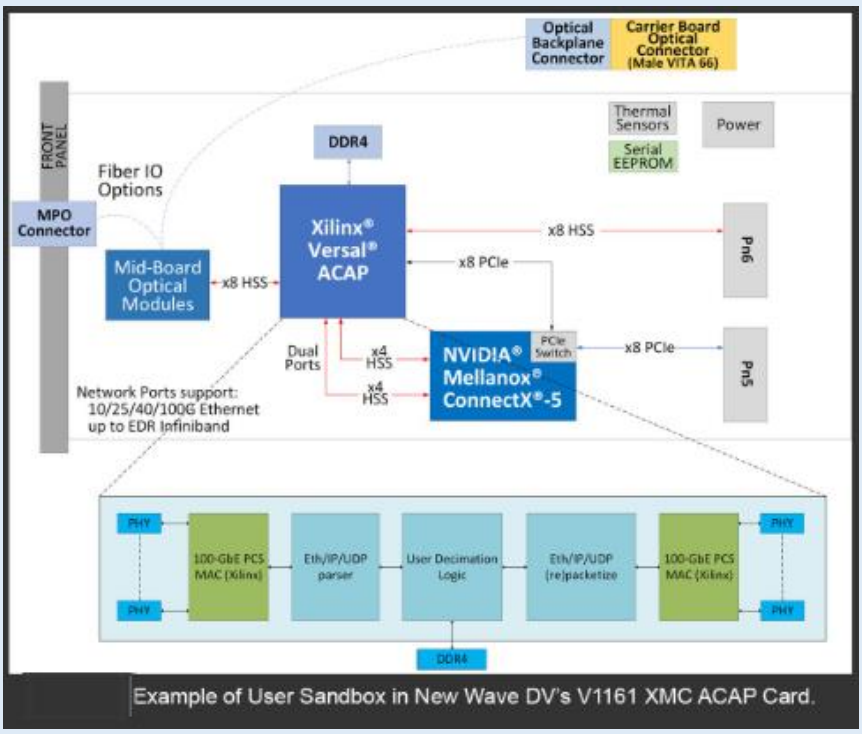
# Applications

## Radar Systems

Advanced digital radar systems that can detect targets in complex, high-clutter environments are essential for mission-critical operations such as defense, search and rescue, and offshore security. Digital radar systems provide activity monitoring, target detection and classification, guidance, and encroachment notification. Additionally, active electronically scanned (AESA) phased array digital radar systems, which reinforce antenna signals in desired directions and suppress them in others, can perform search, track, and guidance functions for scores of simultaneous targets. New Wave DV offers radar interface card hardware compatible with XMC, VPX, PCIe, and PXIe form factors. Leave the details of the interface to New Wave DV, let your team focus on the design of the radar itself. The best part is, the hardware's protocol IP is customizable, allowing end-users to add their own hardware-based processing to the radar interface card, reducing processor burden and latency while increasing determinism.

Our embedded radar interface cards are purpose-built for extreme environments, high-bandwidth networking, and interface applications. The V1153, V1160, V1161 XMC cards and V6061 & V6063 3U VPX modules will withstand harsh environments while staying within your SWaP and budget requirements. Supporting temperature ranges from -40°C to +85°C and complying with VITA 20 standards, each XMC card delivers a reliable, long-lasting solution for your rugged embedded needs.



Example of User Sandbox in New Wave DV's V1161 XMC ACAP Card.

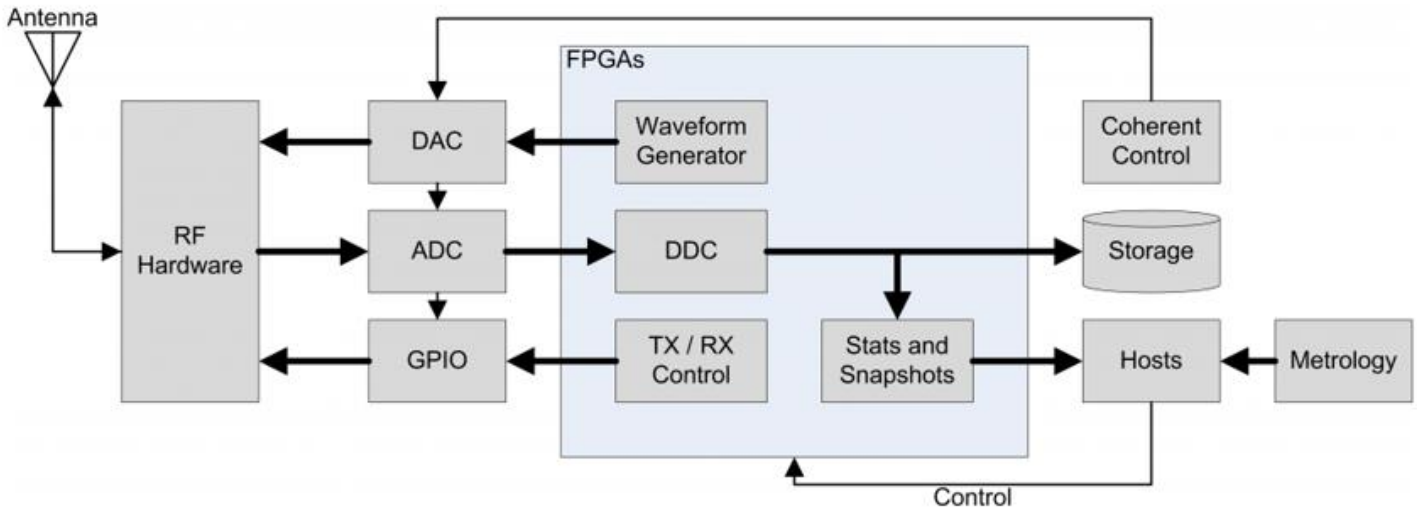
NewWaveDV Products

# Synthetic Aperture Radar

Synthetic Aperture Radar (SAR) is a process used to create images of objects and landscapes, typically from a moving airborne platform. By covering a large aerial distance a SAR device is able to produce a large synthetic antenna aperture and produce high resolution images with relatively small physical antennas.

A typical SAR block diagram is shown below. A SAR operates by repeatedly transmitting pulses (here shown as a Waveform Generator driving a DAC) then receiving and recording the pulse echoes (shown via an ADC feeding a Digital Down Converter / DDC and Storage). The stored data is used to generate high-resolution images offline.

**Figure 1: A Typical Synthetic Aperture Radar (SAR) System**



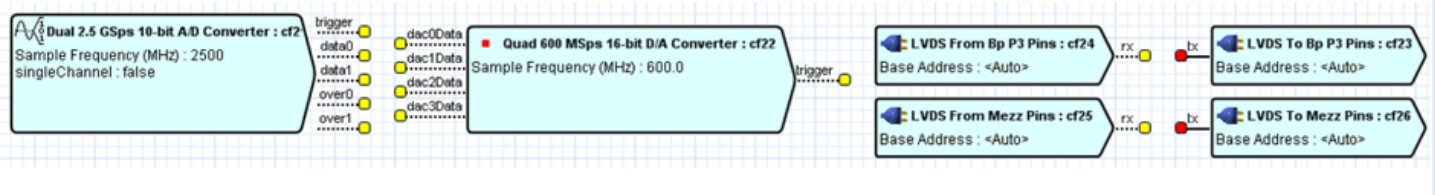

One or more hosts processors usually controls the system, generating TX / RX profiles and looking at statistics and snapshots of data to verify correct system operation. Coherency is paramount, as DACs and ADCs must transmit and receive with extreme timing accuracy to ensure the validity of the reconstructed images. Because of this coherency requirement the TX / RX RF Hardware switching is often controlled via General Purpose IO (GPIO) coming from the system as well. Metrology data is also captured by a Host computer and associated with the captured data to aid in image construction.

The Annapolis OpenVPX EcoSystem™ is a proven platform for SAR development and deployment. Our WILDSTAR baseboards support a vast library of Mezzanine Cards, providing a wide variety of ADCs and DACs that can be coherently synchronized using our high-performance WILDSTAR™ Clock Distribution Boards.

GPIO can be provided via LVDS Mezzanine Cards or through our OpenVPX Rear Transition Modules (RTMs), providing coherent control of RF components.

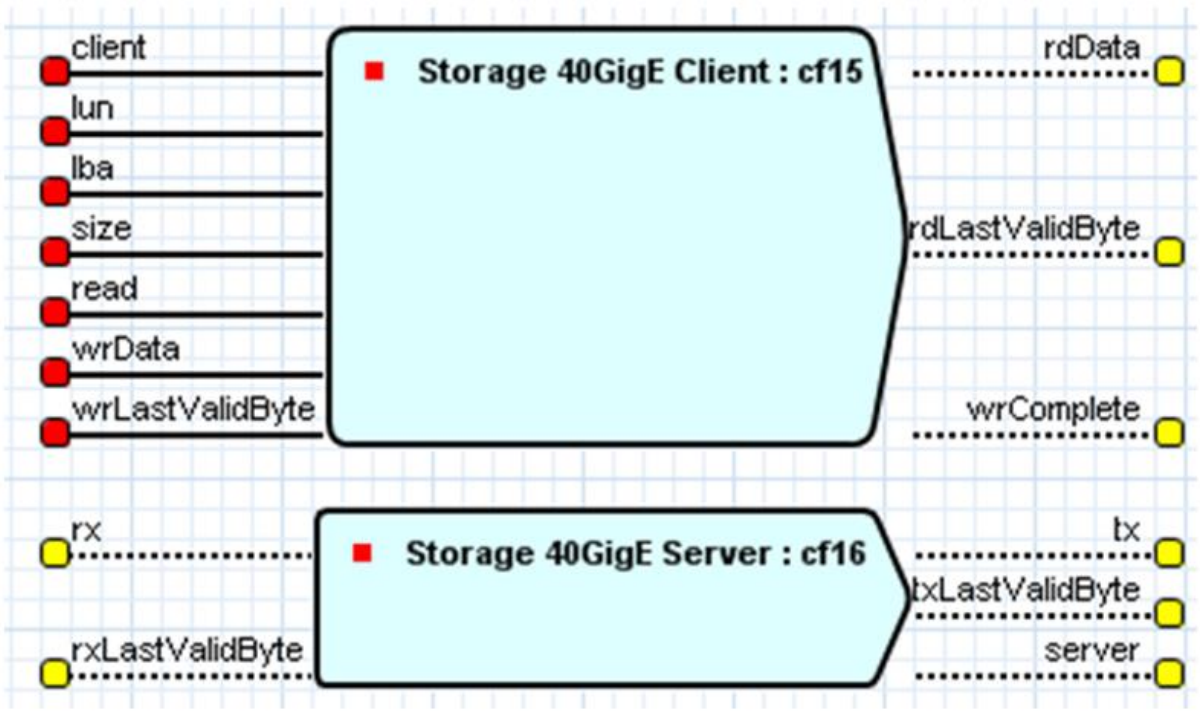
The Mezzanine Card and RTM board-support work is already done for you, and our CoreFire Next™ Design Suite makes for easy integration. The diagram below shows some of the Mezzanine Card and RTM cores – just hook up your datapaths to the ports and let CoreFire Next take care of your dataflow for you.

## Figure 2: A Sampling of CoreFire Next Mezzanine and Backplane Cores




Our WILD Data Storage Solution provides up to 64 TB of storage depth per VPX slot at rates in the multiple GB/s, providing the depth and bandwidths needed for X-Band operation and beyond. Just generate your addressing logic in CoreFire Next and hook it up to the Storage cores shown below and you'll be reading and writing data with ease.

## Figure 3: CoreFire Next Storage Cores



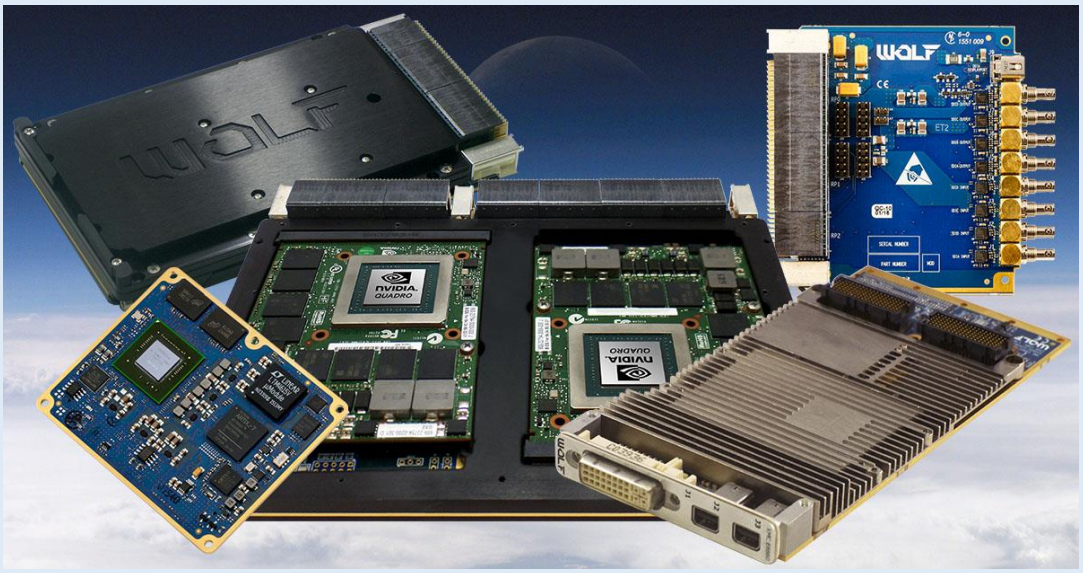

The Annapolis WILD OpenVPX Switch provides network connectivity for all your Hosts, FPGA Boards, and auxiliary units, with 4 Tb/s of non-blocking switching capacity to internal and external devices/users. Getting your data onto the network is easy too, just construct your Ethernet packets in CoreFire Next using our vast core library and connect the datapaths to the pre-made and tested 40GbE XLAUI cores shown below.

## Figure 4: 40GbE Cores to P1, P4, P5, and Mezzanine

The hardware is all tied together via our industry leading WILD OpenVPX Chassis, providing serial backplane I/O connectivity at up to 100Gbps.

CoreFire Next will speed your FPGA development process, with application services available for programs that need it. Our OpenVPX Ecosystem provides all the hardware necessary for your SAR needs and greatly reduces your integration risk, as the interoperability of Annapolis products is guaranteed.

Annapolis Micro Systems Products




WOLF Advanced Technology designs and manufactures rugged high performance computing, AI, and video I/O boards, modules and systems. Solutions are designed to operate in harsh aerospace and defense environments without sacrificing any of the high-speed processing available from advanced NVIDIA GPUs and APUs and Xilinx FPGAs. Products range from extremely low power modules to industry-leading high performance data analysis, processing and AI modules which meet embedded systems SWaP requirements. Products support most video formats including SDI, DisplayPort, DVI, HDMI, CoaXPress, ARINC 818, STANAG-3350, CVBS, RS170, RS343, LVDS, and custom. Product architectures include VPX, SOSA, XMC, MXM/MXC, and full custom designs.

Applications inlude

- Synthetic vision
- C4ISR
- Radar processing
- Autonomous operation
- AI
- Situational Awareness

Wolf Products

For more information contact ティー・ピー・ティー株式会社 (TPT K.K.)
www.tptech.co.jp
Telephone: 81-3-5832-7350
TPT KK: Contact