EUROPEAN SCIENCE FOUNDATION

SETTING SCIENCE AGENDAS FOR EUROPE

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 Technoogies

- **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**

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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?**

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Survey: the framework

- **Recipients**
  - Selected scientists and individuals 'in-between'
  - 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;)**
- **Questions (rating of proposed topics and free text for suggestions)**
  - Available technologies that could contribute to space in their fields; breakthrough ideas that are not known to ESA
  - Successful technology maturation programmes and transfer mechanisms; innovation platforms; open access
  - General recommendations