

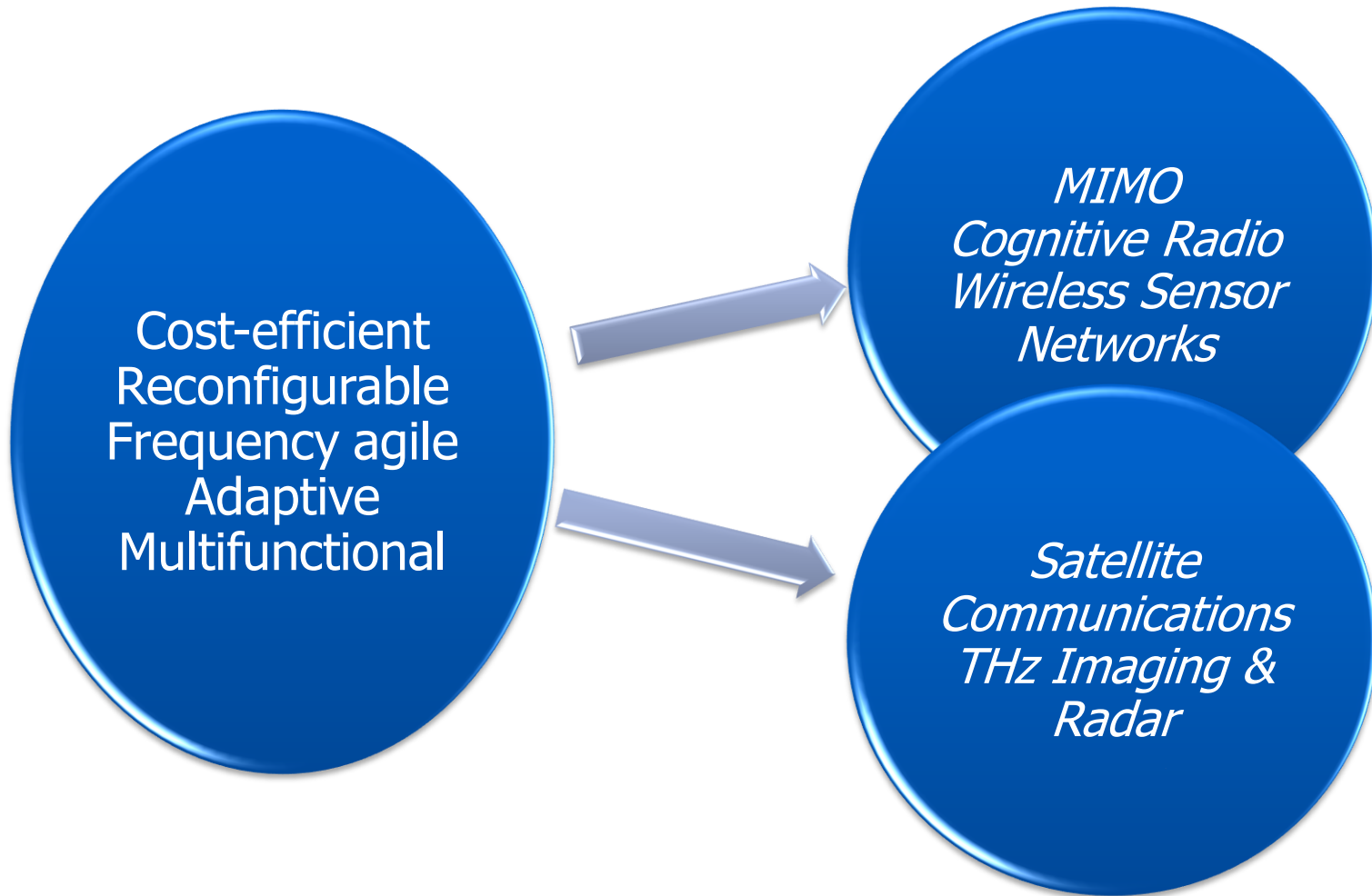
An overview of European cooperation on antenna research

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IMST GmbH

31-8-2012

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Wireless systems of tomorrow



Antennas: an «interfacing» activity in COST

Antennas:

The tyres !!

Channel propagation,
Navigation systems,
Global Integrated Networks ,
Atmosphere; Meteorology

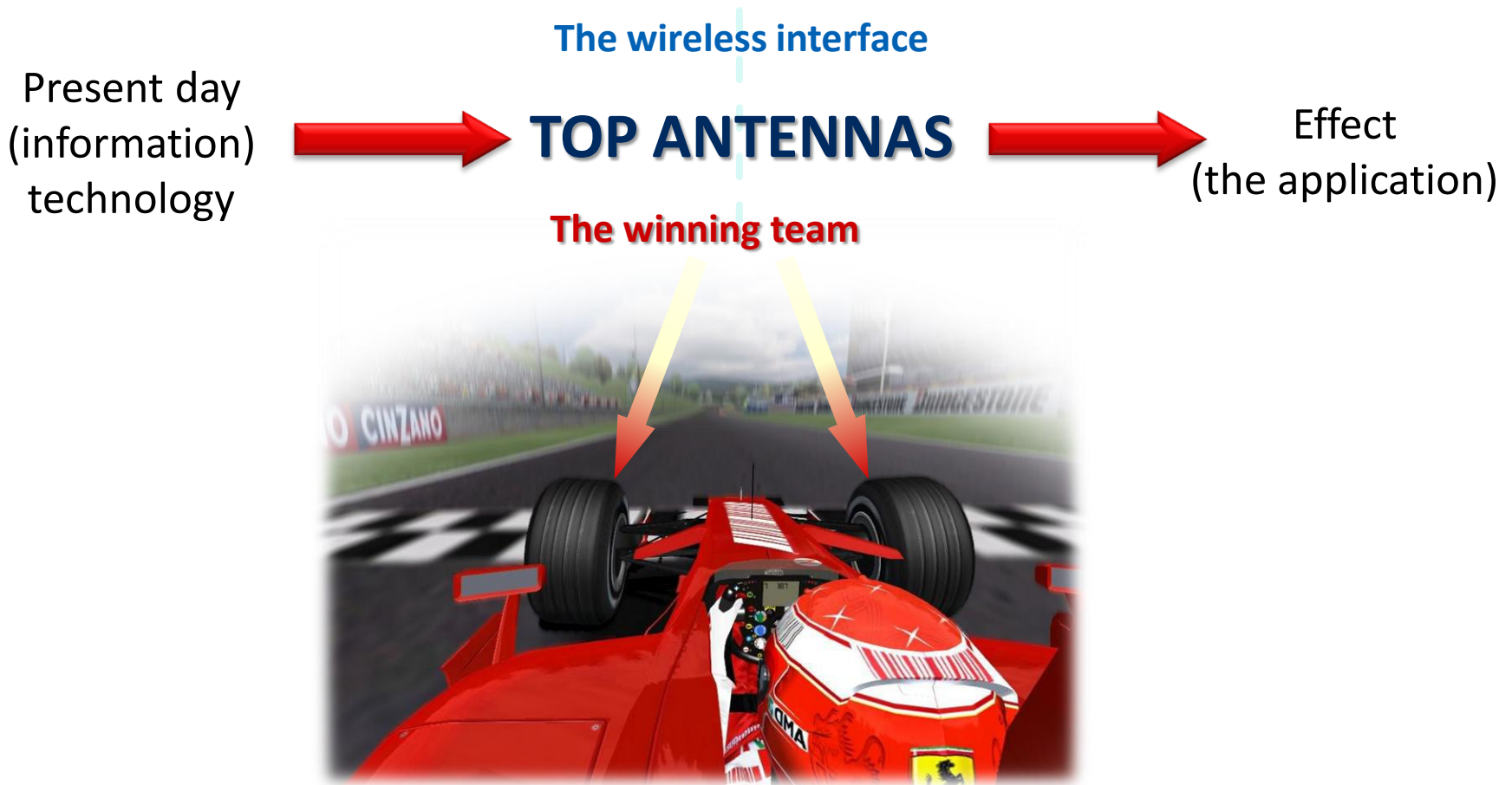
RF-Electronics:

The engine

The track



Why so important?



Antennas are the « **tyres** » of ICT Actions

We should never ignore them!



Translated to antennas:



European Antenna Research

Targets:

- Research, but also
- Networking
- Educational and Societal aspects
- EU strategic aspects

Instruments:

- Networks of Excellence, Coordinating Actions, Marie Curie initiatives, Training Networks, European Schools, “COST” projects...

What is COST?



COST is supported by
the EU RTD Framework Programme

ESF provides the
COST Office through an EC contract



Founded in 1971, COST is an intergovernmental framework for European Cooperation in the field of Scientific and Technical Research. COST Actions cover basic and pre-competitive research as well as activities of public utility.

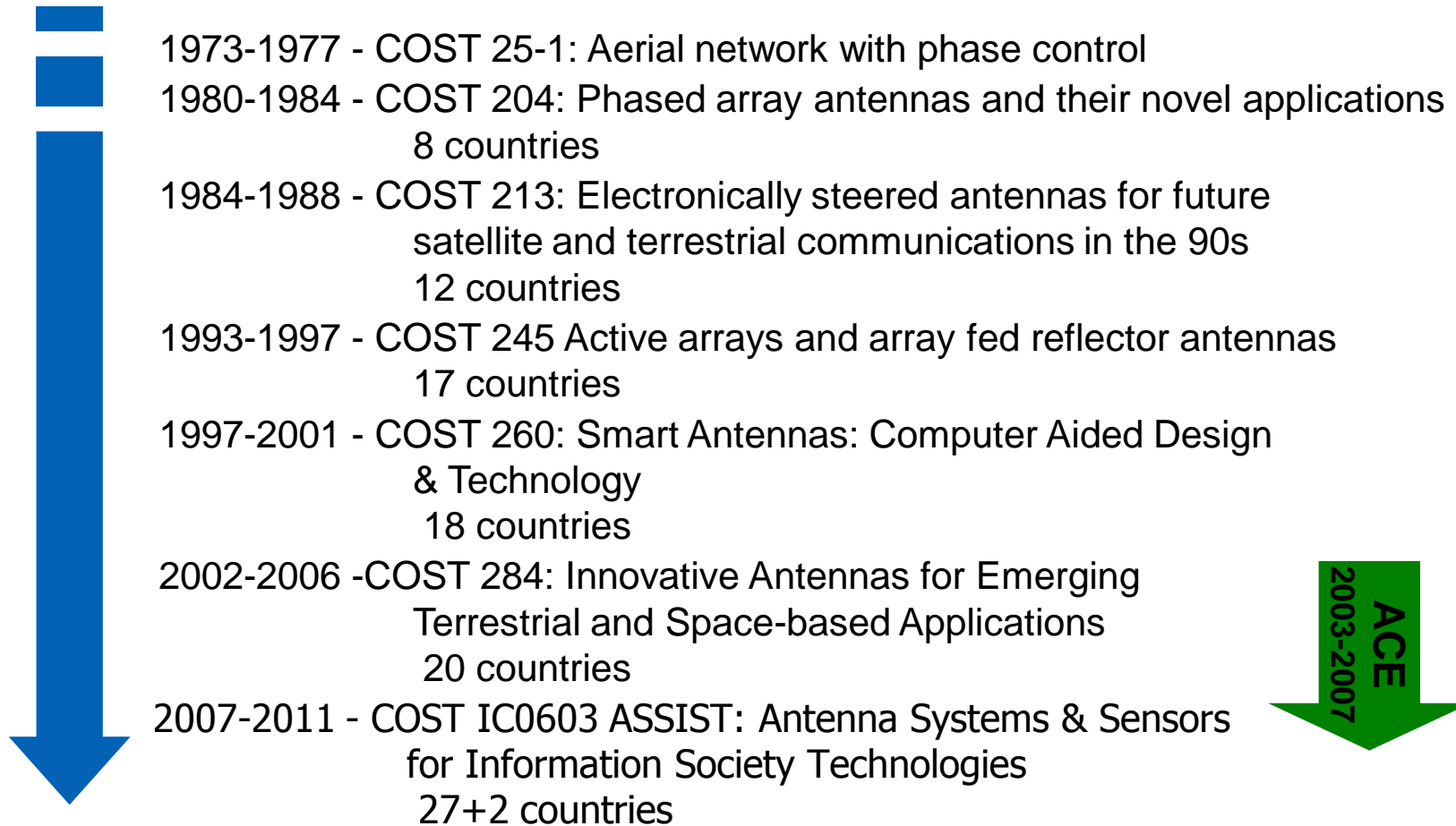
COST has been successfully used to maximise European synergy and it is a useful tool to further enhance European integration.

COST main characteristics



- “Bottom-up” – no fixed programmes / priorities
- Flexible participation – join in if you are interested
- Focus on multidisciplinary cooperation
- Enabling agent – Promotion of Early Stage careers in Research
- Open to global cooperation in the mutual interest
- “Non-competitive” – pre-normative; public utility
- Networks based on national funding of researchers and projects – national responsibility

Timeline: Antenna COST Actions



The ACE Network (2003-2007)



The final answer to existing problems

- No real European antenna community
- Weak cooperation industry – university
- Research not always relevant
- Little cooperation in PhD education
- Little reuse of software and test facilities
- **Too much duplication**
- Weak dissemination

ACE outcomes



- European Association on Antennas & Propagation (EURAAP)



- EUCAP Conference (5th edition next year)



- European School of Antennas



- Benchmarking and standardisation activities (software/measurement)

- Follow-up FP7 coordinating actions: Antenna Research & Technology for the Intelligent Car (ARTIC), Coordinating Antenna Research in Europe (CARE)



European school of Antennas (ESoA)

- Geographically distributed post graduate school
- Founded in 2004 by ACE
- Objective: reinforce European training and research in antennas and relevant applications.
- Presently financed by a Marie Curie Action (MCA) project.
- Courses are distributed in the most accredited European research centres on antennas and wireless systems.

COST IC1102 „VISTA“

- Versatile, Integrated and Signal-aware Technologies for Antenna
- COST domain: Information and Communication Technologies
- Duration: 2011-2015
- Website: www.cost-ic1102.eu, www.cost-vista.eu

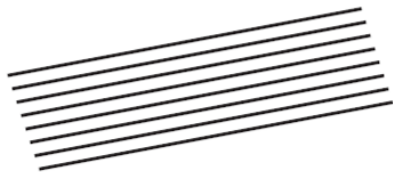
Trends...










Theory: Antennas
as *physical layer*:
physics
(electromagnetics)
& technology
(materials science).



Practice: Antenna
systems spread
into many layers!!!



	$\nabla \times \mathbf{E}$	
		
$z^{-1} + z^{-2}$...11010011...	
		

New challenges call for new paradigms



Demand for **more and better ICT services** explodes



Increased use of **energy and spectrum** limited resources!

Solution: signal-antenna joint techniques for **lower energy and spectrum usage**

MIMO: multi-radio in small devices

Cognitive radio:
opportunistic
frequency/coding

WSN:
distributed
cooperative
communication

Old and new challenges, new solutions

Satellite communications

- Higher frequency (Ka-band) for higher data rates
- Reconfigurability: adapt the coverage/extend lifespan
- Receivers: improved tracking possibilities

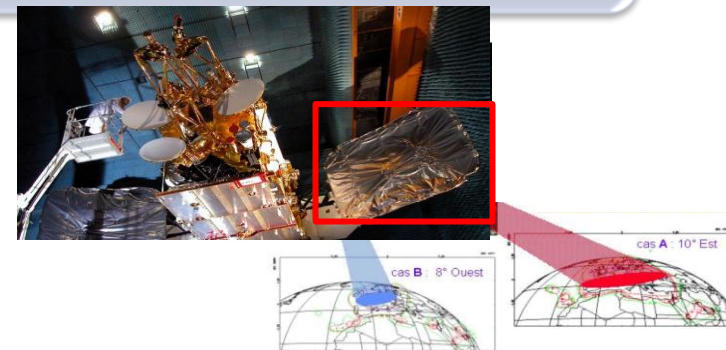
THz imaging and radar

- Reducing the system complexity
- Real-time images.

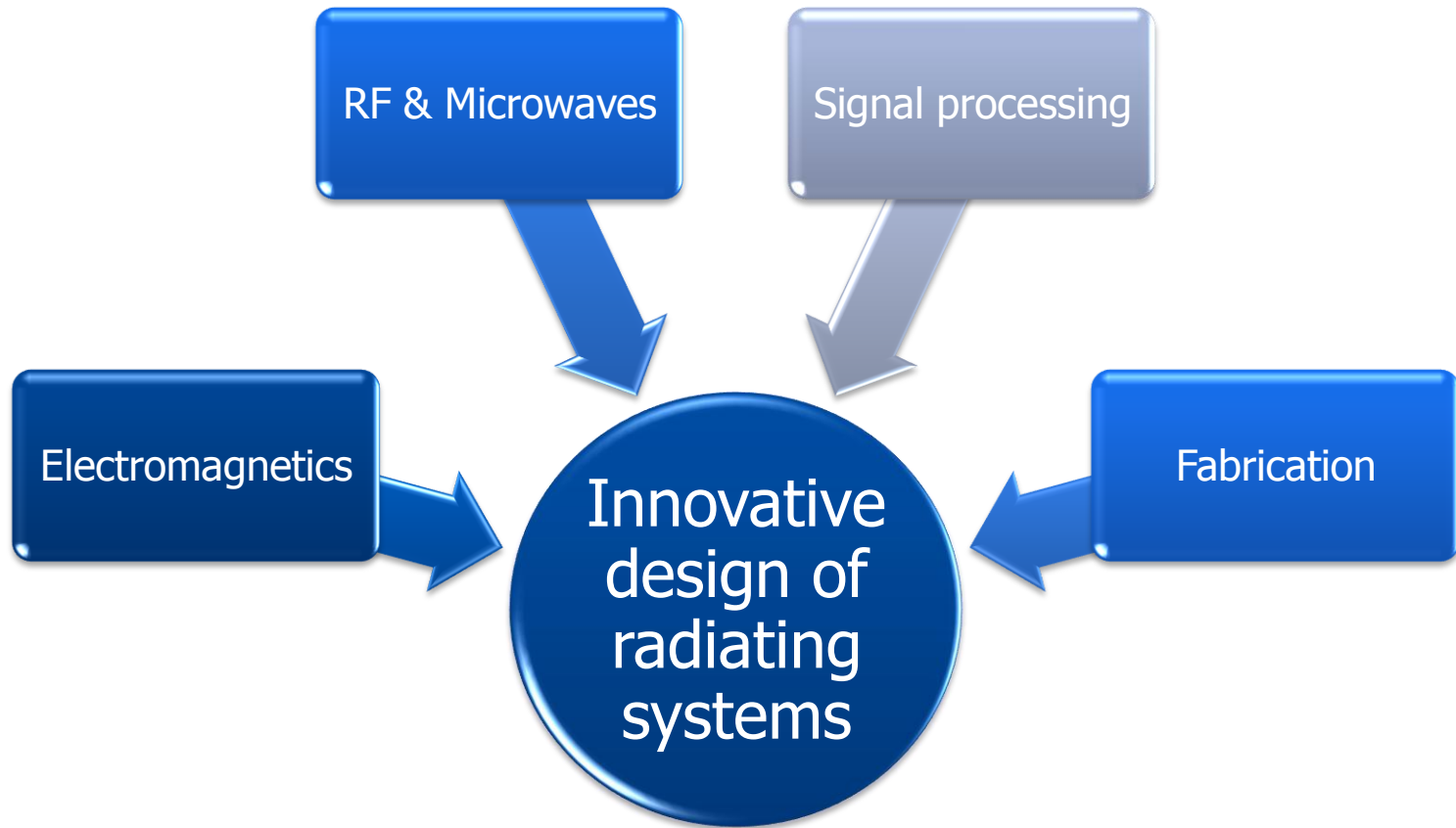
Intra/on/off body communication

- imaging and diagnosis
- radio-controlled, "intelligent" medical devices

New fabrication technologies



Cross-disciplinary research



Benefits of VISTA



COST VISTA: Objectives

Coordinate cross-disciplinary research on integrated and versatile antennas for wireless applications,

Assessment and survey

Technological development

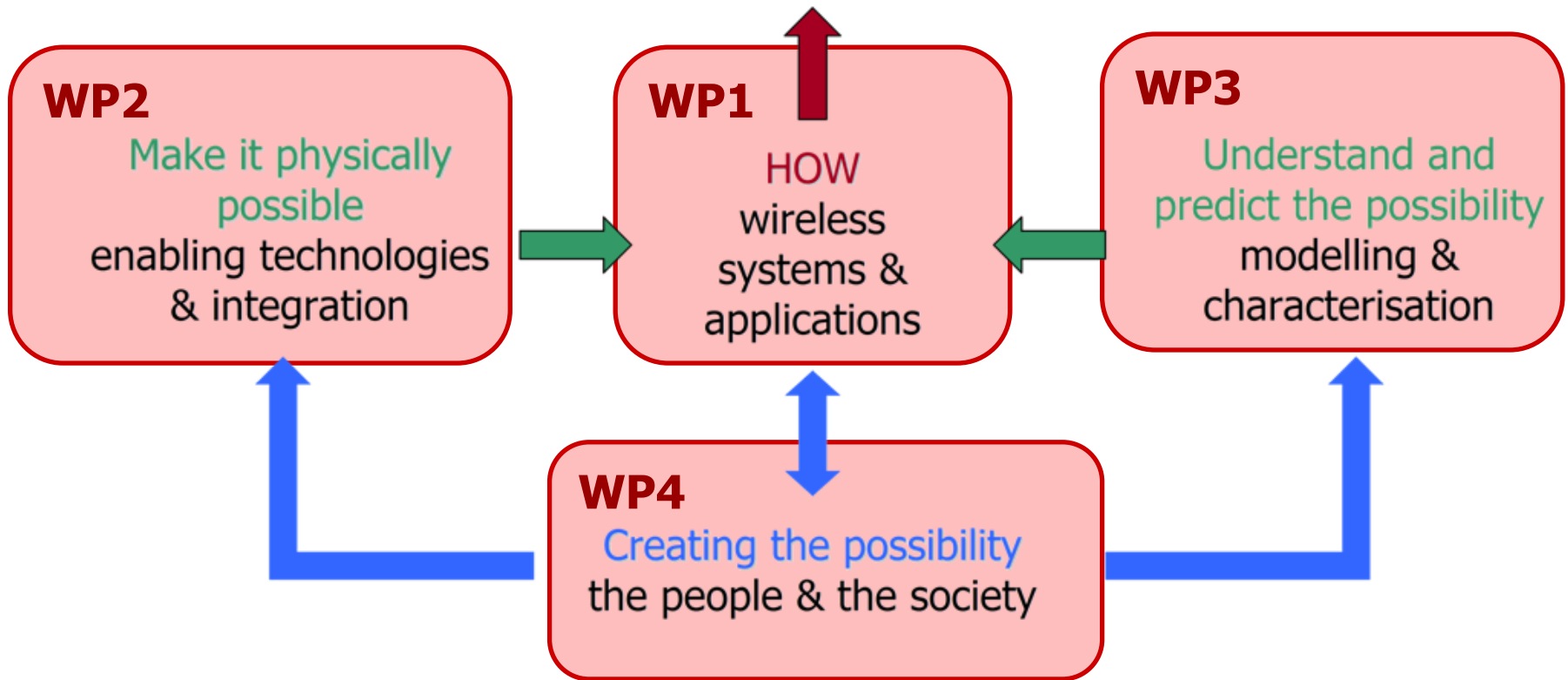
Supporting technologies

Cooperation & Networking

Training and education

Scientific focus

Information harvested, transferred and delivered
wherever needed
whenever needed
however needed



WP1: What? Applications and requirements

Wireless home & office

- enhanced systems for indoor data exchange
- Fast data synchronisation
- Cognitive & SW defined radio

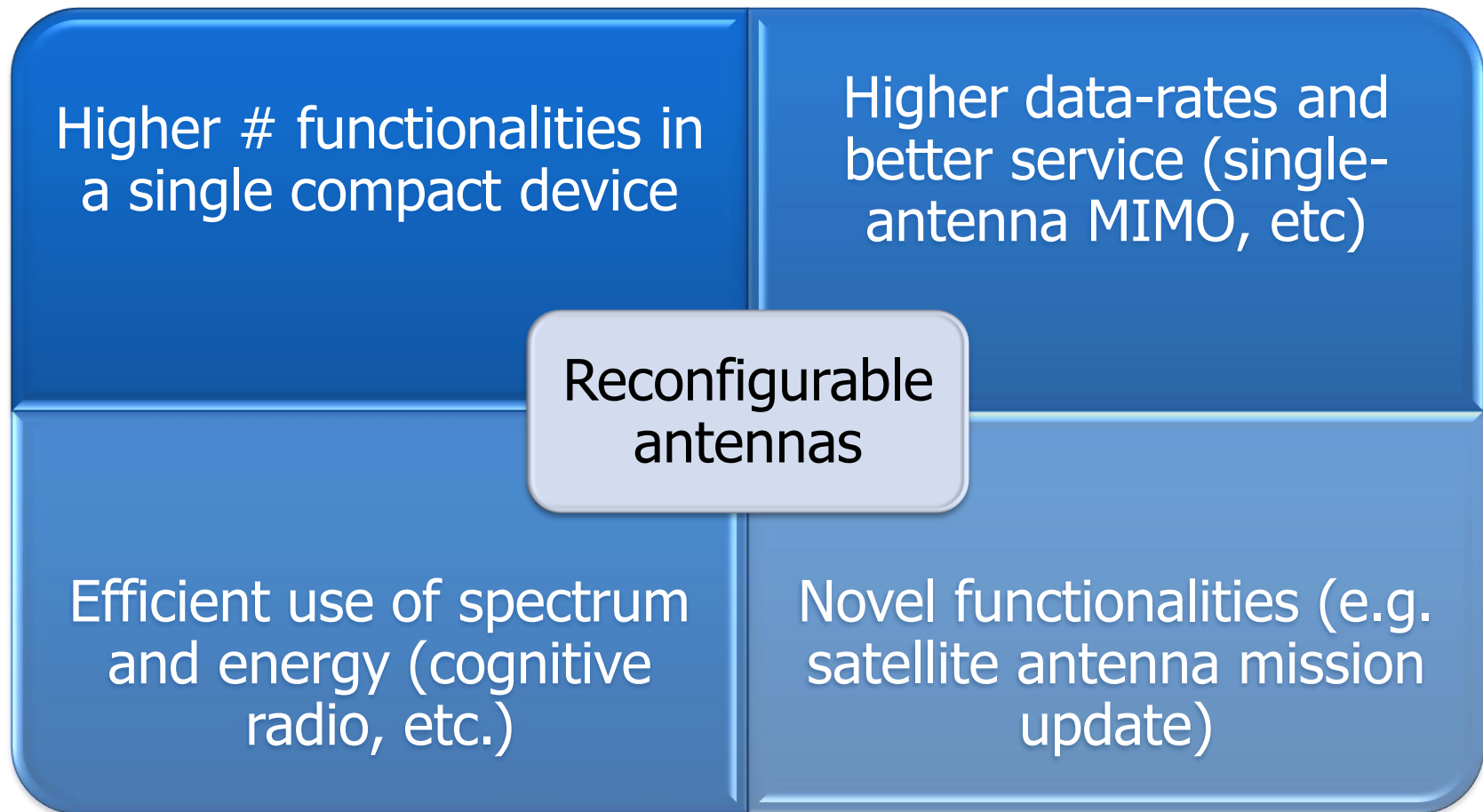
Mobility

- Radar sensors
- Vehicle communications
- On-board infotainment
- Positioning systems

Enhanced quality of life

- health & medical applications
- business & industry automation
- Safety critical communications
- Remote sensing
- Non-invasive diagnostics
- Environmental monitoring

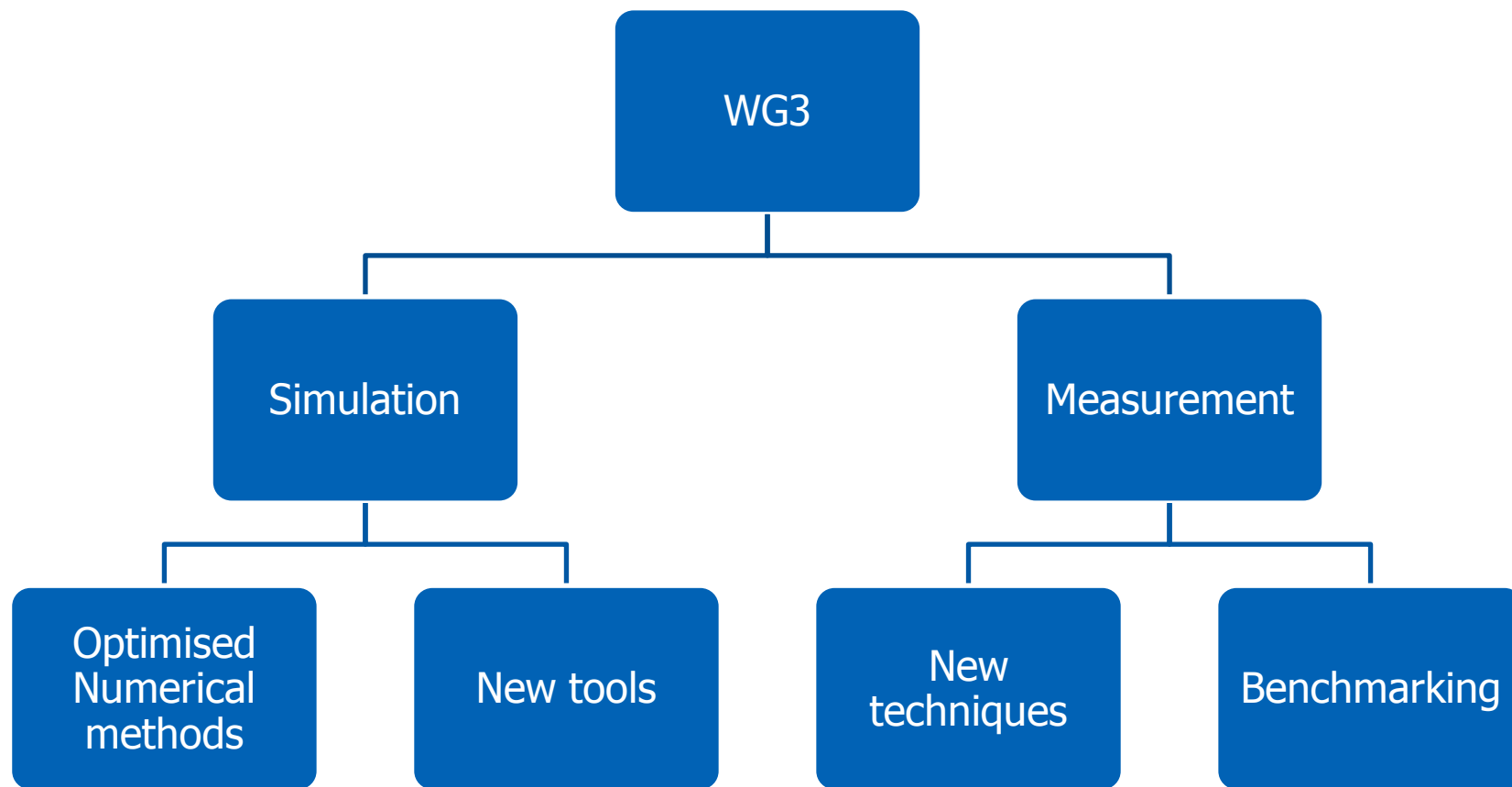
WP2: Enabling technologies and integration



Topic-wise...

- Remember that “**VISTA = Versatile, Integrated, and Signal-aware Technologies for Antennas**” !
- Focus on:
 - Multidisciplinary topics:
 - Link with novel fabrication technology
 - Evaluation of system-level performance, cross-layer design, in particular in radio coding (MIMO, cognitive, etc.)...
 - Higher frequencies up to THz (real time images, etc.)
 - Integration notably for mm-wave (60 GHz, 77GHz...) and reconfiguration
 - ‘Classical’ antennas requiring special evolution for ‘novel’ applications in WSN, medical, IR-UWB...

WP3: With what? Supporting technologies



WP3: With what? Modelling and Characterisation

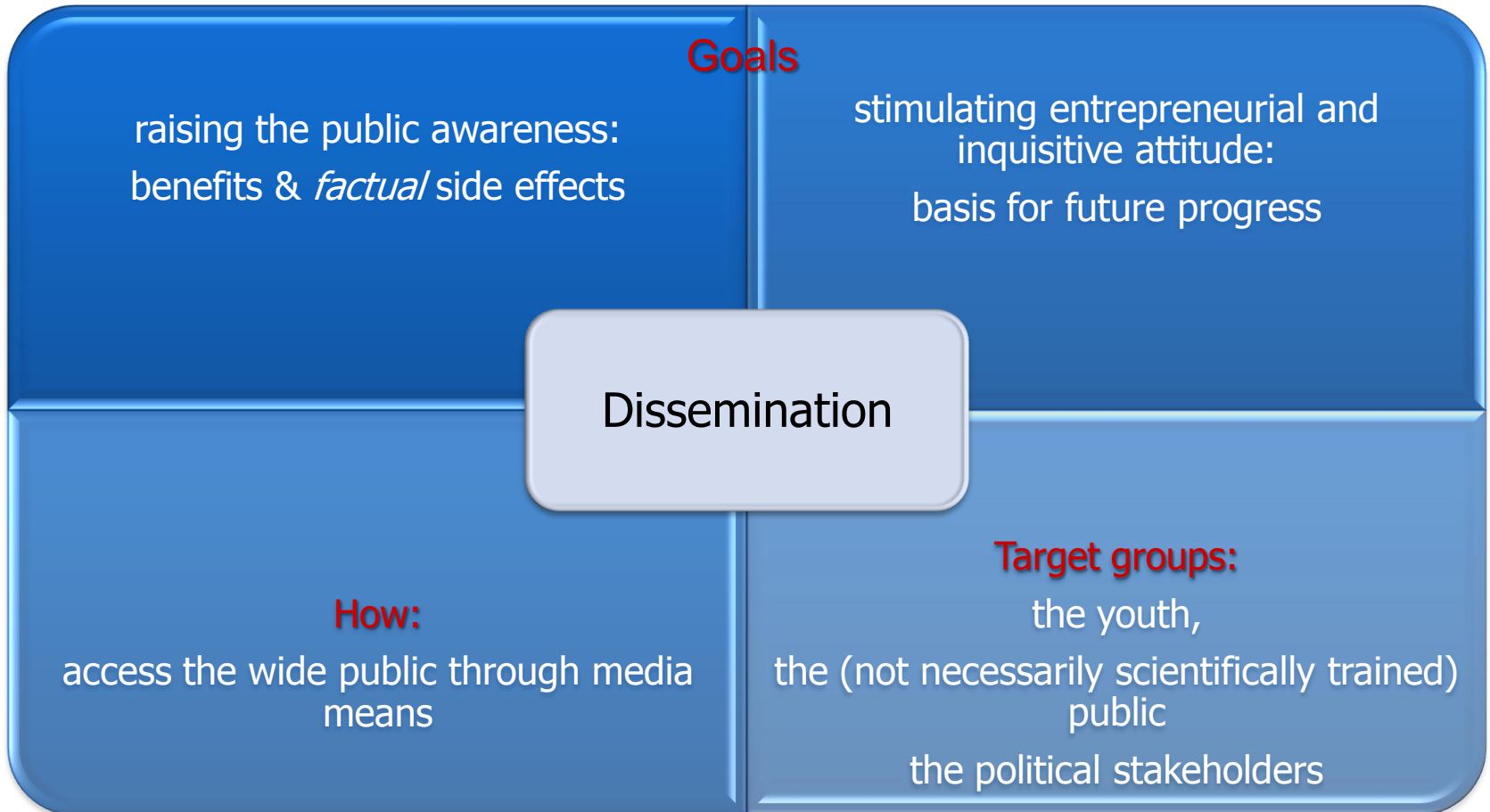
Antenna modelling including environment

- Faster solvers
- Algorithms requiring less memory.
- Hybrid methods,
- Link with fast approximations
- Multi-physics calculation
- Software tools for optimising matching circuits.
- Parallelization of algorithms
- New analytic approaches for complex media

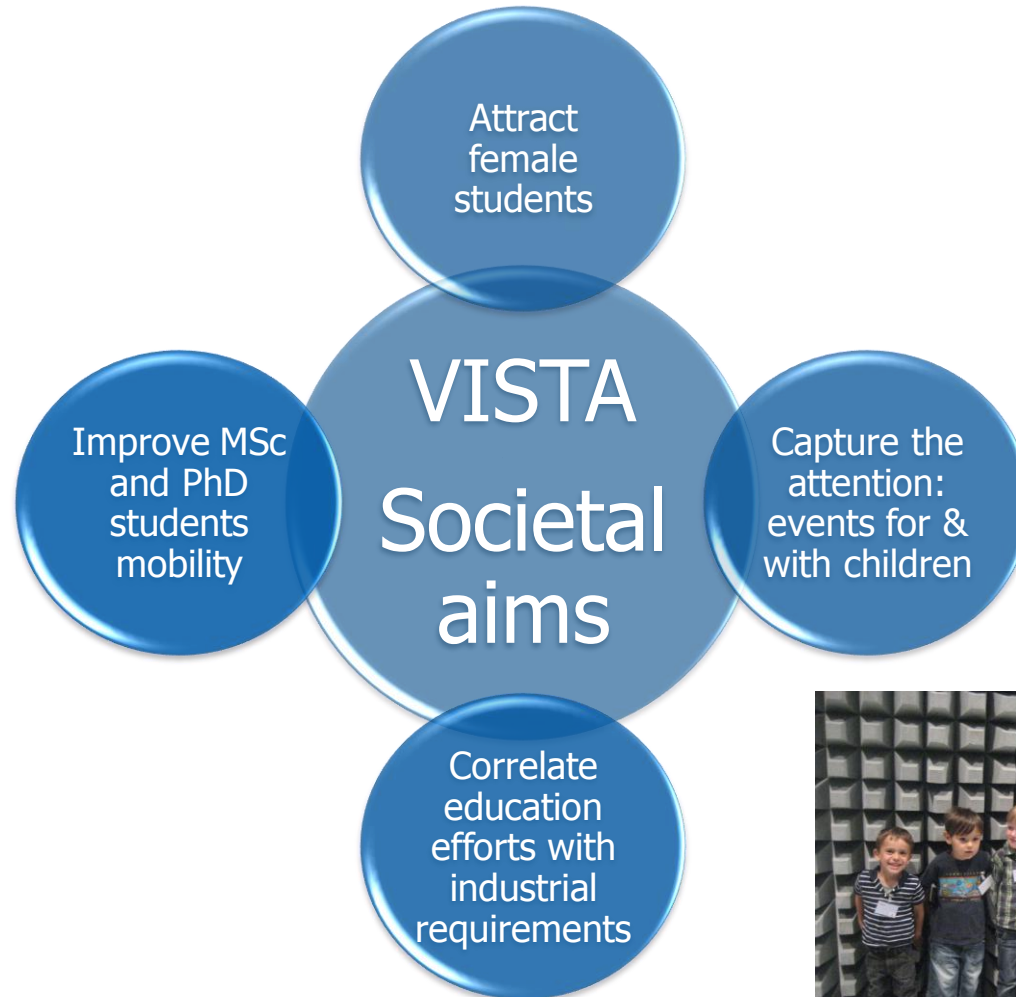
Advanced measurements

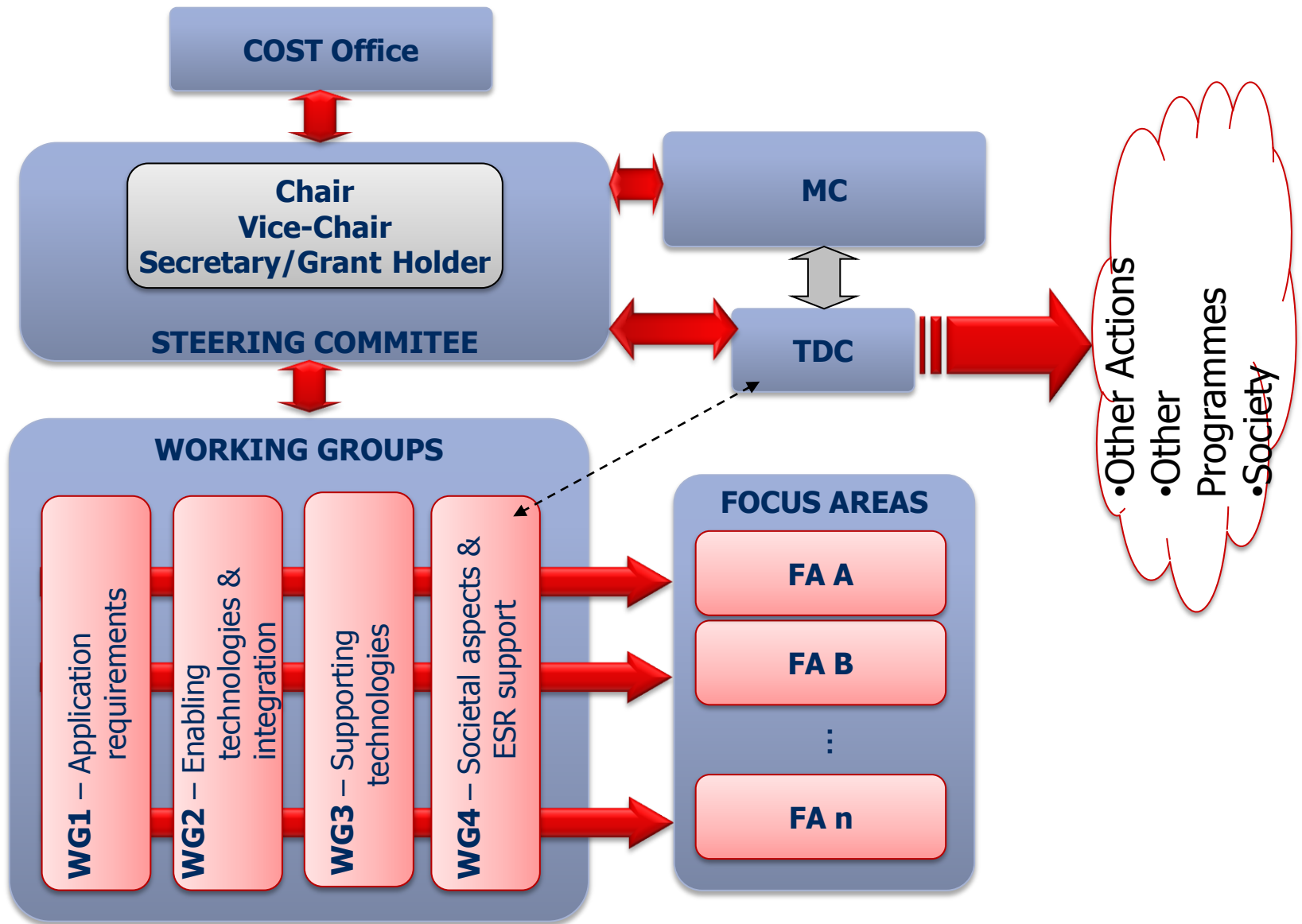
- Experimental validation of modeling techniques
- Near-field methods for new applications
- Advanced methods for OTA test procedures
- Millimetre-wave and TeraHertz measurement techniques
- Measurement of ultra-small radiators and time-varying media.
- Imaging and inversion techniques (e.g. antenna diagnosis)
- Characterization of structured materials (e.g. metamaterials)

WP 4: Who? Message to the broad public

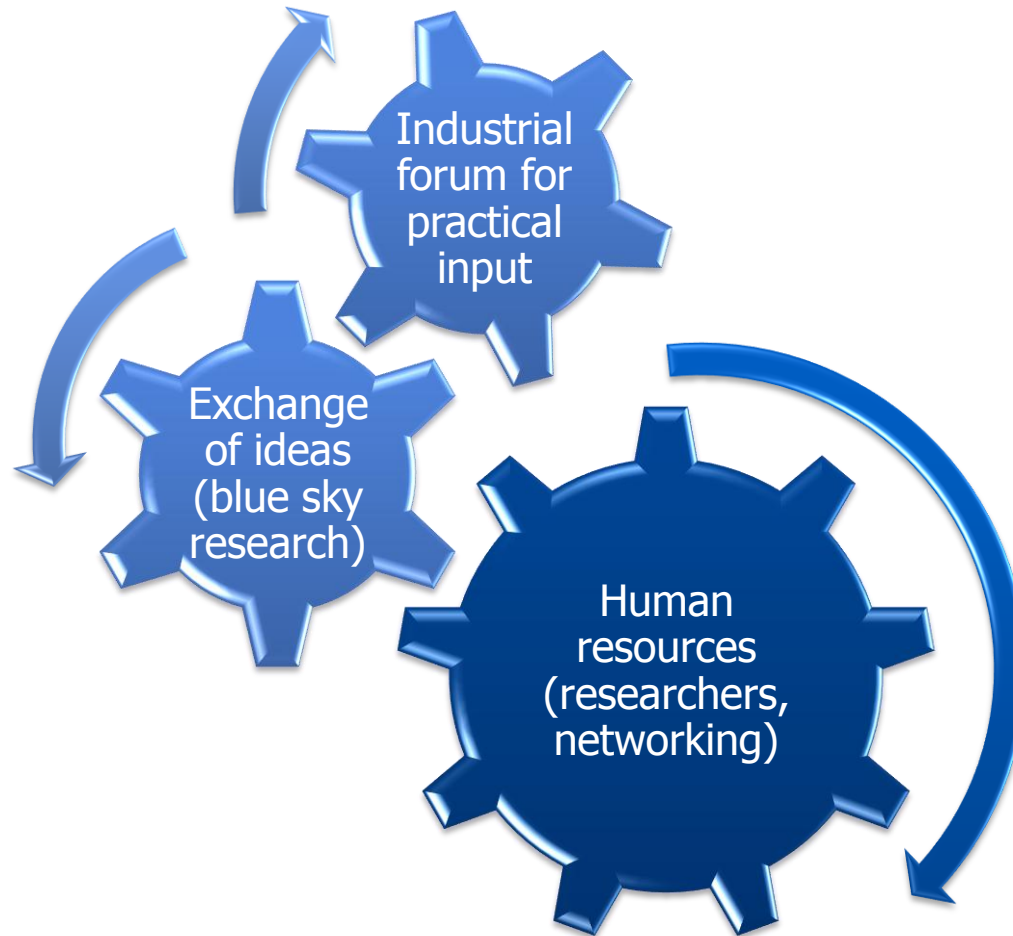


WP 4: Who? Training and Education





VISTA & Industry



Output

Training and education

- Mobility through STSM (>10/year)
- Courses
- Teaching material

Durable cooperation

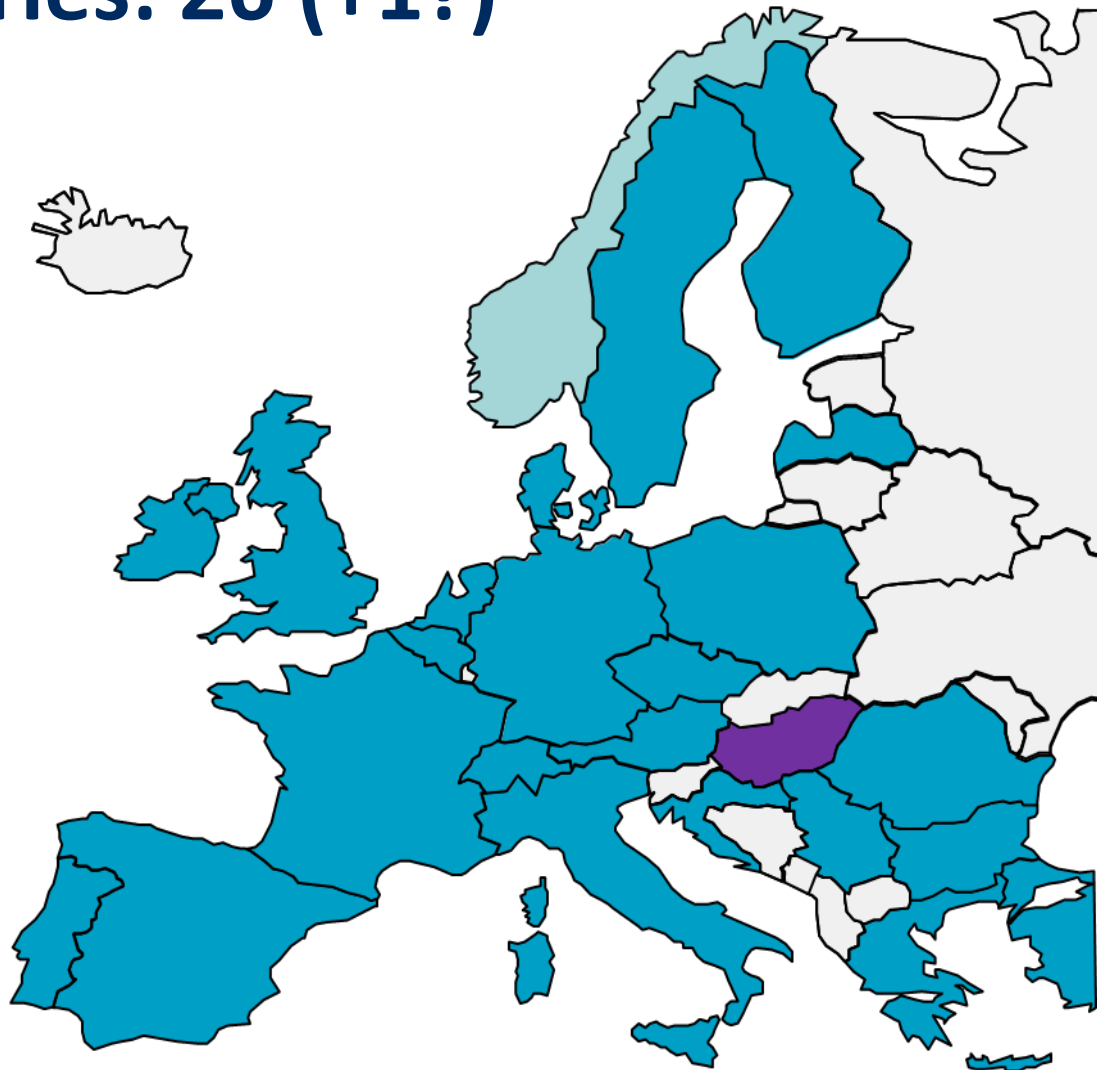
- Industry-University
- Spin-off projects

Technical outputs

- Recommendations for future applications
- Technical documents
- Algorithms & measurements
- Benchmarking activities

Signatory countries: 26 (+1?)

Country	Date
Austria	23/01/2012
Belgium	12/07/2011
Bulgaria	19/08/2011
Croatia	06/12/2011
Cyprus	03/10/2011
Czech Republic	15/06/2011
Denmark	01/11/2011
Finland	21/06/2011
France	12/08/2011
Germany	27/06/2011
Greece	21/11/2011
Hungary	20/04/2012
Ireland	11/08/2011
Israel	06/06/2011
Italy	10/08/2011
Latvia	18/07/2011
Netherlands	14/06/2011
Poland	01/07/2011
Portugal	16/06/2011
Romania	21/06/2011
Serbia	18/10/2011
Spain	07/07/2011
Sweden	15/09/2011
Switzerland	07/07/2011
Turkey	29/09/2011
United Kingdom	18/07/2011

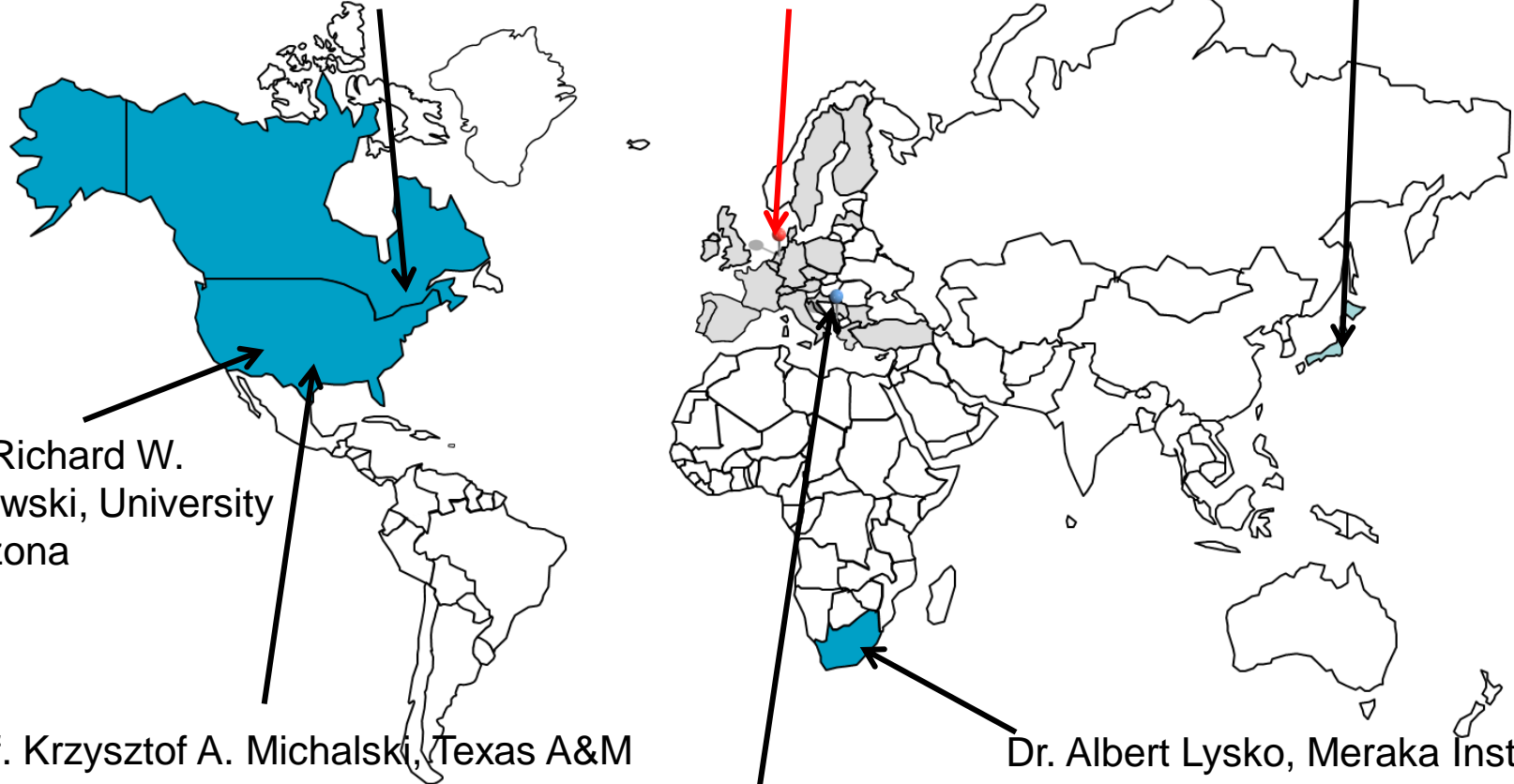


Non-COST& others

Prof. Yahia Antar, Royal Military College of Canada

Prof. Takamaro Kikkawa, Hiroshima University

ESA



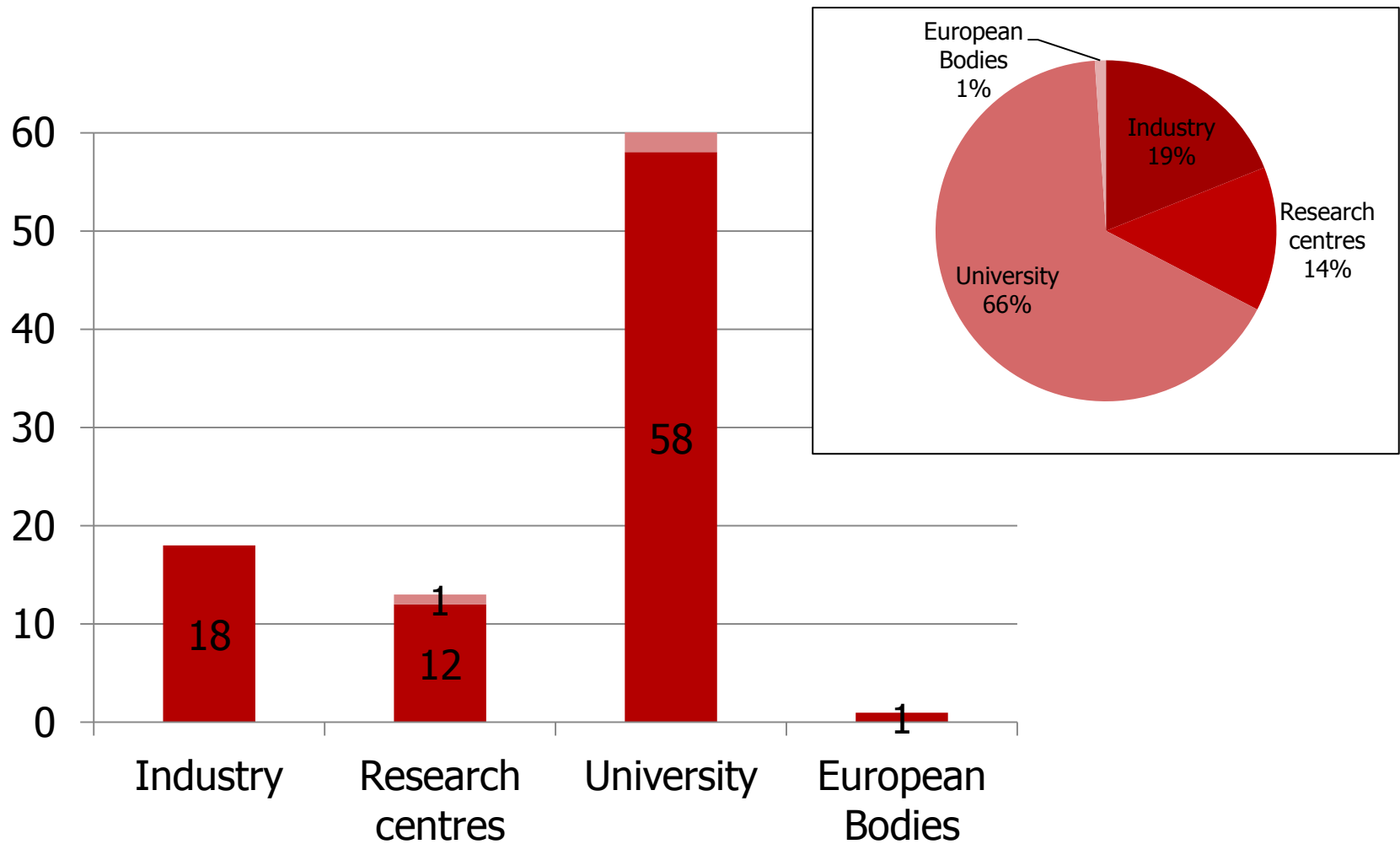
Prof. Richard W. Ziolkowski, University of Arizona

Prof. Krzysztof A. Michalski, Texas A&M University

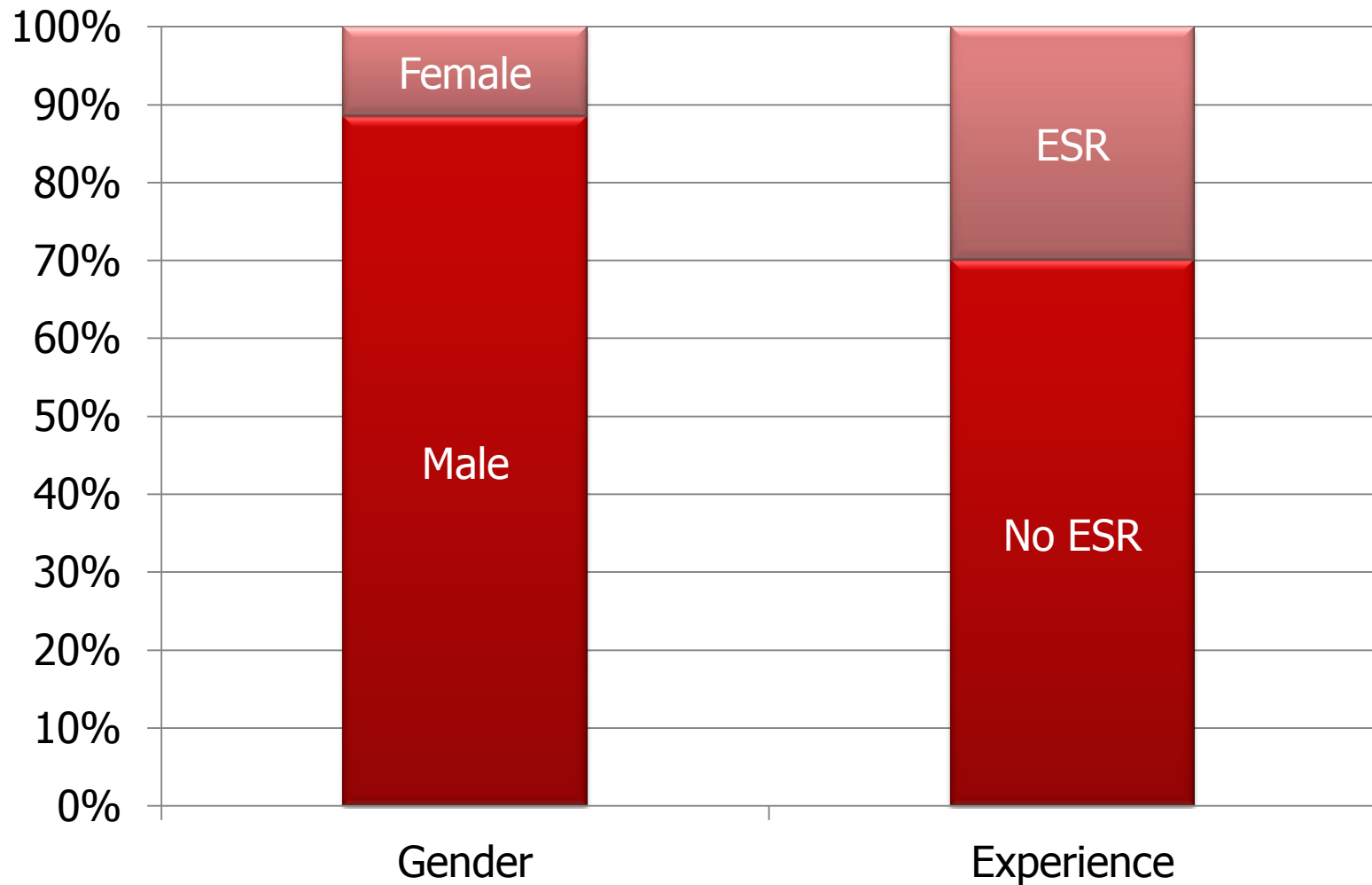
Prof. Igor Djurovic, University of Montenegro

Dr. Albert Lysko, Meraka Institute Council for Scientific and Industrial Research

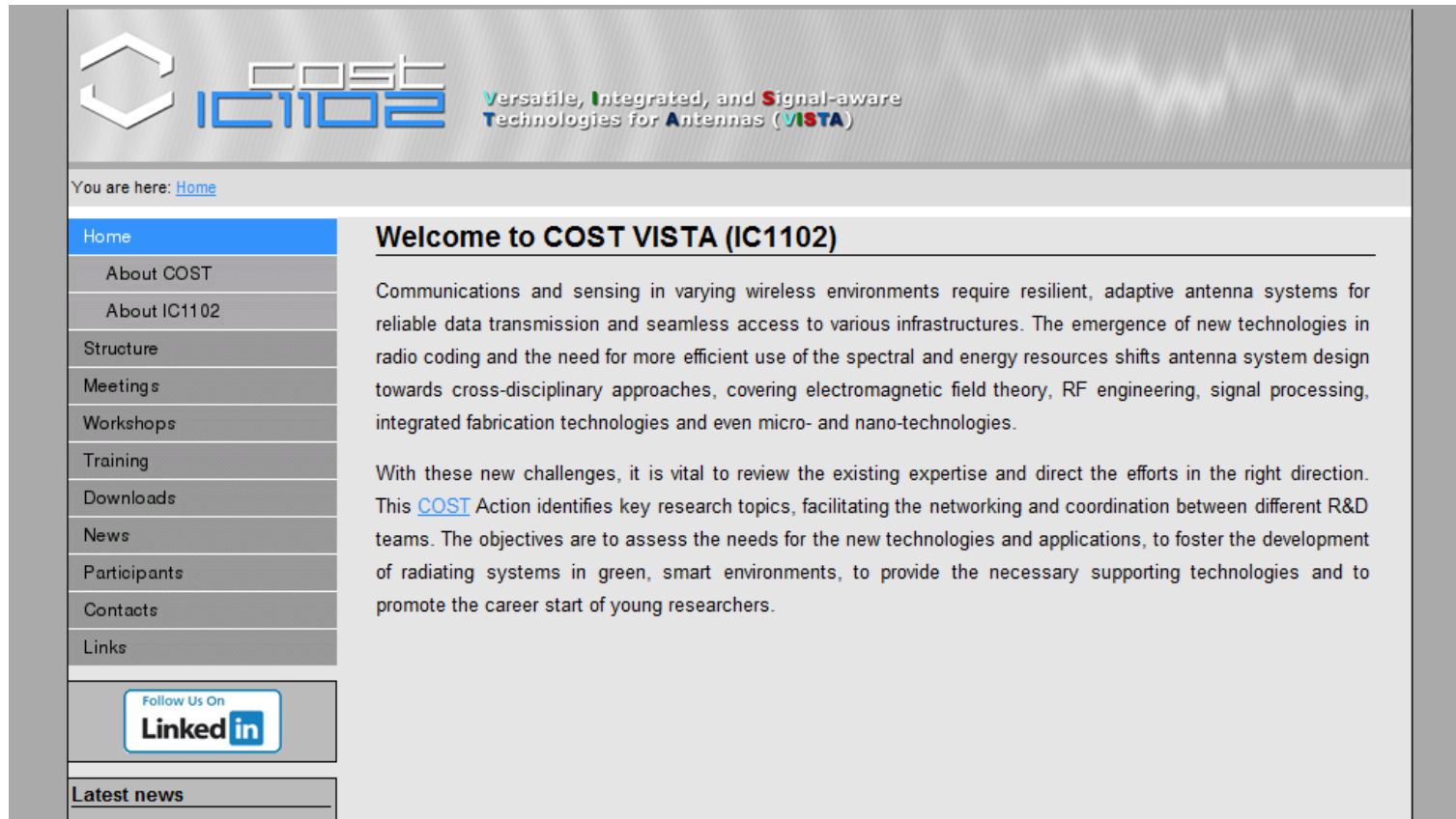
Facts and Figures: 94 Institutions



Facts and Figures: 130 Researchers



COST VISTA website



The screenshot shows the homepage of the COST VISTA website. At the top left is the logo for COST IC1102, which consists of a stylized 'C' icon and the text 'cost ic1102'. To the right of the logo is the tagline: 'Versatile, Integrated, and Signal-aware Technologies for Antennas (VISTA)'. Below the logo and tagline, there is a breadcrumb trail: 'You are here: [Home](#)'. On the left side, there is a vertical navigation menu with the following items: 'Home' (highlighted in blue), 'About COST', 'About IC1102', 'Structure', 'Meetings', 'Workshops', 'Training', 'Downloads', 'News', 'Participants', 'Contacts', and 'Links'. Below the menu is a 'Follow Us On' section with a 'LinkedIn' button. At the bottom of the menu is a 'Latest news' section. The main content area on the right features a heading 'Welcome to COST VISTA (IC1102)' followed by two paragraphs of text. The first paragraph discusses the need for resilient, adaptive antenna systems in varying wireless environments. The second paragraph discusses the importance of reviewing existing expertise and directing efforts in the right direction, mentioning the COST Action and its objectives.

cost ic1102 Versatile, Integrated, and Signal-aware Technologies for Antennas (VISTA)

You are here: [Home](#)

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- Links

Follow Us On
LinkedIn

Latest news

Welcome to COST VISTA (IC1102)

Communications and sensing in varying wireless environments require resilient, adaptive antenna systems for reliable data transmission and seamless access to various infrastructures. The emergence of new technologies in radio coding and the need for more efficient use of the spectral and energy resources shifts antenna system design towards cross-disciplinary approaches, covering electromagnetic field theory, RF engineering, signal processing, integrated fabrication technologies and even micro- and nano-technologies.

With these new challenges, it is vital to review the existing expertise and direct the efforts in the right direction. This [COST](#) Action identifies key research topics, facilitating the networking and coordination between different R&D teams. The objectives are to assess the needs for the new technologies and applications, to foster the development of radiating systems in green, smart environments, to provide the necessary supporting technologies and to promote the career start of young researchers.

www.cost-ic1102.eu or www.cost-vista.eu

COST VISTA LinkedIn group

LinkedIn Account Type: Basic | Upgrade

Home Profile Contacts Groups Jobs Inbox 5 Companies News More

Groups Search...

COST IC1102 VISTA

Discussions Members Promotions Jobs Search Manage More... Share group

Start a: Discussion Poll

Start a discussion or share something with the group...

Your Activity

Choose Your View NEW Show all RSS discussions

Latest Discussions

Job opening @ Chalmers
Here is the information sent by Per-Simon Kildal:
Assistant Professor in Information and Communication Technology at Chalmers ...
Vacancies at Chalmers University of Technology chalmers.se
Please register with email and password. If it is the first time you are applying for a position at Chalmers please click on new user to create your own account. You can then always login and update your application or apply...
posted 15 days ago

See more »

Latest Updates

Marta Martínez Vázquez started a discussion: **Job opening @ Chalmers**
Like · Add comment · 15 days ago

Albert Lysko has joined the group.
Send message · 15 days ago

Ozlem Aydin Civi started a discussion: **8th International Summer School on RF-MEMS and RF Microsystems and European School of Antennas (ESoA) course, RFMEMS Based Antennas**
Like · Add comment · 29 days ago

See all updates »

8th International Summer School on RF-MEMS and RF Microsystems and European School of Antennas (ESoA) course, RFMEMS Based Antennas linkedin.com
June 25-29, 2012 - Middle East Technical University, Department of Electrical & Electronics Eng., Ankara, Turkey
posted 29 days ago

- 66 members
- Quick information exchange

VISTA

Working Groups

WG1:
Requirements

WG2:
Enabling
technol.

WG3:
Supporting
technol.

WG4:
Societal
aspects

Focus Areas

FA-A
Medical
apps

FA-B
THz apps

FA-C
Parallel
computing

Thank you for your attention...

31-8-2012