

Littoral OpTech-West

**Panel 4: Seeing Through the Clutter: On
the Surface & Over the Shore**

Experience of the Sea Giraffe in the USN

- ▶ The requirements for the USN's Littoral Combat Ship created a challenging and interesting solution space for the surveillance sensor:
 - Limited top-side space and weight allowed a single radar surveillance sensor
 - Few options for a *multi-mission* radar in the USN inventory for that class of vessel
 - Challenging performance in the littoral environment

- ▶ The Sea Giraffe AMB, now AN/SPS-77, provided the solution that met the requirements set forth by the USN



Challenging Littoral Environment

▶ Surface Clutter with Many Boundaries

- 2700 km Coastline
- >100 000 islands
- Sea and land

▶ Multiple 'target' types

- Land: Rockets, Artillery, Mortars
- Sea: RHIBs, fishing/shipping vessels,
- Air: A/C both commercial and tactical, sea skimmers, UAVs...

▶ Volume Clutter: Sea birds, Snow, Ice, Turbines, ...

The Scandinavian littoral environment pushes the envelope for the performance of a littoral radar



Radar System Key Parameters

- ▶ The keys for radar design in this environment demands
 - Sufficient dynamic range
 - Allows detection of very small objects (UAVs, mortars, RHIBs) in the presence of significant 'reflectors' (ground and surface clutter)
 - Spectral Purity
 - Clutter cancellation and Doppler resolution
 - Managing ECM
 - High Update Rate
 - To maintain track on small highly maneuverable targets and accurate trajectories (RHIBs, rockets, mortars, missiles, UAVs)
- ▶ The Sea Giraffe Agile Multiple Beam (AMB) radar has these characteristics



How the Sea Giraffe Meets These Requirements

- ▶ High receiver dynamic range
 - Enables receive processing across the entire elevation coverage
- ▶ Parallel signal processing channels
 - Optimizing detectability for differing target types: surface, air, RAM
 - Gun Fire Support
 - Navigation mode
- ▶ High rotation rate – 60 RPM
 - Early track formation
 - High update rate for critical target types (RAM, maneuvering RHIBs, sea skimmers)



Sea Giraffe Becoming the AN/SPS-77

- ▶ Traditionally US Navy radars are specialized and optimized for a given function (long-, mid-, or short-range and air or surface surveillance, fire control, etc) and being part of the development process for the radar
- ▶ A single radar on the LCS is being asked to do more
 - Air surveillance
 - Surface Surveillance
 - Fire Support
- Using less
 - Top-side space
 - Weight
- ▶ LCS needed an *existing radar* but also a strong desire to have a US-supported radar

Converting a Foreign Radar into a Domestic Asset

- ▶ The Sea Giraffe AMB was chosen as the Independence Class surface and air surveillance sensor
 - A multi-role, 3D radar solution designed for the littorals
- ▶ At the same time Saab recognized the USN's need to have the sensor brought into a US-based company
 - Requires cleared technicians, ITAR-restricted modifications, access to the details of the design
- ▶ Saab teamed with, and then acquired, Sensis Corporation
 - Established a US-based prime for the radar
 - Enabled US-only adaptations, in-service support and sustainment
 - Isolates foreign influence and maintains sovereign independence

AN/SPS-77 Today

- ▶ The version of the Sea Giraffe AMB installed on the LCS Independence Class has been designated the AN/SPS-77
- ▶ Saab Defense and Security, USA is the contractor supplying the radar to the USN
 - Is a US company with appropriate clearances and facilities for US specific requirements
 - Provides integration, installation and verification of the radar in the US
 - Adapts the system to US specific (ITAR) requirements
 - Promotes and follows the US Navy trend toward open-architecture modular solutions as it works hand-in-hand with the Saab in Sweden.
 - Helps to build the Saab radar roadmap and is an integral part of the product development of the Saab family of radars.

Summary

- ▶ The littoral creates an environment characterized by the confluence of boundaries:
 - Sea and land
 - Surface, air and ground threats
 - Unpopulated and Urban
 - National Borders
- ▶ Sea Giraffe AMB (and AN/SPS-77) is technology optimized for operations across these boundaries
 - Multi-role
 - Proprietary, ITAR-controlled, National



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