



**PRIORITY AREA A**  
**FUTURE NETWORKS AND COMMUNICATIONS ACTION PLAN**  
**JULY 2013**

## Future Networks and Communications (Priority Area A)

### Context

The Internet has become a critical infrastructure that forms a key element of our social and economic fabric. As more and more services for business, government and citizens move online, global online traffic is increasing. Cisco predicts that global online traffic will quadruple between 2012 and 2015 as the number of devices linked to the Internet climbs to 15 billion. The increase in demand for new services over the Internet is of such a scale that the current Internet as we know it will shortly reach the limits of its performance. This increased demand brings challenges of scalability, capacity, throughput, mobility and trust, all of which need to be addressed by “Future Networks & Communications”.

“Future Networks & Communications”, which includes fixed, mobile and wireless communications, Internet technologies and network & service management, needs to be developed in a holistic way taking into account all building blocks from users, services, applications and networks. The pervasive nature of ICT technologies includes ubiquitous communications, computing and networking facilities that facilitate the collection of data from connected sensors and actuators, and new models of user interaction. These technologies are forming part of the development of new smart systems and cloud computing infrastructures and systems, the continued development of which will be underpinned by “Future Networks and Communications”.

The value of the global ICT market was estimated at €4.6 trillion in 2009 with an annual growth rate of 5.5 per cent up to 2013 anticipated. The constituent elements of the market of relevance to Future Internet include communications, which was estimated at \$1.4 trillion in 2009 with a CAGR of 5.22 per cent. Cloud computing is expected to grow from \$37.8 billion in 2010 at a CAGR of 26.2 per cent to \$121.1 billion in 2015. The European sensor market was worth €10.1 billion in 2007 with an expected CAGR of 6 per cent between 2007 and 2011. The global sensor market was estimated at €36 billion; significant growth in the market is anticipated as sensor technologies are implemented in cities, water infrastructures etc.

There are over 400 enterprises in Ireland within the telecommunications sector employing c. 15,000 people and generating revenues of over €6 billion. In the cloud area there is a wide range of multinational companies in Ireland engaged in the three service areas of Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). SaaS is the largest segment of the cloud computing market accounting for 73 per cent of the market’s revenues for 2010. Ireland has a number of key global players in the sensor market as well as playing host to a number of large scale data centre facilities focused on cloud and green approaches. Key multinational companies engaged in the communications area include Ericsson and Alcatel Lucent. IBM and Oracle are also engaged in the network and service management area.

Ireland has a number of research centres engaged in research activity which underpins the “Future Networks & Communications” area, such as semantic web, analysis and visualisation of network data, optical and wireless networks, microelectronics, network modelling and analysis, adaptive

sensing and embedded systems. Between 2005 and 2009 Ireland scored above the global average for research impact in the computer science (high performance computing, hardware and architecture and software engineering) and electrical and electronic engineering fields.

Ireland needs to be able to develop a competitive position and carve out niche areas where it can lead in the Future Internet to be able to compete with other significant global initiatives in this area such as Asia FIF (Future Internet Forum), Korea FIF and the US GENI (Global Environment for Network Innovations) programme. Ireland should seek to differentiate itself by becoming a test bed of test beds for trial and validation of “Future Networks & Communications” technologies. Building on existing test beds such as SmartBay, Exemplar, Comreg Test & Trial and the IMS Carrier Grade test bed would make Ireland an even more attractive location for potential mobile investment and start-ups. This would present an opportunity to develop an integrated national sensor test bed.

## Future Networks and Communications

**Vision/opportunity:** To focus on Future Networks and Communication to further develop Ireland’s global positioning in the ICT field, by building on existing research strengths and well established indigenous and FDI sectors, to enhance human capital and research capacity to address the current and future needs of this rapidly moving sector and to underpin Ireland’s global reputation through active participation in the development of technology and regulatory standards.

<p><b>Objective 1</b></p>	<p>To fund research to address the strategic needs of the three core areas that comprise Future Networks and Communications; namely:</p> <ul style="list-style-type: none"> <li>▪ Network and Service Management to assess how best to manage and service the network to address new increased demand from devices and applications;</li> <li>▪ Internet Technologies to assess the software and protocols to support the network;</li> <li>▪ Fixed, Mobile and Wireless Communications that will enable connection and collaboration.</li> </ul>
<p><b>Objective 2</b></p>	<p>To realise value add by elaborating links with other research priority areas that will depend on the outputs from Future Networks and Communications; for example, Data Analytics, Management, Security &amp; Privacy (priority area B), Digital Platforms, Content &amp; Applications (priority area C), Connected Health &amp; Independent Living (priority area D) and Smart Grids &amp; Smart Cities (priority area K).</p>

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<b>Objective 3</b>	To create an environment to bring together the necessary disciplines from enterprise and academia and also drawing on the relevant State functions (e.g. regulators) to work collectively on opportunities in the Future Network and Communications area at both early stage and applied research.
<b>Objective 4</b>	To support the development of relevant skillsets in graduates, postgraduates and researchers to achieve the critical mass to meet the strategic needs of enterprise and the research community, including the development of structured training programmes at postgraduate level, to address relevant skills gaps as identified and validated by the Expert Group on Future Skills Needs.
<b>Objective 5</b>	To establish a position of leadership and credibility for Ireland in the Future Networks and Communications area such that Ireland is able to influence and contribute to the development of international standards and regulations for the area.
<b>Objective 6</b>	To develop best in class test beds that are reliable, usable and accessible in Ireland, that can be used by enterprise and the research community, by exploring synergies between existing test-beds (such as Smart Bay, Exemplar, Comreg Test and Trial etc.) and addressing gaps with a view to creating a national differentiator.

No	Action	Deliverable	Benefit	Lead	Support	Timeline
<b>Objective 1</b>	<p>To fund research to address the strategic needs of the core areas that comprise Future Networks and Communications; namely:</p> <ul style="list-style-type: none"> <li>▪ Network and Service Management to assess how best to manage and service the network to address new increased demand from devices and applications;</li> <li>▪ Internet Technologies to assess the software and protocols to support the network;</li> <li>▪ Fixed, Mobile and Wireless Communications that will enable connection and collaboration.</li> </ul>					

No	Action	Deliverable	Benefit	Lead	Support	Timeline
A 1.1	Building on the national research prioritisation exercise, identify and map the key enterprise and academic expertise for the 3 core areas of Future Networks and Communications.	Up-to-date picture of the enterprise and research ecosystem for the 3 core areas.	Knowledge and awareness of where research strengths and enterprise capability and capacity lie.	EI, IDA, SFI	HEA, IRC, MI, DJEI + any other agencies of relevance	Q4, 2013
A 1.2	Assess the current strategic research needs and gaps for each of the 3 core areas through liaison with IDA, EI and other agencies.	Mechanism for mapping enterprise needs against research activity.	Clear picture of enterprise needs.	EI, IDA, SFI	HEA, IRC, MI, DJEI + any other agencies of relevance	Q4, 2013
A 1.3	Continue or extend funding of current research activity to meet needs or run a new thematic call for new areas of need.	Mechanism for allocating research funds against enterprise needs.	Research activity remains fully aligned with enterprise needs.	SFI, EI	IDA, HEA, IRC, MI, DJEI + any other agencies of relevance	Q1, 2014
A 1.4	Continue to fund research in underpinning platform technologies and sciences of relevance to Future Networks	Mechanism for allocating research funds for underpinning	The underpinning research requirements of the Future	SFI, EI	IDA, HEA, IRC, MI, DJEI + any other agencies of	Q1, 2013

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No	Action	Deliverable	Benefit	Lead	Support	Timeline
	and Communications through bottom-up calls.	platform technologies and sciences.	Networks and Communications area are addressed.		relevance	
A 1.5	Devise appropriate mechanisms to facilitate on-going collaboration between relevant research initiatives.	Collaboration programme for researchers to share research initiatives and findings.	Synergies between research initiatives are fully explored and developed.	SFI, EI	IDA,HEA, IRC, MI, DJEI + any other agencies of relevance	Q3, 2013
<b>Objective 2</b>	To realise value add by elaborating links with other research priority areas that will depend on the outputs from Future Networks and Communications; for example, Data Analytics, Management, Security & Privacy (priority area B), Digital Platforms, Content & Applications (priority area C), Connected Health & Independent Living (priority area D) and Smart Grids & Smart Cities (priority area K).					
A 2.1	Identify the research priority areas in which Future Networks and Communications will have role to play.	Mapping of dependencies and linkages between research priority areas.	A clear picture of how Future Networks and Communications can fit with and contribute to other research priority	Forfás	SFI, EI, IDA, HEA, IRC, MI, DJEI + any other agencies of relevance	Q3, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
			areas.			
A 2.2	For each relevant research priority area identified in 2.1 engage in inter-agency discussions to assess their requirements of Future Networks and Communications.	Definition of requirements of Future Networks and Communications from other research priority areas.	A clear picture of expectations from Future Networks and Communications from other research priority areas.	DJEI (via TI)	SFI, EI, IDA, HEA, IRC, MI + any other agencies of relevance	Q3, 2013
A 2.3	Ensure appropriate funding mechanisms are in place to encourage and facilitate on-going collaboration between Future Networks and Communications and other research priority areas.	Facility for collaboration for research priority areas to share research needs and future requirements.	Dependencies between research areas are fully explored and addressed.	DJEI (via TI)	SFI, EI, IDA, HEA, IRC, MI + any other agencies of relevance	Q4, 2013
<b>Objective 3</b>	To create an environment to bring together the necessary disciplines from enterprise and academia and also drawing on the relevant State functions (e.g. regulators) to work collectively on opportunities in the Future Networks and Communications area at both early stage and applied research.					

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No	Action	Deliverable	Benefit	Lead	Support	Timeline
A 3.1	Engage key enterprises (both indigenous and FDI) with strengths in the Future Networks and Communications field to discuss the opportunities arising from the research gaps identified in action 1.2.	Company awareness of the opportunities in Future Networks and Communications area is enhanced.	Enterprise will have the opportunity to exploit the Future Networks and Communications area.	EI, IDA, HEA	SFI, IRC, MI, RPOs, CTTO + any other agencies of relevance	Q4, 2013
A 3.2	Ensure appropriate funding mechanisms are made available to facilitate the identified enterprises collaborating with the relevant research expertise on both early stage and applied research on an on-going basis.	Focused enterprise and research collaboration.	Key capabilities are supported to work together to realise the commercial potential in the research areas.	EI, SFI, HEA, IRC	IDA, MI, RPOs, CTTO + any other agencies of relevance	Q1, 2013
<b>Objective 4</b>	To support the development of relevant skillsets in graduates, postgraduates and researchers to achieve the critical mass to meet the strategic needs of enterprise and the research community, including the development of structured training programmes at postgraduate level, to address relevant skills gaps as identified and validated by the Expert Group on Future Skills Needs.					
A 4.1	In undertaking their work the Expert Group on Future Skills	“Addressing the high level ICT skills	Ireland will build competitive	EGFSN	SFI, EI, IDA, HEA, IRC, MI + any	Q4, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	Needs (EGFSN) will seek to consider the likely skills needs for the Future Networks and Communications area going forward.	across sectors of the economy of Ireland” report.	advantage by planning for future skills needs.		other agencies of relevance	
A 4.2	Linking in with the HEA foresight group map the skills needs against existing postgraduate programmes to identify where gaps exist.	Reporting on mapping of existing postgraduate programmes against skills needs.	A clear picture of current postgraduate programmes of relevance.	HEA	SFI, EI, IDA, IRC, MI + any other agencies of relevance	Q4, 2013
A 4.3	Work with the ICT Action Plan, the forthcoming HEA framework on doctoral education and the relevant academic institutions in collaboration with enterprise to modify existing postgraduate programmes or to scope new research and education programmes to address the gaps identified.	Specification for specific postgraduate training programmes.	A clear picture of gaps to be addressed in postgraduate training programmes.	HEA	SFI, EI, IDA, IRC, MI + any other agencies of relevance	Q1, 2014
<b>Objective 5</b>	To establish a position of leadership and credibility for Ireland in the Future Networks and Communications area such that					

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Ireland is able to influence and contribute to the development of international standards and regulations for the area.						
A 5.1	Map, co-ordinate and link relevant standards and special interest groups for the Future Networks and Communications area.	Map of relevant international standards and special interest groups.	A clear picture of standards of relevance to the Future Networks and Communications area.	EI, IDA, NSAI	SFI, HEA, IRC, MI, NDA + any other agencies of relevance	Q4, 2013
A 5.2	Identify standards groups and special interest groups where Ireland has representation.	National register of Irish representation on standards groups and special interest groups.	Transparency as to which standards groups and special interest groups Ireland is engaged in.	EI, IDA, NSAI	SFI, HEA, IRC, MI, NDA + any other agencies of relevance	Q4, 2013
A 5.3	Identify which standards and special interest groups Ireland should get involved in.	List of standards and special interest groups of interest to Ireland.	A clear picture of standards and special interest groups of relevance to Ireland.	EI, IDA, NSAI	SFI, HEA, IRC, MI, NDA + any other agencies of relevance	Q4, 2013
A 5.4	Build credibility and presence in relevant standards groups	Increased credibility and	Credibility and secured seat at the	SFI, EI, HEA,	IDA, MI, NDA + any other	Q4, 2013

No	Action	Deliverable	Benefit	Lead	Support	Timeline
	and special interest groups by participation in standards related events and relevant research on an on-going basis.	participation in identified standards and special interest groups.	table for Ireland.	IRC, NSAI	agencies of relevance	
A 5.5	Facilitate sharing of information from Irish representatives on standards groups and special interest groups.	Mechanism to disseminate information on relevant standards and special interest groups.	Intelligence on standards and special interest groups will be more accessible to enterprise and researchers.	EI, IDA, NSAI	SFI, HEA, IRC, MI, NDA + any other agencies of relevance	Q1, 2014
<b>Objective 6</b>	To develop best in class test-beds that are reliable, usable and accessible in Ireland, that can be used by enterprise and the research community, by exploring synergies between existing test-beds (such as Smart Bay, Exemplar, Comreg Test and Trial etc.) and addressing gaps with a view to creating a national differentiator.					
A 6.1	Scope a development plan for national test-bed infrastructure.	Plan for development and roll out of national test bed capacity and capability	‘Best in Class’ national test bed infrastructure with best practice regulatory and governance frameworks	EI	HEA/SFI/IRC/IDA, MI, DCENR + any other agencies of relevance	Q4, 2013

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No	Action	Deliverable	Benefit	Lead	Support	Timeline
A 6.2	In the future networks and communications area scope the potential and scale of a national collaborative research platform to integrate and co-ordinate existing and future test-beds both public and private and act as a gateway to European test-bed infrastructures.	Development plan for integration of national test-bed infrastructure	Potential competitive advantage for Ireland as a test bed site providing seamless access to national and European test-bed platforms including in the Future Networks and Communications area	DCENR	SFI, EI, IDA, HEA, IRC, MI + any other agencies of relevance	Q2, 2013

**Forfás**



An Roinn Post, Fiontar agus Nuálaíochta  
Department of Jobs, Enterprise and Innovation