

# **Radarsat-2 Support to Canadian Forces Operations: Transformational Leadership by Project Polar Epsilon**

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Abstract - Project Polar Epsilon: Joint Space-Based Wide Area Surveillance and Support Capability, a \$65 M capital project within Canada's Defence program, is leading a transformational change in the use of Radarsat-2 supporting Canadian Forces (CF) operations. Polar Epsilon has introduced the use of Radarsat-2 to support multiple CF operations including Operation Driftnet '08, '09 and Operation Podium '10. During Operation Driftnet, Radarsat-2 derived ship positional information was combined with other surveillance information to enable the Canadian Forces to support the Department of Fisheries and Oceans in monitoring illegal unregulated unreported fishing (IUU) activity in the Pacific Ocean. This effort permitted surveillance and monitoring efforts on specific vessels suspected of IUU fishing. Wide-area maritime surveillance information derived from Radarsat-2 data has been combined with other surveillance assets such as Maritime Patrol aircraft and other Intelligence Surveillance Reconnaissance sources to provide a more complete marine domain awareness picture. Additionally, ocean features information from Radarsat-2 imagery is being used to support daily maritime operations in combination with other oceanographic sources to produce more complete ocean features analysis. Such analysis assists with acoustic sensor employment and use. Project Polar Epsilon is a transformational initiative to introduce space-based wide area surveillance to Canadian Government marine surveillance and other Canadian Department of National Defence stakeholders. Through RADARSAT 2, Polar Epsilon will provide wide area maritime domain awareness over Canada's ocean approaches and Arctic region. Maritime Domain Awareness ship detection reports will be provided to the recognized maritime picture within 15 minutes of imaging. Polar Epsilon will deliver the infrastructure to exploit RADARSAT 2 for surveillance of Canada's Arctic Region. Due to its polar orbit and all weather day/night earth observation capabilities, RADARSAT 2 is ideally suited for observation of Canada's Arctic Region. Polar Epsilon will be constructing two new Radarsat-2 satellite ground reception sites on Canada's East and West coasts to receive and process RADARSAT 2 data for surveillance of Canada's Arctic Region and ocean approaches. Coherent Change Detection techniques will be applied to the RADARSAT 2 imagery to enhance Arctic domain awareness.