

“Our expertise is in Low Frequency Position, Navigation, and Timing applications and application software, and we are very happy that we have been able to source-in the processing platform expertise that Critical Link brings. Embedding a Critical Link System-on-Module enabled us to meet our dual objectives of speeding up time to market and delivering a high-quality product.”

-- Dr. Gerard Offermans, Senior Research Scientist, UrsaNav

Delivering innovative solutions to complex problems

UrsaNav is a diversified technology company dedicated to delivering innovative solutions to complex engineering and information technology problems. UrsaNav prides itself on its inventive designs and quick turn-around solutions. Its principal areas of focus include radio, radar, 3-D Sonar and inertial navigation; Low Frequency position, navigation and timing solutions; and radar navigation and surveillance. UrsaNav’s diverse client list includes both government, military, and commercial entities, worldwide, including the U.S. Departments of Defense, Homeland Security, State, Transportation and Energy; the Federal Aviation Administration; General Dynamics, Overseas Marine Division; L-3 Communications and L-3 Maritime; the National Oceanic and Atmospheric Association, and the General Lighthouse Authorities of the UK and Ireland.

Precision requirements for maritime navigation

UrsaNav’s Mitigator (UN-151B) is a low-frequency eLoran navigation, data and timing receiver, used for static monitoring and timing applications and for dynamic maritime and land-mobile applications. The Mitigator provides stable frequency and traceability to UTC from the eLoran signals in areas where GPS alone is insufficient. It must operate with high precision; positioning with better than 10 meter (95%) accuracy for maritime harbor entrance and approach, and timing outputs synchronized to within 50 nanoseconds from UTC (Coordinated Universal Time).

The engine is a critical component of the transmitter’s monitor and control equipment, and had to be of exceedingly high quality. The quality imperative led UrsaNav to embed Critical Link’s MityDSP-L138F SoM as their application’s CPU infrastructure.



Challenge: Time to market

Solution: MityDSP-L138F System-on-Module

- TI OMAP-L138 dual core (DSP, ARM) applications processor
- Xilinx Spartan-6 FPGA

Impact: UrsaNav saved approximately six months time to market when compared to a complete in-house development.

To date, Ursa Mitigators equipped with the MityDSP-L138F have experienced zero processing failures.

The Critical Difference:

- Reputation for quality
- Flexible, customizable platform
- Fully met all UrsaNav’s product requirements
- Critical Link engineering expertise and support

More time- and cost-effective than an in-house solution

In developing its receiver products, UrsaNav had always used software radio techniques for processing. Prior to adopting the MityDSP, the company had used other DSP-based COTS processing platforms.

When designing the new Ursa Mitigator UN-151B hardware, UrsaNav recognized that it would need both a DSP and an FPGA. With time to market and non-recurring engineering cost concerns, UrsaNav decided that it was more time- and cost-effective to again pursue the use of a third-party platform, rather than to build their processing platform on their own. The MityDSP-L138F offered both of these processing options, and also came in the small form factor that UrsaNav required.

Processing needs met

The DSP is used for digital signal processing of the received signals from the A/D converters, acquisition, tracking and decoding the eLoran signals. The DSP also interfaces with the outside world through the serial port. The FPGA is used to perform data acquisition from two high-speed A/D converters and extract low-level timing signals from the data using digital filtering and other signal processing techniques. UrsaNav also takes advantage of the MityDSP-L138F's DDR memory, flash, and serial ports for their application's processing needs.

At present, the MityDSP-L138F's ARM processor is not used in the Ursa Mitigator. However, UrsaNav anticipates that future projects that build on the UN-151B platform will employ ARM to run a Linux-based OS. The MityDSP-L138F will easily accommodate these product extensions.

High expectations for the MityDSP-L138F realized

UrsaNav had high expectations for the MityDSP-L138F, and for Critical Link. In the words of Dr. Gerard Offermans, Senior Research Scientist at UrsaNav, "We expected that the platform would be a fit for our application, with processing power to spare. We expected good support for our implementation from Critical Link. We expected that with a COTS processing platform we could be able to get to the market in half a year. With Critical Link, all of our expectations have been realized. We are extremely satisfied with our partnership with Critical Link."

MityDSP-L138-F FEATURES:

- TI OMAP-L138 Dual Core Applications Processor
 - 456 MHz C674x DSP
 - 456 MHz ARM9 CPU
- Xilinx Spartan-6 FPGA
 - CPU Coprocessor
 - Expand Available IO Using Pre-Existing FPGA Cores
- 128 MB mDDR RAM
- 256 MB NAND Flash / 8 MB NOR Flash
- Integrated Power Management
- Small 2.7" x 2", SO-DIMM 200 Pin Connector
- Robust IO
 - 10/100 EMAC, 2 UARTS, 2 USB
 - LCD / Video Output, Video / Camera Input
 - MMC/SD, SATA, McASP, 2 McBSP, 2 SPI, 2 I2C
 - CAP, eHRPWM, uPP, uHPI, RTC
 - 96 Configurable IO Pins

MityDSP-L138F BENEFITS

- ARM+DSP+FPGA for most demanding applications
- Rapid development, minimize risk
- Rich user interfaces
- Scale with Application Requirements
 - Pin Compatible with AM1808, C6748 based SoMs
 - also available without FPGA
- Advanced Operating System Support
 - Real-time Linux, QNX, DSP/BIOS
 - Windows Embedded Ready
- Industrial Temp Version Available

Critical Link provides System-on-Modules and scientific cameras, as well as supporting design and customization services. Critical Link products are used in a wide range of industrial, manufacturing, military, scientific, telecommunications, and other applications with rigorous and complex processing requirements.