



Summary

Personal communication facilitates the exchange of information and emotions between (groups of) individuals. In most relevant applications, personal communication is facilitated and mediated by technology, e.g. computers, portable devices, sensors, internet, and (mobile) network infrastructures. Communication technology is, and will remain to be, a critical factor in many economic and societal sectors: for instance for health and well-being, entertainment and creative industries, mobility and logistics, and digital cities.

With the term "intelligent" we mean that communication systems will incorporate awareness of their heterogeneity and distributed nature, of their expected dependent and secure operation, and of their close collaboration with human users. No fully functional intelligent communication infrastructure exists to date. However, an operational intelligent communication infrastructure is tacitly assumed to be "ready for use" for most applications.

The ICT Innovation Platform (IIP) Intelligent Communication seeks to bridge this gap. In this document IIPIC has explored three important societal domains to search for technological challenges and opportunities: health and well-being, smart mobility systems and smart energy systems. Below we summarize the most important outcomes for the IIPIC community. In the text we also refer to the related EIT ICT Labs themes. Members of the IIPIC community can apply for ICT Labs funds for education, business-development or innovation funds.

The **Health and Well-being** domain has been explored many times, but on the basis of this SRA research we identified three opportunities for IIPIC, that are aligned with the new top sector of life sciences and the EIT ICT theme of Health and Well-being:



- The design and deployment of a health application platform for health related services, including an AppStore (and platform) for health services. Such services may support for instance telecare, with proper security and authorized access to relevant data.
- Contributions to safe and reliable communication across local (home and regional) communication systems, in order to ensure reliable connectivity but also with the possibility of prioritized communication across administrative domains in case of emergency situations.
- Improvement of the up scaling and uptake of new technology solutions within the health domain.

The **Mobility** domain has recently received much interest. Important observation is that while there are efforts to unite this sector (Connekt, Dinalog, IIP MAIS), there seems to be no concerted effort from telecom parties to address the challenges that originate from the proposed ITS solutions in this domain. The mobility domain is related to the top sector Logistics, and the EIT ICT Labs themes of ITS, Smart Spaces and Digital Cities. The mobility domain gives rise to the following IIPIC topics:



- Use of smart cognitive devices: their cognitive aspects allow them to easily join and leave a network. For instance within a car, between cars, between cars and roads, etcetera. Devices vary in capabilities (and power requirements). Low-power versions often use energy harvesting techniques. Others can be tablet-like or smartphones and require batteries.
- Recognition of mobility patterns using smart sensors (e.g. on smartphones). This can be used to provide insight in personal mobility patterns. This, in turn, will enable personal driving directions and even incentives for changing usual patterns in case of unforeseen road incidents, certainly when they are shared in 'private' social networks.
- Fusion of open data: what is the business model so stakeholders buy-in? What type of standards is required? We should also consider 'nice-to-have' services for end-users next to, for instance, professional traffic control services.
- Improving the scalability, safety and privacy of proposed Intelligent Traffic Systems solutions.

Smart Energy Systems: The added value of new communication technologies in the energy sector is very high. Electricity can only be stored at high costs - to the extent that today specific users are paid in hours of excess supply to consume electricity - and thus managing demand and supply is highly economical. This situation exacerbates when energy-supply increasingly decentralizes and the use of electrical cars would increase. The smart grid is the proposed solution to these problems. This is also one of the cornerstones for the top sector Energy and the EIT ICT Labs theme of Smart Energy Systems. Part of the communication requirements for a future smart grid can be met with existing and future generally available communication infrastructures. However, several questions need attention:



- What will be the architecture of the communication infrastructure and management platform that supports the smart grids vision and how does it include various currently available infrastructures? How can the different reliability levels of

different sets of data be managed, and how does the system deal with disturbances? The communication infrastructure and platform should also anticipate the application development by third parties.

- How should data from different sources be integrated? Questions refer to reliability of data transport and standards for data communication between energy providers, equipment providers and users, and between users. This also includes privacy issues and potential business model challenges when data needs to be shared among consumers, prosumers and grid-operators.
- How can the transition be organized between the current distribution networks and a future bi-directional smart grid from both a technological and business model perspective?

Cross-cutting challenges

From the challenges above we can derive research topics for the IIPIC community. Key questions are:

- How to deal with reliability and prioritized communication over heterogeneous networks
- What are requirements and technologies for open application platforms in order to effectively support third party applications and services (e.g. basic platform services and software-development-kits)
- How to access, exchange, provide and control data coming from various sources, complying with standards while ensuring privacy and scalability
- Significantly increase the availability of solutions in domains with strong availability requirements. Implementation and upscaling of new networking and service technologies in domains may require new concepts.