

Mistral Unveils AI Enabled Direct RF family of Products Powered by Altera's latest Agilex™ 9 FPGAs and SoCs

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Mistral Solutions Private Ltd, (Mistral) a subsidiary of AXISCADES Technologies Limited (ACTL), is a chip to product company that delivers AI enabled products to defense, semiconductors, automotive, healthcare, industrial, consumer and hyper-scalers. The defense products include Radar, Sonar, Mission-computer, Electronic Warfare System, Telemetry, Direction Finding System and AI enabled Signal processing systems.

Mistral today introduced an advanced Direct RF and Signal Processing system. It is a Quad & Octal Direct RF & signal Processing Modules in 3U VPX form factor, powered by Altera Agilex 9 Direct RF FPGAs. The Agilex 9 Direct RF family supports wide band and medium band spectrum for Electronic Warfare (EW) and Radar applications for high performance. This could be a game changer for the RF signal processing applications.

These products are the latest additions to the Mistral portfolio of Direct RF digital signal processing products that use Altera FPGAs to detect and process information from a wide range of the electromagnetic spectrum. These products directly digitize radio frequency signals from the antenna, eliminating the down conversion and transmitting RF signal to antenna, eliminating up conversion, switch matrix, local oscillator stages required by legacy hardware.

Mistral Octal 3U VPX is an 8-channel Module based on Agilex 9- AGRW027 FPGA, and Quad 3U VPX is a 4-channel Module based on Agilex 9- AGRW014 FPGA. The Direct RF FPGAs from Altera convert between analog and digital signals at 64GSPS. Altera's Agilex 9 FPGA's deliver enhanced performance with double the number of channel converters, more logic elements, and higher memory density than the previous generation chips. These 3U VPX modules are designed for defense-ready 3U form factor with high-speed GigE and PCIe interfaces.

Mistral offers these products in a ruggedized, conduction-cooled enclosure that is ready for defense applications. All Mistral Direct RF products come with the Mistral Board Support Package (MBSP) that allows customers to develop custom Application software.

Applications and Use Cases

The digital processing modules are engineered to address the most demanding requirements in:

- **Radar Systems:** Enabling high-resolution data acquisition and processing for enhanced situational awareness.
- **Signals Intelligence (SIGINT):** Facilitating the interception and analysis of complex RF signals across wide frequency ranges.
- **Electronic Warfare:** Supporting real-time threat detection and countermeasure systems.
- **5G/6G Wireless Communication:** Delivering the performance required for next-generation communication infrastructure.
- **Test and Measurement Equipment:** Providing precise signal processing capabilities for high-end testing solutions.

Key Advantages

1. **Reduced SWaP-C:** Significant reductions in Size, Weight, Power, and Cost, making it ideal for constrained environments.
2. **Interoperability:** Designed to meet SOSA™ standards, ensuring compatibility with multi-vendor systems and flexible deployment options.
3. **High Channel Density:** Supports up to 8 simultaneous ADC/DAC channels with multi-board synchronization for phased array systems.
4. **Future-Proof Design:** Fully supports Intel's roadmap for FPGA innovations, ensuring long-term scalability and performance enhancements.

“The Mistral AI enabled Signal Processing Platform brings advanced technologies to defense missions, allowing customers to save time and cost by deploying easily customized hardware that leverages the same core technology and IP across different programs,” said Manikandan C, Mistral Chief Technology officer. “With a growing portfolio of products that make Direct RF spectrum digitization possible, our customers now have more options to deploy this technology to capture, process, and exploit signals at the edge.”

“This advanced modular solution will enable the existing system upgradation and new product development in the short span of time”. said Vijay Bharat, Mistral Chief Delivery officer,” “With higher signal processing and low latency, this product provides the capabilities for the customer to deploy in many applications.”

“Altera Agilex 9 Direct RF FPGAs feature integrated circuitry that used to be done in the analog domain, offering Mistral customers the critical SWAP capabilities and accelerated deployment required for next-generation applications in the aerospace and defense markets. We are very proud to have Mistral as a member of the Altera Solution Acceleration Partner Program (ASAP),” said John Sotir, General Manager Military, Aerospace & Government Group at Altera.

“Defense platform development can be accelerated with Mistral’s board solutions developed using Altera’s Agilex 9 Direct RF FPGA and augmented by Mistral’s hardware and defense domain expertise. Altera and Mistral’s Collaboration is a game changer in Radar, EW, Secure Comms and Defense Systems”, said Rina Raman, Vice President of Systems Solutions Engineering, Altera Market Development Group.

Mistral will be showcasing the Direct RF and Signal Processing Module at Aero-India 2025 International Exhibition in Yelahanka Airforce Station, Bengaluru, Karnatak, India, February 10-14, 2025.

Mistral Solutions Pvt. Ltd – Deep Tech Development

Mistral Solutions a chip to product company that delivers AI enabled Aerospace & Defense Products for Radar, Sonar, EW system, Telemetry system, Mission-critical AI enabled SBC and Video Processing to the edge, making advanced technologies profoundly more accessible for today’s most challenging aerospace and defense missions. Mistral Products allow customers to tap into innovative capabilities from chip to system scale, turning data into decisions on timelines that matter. Mistral’s products and solutions are deployed in many more Aerospace & Defense programs and other countries, enabling a broad range of applications. MISTRAL SOLUTIONS PVT LTD is headquartered in Bengaluru, India, and has many more locations in worldwide. To learn more, visit www.mistralsolutions.com.

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