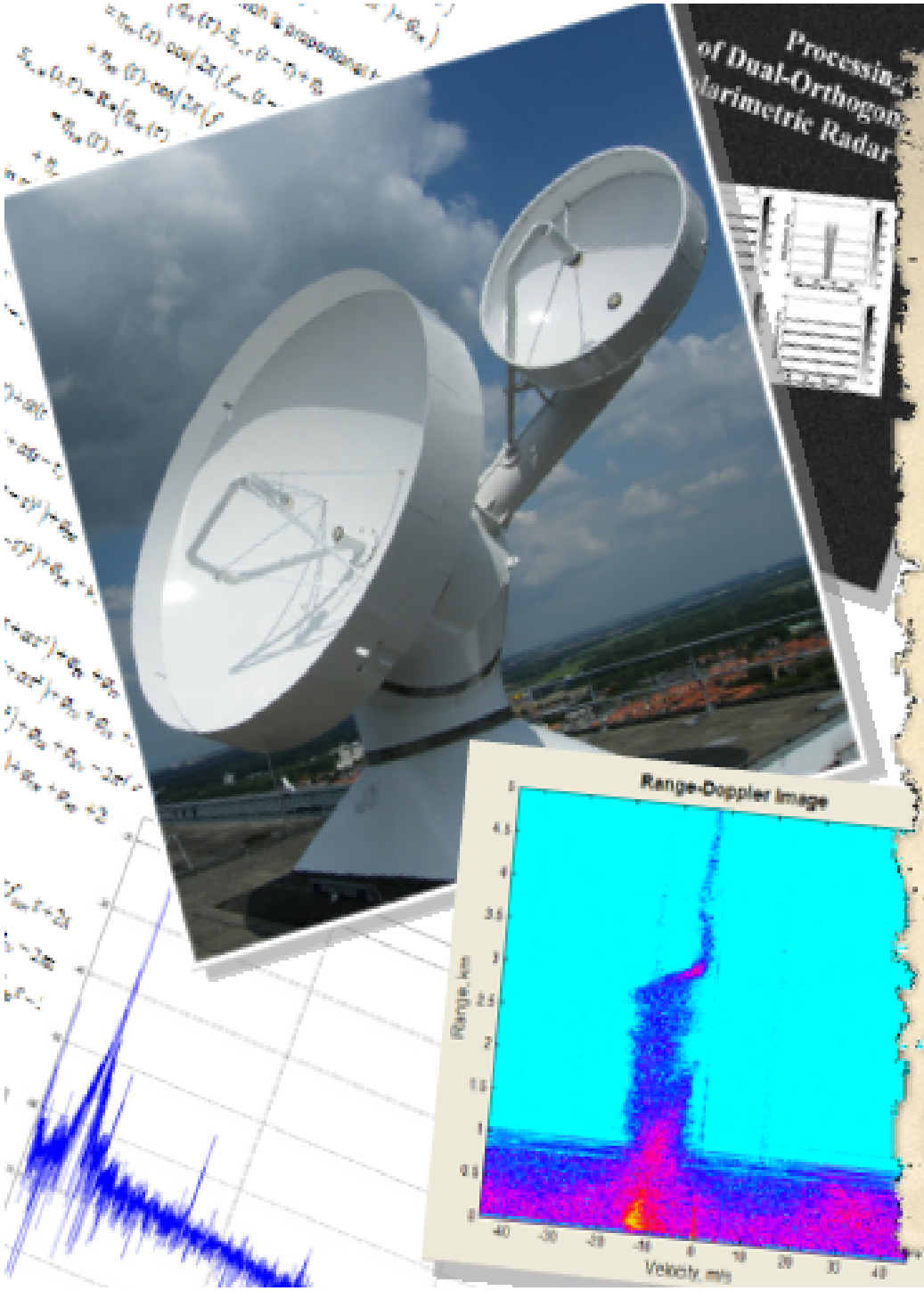
TU Delft
PARSAX
stw
Opening of PARSAX Radar
We are pleased
to invite you...
October 29, 2009 at 14.30



The IRCTR is pleased to invite you to
the Opening of PARSAX radar.
The ceremony will take place
October 29, 2009 at 14.30
in foyer of TU Delft EEMCS building
Mekelweg 4, Delft

The Program:

14.30 – Opening Ceremony

- Inauguration of the PARSAX Radar – Prof. dr. ir. L.P. Ligthart.
- PARSAX – New Generation FMCW High-resolution Doppler Polarimetric Radar - Dr. O. Krasnov
- New Radar for the Environment Study – Prof. dr. ir. H. Russchenberg
- Flexible Radar System in Education – Prof. dr. A. Yarovoy

15.15 – 17.00 Reception

15.30, 16.30 Excursions and Demonstrations of the PARSAX Radar (23 rd floor)

17.30 Closing

Historic Perspectives of PARSAX

Radar highlights in TU Delft

- 1973 LFM-CW radar experiments
- 1976 LFM-CW radar laboratory demonstrator
- 1980 LFM-DARR (high range resolution, sensitivity) allowing Clear Air Turbulence measurements (IEE award, Veder prize)
- 1983 LFM Doppler in DARR (First EU)
- 1986 LFM Doppler-polarimetry (First world-wide)
- 1998 Multi-beam TARA with LFM Doppler-polarimetry (First world-wide)
- 2006 LFM Drizzle radar IDRA for CESAR
- 2009 Real-Time Doppler-polarimetry in PARSAX (IEEE-MIKON award 2008, EuRAD radar award 2009) utilizing arbitrary waveforms

PARSAX : Polarimetric Agile Radar in S- and X-band

Project manager:
Prof. dr. ir. L.P. Ligthart
Co-project leader:
Prof. ir P. van Genderen

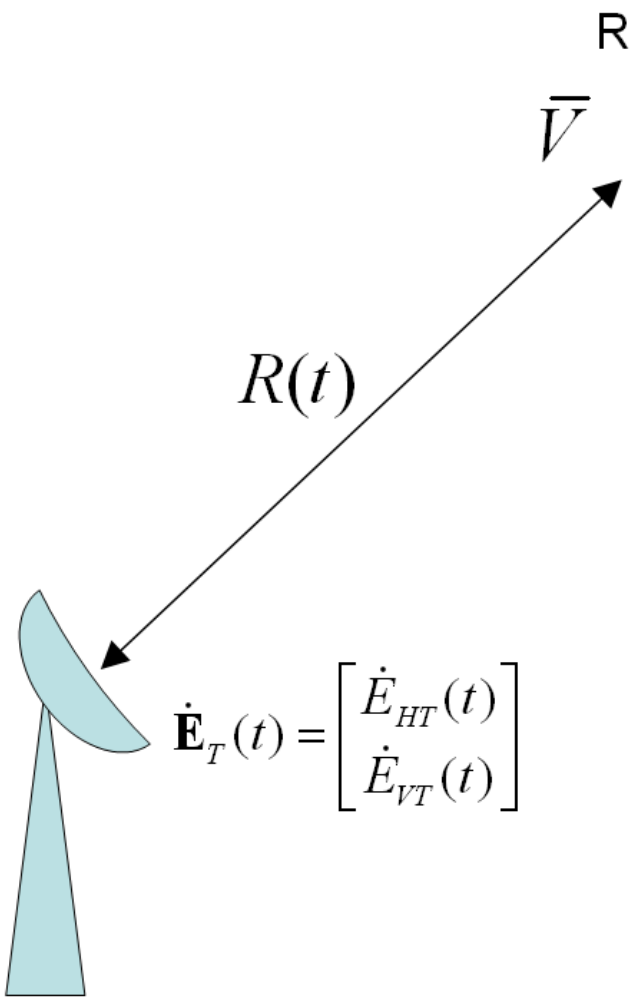
STW programme officer:
Dr. P. Schuddeboom

Project Coordinator:
Dr. O. Krasnov (scientific)
Ing. F. van der Zwan (technology)

User Committee
THALES-NL: R. de Jongh, A. Smits
TNO-DSS: A. Huizing, Dr. F. Smits
KNMI: Dr. R. Boers
Wageningen University: Prof. Dr. Ir. R. Uijlenhoet, Dr. H. Leijnse

Research staff:
Dr. G. P. Babur
A. Fasoula MSc. (PhD candidate)
P. Lys MSc.
Z. Li MSc. (PhD candidate)
R. Tigrek MSc. (PhD candidate)
Dr. Z. Wang
D. Grama
F. Radu

Technical staff:
P. Hakkaart
J. H. Zijderveld



$$\dot{\mathbf{S}}(t) = \begin{bmatrix} \dot{S}_{HH}(t) & \dot{S}_{HV}(t) \\ \dot{S}_{VH}(t) & \dot{S}_{VV}(t) \end{bmatrix}$$

$$\dot{\mathbf{E}}_T(t) = \begin{bmatrix} \dot{E}_{HT}(t) \\ \dot{E}_{VT}(t) \end{bmatrix}$$

$$\begin{bmatrix} \dot{E}_{VR}(t,\tau(t)) \\ \dot{E}_{HR}(t,\tau(t)) \end{bmatrix} = \underbrace{\begin{bmatrix} \dot{S}'_{HH}(t,\tau(t)) & \dot{S}'_{HV}(t,\tau(t)) \\ \dot{S}'_{VH}(t,\tau(t)) & \dot{S}'_{VV}(t,\tau(t)) \end{bmatrix}} \cdot \begin{bmatrix} \dot{E}_{VT}(t) \\ \dot{E}_{VT}(t) \end{bmatrix}$$

The resulting scattering matrix includes influence of all parts of the radar channel (a transmitting antenna, propagation medium, and receiving antenna).

Major breakthroughs in PARSAX

Simultaneous transmission of two non-equal arbitrary waveforms in polarization channels

- **digital generation of orthogonal waveforms (LFM, PCM, OFDM) with high precision and stability**

AD conversion of received signals at IF

Radar design optimization using Advanced Design System (ADS)

- **modularity, flexibility and easy maintenance**

Improved specifications with respect to DARR, TARA, IDRA

Various modes of operation dependent on applications

- **first mode of operation realized October 2009**
- **LFM wavelet processing for optimum range-Doppler performance**
- **Multi-static concepts for high resolution imaging of objects**

Many thanks

- STW
- IRCTR research, technical and support staff
- PhD candidates and MSc students
- TUD workshop and service departments
- IRCTR-SB
- Thales-NL, TNO, KNMI, WUR

The PARSAX facility allows us to do front-edge research and education on
Microwave Technology and Systems for Radar
Remote Sensing of the Environment
expanding its capabilities for various applications and creating optimum conditions for cooperations with other top research institutes world-wide

The PARSAX team is grateful that you want to celebrate with us that this unique facility is operational now.