CONVERSION

SPECTRUM CONTROL

STRATEGIC BRIEFING: High-Density Wideband Conversion for SIGINT/EW

Mission Relevance: 5th-gen SIGINT and EW platforms are being asked to expand capability without expanding integration and deployment timelines. The mission need is to add signal capacity quickly: higher channel density per chassis slot, high-fidelity RF conditioning, and up to 2 GHz instantaneous bandwidth per channel to feed direct conversion. Modernization also favors modules that are software-connectable so tuning, control, and health/status can integrate cleanly into platform-owned control and data spines for coordinated operations and situational awareness. *Bottom line: Rapid capacity expansion requires high-fidelity, high-density, software-connectable conversion front ends.*

1. Add signal capacity fast (rapid fielding)

Programs need immediate capacity growth to keep pace with evolving mission profiles without lengthy redesign cycles.

If capacity can't be added quickly, operational relevance decays.

2. Preserve fidelity at mission bandwidths

Wideband missions demand conditioning that protects signal integrity (dynamic range, noise performance) so conversion produces trustworthy observables.

If fidelity is compromised, digital decisions degrade, even if you have more channels.

3. Increase channel density per slot to expand the mission (or reduce SWaP)

Higher channel density enables mission expansion within existing chassis footprints or delivers size/weight/fuel savings for the same capacity.

Density turns platform constraints into scalable capability.

"Composable RF building blocks turn mission demand into deployed capability"

4. Configure the Tx/Rx mix to match the mission

Platforms and variants rarely align to a fixed Tx/Rx ratio. Conversion front ends must support mission-defined channel roles.

Without an optimized Tx/Rx mix, mission systems must compromise or consume more chassis slots.

5. Connect cleanly to platform nodes and backplanes

The typical RF front end is often delivered as a standalone hardware function, leaving the platform team to build the software interface after delivery, adding months to schedules.

If the interface isn't ready, fielding isn't fast.

6. Design for rapid deployment & reuse

Plug-and-play building blocks enable speedy deployment and uncomplicated reconfiguration.

Reuse of proven channel elements across form factors further reduces integration effort.

Composability drives speed and scale.

Spectrum Control Strategic Response

Spectrum Control provides wideband RF front ends that expand 5th-gen SIGINT/EW capabilities by pairing exquisite signal conditioning with high channel density. Delivered in a 3U VPX, SOSA-aligned package, the design increases channel density per slot to add signal capacity (or reduce chassis size/weight) while supporting a mission-defined Tx/Rx mix, up to eight mix-and-match channels.

Equally important, the modular blocks are software-connectable: VITA-compliant interfaces provide standardized tuning/control plus health and status visibility, enabling rapid integration into system backplanes without months of custom interface software development. The architecture is also modular and composable, using RF-on-mezzanines, RF SiPs, and integrated modules so proven channel elements can be deployed as plug-and-play building blocks and reused across different form factors and mission variants.

Solution Highlights - Composable, Channel-dense RF Front Ends

Spectrum Control expands 5th-gen SIGINT/EW capacity using high-fidelity, channel-dense front ends enabled by standardized RF mezzanine cards and RF SiPs; software-connectable to platform interfaces for control, status, and situational awareness.

- 3U VPX, SOSA-aligned module with industry-leading channel density
- Up to 8 channels, configurable as any mix of Rx and/or Tx via interchangeable channelized mezzanine cards
- Each channel provides wideband coverage 0.02–18 GHz with 2 GHz IBW per channel
- Super-heterodyne RF conversion subsystem enabling high dynamic range and low noise performance
- VITA-compliant digital interface for tuning/control and health/configuration (backplane-ready); includes Ethernet and PCIe; supports MORA configuration/control
- Designed for production: optimized to minimize supply chain risk; US-manufactured/sourced

For more info visit spectrumcontrol.com/sci-blocks

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