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**ICT Future & Emerging Technologies in
FP7 – wrap up of presentations on the
Beyond the Horizon action results.**

*Check Against Delivery
Seul le texte prononcé fait foi
Es gilt das gesprochene Wort*

Presentation to the ITRE Committee, European Parliament

Brussels, 10th May 2006

Lady and gentlemen Members of the European Parliament,

Colleagues,

It is a privilege to be with you today, at the invitation of the European Parliament, for this presentation of the results of the Beyond the Horizon action.

You have been sitting listening for an hour and a half and I will try to be brief and summarise what you have heard so that it is clear in your heads before your go.

Why am I here to talk to you at the end of this session? I work at the CCLRC Rutherford Appleton Laboratory which provides the large scale research facilities that you have heard already that ICT researchers do not need, but physicists do – the world's most powerful pulsed laser beam, the world's most powerful neutron source, the world biggest something or other, and then we get to the world's biggest bandwidth on the Internet. If you give physicists something to play with they always want the biggest, or the most, or the fastest, so we end up having some of the biggest ICT to support them, and for the last 40 years we have been working a lot with companies and universities to make sure that our researchers can be first users, the first adopters, the first proving grounds for ICT developments, and that is what we continue to do. So I sit in the middle of university ICT research and corporate development as a user representative.

We need to consider how we can continue, or sustain, ICT research. ICT is a technology which all industries and commercial activities rely upon second only to whatever their speciality is; if you look at engineering: firstly they are engineers, secondly they use ICT; if you look at the City of London in finance: firstly they are finance people, secondly they use ICT; if you look at biosciences and biochemistry, firstly its pharmacology, then its ICT that is important to them. ICT dominates the whole commercial activity. In all of those areas, if Europe is going to stay ahead, it needs to stay ahead in its ICT research, because we need to innovate there in order to stay ahead in a global knowledge based economy.

For research that is really close to the market, industry can invest in what it wants to do when it is developing its own products. If they know what the market is; they know what the technology is; they can invest; and they want to, because they want the IPR; they want to address the issues of software patents, they want to address the issues of keeping the bodies who developed it in their companies so that they can keep the IPR to themselves.

Universities, at the other end of the innovation lifecycle, are very good at coming up with basic research ideas for comparatively little funding. You have heard from Michel Cosnard of the importance of ICST, not as a technology, but as a science. There is national funding for that research, and possibly ERC funding. I don't understand the detail of ERC funding, but as it is being defined it sounds like it may join national funding in this area.

How can we make the leap from what is happening in universities to what companies want to do? How do we pull those innovations through? We need a mechanism to do that. Obviously the general ICT programme is there; once things are recognised by industry, then they can be pulled by industry. But what we also have to do is drive forwards those ideas from universities. We need something that sits between the universities and the industry lead activities – and that is where the FET programme sits.

What is particularly important about that period after the basic university research is that universities encourage individual discipline work in single discipline teams. The career path in most universities – the Harvard professorial model – says "If you want to feel good, if you want to get rewards, if you want to get titles; then set up your own research group, and become the world's expert in that area; and then we will

give you a professorship, and worry about Nobel prizes and whatever else". Universities do not reward interdisciplinary research. The whole academic system doesn't. Research is usually judged by journal publication. Academics rate journals more highly that cover the scope of existing disciplines, ones in a specialist area; they won't rate highly the interdisciplinary work. But we need interdisciplinary, converging technologies to make those innovative breakthroughs that companies want. That is my view. We have heard it a few times already today, and if you look through any of the US or the Chinese (in translation in my case) funding agency's planning documents, you will see that all of them are saying – at the NIH, NSF, DARPA – they are all saying that innovative breakthroughs are going to be interdisciplinary. We need interdisciplinary work, so we need something that contrasts with the university system, before we get to the industry pull. We need that interdisciplinary support to overcome the structural barriers that exist in our current academic system.

Just as an aside – if you are going to introduce something like a European Institute of Technology, then that really needs to address these career issues; it needs to address interdisciplinary issues and it really has to address the notion of what the rewards are for the people going into it. But that is an aside arising from earlier comments.

Where FET fits into that cycle, it provides a structure to support this interdisciplinary convergence. So that basic research can converge before one gets to something that looks like an innovation that industry can pick up.

You have heard from Dimitris Plexousakis the process that was gone through - the consultation exercise for developing the topics that were chosen. You have heard from Prof Stephanidis of how ERCIM brings together expert researchers from across Europe. Expert groups who make breakthroughs are rare. We had a very nice example earlier from Prof Jähnichen from Germany of a brain computer interface. If I go around Europe asking how many other teams are working on that topic, I can think of about three – there is one in Zurich, one in Sunderland in the UK. There are not very many of them, and they are in different places, and those groups that will actually work with them – the neuroscientists that they need to work with in that example – they may not be in Berlin, they may be somewhere else, they may be in a different country. There may be some great neuroscientists in Berlin, but they might not want to do the interdisciplinary work. These groups are dispersed around Europe. We need European action to bring together these dispersed groups at a European level in order to get the critical mass that we need in order to have an impact in an area. It was a very nice video, a nice example which you can show to us – but it is one example. We need to ensure that we have some groups of people working in an area who can be seen at the conferences in Japan, in China, in the USA, that can clearly be identified as "this group in Europe who are good and they are working in this area", because we have to make the next step in the cycle – to make industry recognise what we are doing.

Whatever we are talking about in the way of budgets for FET, given whatever resolutions are made to conflicts in the FP7 proposal, it is quite limited. We are not talking about billions. Whatever the limited funding, we have got to focus it on a very few topics so that the effect is not just diluted so thinly that it doesn't have any impact. So the FET programme has to select a small number of focussed topics in order to create a critical mass to work in these areas. So how do we select those topics? Any selection is going to be criticised. Take one area: Intelligence and Cognition. Whatever I select in that area, somebody is going to say "I've got a very good research group, and I call it *intelligence*, and you've not got it in your programme, so your programme is too limited." I can go through research teams in many universities across Europe who will make that comment about whatever programme you put forward - because it's not their's. They want their work funded.

So, the process that has been gone through has been to try to get above that simplistic self interest; it is to try to look for the top down strategy, given the issues that I have raised about critical mass, of joining together groups for collaboration and so on.

It has been a lengthy process and it has come up with six strategic research areas.

Those areas lie at the innovative cusp of basic research, so that now is a very good time to invest in them. There have been some good developments at the university level but we need more investment to move them on.

We need to draw together results from different disciplines in order to have the innovations that companies can identify and take forward – so, they are interdisciplinary in the innovations that they are going to produce.

The strategic research topics are in areas where European teams have a leading edge. There are some candidate topics that were discussed where there were no European leading researchers. These strategic research topics are ones where there is existing European excellence, and that excellence can be brought together; and there is European added value because the research groups are thinly spread around Europe and we need to bring them together.

Why are we doing ICT research? We are doing this partly to build a competitive Europe. If FET, or a similar initiative under a different label, does provide support for these topics in Framework 7, then they should provide innovations that companies can develop into the products required to maintain a competitive position for Europe in the world economy. The world economy is global. The world economy is knowledge based. A competitive advantage is required by Europe where we have much higher social costs, and environmental costs than the Chinese. We are not willing to pollute the world, and if we want to build a factory in one place we are not going to use force to remove the people who happen to be living there. We have moral and ethical standards that we want to maintain. Those standards are expensive. In order to compete we have got to innovate to keep our place in a competitive knowledge based economy.

The proposed sorts of research, and the funding to support them, are necessary for Europe to be in a position in a few years time where companies will see these innovations and be able to develop them for the marketplace.

We are not just doing the research for the wealth creation. We have those ethics; we have those views about how life should be. We actually want these technologies to improve our quality of life. After the companies have made money from the research products; while the economic cycle is continuing, the European citizen, the human who votes for his MEP, is going to be better off in his quality of life.

That is why we believe that the proposals from the Beyond the Horizon plan are the right things to be done; things that need to be funded now, and things that will benefit Europe when they are funded.

That was a quick summary of what you have heard. I hope that it gets it into your head just before you go home.

Thank you.