

IRCTR ↔ COST 284

– from potential to concrete cooperation –

Ioan Lager

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- IRCTR – research potential
- The WISE project proposal
- Personal contributions

International Research Centre for
Telecommunications-transmission
and Radar

— IRCTR —

research institute under the umbrella of
Delft University of Technology
(TU Delft), the Netherlands

Human resources:

- 19 scientists (3 full professors, 1 visiting full professor);
- 6 engineers;
- 9 long term average students;
- Personnel involved in antenna related topics: 8 scientists, 2 engineers, 3 students.

Special research facilities:

- An anechoic chamber facility of moderate size, (3m×3m×6m), called DUCAT;
- Measurement facilities for millimetre waves up to 110 GHz;
- Outdoor far-field antenna measurement system.

IRCTR is organised in four sectors:

- Antennas:
 - antenna measurement techniques,
 - new antenna concepts;
- Telecommunication-transmission:
 - radio and broad band propagation;
- Remote Sensing:
 - measurement of cloud properties (in relation to climate change),
 - satellite communication at high frequencies;
- Radar:
 - radar design technology,
 - radar networks,
 - radar navigation,
 - integrated radar-communication.

IRCTR receives support on behalf of many industrial organisations:

- TNO Physics and Electronics Laboratory,
- Thales Nederland,
- ESA/ESTEC,
- Nokia Research Center, Nokia Group Finland,
- Ericsson,
- Siemens,
- KPN Research,
- Korea Telecom,
- Communications Research Laboratory (Japan),
- CSEM (Switzerland),
- IMEC (Belgium),
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International cooperation – key to many of IRCTR’s achievements

Collaboration with:

- Birmingham University, United Kingdom,
- Leeds University, United Kingdom,
- Middle East Technical University, Ankara, Turkey,
- Military Technical Academy, Bucharest, Romania,
- Moscow State University of Civil Aviation, Russia,
- Nice University, France,
- Rheinische Westfälische Technische Hochschule Aachen, Germany,
- Stellenbosch University, South Africa,
- Tomsk State University of Control Systems and Radio-electronics, Russia,
- University of Perugia, Italy,
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For more information,
please visit our web site at:

<http://irctr.et.tudelft.nl/>

The WISE project

WIDE BAND
SPARSE ARRAY ELEMENTS

Distinctive trend in the Dutch radar community:
increased need for bandwidth of antenna aperture

Requirements:

- (ultra) wide band aperture;
- wide angle electronic scanning;
- phased arrays.

The trend became explicit in the discussions for the
Nederland-Radarland initiative.

For addressing these challenges, it was proposed:

1. To build a portfolio of radiators for (ultra) wide band apertures.
2. To investigate through theoretical studies and experimental verification the behaviour of the radiators.
3. To investigate through theoretical studies and experimental verification the behaviour of the (sparse) arrays of radiators.

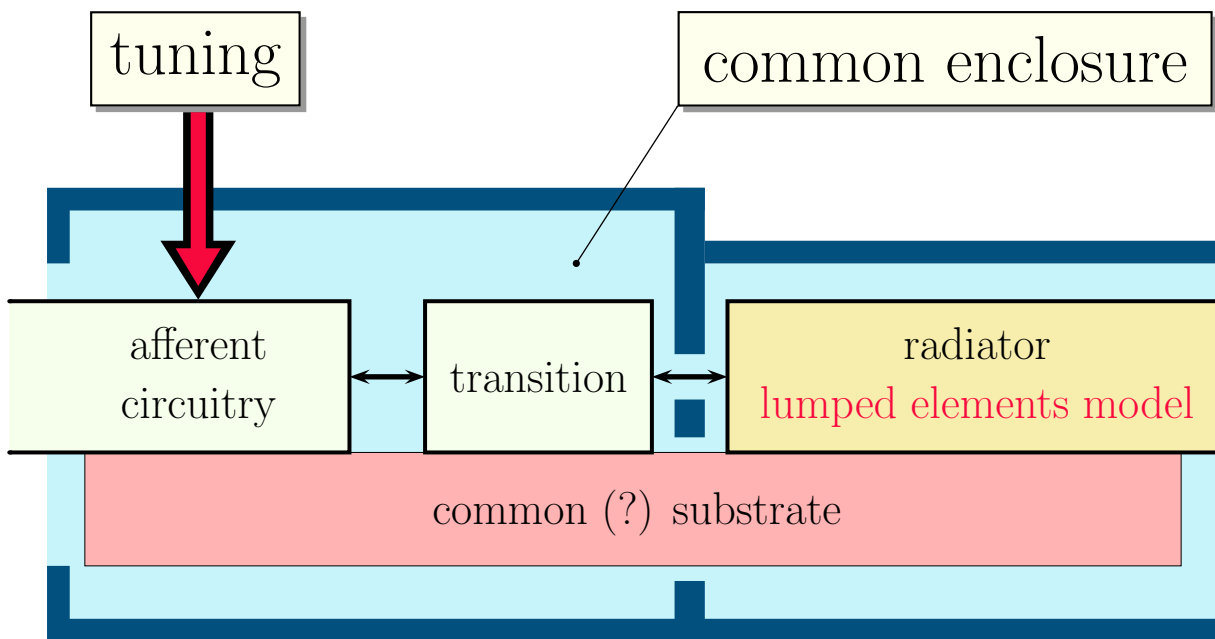
The project is expected to benefit from the expertise of several research and industrial organisations:

- IRCTR;
- The Middle East Technical University (METU);
- Romanian Military Equipment and Technologies Research Agency (METRA);
- THALES Nederland.

Research will focus on the following topics:

- Radiator properties:
 - mutual coupling, in particular aimed at the scanning capability of the array;
 - minimum physical dimensions;
 - polarisation properties;
 - bandwidth.

- Arrays of radiators:
 - development of a sparse array theory;
 - study of possible interactions between different sparse arrays in a multiple sparse array.



The WISE project represents a good platform for providing input to the COST 284 Action:

- In depth analysis of individual radiators,
- A systematic approach to the design of sparse antennas,
- Sparse antenna techniques
 ➔ “sparse signal synthesis”.

- With IRCTR since 1998.
- Previous experience:
 - 1990–1993: Faculty of Electrical Engineering, Transilvania University, Braşov, Romania;
 - 1993–1996: Laboratory of Electromagnetic Research, TU Delft;
 - 1996–1997: Visiting Scientist, Schlumberger–Doll Research, Ridgefield, Connecticut, USA;
 - 1997–1998: Laboratory of Electromagnetic Research, TU Delft.

- Research interests:
 - Computational electromagnetics: finite element (type) methods, expansion techniques;
 - Analysis of radiating elements;
 - Educational software;
 - Recently: (sparse) antenna arrays – analysis & synthesis.

- Rôle at IRCTR:
 - Research activities – theory & applications;
 - Educational tasks – lectures & supervision of PhD students;
 - Synergy of EM activities.