battery	3 cell, 53.5 Wh

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Environmental Specification	
<b>HUGIN 304DF main unit with environmental case</b>	
Main Unit	6U 19-Inch rack mount enclosure 266 x 482 x 465 mm (HxWxD)
Environmental case	Shock mount 19-Inch rack case 410x490x710 mm (HxWxD)
Compliant to	IP54 & DEF STAN 81-41
Total weight	25 Kg
Operating temperature	0C to +55C
Storage temperature	-20C to +55C
Maximum Altitude	2000m (6500Ft.)
<b>Direction finding antenna</b>	
DF Antenna base size	550 x 550 mm
DF Antenna height	680 mm
DF Antenna weight	6 kg (excluding cables)
<b>Client/Operator Laptop</b>	
Compliant to	IP53 & MIL-STD-810G&H
Operating temperature	-29C to +63C
Weight	2.3 kg
Size	33,6x340x220 mm (HxWxD)

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## Options

- 24V DC operation
- Monitoring (without DF): 0,5-6GHz via separate antenna connected to tuner 4
- Monitoring and DF antennas for fixed ground sites and naval ships
- Environmental case color: Olive green
- Rugged Backpack for laptop

## Customization

HUGIN 304DF can be customized to meet your project or mission requirements. The versatile platform combined with our business model helps you to get the best possible tactical EW/SIGINT system fulfilling your requirements while being cost effective.

## About Novator Solutions

Novator Solutions AB, part of Novator Consulting Group, is a leading provider of products & system development within SIGINT & EW domains. Our highly skilled R&D team applies its extensive know-how in high-speed data processing and software defined radio “SDR” technology to develop next generation COMINT receivers and ELINT signal recorders. Our software expertise combined with a modular hardware architecture allows us to provide customized products and complete turn-key solutions tailored to specific project or mission requirements.

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## GET IN TOUCH

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