**Anexa 2.6**

**Experienta Frantei si propunerile NANOPROSPECT**
**(comentarii Louis Trepied, CEA - CEA - DRT/DSP/SMR)**

**1. Present status at the national level** - no comment (specific to the Romanian situation)

a. numerous projects were accomplished and important acquisitions for performing equipment were financed, *but*:
b. there is no plan that would concentrate the research in specific domains, where there is critical mass and an interest from economy and society is obvious.
c. the lack of a strategy that would cover all the important aspects for the development of Nanotechnologies at National level is also noticed
d. the fragmentation of the financing was accompanied by the difficulty to get relevant information concerning important resources and results for the actual domain: the NANOPROSPECT Project has been trying, in a very short interval of time, to counteract this last deficiency. The NANOPROSPECT databases, http://www.imt.ro/NANOPROSPECT/databases-advanced-search (in English, open to the public) already contain almost 3000 records.

**2. Human Resources, Education** - no comment (specific to the Romanian situation)

a. demand of multidisciplinary education at different levels and interdisciplinary formation through research
b. support for young researchers, as well as for specialists who have returned from abroad after a period of study or activity
c. transparent recognition of performance
d. a difficult problem, specific to the present situation in Romania, is the *limited* involvement of the Universities in the R&D activities and in the interaction with the industry (the reform promoted by the new Law of National Education should facilitate a higher level of ambition)

**3. Infrastructure**

a. Since providing complete experimental facilities is expensive and integrating human resources takes time, the most efficient way to benefit from the new equipments is to form networks of experimental facilities, each facility working in close connection with "competence centers". – OK
b. the "networks of facilities" should provide scientific and technological services, as well as direct access –as much as possible- to equipments of the interdisciplinary research teams, Ph.D. students and innovative companies. – Yes
c. Medical (research in nanomedicine) and Computing centers should be added to the Nanotechnology experimental facilities network - There is no reason to distinguish between the different sectors where nanotechnologies apply. Nevertheless, nanomedicine is a sector in itself and the cross-fertilization between nanomedicine and other nanosectors is not straightforward, except in the field of medical imaging. On the other and, yes, computational centres need to be associated to nanotechnology development
d. In addition: long term research in networking (consortium, partnerships) as well as access to the respective European facilities may contribute to assuring an adequate support for research in nanoscience and nano technology. – Yes

**4. Interaction with industry**

a. On a lager scale, the interaction of education and research, on one side, with industry, on the other side, is essential to develop the human resources, to provide technological competitiveness, for the knowledge-based economy (in which the knowledge must *rapidly* be transformed into economic results). – Yes
b. R&D interaction with industry in nanotechnologies becomes really attractive through the interest shown by large companies, and also through creating clusters of companies that are interested in

the applications for a certain domain. It is also worthwile to establish *scientific and technological platforms* at the national level, including R&D institutions and companies. These platforms could be similar to a certain extent to the European technological platforms, but they must be more focused on certain technologies and "niches" in the application domains: this focalization is absolutely necessary for obtaining results (a large profile would only lead to the fragmentation of the activities, discrediting in fact the advantages of the "platform") – Yes. Among the specific fields an ETP should address is the nanosafety (France wishes to be active on this domain)

c. The interdisciplinary research complexity related to the nanotechnologies, and also the wide variety of application domains make the designing of "innovative ecosystems" very attractive, but they call for large amounts of resources, hard to get for the moment at a national level. However, we must note the project "Extreme Light Infrastructure" (ELI), in the final stage of approval, which should nucleate such an ecosystem, to be fully completed at the time horizon of 2020. – Yes.

d. In absence of a critical mass for the interaction with the industry, the "small-steps method" should not be overlooked; for example: cooperation with foreign companies (i.e. not yet present in Romania), or creating "spin-offs". – Yes.

**5. Risks**

a. The risks for using nanotechnologies and some nanoparticle-products cannot be avoided, even without a national R&D program for nanotechnologies. However, we must have a system. – Yes , since nanotechnologies are already on the market, whatever the maturity of the nanotechnology industry in a given country

b. When there is a study for the product toxicity, it is recommended to correlate it with the research activity in nanomedicine. – It doesn't seem to me that nanomedicine and nanotoxicology need to be systematically associated. They are two different domains having separated objectives and methods. Nevertheless in some circumstances, links between these two domains can be fruitful.

c. International cooperation in this field is mandatory. – Yes (twice!)

**6. Prospective domains**

a. A selection for the domains in which there is an active, multidisciplinary community is necessary, based on a critical mass and on competitive advantages - Yes.

b. In order to select these domains one must take into consideration the interests of large companies which are active in Romania, as well as the strategy for national development - Yes.

c. It doesn't make any sense to invest in a research that is already very advanced worldwide and where the probability to develop competitive R&D and innovation activities is low. - Yes

**7. International cooperation**

a. The international cooperation is facilitated by the performance of human resource (not only by increasing the number of publications, but also by excellence and "niche" specialization). The existence of well established research schools in basic sciences should be a favorable argument - Yes.

b. International cooperation (and especially participation to European programs) must be promoted through internal policies. We could mention here: financing potential domains/themes of interest in an European perspective, promoting "best practices", using material and moral incentives etc – Yes

c. Diaspora can play an important role by accelerating the contacts, initiating cooperation proposals, creating "twin" labs, participating in evaluation process in the country, and being involved in elaborating internal policies for the increase of competitiveness of Romanian research groups etc. – Yes