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The Knowledge Network

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Dear Mr Colasanti

AVAILABILITY AND ROBUSTNESS OF ELECTRONIC COMMUNICATIONS INFRASTRUCTURES

Thank you for the opportunity to meet on 1st March and to provide comments on the draft final report “Availability and Robustness of Electronic Communications Infrastructures”

The Institution of Engineering and Technology (IET) believes that much of this report is important, relevant and worthy of support. The authors have clearly taken account of much good practice, drawing on UK experience. However, overall, there is too much emphasis on intervention and too little on what can be better achieved by voluntary cooperation. Any regulatory intervention must be both pragmatic and proportionate. The report does not address these issues. Organisations with a greater impact on the Critical National Infrastructure (CNI) need to be coordinated and involved in proportionate measures.

Experience in the UK suggests that a cooperative (non-regulatory) approach which links such voluntary commitment with access to important ‘information exchange’ resources, can produce a better result than brute force regulation. Once this is in place and actions are focussed on firms within the CNI or which serve the CNI, then the difference between the Government’s interest and firms’ own self-interest may be far smaller than some might imagine. Hence the ‘market failure’ frequently used to justify regulatory intervention is rare.

The IET has in excess of 150,000 members worldwide drawn from a broad range of science and engineering disciplines, of whom approximately 25% work in ICT. The membership represents a wide range of expertise, from technical experts to business leaders, encompassing a wealth of professional experience and knowledge, independent of commercial interests. This response has been prepared on behalf of the Institution’s Trustees, after inviting input from the membership, including in particular both the Communications and Information Technology Sector Panels.

If you require further information or amplification of any aspect of this submission, please do not hesitate to contact me.

Yours sincerely



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Enclosure:

1. IET Comments on the EU Information Society and Media draft final report
“Availability and Robustness of Electronic Communications Infrastructures”.

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**IET Comments on the EU Information Society and Media draft final report
“Availability and Robustness of Electronic Communications Infrastructures”**

This IET response focuses on the ten key recommendations made in the draft final report¹. It is structured around a series of general observations, followed by a review of each of the key ‘Recommendations’ and their respective ‘Purpose’ statements, with detailed comments for each and an overall ‘IET view’.

1. GENERAL OBSERVATIONS

The IET expresses the following general observations about the draft final report:

- 1.1 **Importance of mobile and broadband access.** Whilst the full report covers a comprehensive range of communications networks and architectures, the key recommendations do not highlight the particular challenges related to mobile and broadband access. This is a major weakness. For example in many member states there are now twice as many mobile phone subscriptions as fixed lines. Individuals and organisations frequently use their experience of fixed networks to make assumptions about the resilience of mobile networks, and these are not always justified. The implications of mobile networks’ vulnerability to overload and to prolonged regional or national power failure are not fully recognised, and some alternative mobile networks may be based on the same power or core transmission arrangements. Similarly, many organisations’ business continuity plans assume extensive use of ‘working from home’ through exploitation of the now extensive roll out of fixed and mobile broadband access. The traffic dimensioning (contention ratios) and backup power arrangements may not be compatible with such usage.
- 1.2 **It is important that the EU considers what is “critical” on an EU basis, and then looks at how to coordinate national best practice within this.**
- 1.3 **Justifying regulatory intervention.** The report gives too much priority to regulatory market intervention rather than the use of voluntary market-based mechanisms that have been demonstrated to be successful in the UK. It is wrong to assume always that there is market failure that needs to be addressed by regulation. Any intervention must be shown to be proportionate to the challenge being addressed.
- 1.4 **Avoiding unnecessary barriers to trade.** Given the diversity of member states and their different stages of development, it is vital that the necessary co-ordination of a European response is used to eliminate rather than create barriers to trade.

2. DETAILED COMMENTS ON KEY RECOMMENDATIONS

2.1 Emergency Preparedness

“The Private Sector and Member State governments should jointly expand their use of emergency exercises and establish pre-arranged priority restoration procedures for critical

¹http://ec.europa.eu/information_society/newsroom/cf/document.cfm?action=display&doc_id=189

services to better meet the challenges of inevitable emergency incidents.”

Stated purpose

“This recommendation is aimed at *improving the speed of response to crisis situations by making as many decisions as possible before the crisis occurs*. If implemented, its impact will be to strengthen infrastructure robustness by better preparing for unknown stress conditions and improving network availability by reducing the time required to restore services.”

IET Comments

There is no substitute for regular and realistic exercising of business continuity exercises and/or disaster recovery plans. The recent British Standard BS25999² contains much useful guidance of general applicability to organisations of all sizes across all sectors. It must always be borne in mind though that pre-arranged service restoration plans have limited scope, as these can only be made against known failures and scenarios. Experience shows that each emergency has to be dealt with on its own merits and successful response plan must focus on getting the right people together either physically or through electronic communications in order to make the appropriate decisions.

Business continuity plans for any organisation must also include examination and testing of the plans of those organisations on which it depends, both upstream and downstream in the supply chain. Increasingly this will need to take into account the testing of internationally out-sourced arrangements.

Exercises need to be rigorous in testing dependencies between different elements of infrastructure. For example, to what extent might the loss of core transmission services or power impact the availability of mobile networks?

IET view on recommendation 1

This recommendation is supported, albeit with the caveat that much of the value of exercises comes from learning how to get these ‘people’ and ‘process’ issues right and highlighting unexpected dependencies, rather than from the specifics of the scenario used.

2.2 Priority Communications on Public Networks

“Member State governments should implement a standards-based priority communications capability on future public networks in order to ensure vital communications for critical government authorized callers. This public network capability is needed in addition to any private emergency networks that already exist and should not be viewed as a substitute or replacement for such private networks.”

Stated purpose

“This recommendation addresses the issue of *how to maximize the probability that the most essential calls are completed during periods of high traffic*. This capability focuses on the aspect of robustness that retains the most critical functions during periods of stress.”

IET Comments

Present systems tend to focus on cutting off access to non-priority users, whereas the right approach is to ensure that priority customers get through even when other traffic is, by

² <http://www.bsonline.bsi-global.com/server/index.jsp>

necessity, choked back. Any standardisation now needs to focus on the future “Next Generation Network/Internet Protocol” (NGN/IP) world. In that respect, the “Internet Engineering Task Force” (IETF) has been working on ‘GETS’ (A US Government Emergency Telephone Service). A concerted and focussed European input to this work is strongly desirable, as the US approach is not necessarily compatible with the way in which many EU States are organised.

Even with present-day networks, such a service ought to be easy to implement, by ensuring that calls from priority customers are marked with a priority bit in the SS7 message and that all Network Management call-gapping and other restrictive controls let such calls through.

However, the biggest problem with emergency calling is overcoming the human issue of ensuring that the right people are classed as priority users and that such lists are maintained up-to-date. The scale of the task often means devolving responsibilities across a wide range of organisations that might not share similar criteria. This has been a perennial problem with UK attempts at priority access through ‘Access Overload Class’ (ACCOLC) systems.

IET view on recommendation 2

This recommendation is supported, but with the caveat that the challenges of keeping up to date lists of priority users, and ensuring they carry with them the necessary devices or tokens, is substantially greater than the technical measures for delivery.

2.3 Formal Mutual Aid Agreements

“The Private Sector should establish formal mutual aid agreements between industry stakeholders to enhance the robustness of Europe’s networks by bringing to bear the full capabilities of the European communications community to respond to crises.”

Stated purpose

“This recommendation addresses the issue of how to significantly extend the robustness and resiliency of any given network through the shared resources of other industry stakeholders.”

IET Comments

The UK has a National Emergency Plan and within it a mutual aid agreement that can be invoked in emergencies. In the UK there is a history of constructive voluntary co-operation between ‘competitors’ for mutual aid in emergency situations.

IET view on recommendation 3

This recommendation is strongly supported on a Member State basis. The case for extended co-operation across borders is less clear and certainly more problematic.

2.4 Critical Infrastructure Information Sharing

“Member States and the Private Sector should establish formal means for sharing information that can improve the protection and rapid restoration of infrastructure critical to the reliability of communications within and throughout Europe.”

Stated purpose

“This recommendation addresses the need to share sensitive information between industry and government stakeholders, within a trusted environment, enabling all participants to

benefit from this shared body of knowledge.”

IET Comments

The UK system of ‘Information Exchanges’ not only works, but also by organising it within a trusted environment, provides a win-win system that obviates the need for formal regulation. Clearly the security context for these exchanges has to be carefully established and maintained as they can be seen to highlight vulnerabilities and protection strategies.

It may be helpful to set up a secure and confidential voluntary forum at the European level in which knowledge and experience gained of ‘human failures’ can be shared between Member States and key infrastructure providers, with some funding of targeted research.

IET view on recommendation 4

This recommendation is strongly supported, particularly in the context of limiting the need for regulatory intervention.

2.5 Inter-Infrastructure Dependency

“European Institutions and Member States should engage with the Private Sector to sponsor a coordinated European-wide program that identifies and addresses the interdependencies between the communications sector and other critical sectors, to enhance the availability and robustness of Europe’s public communications networks.”

Stated purpose

This recommendation is aimed to *enhance the availability and robustness of Europe’s critical infrastructures by identifying and addressing sector interdependencies.*

IET Comments

A ‘hazard analysis’, systematically identifying inter-infrastructure dependencies, is clearly a vital requirement, but identifying such dependencies is not ‘rocket science’. The major areas are:

- Electrical Power
- Fuel
- Human access to facilities
- Flow of key materials

Of particular note are those where the dependencies are mutual, as between electrical power and telecommunications. For example, consequential telecommunications failures caused by a primary power failure slowed the restoration of the Italian power grid after it collapsed in the wake of failure of the power inter-connector with Switzerland.

Particular account needs also to be taken of the inter-dependency of telecoms networks on each other; e.g. mobile networks use of links from fixed network providers. Many alternative providers use the incumbent’s ‘last mile’. Co-trenching and duct route sharing can result in unexpected dependencies between apparently separate networks.

The extent to which a major communications failure can impact other vital services such as the Emergency Services and Broadcast Providers, who may have a crucial ‘public order’ role during service restoration, also needs to be clearly understood.

The dependencies associated with WEB services would be worth a separate review as more public / private applications become dependent on major Internet routers.

IET view on recommendation 5

This recommendation is strongly supported, but a wide view needs to be taken on the scale and scope of potential interdependencies.

2.6 Supply Chain Integrity and Trusted Operation

“European Institutions and Member States should embark on a focused program to promote the integrity of supply chains used to build network systems, and promote the implementation of innovative trust concepts to support the operation of these systems. The program should focus on articulating a vision, providing incentives for research and development, and establishing policies affecting government procurement contract awards.”

Stated purpose

“This recommendation is aimed at providing hardware and software supply chain technology and assurances for integrity regardless of where or by whom, the technology was designed, developed, manufactured, or deployed. It is further aimed at operating future networks with safeguards that provide assurances of trustworthiness, regardless of their owner or operator.”

IET Comments

The need for the integrity of the supply chain is important to both the member state and the EU. This integrity can be in part achieved through enhancing the professionalism of those designing, implementing and running software infrastructures. This needs to be achieved on a global scale given, as the document notes, that the rise in off-shoring and outsourcing can bring different risks. It is therefore important that a focussed programme to identify the supply chain dependencies be developed.

The UK Computing Research Committee (UKCRC) has made specific recommendations to the UK Government on these points, in particular that the appropriate entities within European and Member State governments should:

- drive meaningful policy changes that focus public sector research, motivate academic research, and encourage private sector research and development on trusted technologies;
- provide incentives to invest in trusted technology research; and
- drive meaningful policy changes that impact the awarding of contracts based on the successful implementations of these capabilities.

In other words, use public purchasing to drive industry to use technologies that allow you to have justified confidence that the resulting systems are dependable.

IET view on recommendation 6

Whilst this recommendation is strongly supported, it would be foolish to underestimate the scale of the work required, all the way back to primary research, to make this a reality. The IET would be delighted to work with the Commission on these areas.

2.7 Unified European Voice in Standards

“Member States should consider opportunities to coordinate positions during standards development, since a unified voice can give the European Union members more leverage in addressing concerns of mutual interest to the members. The Member States should coordinate the selection of standards bodies in which to actively participate. Member States should agree on which standards to follow to minimize conflicts.”

Stated purpose

“This recommendation is aimed at *promoting network availability by reducing conflicts* between network operators, service providers, equipment suppliers, and between networks operating across Member State boundaries by adopting common standards. Coordination at standards bodies strengthens the European Union influence and ensures that the standards meet the unique needs of the European Community.”

IET Comments

There is no doubt that the global success of GSM originates from the way Europe concentrated on producing a single standard for digital mobile phones to meet the European market. Prior to the GSM standardisation, which started in the CEPT and moved into ETSI soon after the latter was set up, the mobile phone market in Europe was completely fragmented with several incompatible technical solutions which meant roaming was generally impossible (the Nordic countries are a notable exception here) and the market was so fragmented that economy of scale was not available to the manufacturers who therefore were relatively slow to innovate.

With GSM, the strategic objectives were agreed between the European States at the beginning of the project and the chosen solution was designed for seamless use across Europe. This turned out to have global appeal and the result is that today over 2.5 Billion subscribers worldwide use GSM phones. It is tempting to think how to reproduce this success and the description of the justification for this recommendation betrays that this is in the mind of the drafters of this report.

However, the global market is completely different now to how it was in the mid 1980s and the IET does not understand what is meant by "the unique needs of the European Community". It is seductive but dangerous to regard the EU as having specialist requirements which risk leading us into a ghetto of aging second-rate technologies, left behind by a global industry addressing the much larger markets beyond the EU. EU-based industries would be working at a disadvantage if they had to serve a home market with different requirements to their main markets.

The IET therefore considers that the standardisation of networks, services and terminals should be driven by the industrial concerns that will exploit them. The interest of the Member States is to make sure that the various standards bodies, formal and informal are open and transparent and that appropriate policies and practices are followed so as to avoid de facto monopolies being created around specific technology solutions. Coordination of standards bodies is a task for the members of the bodies concerned and the emergence of compatibility and interoperability testing by economic players cooperating together should be encouraged, again in an open and transparent way. Moreover, care should be taken not to embrace legislative or regulatory solutions that work against innovation and investment. The key to prosperity for Europe is to enable European-based entities to lead global innovation and to develop their global markets on the back of success in their European markets.

IET view on recommendation 7

The IET does not therefore support this recommendation as drafted and we do not think that the objectives described will be secured with this approach. Indeed, the role of standards may have been overstated here. When there have been major outages it has often been because of human failures and the fact that even with standards, not every implementation of them will be the same. We are however supportive of a nominated (but light touch) focal point within the EU for discussions, exchange of best practice, and standardisation of CNI approaches.

2.8 Interoperability Testing

“The Private Sector and Member States should develop an industry-consensus, standardized, network-to-network testing framework to ensure that a rigorous set of tests are performed prior to interconnecting new network to existing networks.”

Stated purpose

“The reliability of the future networks can be enhanced by having an agreed upon set of tests that would be executed prior to the connection of a new network to existing networks. Since a network is only as viable as the weakest element, this testing framework will help to ensure the integrity of future networks. A standardized testing framework would ensure an expedited validation process, and reduce disputes regarding tests results. This testing framework provides a systematic and comprehensive method of validating all the various necessary operations.”

IET Comments

This recommendation is rather naïve. Interoperability testing has an important role in ensuring the proper *normal* operation of networks and often occurs on a voluntary basis. It has, however, far less importance in maintaining network integrity, as you can only test for the known, whereas failures often expose the unknown. Inter-operability testing will not find the really dangerous ‘common-mode’ failures within a single network.

IET view on recommendation 8

This recommendation is not supported.

2.9 Vigorous Ownership of Partnering Health

“European Institutions, Member States and the Private Sector should re-invent their approach to collaborating and embrace a mind-set of unilateral responsibility for the success or failure of critical public–private partnerships.”

Stated purpose

“This recommendation addresses the issue of how each party of a critical Public Private Partnership can break through the impedance that too often stifles necessary collaboration, and thus wastes opportunities to collectively advance common interests regarding network availability and robustness.”

IET Comments

If a new approach or mindset is needed, then it should be one where everyone recognises that voluntary cooperation is far more likely to succeed than governments trying to impose regulation.

IET view on recommendation 9

Whilst some 'Re-invention' may well be useful, this needs to be based around voluntary co-operation.

2.10 Discretionary European Expert Best Practices

“European Institutions and Member States should encourage the use of discretionary, industry-consensus Best Practices to promote the availability and robustness of Europe’s electronic communications networks. The Private Sector should contribute its expertise to industry Best Practice collaboration and implement the resulting Best Practices, where appropriate.”

Stated purpose

This recommendation addresses the issue of *how to ensure that the best expertise is engaged in promoting the availability and robustness* of Europe’s electronic communications infrastructures. Appreciation for the value of voluntarily- implemented, industry-consensus Best Practices comes from understanding both the nature and vital role of expertise in this sector.

IET Comments

An IET member has provided such guidance on best practice to the UK Government and this could be made available on request.

IET view on recommendation 10

This recommendation is fully supported.

3. CONCLUSION

The IET believes that much of this report is important, relevant and worthy of support. The report has clearly taken account of much good practice, drawing on relevant EU experience. However, overall, there is too much emphasis on intervention and too little on what can be better achieved by voluntary cooperation. Any regulatory intervention must be proportionate and the report does not address this. Organisations with a greater impact on the Critical National Infrastructure (CNI) need to take proportionately greater precautions. Experience in the UK suggests that a cooperative (non-regulatory) approach which links such voluntary commitment with access to important 'information exchange' resources, can produce a better result than brute force regulation. Once this is in place and actions are focussed on firms within the CNI or which serve the CNI, then the difference between the Government’s interest and firms’ own self-interest may be far smaller than some might imagine. Hence there is not always the 'market failure' frequently used to justify regulatory intervention.

IET

30 April 2007