European leadership in e-science and grids

Welcome address by Emil Broesterhuizen (Ministry of Education, Culture and Science) at the opening session of the e-IRG workshop "European leadership in e-science and grids"

Ladies and gentlemen,

The Netherlands warmly supports e-science and the research e-infrastructure. That is why the Dutch Presidency welcomes the e-Infrastructure Reflection Group for this workshop followed by a conference over the coming few days.

You are gathered here with the aim of further developing and indeed improving the e-research infrastructure. The Netherlands enthusiastically supports this effort.

From my own perspective as a policy official, I will start by briefly touching on the importance and essence of research e-infrastructure and e-science. I will then outline the relevance of these issues in relation to the science policy priorities of the Dutch government. I will also be focusing on the significance of e-science and grids with regard to the agenda of the Dutch Presidency. My conclusion will be that it is almost impossible to overstress the relevance of e-science and research e-infrastructure. Finally, I will also be touching on the position of the e-Infrastructure Reflection Group in the preparation and consultancy for the 7th Framework Programme.

Ladies and gentlemen,
The European Commission broadly defined what it means by research infrastructures in the Working Document on research infrastructures in Framework 6. These are: *"facilities that provide essential services to the research community in both academic and industrial domains"*. The Commission wants to focus exclusively on research infrastructures with a clear European dimension. This spans the entire range of scientific and technological fields, from the social sciences to astronomy, going through genomics or nano-technologies. Examples include libraries, biological resource centers, clean rooms, communication networks, synchrotrons, accelerators, telescopes etc. They may be "single-sited", "distributed" or "virtual". The distributed type includes infrastructures based on Grid-type architectures and the virtual one is being provided electronically. These, in the Commission's view, are the types of infrastructure Europe needs to focus on. As in part already under Framework 6 these ideas have in our view to be implemented in the 7th Framework programme too.

What strikes me most when these documents speak about research infrastructures, is the many references to e-infrastructure. This is hardly surprising. The infrastructure scheme of the Sixth Framework Programme already had a strong e-component. 3 out of 5 infrastructure lines in that programme could not be realised without the application of e-infrastructures.
These three lines are:

- First, trans-national access: new opportunities for research teams to obtain access to the best research infrastructures in Europe.
- The second is: integrating activities to support the integrated provision of infrastructure related services: networking, access and joint research activities.

- And the third is communication activities: to help establish the GEANT communication network and support GRID type activities.

The Sixth Framework Programme already saw considerable investments, some 300 million Euros, in GEANT and GRID. If the European Commission has its way, the strategic lines of the Sixth Framework programme will be continued in the Seventh with continued focus on e-infrastructures. The intention is to set strategic priorities through a bottom-up approach. I will be addressing this issue again later on.

Ladies and Gentlemen,

Some people refer to e-science as enhanced science. What they are referring to is doing science, not being limited by time and place and with near limitless opportunities for communication and for the remote use of equipment, libraries and data facilities. There is also a great deal of potential for communication between appliances and computers without human intervention.

E-science has the potential to greatly enhance the efficiency and productivity of science. Nevertheless, e-science is still in its early days. We are seeing a lot of promising developments in the area of grids, but there are just as many challenges ahead. One of the White Papers of this Reflection Group defines grids as "frameworks enabling coordinated resource sharing and problem solving in dynamic, multi-institutional virtual organisations". Grids designed to meet those sorts of demands will inevitably have a complex layered architecture:

- There is at first the basic <u>network layer</u>.
- Then <u>the resources layer</u>, which is designed to link up the various resources such as telescopes, computers, databases, instruments, virtual laboratories, etc.
- The <u>middleware layer</u> is designed to provide the necessary protocols for resource sharing. This involves a number of challenges such as authorisation, authentication, accounting etcetera.
- And finally there is the <u>application layer</u>. There are still many more R&D challenges where it comes to this more technical aspect of grid development.

In the area of connecting resources there is still a great deal of work to be done where it comes to issues like inter-operability, uniform data packaging and distributed computing. A number of encouraging European projects in this area (DEISA, EGEE, Diligent and several others) are conferring in The Hague this week. The Netherlands is enthusiastically participating in these initiatives.

We could also refer to further experimentation with so-called lambda connections. The use of individual optical wavelengths seems very promising for the creation of virtual private networks with excellent quality of services, and that could be very important for international research co-operation.

Ladies and Gentlemen,

The second topic I would like to cover is the significance of e-science and e-infrastructures in the light of more general science policy priorities. In the recent Science Budget, the leading policy White Paper of the Dutch government on science policy, five core priorities were formulated. I would like to mention three of those:

- focus and concentration;

- excellence and quality;

- knowledge in aid of economic development and, broader, societal issues.

These priorities also overlap with some of the main concerns of the Dutch presidency, which - by the way - have broad support within the European community. The Dutch presidency has defined the following 6 research priorities:
- excellency with a focus on basic research

- improvement of the human capital base

- cooperation in the field of research infrastructures

- the position of SMEs

- interaction between science and industry, mainly through the establishment of European technology platforms

- the possible creation of a European Research Council.

As you will gather, the success of many of these priorities depends to a large extent on the introduction and implementation of a grid infrastructure in the broadest sense. The outcome, in other words, will depend on the successful realisation of e-science. Grids and e-science will greatly improve the level of focus and concentration in science. They will enable virtual collaborations (perhaps preceding an actual local concentration). Collaboration between private companies and knowledge institutions will get an enormous impulse from researchers being able to look over each others' shoulder and collaborate on joint projects (this also goes for SMEs). Finally, the introduction of a grid structure will play an important role in facilitating the optimisation of supply and demand.

Obviously, e-science also has the potential to stimulate excellence:

- scientists will work together more intensively;
- excellence will have the opportunity to meet excellence, the world over;
- the level of efficiency achieved through e-science will free researchers from a great deal of routine tasks.

This will lead to a more effective use of the human capital base. E-science will also result in more transparent research. It goes without saying that e-science and grids can also play an important role in facilitating the Technology Platforms.

In short: grids and e-science are of strategic importance in realising most of the priorities of both our national and European science policy. That means the efforts of especially the Reflection Group are crucial to the success of our European research ambitions.

Ladies and Gentlemen,

At the start of my speech, I promised to touch on the position of the e-Infrastructure Reflection Group. This group was established in 2003 through an initiative by the Greek Presidency. It has been highly active ever since, producing a number of vital policy documents and working to create more awareness of the challenges that still lie ahead, a number of which I have just mentioned. Your objectives are in harmony with the goals of the ESFRI, the European Strategy Forum on Research Infrastructures. That is why it is so important that the Reflection Group establishes formal ties with that same ESFRI, in

order to safeguard its contribution to the 7th Framework Programme. I think it is important that the Reflection Group takes part in the establishing of the road maps for investments in research infrastructure the ESFRI has been asked to set up.

We welcome the view of the European Commission on research infrastructure in KP7, as expressed in some recent publications.

"Developing research infrastructures of European interest" appears as one of the six major objectives in the recent communication of the Commission on the future EU research policy. In this and other Commission documents, such as the Commission's communication on the financial perspectives of the European Union, the support to research infrastructures of European dimension and interest is mentioned as a key element for the European effort in research and technological development. E-infrastructures like GRIDS and research networks are mentioned explicitly.

Also the IST Advisory Group in its recent publication entitled 'Strategic Orientations for Information and Communication Technologies Research in Europe' is stressing the importance of a pan-European infrastructure based on GRID-architectures. It underlines that "it is a major priority to build a pan-European GRID-empowered e-infrastructure of production quality that will serve the concrete and actual needs of all researchers".

So there is a lot of support and a sense of urgency as well, around the e-Infrastructures Reflection Group and its objectives. It puts you in the centre of interest. You have important work to do. So I wish you a constructive and creative workshop and a similar conference.

Thank you for your attention.