R•I•T College of Science

Chester F. Carlson Center for IMAGING SCIENCE

Seminar Series

Autonomous Hyperspectral Change Detection

Alan Schaum

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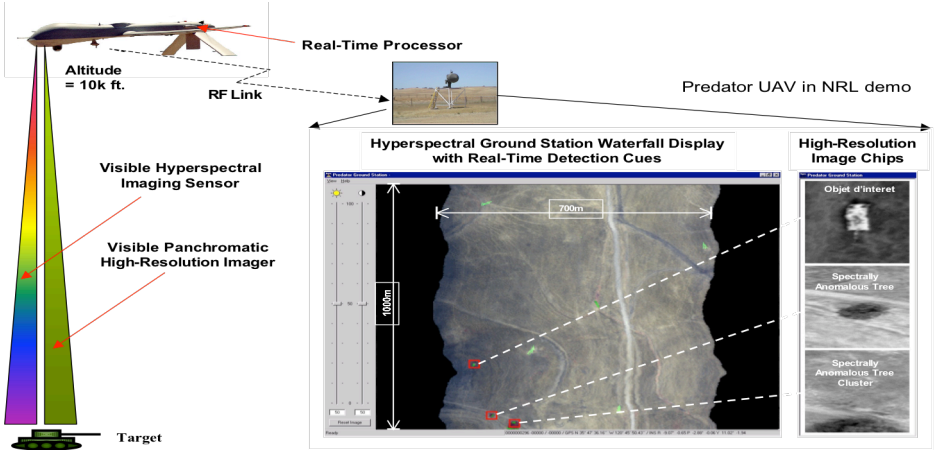

4pm, Wednesday, Sept. 28, 2005

Auditorium of the Center for Imaging Science

The autonomous stand-off detection of newly arrived objects that might appear within a regularly monitored geographical area has become a critical capability for many surveillance system concepts. Broadband electro-optical sensors can meet this requirement for short time intervals only, when natural background dynamics generate only minor radiometric innovations. For larger intervals-associated with larger search areas-significant changes in sensed radiance are induced by many sources of variation: illumination levels and origins, atmospheric constitution, viewing-angles, sun-angles, adjacency effects, path radiance and others. Through their ability to oversample background phenomenology, hyperspectral imagers can be used to distinguish naturally occurring scene dynamics from thematic changes. Here we describe the "Chronochrome" algorithm and a more robust sub-optimal relative, which produce subclutter visibility of arrived objects at the pixel level. These advanced signal processing techniques operate by invoking the conservation of certain physical quantities, and the suppression of nonconserved ones.

www.cis.rit.edu/seminar

Speaker Bio

Dr. Alan Schaum received a Ph.D. in Theoretical Physics in 1978 from The Johns Hopkins University, where his research focused on relativistic quantum field theory. Until 1983 he applied queuing and information theories to network planning problems at Bell Laboratories in Holmdel, New Jersey.

For the past 22 years at The Naval Research Laboratory in Washington D.C., he has developed signal and image processing methods in support of intelligence operations. His current research emphasizes multivariate detection theory and the modeling of hyperspectral terrestrial background signatures and their dynamics.