

DTA
D-TA SYSTEMS INC



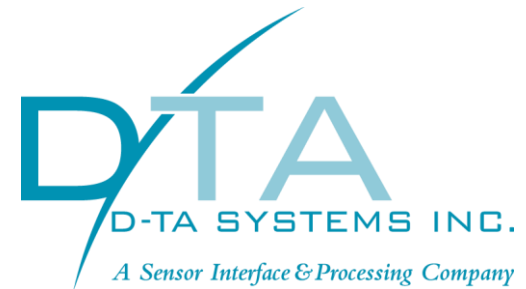
Spectrum Processing for Total Dominance

Mission Statement

As threats become more agile, deceptive and diverse, our mandate becomes more focussed on delivering mission critical EW sensor solutions that drastically cut deployment risk, time and cost



*We are positioned to become a Global
EW Powerhouse For Sensor Systems*



10 Gigabit Sensor Processing



All D-TA Sensor Interface Products Use 10 Gigabit Optical Networks As Data Backbone

FAST, SCALABLE AND SYNCHRONIZED

D-TA pioneered 10 Gigabit Sensor Processing which has simplified sensor system development. Any system now has only two parts: Sensor interface (D-TA products) & processor (typically commercially available low-cost server class computer). One or more 10 Gigabit networks (fibers) move data from one to another.

- Simple & low-cost solution for rapid deployment (D-TA provides the Sensor Interface subsystems for different applications and the user only develops application software)***
- Scalable solution, as channel-count & BW increases more fibers can be used***
- Use of Optical fibers allow sensor interface & processor to be far apart (antenna-level digitization is possible)***
- OS agnostic***

Deployed Applications At-A-Glance

D-TA offers readily customizable open-architecture sensor systems for EW applications. D-TA's products have been deployed in wide ranging applications from COMINT to SONAR.

COMINT

- Portable Solution for RF spectral surveillance, real-time RF recording & playback, Search Receiver
- Multi-Antenna transceiver solutions for ES, DF, COMS & EA

ELINT

- Ultra-wideband RF transceiver for ELINT Pulse Processing, Data Collection & Data Management

RADAR

- Cognitive Radar in the L, S, C, X & K bands, Passive Radar, Over-The Horizon Phased Array HF Radar

EW Emitter SIMULATION

- COMINT, ELINT & Radar Simulation

SONAR

- ASW, Mine, Dipping Sonar & Sonobuoy Processing

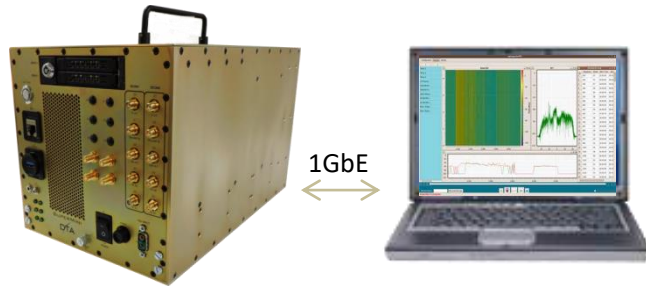
SPECTRUM FUSION

- DC to daylight spectrum processing for spectrum dominance

COMINT

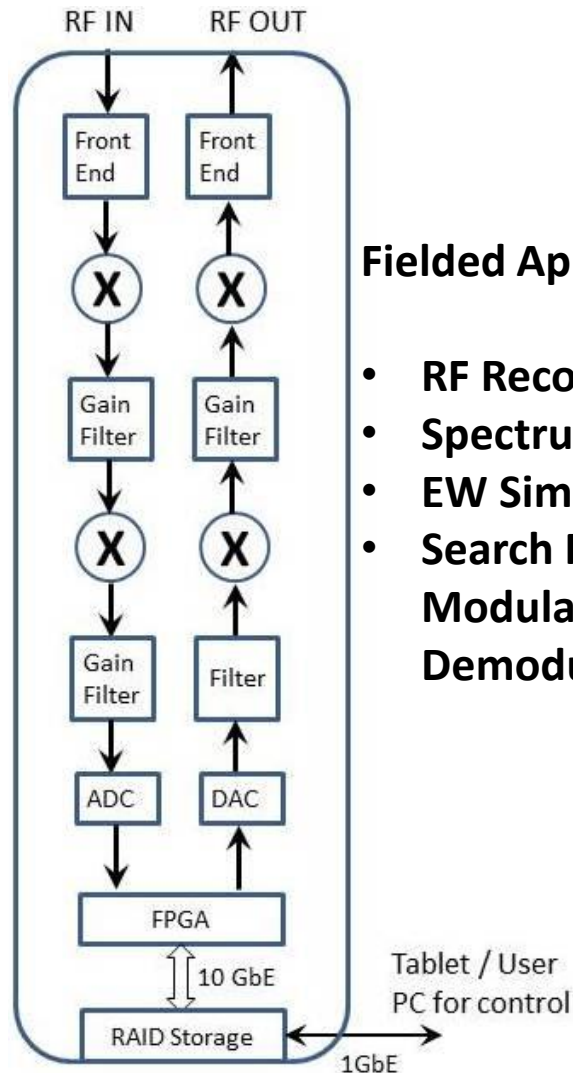
Portable RF Record/Playback, Simulation, Search Receiver

RFvision1-Supermini



RFvision1-Supermini
[7.64"x7.5"x12.76" ; 8.1 kg
& 2xSSDs]

- **1 Rx & 1 Tx or 2 Rx or 2 Tx**
- **1 MHz – 8 GHz with 40/80 MHz IBW**
- **8 dB NF, & 93 dB Gain Control**
- **16 Bit data converters**
- **FPGA based programmable DDC & DUC for BW selection from 5 kHz to 40/80 MHz**
- **2 TB SSDs for real-time record & playback**



Fielded Applications:

- **RF Recording & Playback**
- **Spectrum Monitoring**
- **EW Simulation**
- **Search Receiver with Automatic Modulation Recognition & Demodulation & Decoding**

UNMANNED AERIAL RF MONITORING (UnARM) / TARGET ACQUISITION & JAMMING



Unmanned Aircraft System

RFvision1-Supermini can be mounted on a small UAS for spectral surveillance and also jamming (requires external power amp)

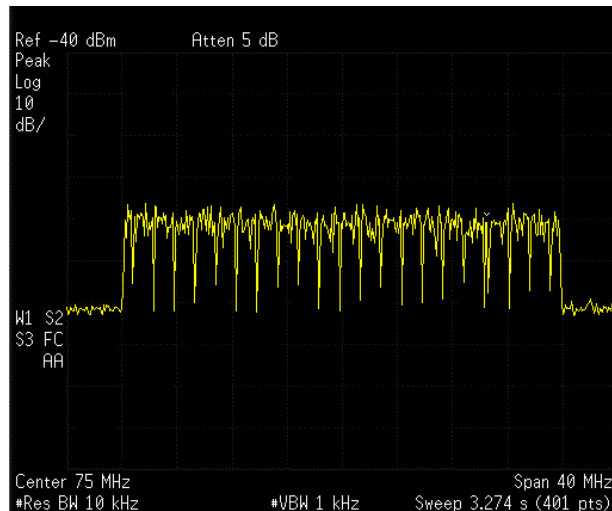


RFvision1-Supermini

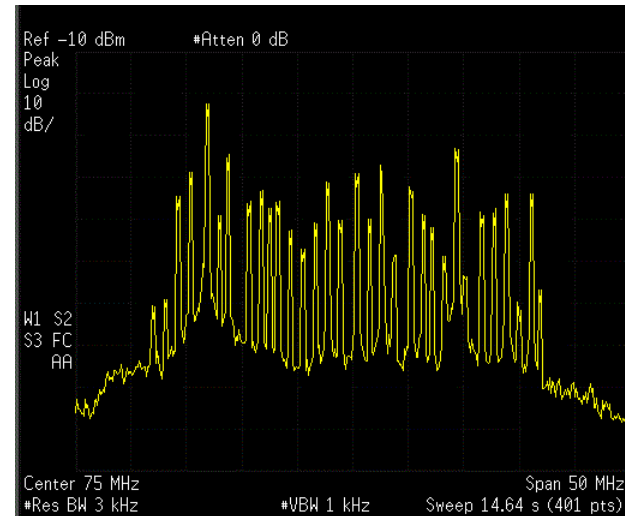
RFvision1-Supermini For Portable Dual Channel Arbitrary RF Waveform Generator For Communications & Radar Signals

Streaming I/Q Data from hard drives to tunable RF transmitters simplifies RF signal generation. D-TA's Communication and Radar signal builder GUI creates waveform data files and stores them in the hard drives

Examples of Complex Signal Generation

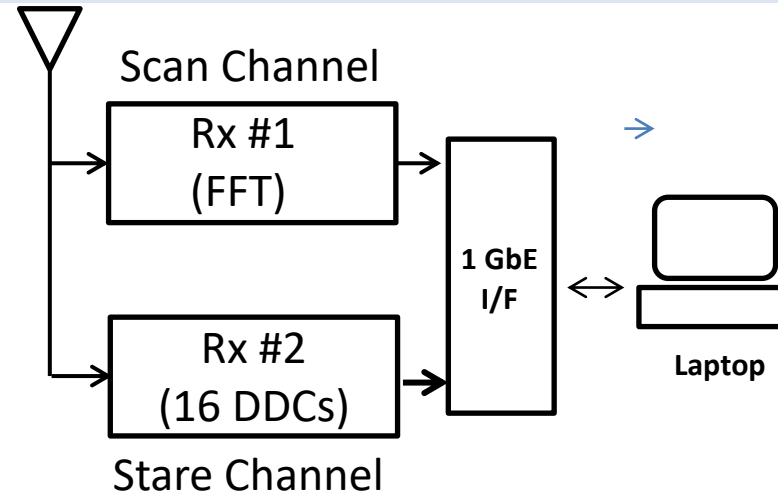
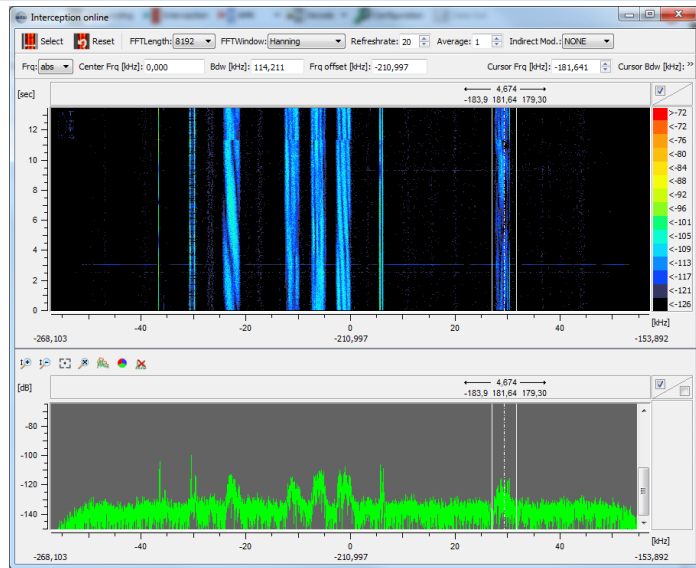


Weighted OFDM signal



**Sonobuoy Receiver Signal
(32 FM channels)**

RFvision1-Supermini Portable Search Receiver

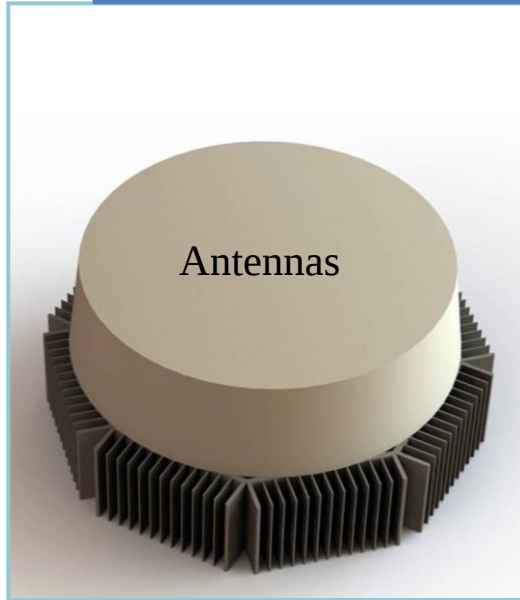


- Intuitive and efficient GUI based operation
- Spectrum viewing with high resolution waterfall display & selecting signals of interest
- Based on signal activities, the stare receiver's DDCs can be tuned to provide up to 16 narrow band I/Q outputs
- Narrowband signals are analyzed with powerful automatic modulation recognizer, protocol recognizer and decoding
- The AMR automatically determines the modulation type and its technical parameters such as frequency offset, signal level and baud rate
- The automatic protocol recognizer and decoding support a long list of decoders and extract text, picture or hexadecimal binary output
- Universal demodulators for many modulation types to produce a bit or symbol stream
- Record signals or spectrum segments
- Listen to signal speech transmissions

MULTI-ANTENNA PLATFORM

ALL-IN-ONE COMINT PLATFORM FOR ES, DF, COMS & EA

RUGGED VERSIONS



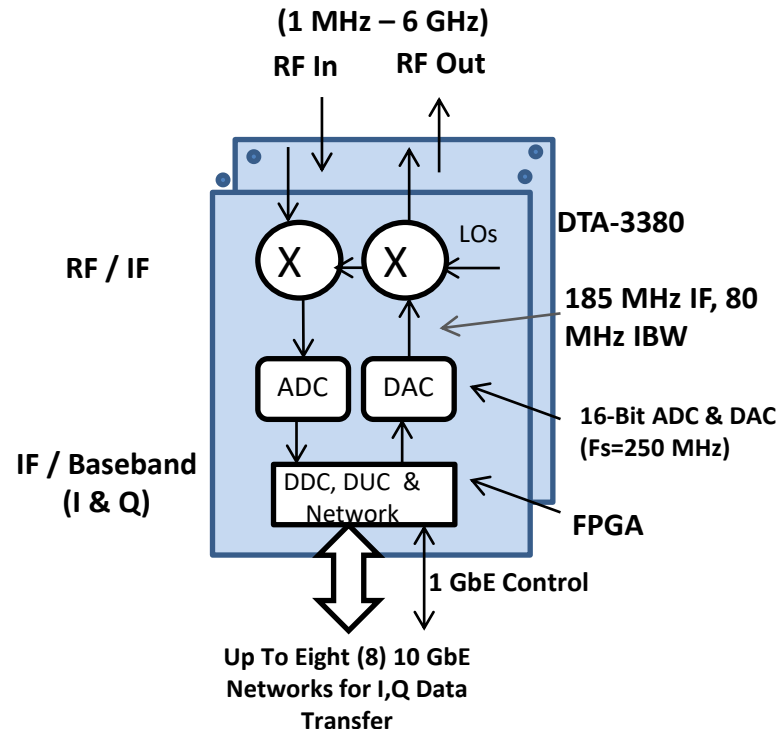
3-5 Channels in
 $\frac{1}{2}$ ATR

RADIO HEAD

DTA-3380 RACK-MOUNT



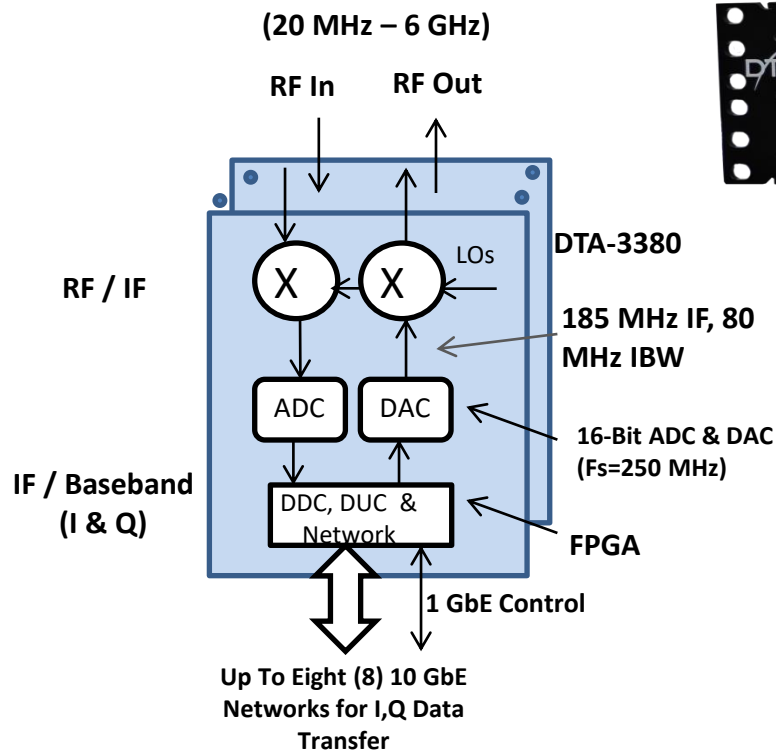
Up to 16 receive and/or transmit channels can be housed in a 2U enclosure. For each channel the tunable frequency range is from 1 MHz to 8 GHz and the IBW is 80 MHz. The number of 10 GbE networks for I & Q data transfer is a function of the channel count



Multi-Antenna Configuration with 80 MHz Operating BW



DTA-3380 Multi-Antenna Transceiver
(1 MHz – 8 GHz frequency tuning range & 80 MHz IBW)

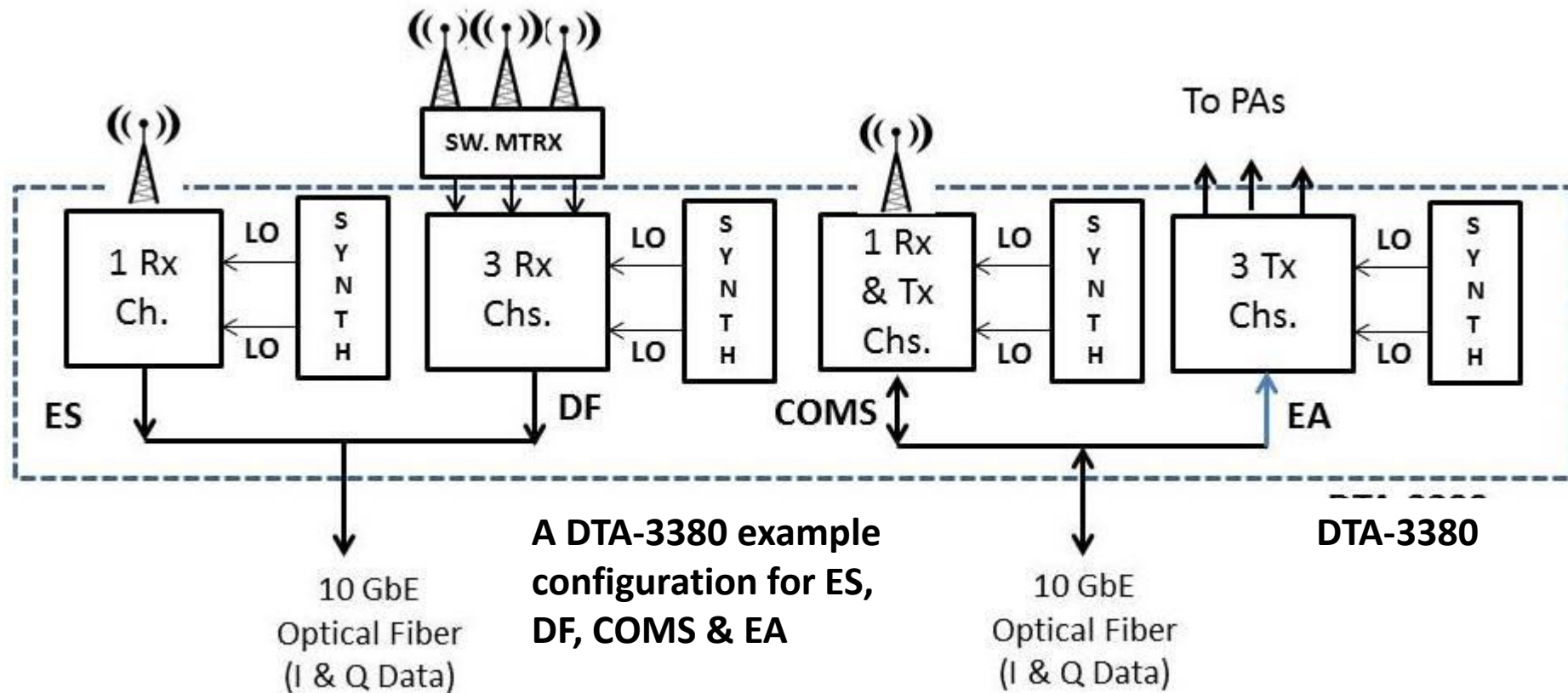


DTA-3380 Block Diagram

Download Tech Note TN-41 for
more information on DTA-3380
(www.d-ta.com)

- Any number of user specified Rx or Tx channels up to 16 in a 2U enclosure;
- Phase-coherent and/or independent tuning;
- 1 MHz to 8 GHz frequency range (optionally 200 kHz – 18 GHz);
- 80 MHz IBW & DDC & DUC selectable operating from 4 kHz up to 80 MHz;
- 16 bit data converters;
- Up to eight (8) 10 GbE optical networks for I.Q data transfer at full BW for all channels (VITA-49 compliant)
- Separate 1 GbE network for control
- SigInspector™ GUI & SDK offered to support user development

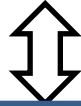
User Defined Configuration Of DTA-3380 For COMINT



- 1 MHz – 8 GHz Spectral Coverage & 80 MHz IBW
- Up To 16 Phase-Coherent and/or independently tuned channels
- 8 dB Noise Figure, >+30 dBm OIP3, 93 dB Gain Control & 16 Bit Data Converters
- DDC programmed Operating BW selection From a few kHz to 80 MHz
- K-7 FPGAs (User Programmable)
- Multiple 10 GbE Optical Networks for Data Transfers for Server Based Processing

RFvision-Broadview With Integrated Processing & Record / Playback

DTA-3380



DTA-5000
(24 TB SSDs)

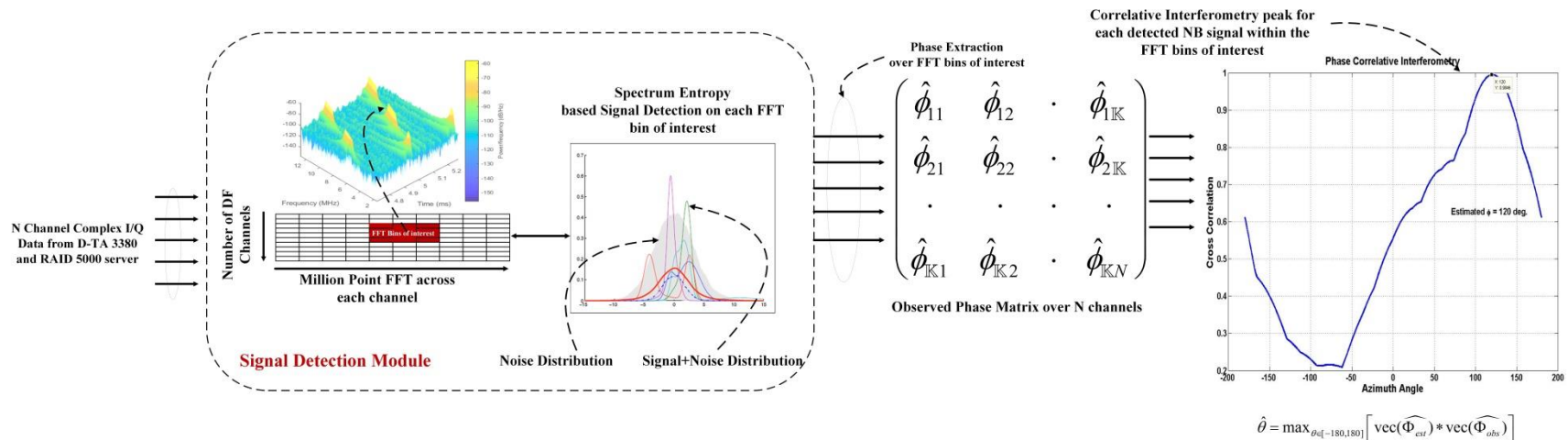


Replicated 10 GbE RAID Server
Link To an
Optional
Processing Server



RFvision-Broadview (DTA-3380 RF
Transceiver & DTA-5000 RAID Server)

Typical DF Processing (Simultaneous Recording & Processing)

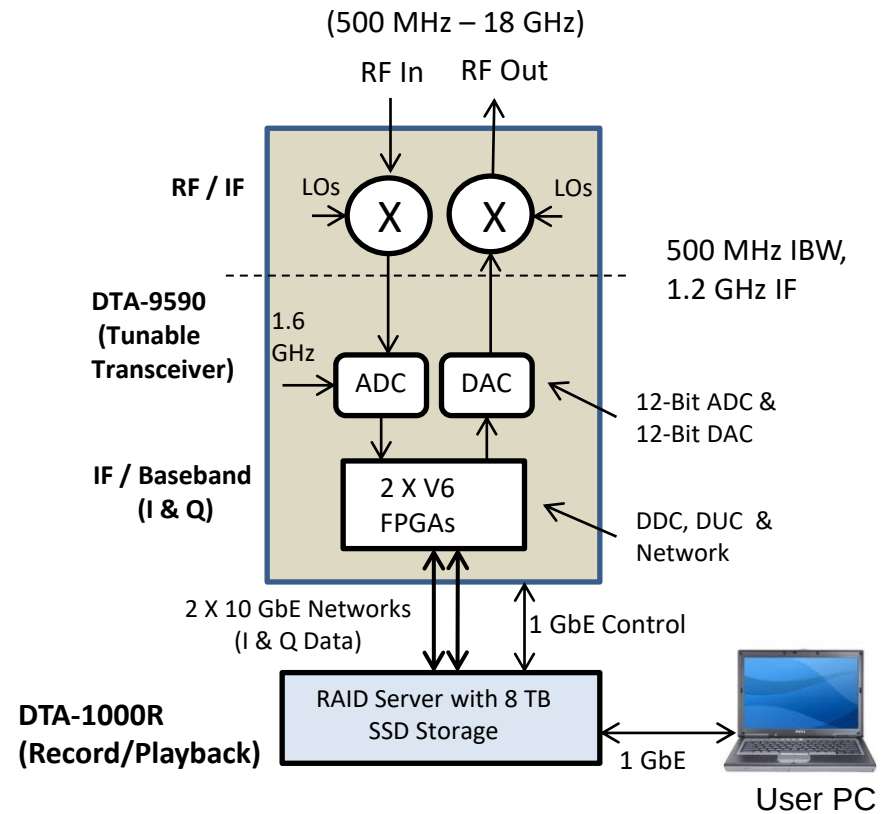


RFvision-2 Tunable Ultra-Wideband Transceiver System For ELINT/RADAR/THREAT SIMULATION



RFvision-2 –(1R1T) System (3U)

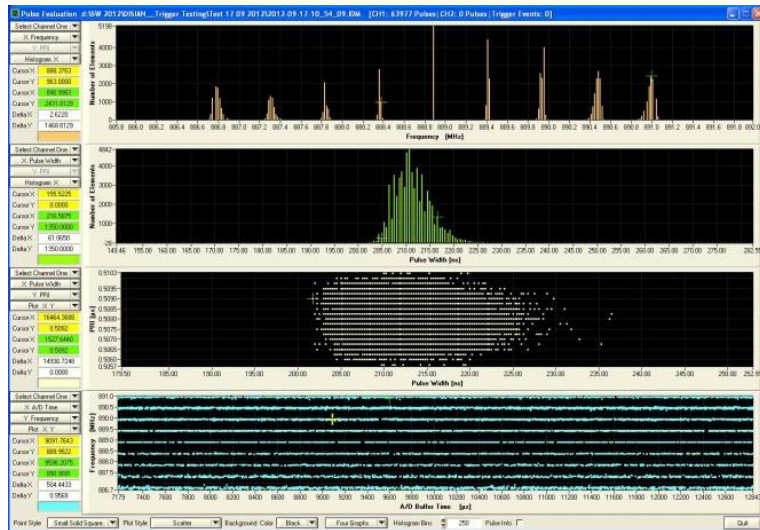
- Independently tuned receive & transmit channels
- 500 MHz to 18 GHz frequency range (expandable to 40 GHz)& 500 MHz Instantaneous BW
- 12-Bit, 1.8 GSPS ADC with over 60dB SFDR and 12-Bit 4 GHz DAC
- 2 Virtex 6 FPGAs with programmable DDCs, DUCs, 10 GbE optical data networks & 1 GbE optical control network cores
- I & Q Data on 10 GbE networks for record/playback and/or real-time processing
- Real-Time recording & RF playback (full 500 MHz bandwidth) at 1.6 GBytes/s for over 1 hour using the DTA-1000R RAID Server



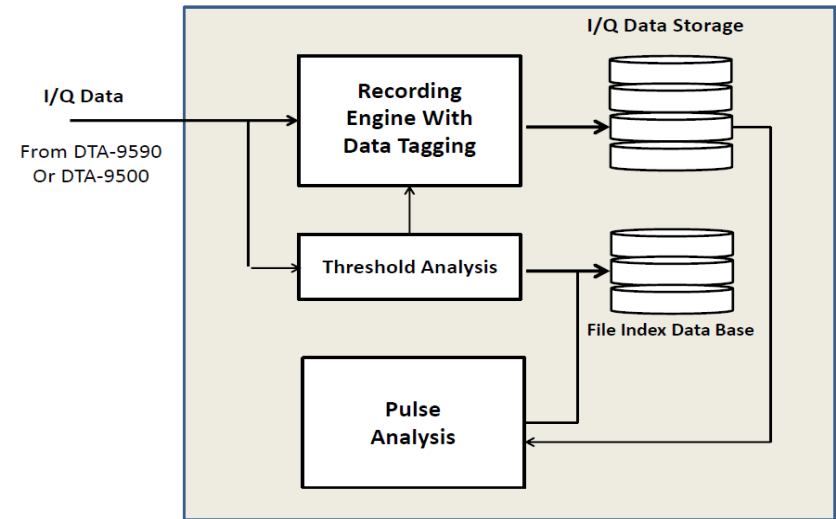
RFvision-2 -1R1T System Block Diagram

Multi-Function ELINT With Advanced Pulse Processing, Data Collection & Data Reduction

RFvision-2-MFEL



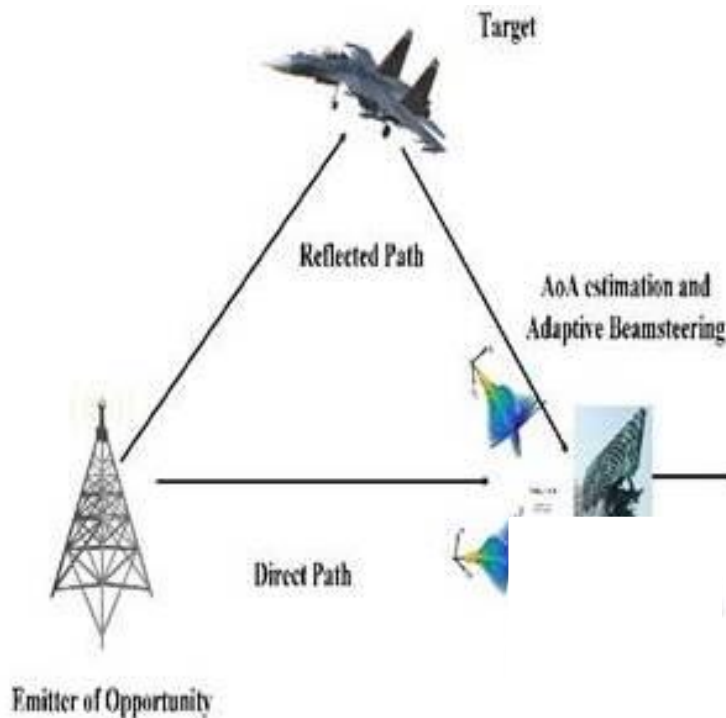
Frequency range: 0.5 – 18 GHz
Instantaneous bandwidth: 500 MHz
Noise Figure: 14 dB; SFDR: 63 dB
Gain Control: 31 dB in steps of 1 dB
Dynamic range: 63dB
PW resolution: 1.875 ns
MOPs Recognition :
FMOP - Linear and non-linear;
PMOP - Bi-phase, multi-phase, Barker,
Storage: Up To 24 TB



DTA-1000R RAID Server

The key differences in the design of the MFEL system over other ELINT system in the market is that it is based on processing recorded (wideband I/Q) data and as result every sample is scrutinized for the highest probability of intercept and more accurate analysis. Processing happens concurrently as data being recorded in multi-core software environment

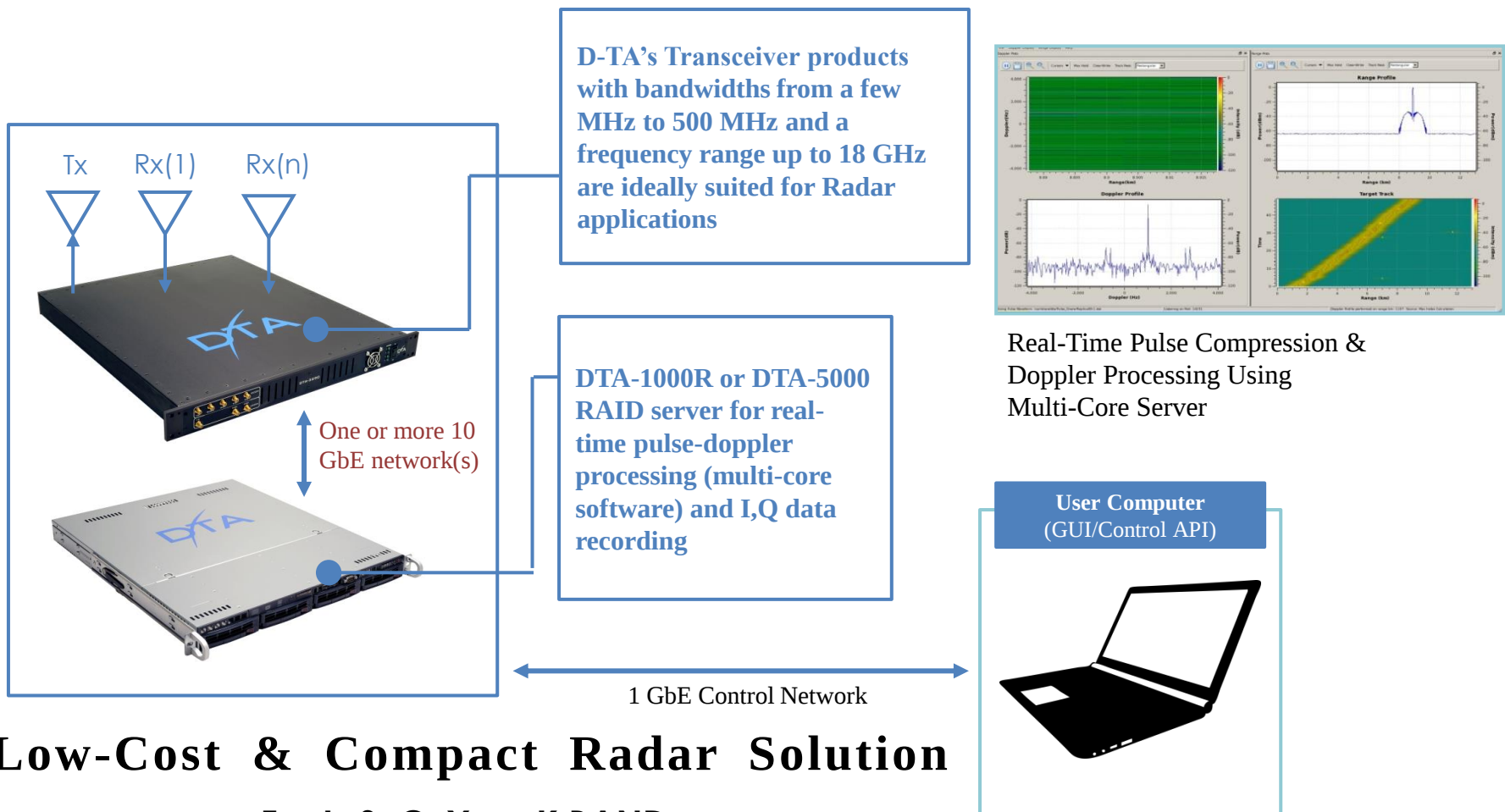
Passive Bistatic Radar



**N-Channel RFvision-Broadview
(1 MHz – 8 GHz, 80 MHz BW)**
DTA 3380 with DTA-5000 RAID server

- **Wide frequency tuning range so any illuminator of opportunity can be used.**
- **One beam formed towards the illuminator for collecting reference signal.**
- **Second beam collects target signal (more than 1 beam can be formed).**
- **All processing (bistatic range-doppler) processing done in multi-core server.**
- **Recorded data can be revisited for processing by multiple algorithms for radar data cube processing (Range-Doppler extraction, tracking, target detection and discrimination, etc.)**

COGNITIVE RADAR IN ANY BAND

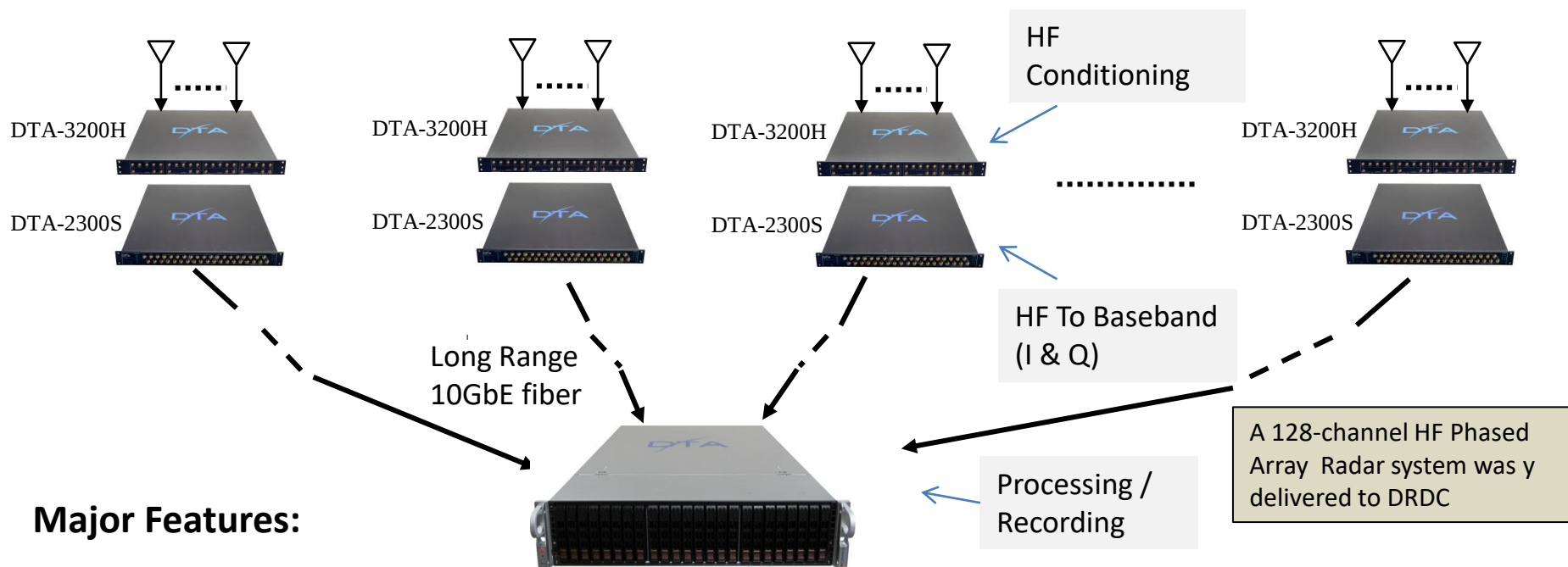


Low-Cost & Compact Radar Solution

For L, S, C, X, or K BAND

Any frequency range up to 18 GHz and any BW up to 500 MHz, D-TA's transceiver products simplify radar system development for both single and multi-antenna applications. I & Q data samples are processed in the multi-core server for both receive and transmit processing.

Over the Horizon Radar (OTHR) – Phased Array HF Radar



Major Features:

- 1 MHz to 30 MHz coverage with front-end HF band splitting option for high sensitivity HF operation (see block diagram)
- Fully differential amplification for 2nd harmonic distortion reduction
- Programmable 31-dB attenuator in steps of 1dB for gain balance and spurious management
- Full Transceive Operation

- 90 dB SFDR
- Optical 10GbE network allow long distance transmission with LR optics
- Lengths up to 10km possible
- A cluster of 16 or more channels can be placed in a single location -- improving sensitivity
- Multiple clusters may be spaced out to match with the actual antenna placement
- Digitized data can be transmitted to common recording / processing station
- Reduces deployment cost and improves RF sensitivity

Synthetic Emitter Simulation For Test & Training

Streaming Waveform I/Q Data from computer hard drive to tunable RF transmitter simplifies RF signal emulation. Any waveform for virtually any duration can be created



US Army COMINT Simulation using D-TA's RFvsiion1 series products



EW Testing in mid-ocean using UAV equipped with D-TA's EW Emulator

Desk-Top Multi-Channel Radar Signal Emulator

MRSE-5000

Up To 500 MHz BW For Each Channel
(0.5 – 18 GHz)



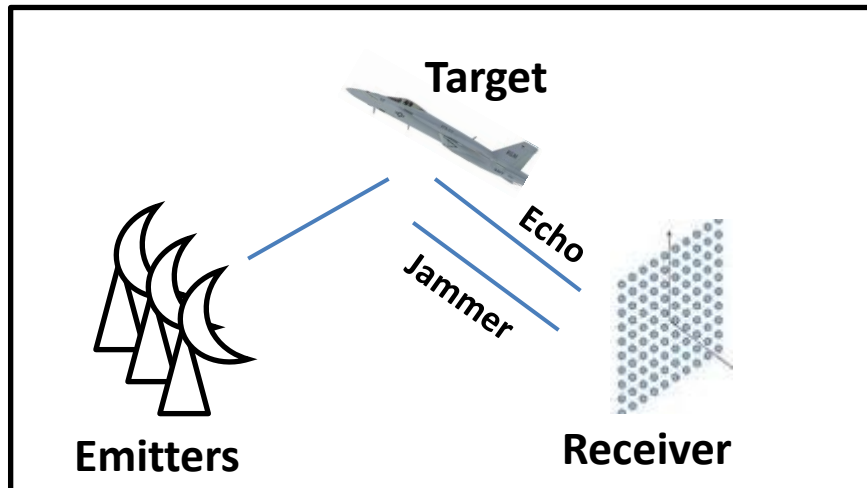
RAID Server with 24 TB Storage



User PC

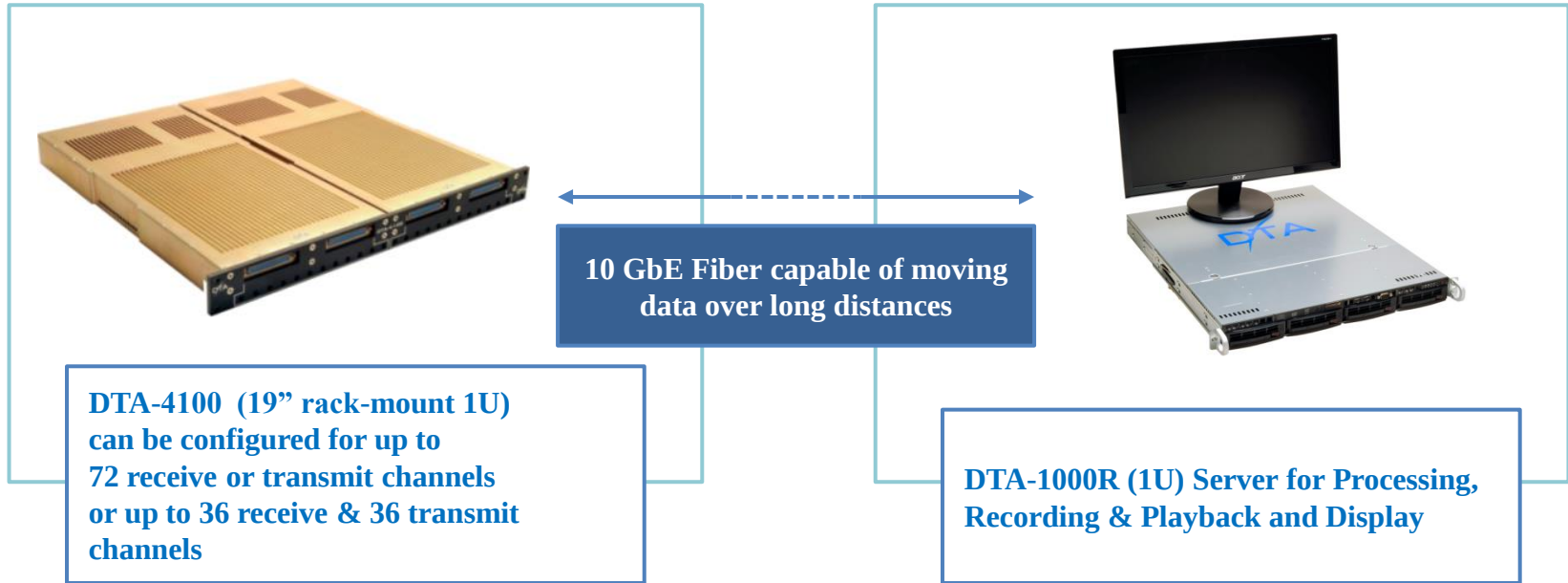
D-TA's multi-channel MRSE-5000 radar signal emulator system is based on streaming radar waveform (I/Q) data to tunable RF transmitters for creating any radar signal scenario over a long duration.

The MRSE-5000 base system is available in 1,2,3 and 4 channels with BW up to 250 MHz or 2 Channels with BW up to 500 MHz



The Radar Signal Builder (RSB) software running inside the server can create receiver I/Q waveform data files for multiple emitters, including jammers with or without a target. The software can model path loss, target radar cross-section with motion dynamics, linear and non-linear FM, phase-coded and CW waveforms; variable PWs, BWs, Frequency hopping, pulse-on-pulse & pulse pair designs, PRI staggering, antenna geometry & scan patterns.

MULTI-CHANNEL ACOUSTIC RECEIVE & TRANSMIT PROCESSING



DTA-4100 Receive Sub-System:

- 36 Differential Inputs with Signal Conditioning
- 24-Bit, 2.5 MHz Sigma-Delta ADCs that offer over 108 dB SFDR
- Two DAC outputs that can be used for test/transmit
- Multiple DTA-4100 receive subsystems can be stacked to increase channel count
- 10 GbE Optical Link allows full bandwidth operation

DTA-4100 Transmit Sub-System:

- 36 Differential Outputs with Signal Conditioning
- 16-Bit, 50 MHz DACs that offer over 88 dB SFDR
- Two ADC inputs that can be used for test
- Multiple DTA-4100 transmit subsystems can be stacked to increase channel count
- 10 GbE Optical Link allows full bandwidth operation

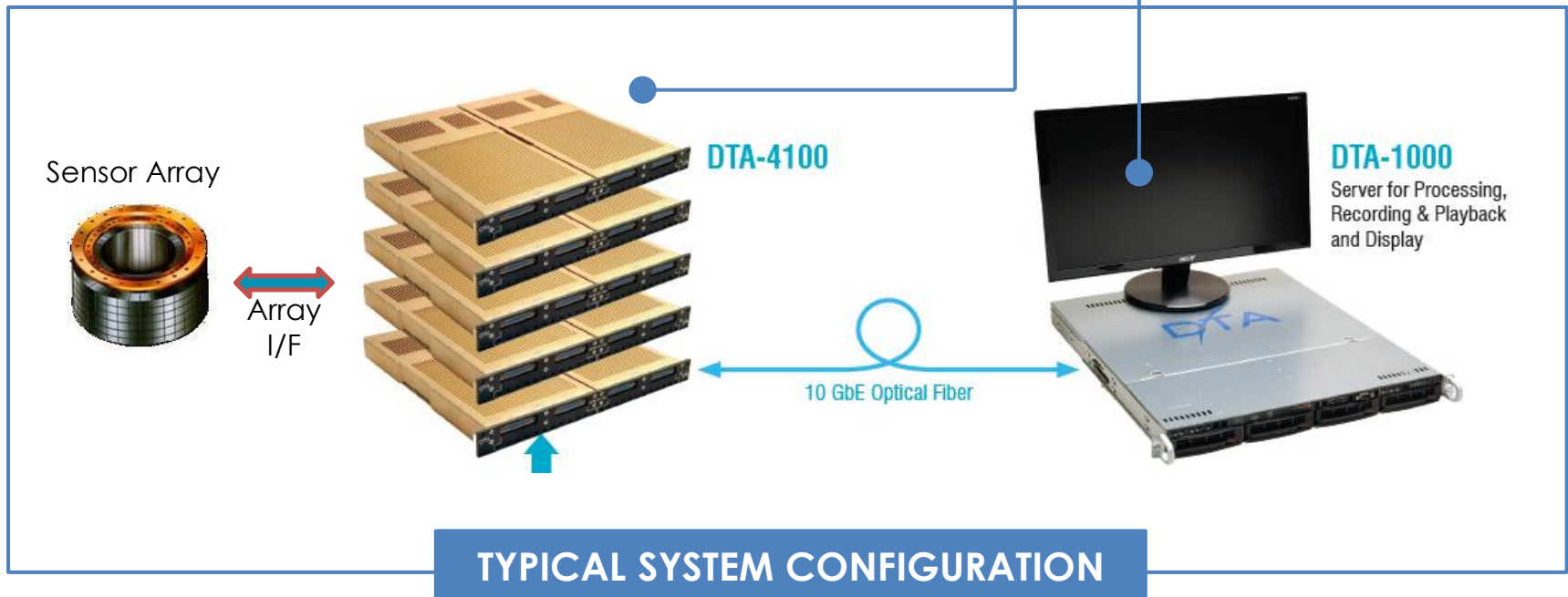
LARGE CHANNEL COUNT ACOUSTIC PROCESSING

Scaling Up To Handle A Large Number Of Channels

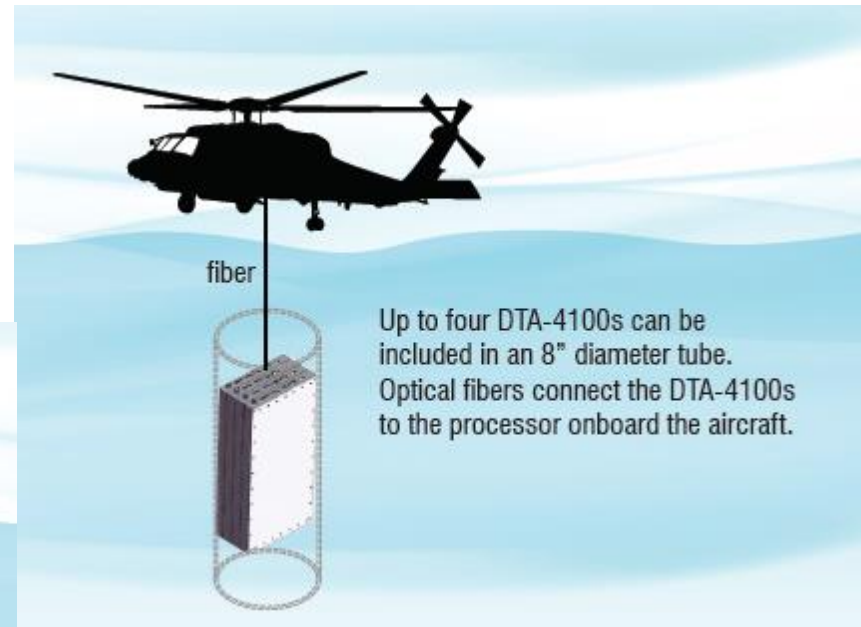
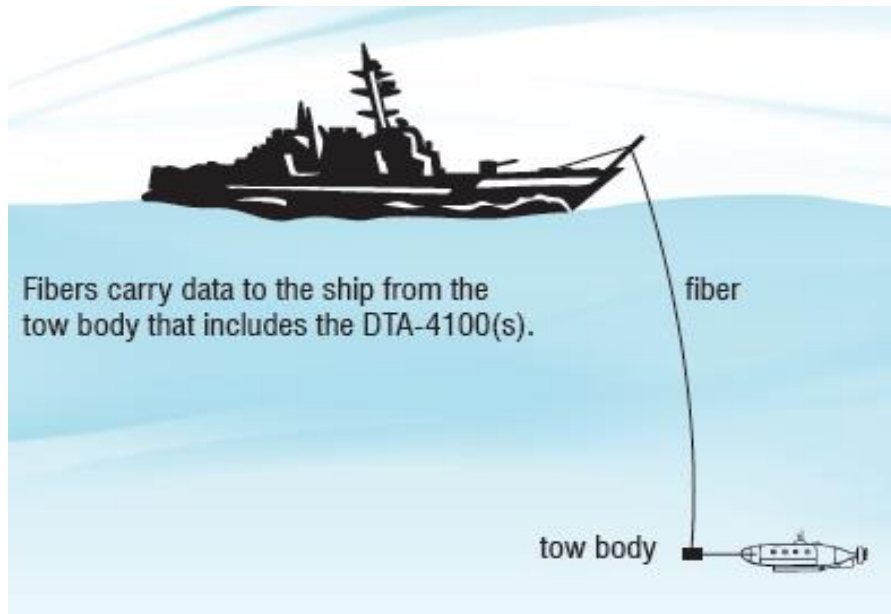
Many acoustic application require processing a large number of sensors (e.g, sonar), virtually any number of DTA-4100 units can be operated synchronously to increase channel count.

**Synchronized Operation with
 $N \times \text{DTA-4100}$**

Only optical fibers connect DTA-4100s to the processor for remote processing



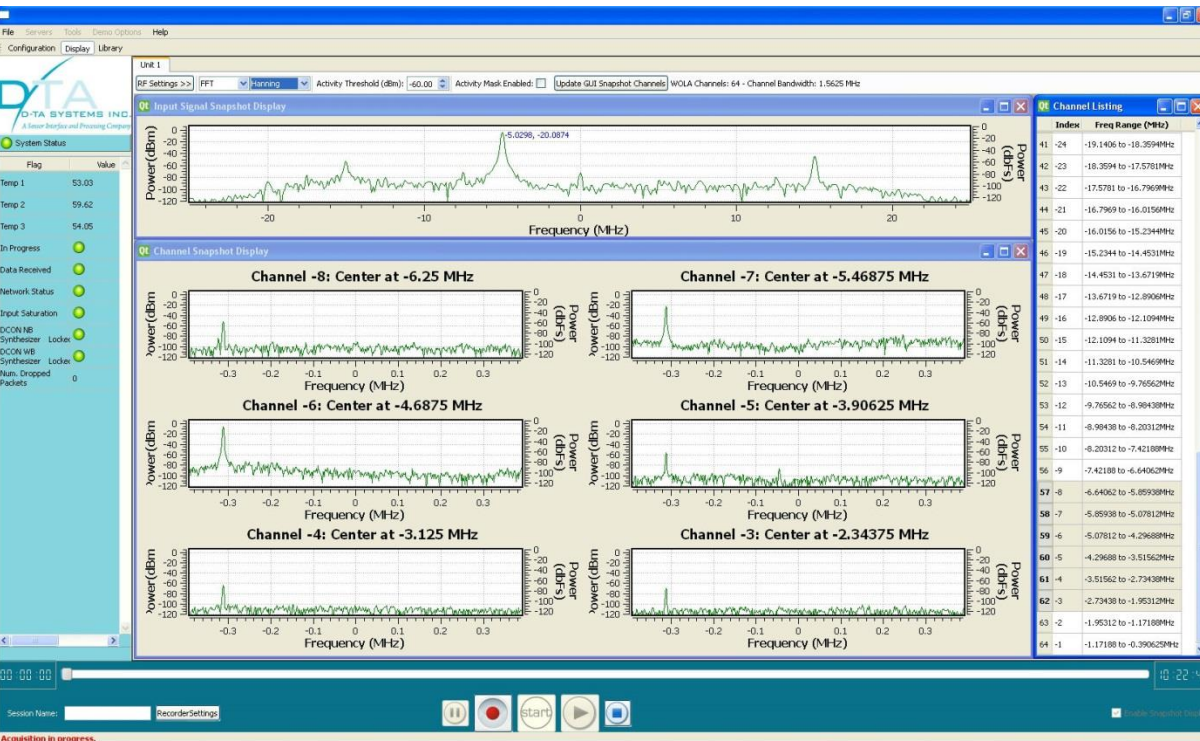
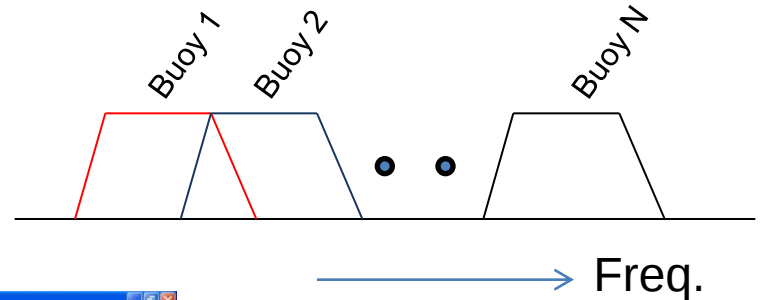
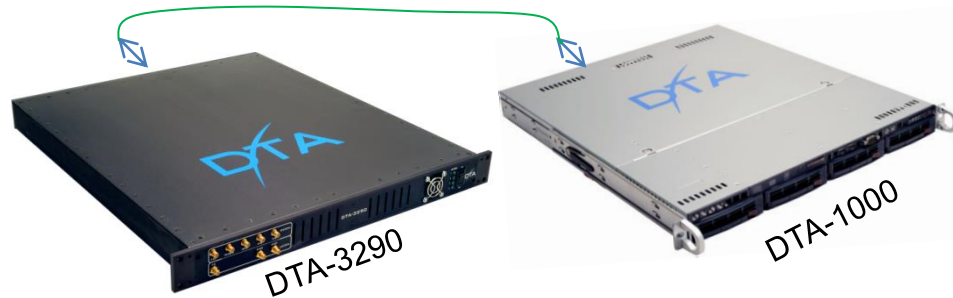
Mine Hunting & Dipping Sonar For Halifax (Suggested)



In applications that deploy tow bodies or buoys, DTA-4100 is particularly well suited. The DTA-4100 can be placed close to the sensors. Digitized sensor data can be transferred over a distance of close to 1Km (without using repeaters) for processing.

Sonobuoy Receive Processing

D-TA's RFvision-1 RF receivers simplify Sonobuoy processing of Frequency Division Multiplexed VHF radio signals from 32, 64 or more buoys

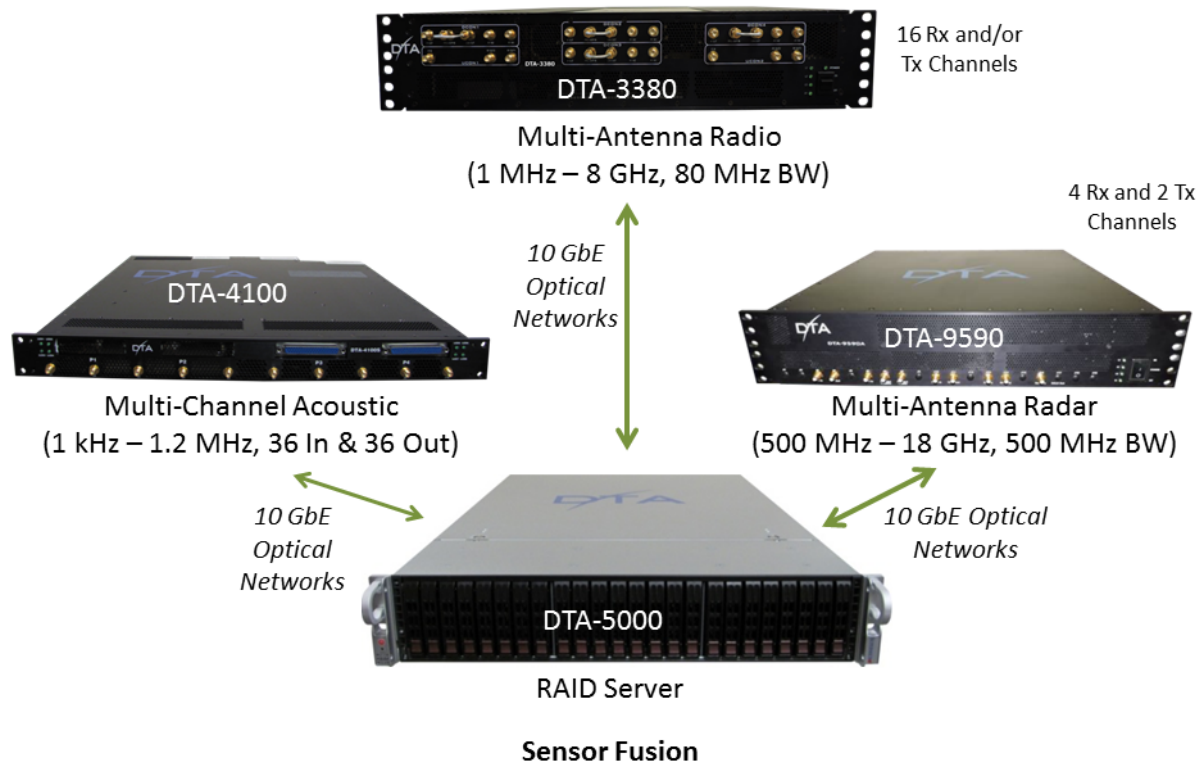


Channelized VHF Receiver

Drastic Reduction of Size & Cost

Spectrum Fusion For Complete Situational Awareness

Simultaneous Processing Of Acoustic, Radio & Radar Signals



A Common Platform for Sonar, Radio & Radar processing

For more information
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Spectrum Processing For Total Dominance!



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