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2017

Document Version:
Peer reviewed version (aka post-print)

32nd URSI GASS, Montreal, 19–26 August 2017

Introduction to the Memorial Session of Staffan Ström

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This paper is an introduction to the session that is organized to commemorate the life and scientific work of Professor Staffan Ström (1934–2016), and it gives a review of his accomplishments from the graduate studies until the final work he did during his retirement.

Staffan is a well-known scientist in the radio science community, both in Sweden and internationally, and during his entire life he was strongly engaged in the scientific work of URSI. In particular, he served as Commission B (Fields and Waves) chairman during 1999–2002, and as chairman of the Swedish National Committee of Radio Science 1994–2005. He organized several conferences, *e.g.*, the Electromagnetic Field Symposium of Commission B in Stockholm 1989, and as the chairman of Commission B, he organized the Electromagnetic Field Symposium 2001 in Victoria, Canada. He was also engaged in the activities in the Commission B program at the URSI GA in Maastricht 2002.

Staffan worked actively in wave scattering and propagation, interaction of electromagnetic waves with materials, and mathematical fundamentals of radio science, and he made numerous important contributions to these fields — in particular to the field of scattering theory. The scientific work by Staffan is divided into three parts:

1. Work concerning the representations of space-time transformations groups
2. Work concerning the Null field approach to scattering and wave propagation of time-harmonic elastodynamic, electromagnetic, and acoustic waves
3. Work concerning wave-splitting, imbedding and Green function methods in direct and indirect scattering in the time domain

The work in group theory deals with different aspects of the unitary irreducible representations of several space-time transformation groups, such as the Lorentz, Poincaré, de Sitter and Euclidean groups. Staffan's contributions to the Null field approach are pioneering. The Null field approach, which was developed by Peter Waterman in the late 60's and early 70's, was generalized by Staffan to multiple scattering by several obstacles. The translation properties of the spherical vector waves played an important role in the solution of this problem. He also solved the scattering problem for several complex layered geometries. These efforts resulted in a large and well cited collection of journal papers and book chapters. Under several years Staffan also worked on imbedding algorithms to solve and understand the ill-posedness of the inverse scattering problem.