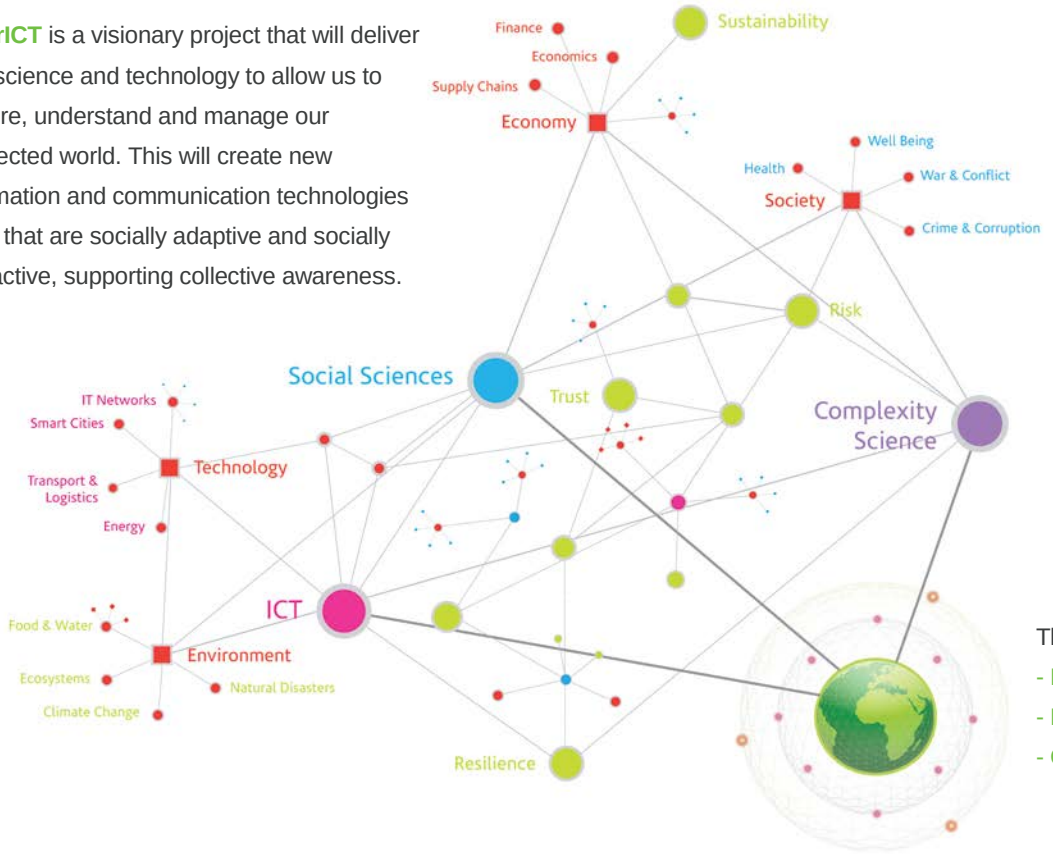
FuturICT is a visionary project that will deliver new science and technology to allow us to explore, understand and manage our connected world. This will create new information and communication technologies (ICT) that are socially adaptive and socially interactive, supporting collective awareness.



The FuturICT Platform:
- Planetary Nervous System
- Living Earth Simulator
- Global Participatory Platform

IT Networks and Communication Observatory

Over the last decades, our societies have become increasingly connected, thanks to the ubiquitous availability of communication technologies and IT networks. Some of the most remarkable events of the recent months, such as the uprisings in north Africa, could not have happened without the level of connectivity among individuals provided by today's communication technologies. This is however just the beginning of a revolution whose consequences are difficult to predict, but will surely transform our lives and even more those of our children. Connectivity is extending to machines, and our future environments will become increasingly smart, thanks to the interconnection of myriads of smart objects. This futuristic scenario opens a number of fascinating possibilities, such as the FuturICT vision of new technologies to monitor, predict and control the evolution of our world.

The IT networks and communication Observatory will focus on the progress in networking technologies (from the Internet to cellular systems, to ad-hoc and sensor networks), to identify and develop the right tools to support the decision-making of policy-makers, business people and citizens, through a Planetary Nervous System, which is intended to facilitate better social, economic and political participation.

The Global Network

Without data networks, the FuturICT vision could not have been conceived. Our daily experience of the Internet and of wireless data networks over recent years has given us confidence in the possibility of developing a global data network to acquire and transport information about any (human or artificial) system, and has thus opened the door to creative ideas for the exploitation of this new feature. FuturICT is the most visionary concept that has been developed for the massive exploitation of the information collection and distribution capabilities of global data networks in the interest of the ordered development of our planet

Data networks (wired and wireless) play at least three different key roles in FuturICT:

1. Data networks are the main building block for the achievement of many of the FuturICT goals, from smart cities and smart grids to intelligent transport and logistics. Data networks are the main enabling technology for the protection of critical infrastructures, social participation systems, smart sensing environments, e-health services, and environment monitoring and protection.
2. Data networks themselves are a relevant example of a complex system, of a critical infrastructure, and of an essential service to our society.
3. Data networks are a key enabler for the distributed simulation of the living planet over large numbers of computers, possibly adopting the cloud concept.

While data network technologies have experienced an impressive development over the last 20 years, the present level of technology is not sufficient to be painlessly adopted as is for the achievement of the FuturICT goals. Indeed, on the one hand, the number of data collection points, and the amount of information to be carried and filtered requires significant advances in architectural and technological aspects, and, on the other hand, the peculiar characteristic of the FuturICT system pose challenges that have never been explored before.

Challenges

Scaling networks to the level of pervasiveness and ubiquity required by the FuturICT context is a significant research challenge per se, since it requires 2-3 orders of magnitude increases in the number of network ingress/egress points. This brings about critical architectural problems, such as addressing and naming. Addressing is a problem already in present networks, which are mostly based on IP version 4, and the transition to version 6 has been encouraged many times with very little success. The myriads of network terminals foreseen by FuturICT require new addressing approaches, and might even be such that IP version 6 turns out not to be adequate, so that new alternatives must be explored.

Today's networks include resilience and fault tolerance approaches, but they are based on the assumption that most network elements are interconnected most of the time. The FuturICT context (at least for some applications, like, for example, environment monitoring) may be such that most of the network elements are disconnected most of the time. The possibility of effective networking in such case has yet to be proven, and adequate architectures have to be studied.