

EUROPEAN
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SETTING SCIENCE AGENDAS FOR EUROPE

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**TECHBREAK
ESF FORWARD LOOK**

Aims of the conference

- **Intended outcomes are**
 - to identify technology areas of use to the space sector and the granularity level at which they can be useful
 - to highlight processes and mechanisms for technology maturation and transfer, that could be useful for the space sector
 - to define the contents and audience of further specialised workshops in support of this foresight activity, i.e. going into more detail of the selected technology areas
- **making use of Key Enabling Technologies (KETs) and other ‘enabling’ technology areas**
- **external survey to be set up, to refine the findings and outcome of the conference**

Programme structure

- 1st session of the conference sets the scene (needs of ESA in the various scientific domains)
- 2nd and 3rd sessions will confront people from different sectors
 - Session 2: goals and limitations of KETs and related technologies → non-space technologies potential for space (existing mechanisms and innovation systems, risks)
 - Session 3: drivers, challenges and showstoppers of space-related ETs → knowledge transfer to/from space domain
- Session 4 (2nd day): to match ETs from both sides and identify gaps (existing technologies on one side, not on the other)
 - Criteria to filter and classify existing material
 - Granularity level for sub-areas
 - Survey

Some issues to consider

- Multidisciplinary character of KETs
- Bottlenecks in EU/national innovation policy(ies) and mechanisms
- (under?)investment
- European “windows of excellence”
- Design and simulation versus production
- Promising/demonstrated mechanisms such as technology watch, innovation incubators and open access centres, public-private infrastructures, etc
- Institutional/EU policy issues

(Key) Enabling Technologies

- **5 KETs defined by the EC in 2009 – all interlinked**
 1. Nanotechnology
 2. Micro and nanoelectronics (incl. semiconductors)
 3. Photonics
 4. Advanced materials
 5. Biotechnology
- **Other areas critical to space are, e.g. energy, robotics, biomimetics, advanced propulsion, and more generally, materials science at large**
- **Energy and ICT not part of the KETs, but addressed through KETs 1 to 4**
- **KETs pertaining at various levels to EU's Grand Challenges, e.g. energy, healthcare, security**
- **Energy, photonics, and ICT not at the conference**

Technology tree structure

- By field, sub-field, etc or by functionality?
e.g. in nano- and microelectronics:
- Packing density; complexity; multi-functionality; signal processing rate

or

- Nanotubes; CMOS with high-mobility channel materials; electronic or silicon photonics; biochips; organic electronic devices; silicon-based THz devices; sensor networks; milli-Volt powering

Assessment matrices

- Using the defined tree structure and granularity agreed at the end
- 1 matrix per sub-category
- Risk vs. benefit to quantify (1→5?)
- Fill-in matrices using workshops, individual interviews, online survey
- Isolate sub-manifold of low risk – high benefit
- Throw in wild cards – How?

Survey: the framework

- **Recipients**
 - Heads of Tech Depts, EIROFORUM-type organisations
 - CTOs of high-tech companies
- **Description of TECHBREAK objectives and definition of the space needs**
- **Presentation of the output of this conference (i.e. ETs and granularity; identified mechanisms)**
- **Questions (rating of proposed topics and free text for suggestions)**
 - Available technologies that could contribute to space in their fields
 - Successful technology maturation programmes
 - Transfer mechanisms; innovation platforms; open access centres
 - General recommendations