



Personal information

First name, Surname: Chuck, Livingstone
 Title: Dr.
 Organization: DRDC Ottawa, Canada



About the Author

Dr. Chuck Livingstone received his PhD degree in Physics from the University of Western Ontario in 1969. After spending seven years as an Assistant Professor of Electrical Engineering at the same university, he joined the Canada Center for Remote Sensing to develop airborne synthetic aperture radar systems and quantitative uses of their data. He joined Defence Research and Development Canada in 1997, initiated the RADARSAT-2 GMTI mode development and is project manager for the RADARSAT-2 GMTI project. At the present time, he leads the Space-Based Radar research group at DRDC-Ottawa and is the Surveillance and Space research thrust leader for DRDC.

Research interest

During the past several years Dr. Livingstone has focused his research efforts on the development of realizable, space-based Ground Moving Target Indication radars. Much of his effort has been devoted to the development of GMTI modes for RADARSAT-2 and in leading the SAR-GMTI research needed to use this satellite capability. In parallel with this work he has guided studies into the creation of sector-scan space-based GMTI systems and has supported and guided work towards new space radar paradigms.

Summary

Space-Based MTI techniques

This lecture will address two topics within the broad field of space-based MTI techniques:

1. Space-based SAR-SMTI (Surface Moving Target Indication) systems: The properties and limitations of today's technology

Radar systems on orbit today use one-dimensional electronic beam forming and beam steering to control the radar data acquisition. Two of these, TerraSAR-X and RADARSAT-2 have two-aperture antennas to support experimental SMTI capabilities. The constraints imposed by existing radar architectures and one-dimensional beam steering are discussed. The RADARSAT-2 design is used to illustrate SMTI implementation issues and available options. Design issues for future systems are presented.

2. Moving target measurements using space-based SAR-GMTI systems.

Prior to the launch of TerraSAR-X, SMTI research was based on theoretical studies, simulations and airborne SMTI experiments. Although much of the airborne work can be translated directly to the space radar case, differences in platform velocity and observation geometry between airborne and satellite systems do impact moving target measurements made by space-based radars. These will be outlined and discussed.