VALIDATION OF PROJECTS SUBMITTED UNDER THE BULGARIAN NATIONAL ROADMAP

FIRST DRAFT REPORT

The National Roadmap of the Republic of Bulgaria was drafted by an expert working group assigned by the Ministry of Education and Science (MES) based on the entries from national research organizations and universities.

All selected projects have been identified as important to impact on the science and technology development at national and international level, supporting new ways of doing science in Europe and the growth of the European Research Area (ERA)

New RI's (or major upgrades) in the Roadmap have different degrees of preparedness, but all of them need to find long-term commitments by a national Government (if positively validated).

1. THE RATIONALE FOR VALIDATION OF NATIONAL RESEARCH INFRASTRUCTURE NETWORKS

In the latest European documents, it was highlighted the need to create a more coherent and coordinated approach toward construction of large-scale research infrastructures, identified in the ESFRI roadmap.

Member states were invited to develop national visions, assessing strong research areas, equipped with sufficient number of human and physical potential, in parallel to cluster those that have the potential to be developed as priority national research facilities.

Furthermore, such national research infrastructures should be closely linked with the ongoing construction of the pan-European infrastructure projects, either as partner facilities or satellite nodes.

Validation and assessment of the national research infrastructure networks is an important element for the future decision-making and resource allocation.

As the Roadmap is expected to be adopted by the Council of Ministers it is crucial to provide a objective benchmarking and compatibility of national research infrastructures with the European-wide trends.

2. ACTIVITIES OF THE VALIDATION TEAM

a. To assess and advise the MES on the best procedure to support the efforts for the implementation of the national infrastructure projects;

b. Follow the general development of the EU and Global RI landscape in the filed.

c. Advise MES on the best way to stimulate the maturity of current national proposals

d. Advise MES concerning the capacity of Bulgarian teams to actively participate in the ESFRI research infrastructure projects and facilitate decision-making on official national participation

3. REVIEWED NATIONAL RESEARCH INFRATSRUCTURES:

- Infrastructure for conservation, access and *e*-preservation of artifacts
- Network "Alternative and renewable energy sources"
- Balkan Social Survey (including national component of the European Social Survey)
- Regional astronomical center for research and training
- Distributed research Infrastructure for Sustainable development of Marine research;
- Distributed infrastructure on Instrumental methods for intelligent design and characterization of advanced materials.

The validation was designed both on a remote and on the spot basis. The latter included:

- Meeting with the national coordination unit within the MES to discus the policy trend in terms of research infrastructure development and support;

- Meetings with each of the proposed research infrastructures, including oral presentations and when needed site and existing research base review;
- Drafting a preliminary conclusions on each proposal together with the MES
- Follow-up report combining individual statements on the specific research infrastructures and general recommendation on those research facilities that must be supported as a high priority and as immediate action by the national government; research infrastructures that are highly relevant to existing pan-European selected facilities; and research complexes that can be supported partly by the national funds and partly via other resources.

4. GENERAL ASSESSMENT CRITERIA

a. Quality of the consortia and uniqueness at national level;
b. Coherence with similar European networks; opportunities for added value;
c. Existing research base in the consortia partners;
d. Availability of e-infrastructure and level of utilization and networking;
e. Research potential;
f. Definition of the project aim and objectives – clearness; visibility; necessity; rationale; innovativeness; link to social and economic sectors and added value toward solving socio-economic issues; service-oriented projects; training opportunities, etc;
g. Relevance of the project objectives with the national and European documents;
h. Need for further development; construction and infrastructure development, both physical and human;
i. Visible trends for establishment of various business and educational partnerships;
j. Future-oriented approach - how such research facilities and complexes will benefit and contribute emerging research; social and economic problematic;
k. Financial visibility (5 to 7years trend);
l. Level of coordination and management

5. INDIVIDUAL ASSESSMNETS:

a. DISTRIBUTED RESEARCH INFRASTRUCTURE FOR SUSTAINABLE DEVELOPMENT OF MARINE RESEARCH

The proposal aims at establishing a coordinated action to:

- Update the available infrastructure to become competitive with the respective of the more advanced among the EU countries.
- Improve the utilization of marine resources and the protection of the marine environment in the heavily loaded Black Sea.
- Promote the cooperation with the respective organizations of EU countries and benefit by participating in European projects.
- Attract the interest for cooperation with neighboring countries.

It covers different maritime topics, a climate research, environment and pollution, natural resources, hydrodynamic techniques, naval education (civil and military), and social affairs. It includes reparation and acquisition of new vessels, building of new laboratories, new research centres and upgrade of several laboratories.

The time horizon is till 2015 (six years).

The establishment of the National Maritime Research Centre by three of the partners i.e. BSHC, IO and Naval Academy N. Vaptsarov, is expected to evolve to the Marine Environment Research Centre (MERC) to be formed jointly by all the partners of DISDEMAR. MERC is expected to serve as the manager of the whole infrastructure and coordinator of its exploitation. This is indispensable in the case of the research fleet (RF) which requires special teams and funding for the shipbuilding or ship modification, the maintenance and the manning (crews).

Similar arrangements should also apply in the cases of the Analytical Environmental and Experimental Complex (A2EC), the National Operational Marine Observing System (NOMOS) and the Bulgarian National Oceanographic Data Centre (BNODC). These entities will support the coordination and the allocation of the major scientific instruments to achieve maximum benefit at a reasonable cost, whenever the partner organizations are involved in common activities.

The list of the proposed tasks encompasses new constructions and acquisitions as well as upgrading of existing equipment. The proposed tasks are reasonable, taking into account the current state of the art nationally and across European Union.

Some attention should be paid to the human resources available for the implementation plan. **In the proposal a section should be devoted to the presentation of human resources describing the currently available personnel per partner and any additional personnel required after the upgrading. Any requirements in terms of external personnel during the implementation phase should also be stated.**

Capacity building actions should be underlined and presented in a sustainable way.

In order to support the cost estimations one or two offers by suppliers should be included in the proposal. Furthermore, there is a confusion regarding the estimated cost for each item as described in the proposal and the amounts included in the cost estimation table. The amounts at the end of the report should refer to BGN and not to Euros. Furthermore, the figure for the upgrade RV Academic in the report is 1400 K€ (2740000 BGN), on the Table 5000000 BGN. Finally, the total cost per item can not be derived on the basis of its component costs.

Thus, the total requested budget, as stated at the end of the proposal (58 861 KBGN or 30.12 M€) needs additional documentation both in terms of more detailed specifications and the associated costs for each major item. The attachment of two offers per major item would further support the requested budget.

For construction of new objects it is highly recommend that MESB require that all documents be prepared (all communal permissions, etc.) when construction of building is planed.

Following the previous comments, the idea of forming a consortium based in Varna to coordinate the upgrading of the national capacity in marine research **is well documented and reasonable, involving all the stakeholders.** The proposed consortium has the potential to accomplish the proposed investment. The establishment of centres to coordinate the resources of organizations with adjacent activities is common in the smaller countries where the size of the partner organizations doesn’t support a fully independent operation. Furthermore, even in the larger countries there is always a looser or tighter cooperation between the respective institutes in terms of exchanging information, although sometimes competition is also apparent.

The cooperation between the partners will enhance the chances to participate in an international (or European) forum, by improving the identification of the initiatives and by supporting the participation of a partner organization. **Further cooperation of the partners with relevant institutes in the neighboring countries is advised for their mutual benefit.**

The requirements for additional personnel, temporal during the implementation phase and permanent to support the upgraded activities should be described in some detail. In this respect, the tasks and activities that will be supported by the present staff should be listed. It is a question if, at the moment, enough properly educated staff is available to perform all ambitious tasks (for example, to build the Marine toxicology lab and Marine population genetics lab).**The qualifications of the additional staff and the availability of candidates to man these activities should also be declared.**

The project scope, the strategic fields of research and the particular objectives are clearly stated in the synthesis description, and the accompanying documentation (brief description and presentation of DISDEMAR, introduction of the consortium partners, table of expanding capabilities). The fulfillment of these objectives will not only cover the existing gap to the current status of the more advanced European countries, but also allow for initiating activities of interest both in the national and European environment. The latter is very important in dealing with projects of particular interest in Black Sea. Well documented proposals of this kind can quite easily find support by EU, in case the submitting organization has the potential to carry out the proposal. The participation in European networks is beneficial. **However, the participation in funded competitive research projects will greatly support the upgrading strategy and improve the state of the art of the partner organizations.**

It is very much recommend that a priority setting of tasks under the DISDEMAR project is provided. At the moment, there is no clear and sustainable managing structure of the project.

The coordinators of networks (consortia) are not assigned. Due the fact that this is large project, at least a scientific committee and a steering committee should be set. Members of committees must come from partners, MESB, from potential users, (industry, however, it is not necessary that they participate in project financially), and from abroad. Each subtask should have a manager, who is responsible for managing of the project part. (In the proposals only contact persons are assigned.) Deadlines and reporting hierarchy must be set before the project starts. The scientific committee and steering committee must confirm eventual delays and changing of priorities. It is to recommend that an intellectual property management is

included into project proposal (who are owners on new knowledge, for example patents, who can publish results, etc.)

In general, the budget in the presented proposals is not adequately described. The MESB should require a detailed breakdown of the budget.

The time scope of 2015 is sufficient.

Finally, environmental issues and their impact on the commercial activities and the quality of life of the seaside and riverside area emerge to major priorities of all International and European Organizations. Thus, any investment on theses issues will certainly have positive social and economic impact on the country.

b. INFRASTRUCTURE FOR CONSERVATION, ACCESS AND *E*-PRESERVATION OF ARTIFACTS

The project team consists of 7 institutions from museum (3), research (2) and teaching (2) areas, indicated below with appellatives P1 – P7:

- P1 – National Institute of Archaeology with Museum (NIAM-BAS) – the leading institution,
- P2 – National Museum of History (NMH),
- P3 – "St. Clement of Ochrid" Sofia University (SU),
- P4 – National Academy of Arts (NAA),
- P5 – "Prof. Alexander Fol" Center of Thracology (CT-BAS),
- P6 – Institute of Organic Chemistry with Center of Phytochemistry (IOCCP-BAS),
- P7 – National Institute of Ethnography with Museum (NIEM-BAS).

The evaluators assigned to this project visited three consortium members:

- P1 – National Institute of Archaeology with Museum (NIAM-BAS) – the leading institution,
- P2 – National Museum of History (NMH) and
- P6 – Institute of Organic Chemistry with Center of Phytochemistry (IOCCP-BAS).

Visits were focused on laboratories and facilities for conservation – restoration (P1, P2) and dating (P6).

The hosts presented existing infrastructure and achievements based on it, also the need for modern equipment and building improvements. It was also stated that a new building to house the laboratory of NIAM-BAS has been completed recently.

The project as a whole was presented by Dr. Lyudmil Vagalinski – the project Chief Coordinator, Deputy Director of P1 – NIAM-BAS.

Prof.Dr. Ivelin Kuleff presented activity related to cultural heritage in P3 – SU, underscoring the archaeometry program.

The evaluators had extensive discussions with:
- Dr. Kalin Dimitrov – Deputy Coordinator, from P5 – CT-BAS,
- Ms. Svetla Tsaneva – expert coordinator, also other members of Central Laboratory for Conservation and Restoration from P2 – NMH,
- Members of Laboratory for Conservation and Restoration from P1 – NIAM-BAS,
- Prof. Dr. Valeria Fol – expert coordinator from P5 – CT-BAS.

The evaluators were received by the top management from P2 and P6 and noticed the good will for the project implementation and cooperation among partners.

The project coordinators supplied the evaluators with the detailed budgets per partner, translated in English, which were not included in the original documentation sent by the Ministry of Education and Science. Only after studying the budget were the evaluators in a position to assess the complexity and comprehensiveness of the project.

Institutions taking part in the consortium have an excellence in their working area and a national significance:
- museums and teaching institutions have laboratories for conservation-restoration and traditions in using them (P1, P2, P3, P4, P7);
- teaching institutions have educational programs dedicated to diagnostics, conservation-restoration (P3, P4);
-R&D institutions have projects related to history, archaeology or cultural heritage (P3, P5, P6).

Some of the consortium members have prior experience in joint projects and important external relations and are partners in international projects.

NOTE: The 7th partner P7 – was evaluated from project document only. Nobody from this institution was present. P7 's budget and break down into expenses per year is incorporated in the NIAM-BAS budget. It should be further explained the reason behind this issue in order to avoid any sleeping partners within the consortia.

The project areas as they are mentioned in the project title may be divided in:
Diagnostics is an activity proper for distributed infrastructure and consequently proper for networking. Different analytical tests could be performed in different institutions without losing coherence.
For choosing the institution where the equipment is better used, some other particularities may be considered: analytical equipment is usually expensive, complex and its proper utilization requires training and takes time. A convenient knowledge level is difficult to be maintained if the analytical technique is not practiced enough. A place where such equipment is efficiently used is a higher education institution: placing equipment in a university is a warranty for its constant using – specialists will continuously be available (mobility is less among university teachers); the specific knowledge will continuously be transmitted, because basically a university is a methodological focal point with dissemination through normal class, PhD, post-doc programs;
Conservation and Restoration are activities that must be developed in institutions of national importance. Sometimes it is important to be unique, so that the institution does not have unexpected fluctuations in funding or other functional aspects (an example: for a museum / repository / library, lack of electric current during winter could be deadly).

The awareness and the care for cultural heritage is a constant trend in Europe and all over the world. The devoted section of the project broadly exemplifies the related European official documents Cultural Heritage.
European R&D projects, project frame and networks are specifically mentioned in the project, also recent European meetings. The project provides the opportunity for sustaining these networks.
Some important web sites are indicated.

Web sites of project partners are missing. The level of e-technology in general is low. Project coordinators are aware of this and, indeed, development of an e-infrastructure is one of the aims of the project. **However, it is not very clear how this will be implemented. Although**

for the other modules of the project detailed technical information is given, this section is rather vague.

NOTE: A point that has to be corrected in the final version of the project description is the reference to the three level approach to accessibility: It is obvious that the levels are not geographical (national- regional- European) but functional (general/ educational- scientific).

The CVs of the team members indicate that they are experts in their respective fields, sufficiently qualified and with a long experience in their institutions. It is expected that new employees will be recruited as part of the training module. **It is highly recommended that a section explaining the recruitment of young scientists is clearly described and that the consortia ensures a sufficient flow of new generation of researchers.**

The project consists of a combination of a leading infrastructure element and a secondary research element, both with specific reference to diagnostics, conservation and restoration of metal artifacts.

Following a detailed description of the existing infrastructure of the partners and of their scientific and technical staff, the project lays out the aims of the proposal. The targets are clearly defined into components (diagnostics, conservation and restoration) that will be served and further enhanced with the help of new equipment, mobile field laboratories, a modern e-infrastructure, education and training and research.

It is a comprehensive and well defined project with clearly set objectives.

The Table "Supplies" gives a very detailed description of the equipment to be purchased for the project, and each partner's budget indicates where the equipment will be situated. **However, the locality of the central server, the layout and technical specifications of the e-infrastructure need to be further elaborated.**

The project gives a comprehensive enumeration of the services to be provided to third parties as a result of the modernization process and specifies the types of 'custumers' who will employ the services of the modernized laboratories. There is a clear implication here that the laboratories will eventually derive profit from such services.

<u>Relevance of the project objectives with the national and European documents</u>

Unity in diversity:

a) the project proposes the improvement of the infrastructure distributed at partners from museum, also research and teaching areas; dissemination – other aspect included in European R&D philosophy, is an intrinsic task of museums; one member of the consortium, the Center of Thrachology, is a research center in the domain of humanities and the publisher of Orpheus – Journal of Indo-European and Thracian Studies;
b) the reason of infrastructure improvement is coherent – cultural heritage oriented, also diverted – conservation and restoration of artifacts for history, archaeology, ethnography.

Cultural heritage: a social need also a trend in EU

In P1 and P2 there are 500,000 metal artifacts, most of them waiting to be studied and treated. In the same time the 270 Bulgarian active archaeological sites yield over 5,000 metal pieces yearly, an output that requires the services of an enlarged and well- equipped network of specialized laboratories.

EU philosophy approves and supports any cultural heritage approach underscoring diversity of the member states.

Need for further development; construction and infrastructure development, both physical and human

It is evident that the wealth of artifacts yielded by older and recent excavations; the need to assist other services (other museums, Internal Affairs and Prosecution, industry and ecology); and education require an investment in the type of infrastructure proposed in this project. Upgrading the existing material infrastructure and hiring and training additional personnel are key elements of the project. Bulgarian archaeology and culture in general will derive a lasting benefit from this investment, since, acording to the financial analysis, the infrastructure will be in place and operational, from the early stages of the project until many years after its end.

The financial analysis is sound, since it provides for the largest part of the funding during the first year, for the purchase of equipment, and spreads out training over the entire 5-year period of the project.

Besides, the modernization of the laboratories (equipment upgrading and building improvements), the education and training of existing and new personnel will enable Bulgarian institutions to increase the quantity and level of their research output and to further develop their international networks and cooperations.

Financial visibility (5 to 7 years trend)

The project is previewed for 5 years which is a time interval long enough to appear good results.

Most of the money is required in the first year when equipment will be procured. It should be secured that one year is enough time to deliver a large number of equipment. It could be a challenge and our advice is to enlarge the work for delivery of new instruments to two years.

Furthermore, it should be advisable that in parallel with the acquisition of the equipment, the project partners start with remuneration of new staff and training of the existing experienced and young researchers, as the capacity development for future work on new instrumentation is crucial.

NOTE: The financial plan of P7 is included in the budget for NIAM-BAS as it includes only salaries and travel costs for personnel and no equipment.

Level of coordination and management

1 – Good premise for efficient results

Archaeological activity in Bulgaria is organized and decisions are taken in a centralized manner by P1 – NIAM-BAS – the institution that will coordinate the project.

NOTE 1: Part of archaeological work at the country level is performed by institutions taking part in this project. Other archaeological sites are under the jurisdiction of regional museums, also state supported. ***The project does not mention what will happen with archaeological artifacts found by these regional museums. To prevent the case of 2 state-supported institutions with the same profile, paying one to another a conservation-restoration treatment from budgetary funds, maybe a Memorandum of Understanding at national level is necessary.***

NOTE 2: The IOCCP- BAS, the NMH and SU have included in their budgets sums for building improvements and/or construction. Although the relevant tables were not supplied by the Ministry with the other documentation, it is clear that detailed provisions exist. **The question that needs to be solved on the planning level is whether delays in construction will affect the purchase and installation of equipment in the labs.**

2 – Level of coordination

- The project coherence is assured by the following measures:

a) the project is conducted by 2 peoples at a central level (chief and deputy coordinators) and by representatives of each partner (expert-coordinators);

b) Dr. Lyudmil Vagalinski – the project Chief Coordinator has experience in administration and is working with P1 – the leading institution;
c) from the financial point of view coordination will be assured by chief accountants of the team members.
NOTE 1: It is highly recommendable that a Management board is set including members not only form the consortia, but also from other stakeholders and from abroad.

Because a project devoted to infrastructure improvement will have as added value new modern equipment and ability of its utilization, it is useful to be considered at the **implementation phase some coordination activities connected to knowledge improvement and dissemination.**
Moreover, although the project contains an inventory of existing equipment per partner and the detailed budget clearly states which partner will acquire what piece of equipment, what is **missing is a clear picture of how coordination and sharing will work in practice. The evaluators were nevertheless assured that all practicalities are provided for in a MoU.**

NOTE: A even more coherent policy could be constructed if the entities from the chain *Archaeological activity – Conservation/restoration – Museum*, would have the same "national administrator" (BAS, Ministry of Culture?, R&D Ministry?). The National administrator supposes to have important responsibilities mentioned in MoU, for instance it should decide treatment priority of archaeological findings at national level, how and where to use the mobile labs et al.
Management
The management previewed 3 important measures for the implementation phase:
-external financial audit;
-legal consultant for purchasing activities;
-technical consultants for building improvements.

When asked by the evaluators what will happen if the budget is reduced by the Ministry, they were assured that there is an understanding that the budget will be proportionately reduced at partner level. There is an understanding on this among the partners.

NOTE: As in any large project extended over several years, it is wise to have backup plans (scenarios) for the case of insufficient funding or a financing rhythm other than previewed.

During the evaluation process the reviewers expressed thoughts and advice for both partners and Ministry management. They are assembled in the SWOT matrix (strengths - weaknesses - opportunities - threatening) below.

Strengths	**Weaknesses**
- The project is focussed on cultural heritage – a sensitive area and one of great concern in the European Union. - The project is complex and includes team members specialised in all activity types, a regular project is supposed to have: technical (diagnostics, conservation and restoration), research, training and dissemination. - *Characterization* (diagnostics), *conservation* and *restoration* of cultural heritage artifacts are 3 aspects of the same problem. It is correct and most efficient to consider them all together. The project has a balanced approach to all these three components. - Some expensive equipment (like SEM microscope, endoscope) could be used also for characterization of other material types – wood, leather, stone et al. The project justly highlights this possibility. - The project also mentions the possibility of using the modernized laobratories for additional paid services for private of public institutions. - At the project end each team partner or the team as an entity will have enough technical expertise and equipment to participate in European projects. This will be a lasting benefit for Bulgaria.	- Most expensive equipment is devoted to characterization. To use it only for diagnostics, or more specifically for metal items diagnostics, means (most probably) accepting a low rate of utilization. **An improved solution might be to use it also for teaching and research.** - Evaluators had not the access to alternative or back-up plans in case the funding will not be available at the desired level, at the desired rhythm or it will be interrupted. - The interdependency between partners as to sharing equipment and expertise is assured according to the project. What is not clear is how this interdependency between departments will operate in practice (prioritizing etc) - The e-infrastructure module will require further elaboration and possibly a transfer of resources from one partner to another. The rationale behind the establishment of the server at the CT, whereas the ICT experts are employed by the NMH, is not clear.
Opportunities	**Threats**
- Bulgaria seems to have a very useful	- The proposed purchasing rhythm is very high

achievement: analysts and archaelogists are able to work together because they speak a common language, are able to built common plans and mutually know eachother's limits. This is due to the fact that a master program in archaeometry is organized by one of the project partners. - The previewed modern, good quality infrastructure, though situated in Sofia institutions, will have enough working space for all the country's needs. However, beyond the project itself, a Memorandum of Understanding between all museums in the country should establish access by all to this new infrastructure. Besides the use of the new equipment for teaching and research purposes could be encouraged. A provision for understandings with University departments and Research Institutes across the country for this purpose will add value to the project.	(most pieces of equipment supposed to be acquired in the first year). On the contrary the knowledge acquisition seems to be more relaxed. If there is no balance between the two actions, there is the risk to not know to establish the proper order: needed technical specification and/or spare parts. - In neibouring countries there is either an inflation of C14 dating centers (Italy), or an experience one is in function (Greece). Romania decided to build a multipurpose C14 center equipped for environmental, medical and archaeometric tests. In these conditions the Bulgarian dating center will have to survive only from internal demands because it has a small probability to receive orders from abroad.

Conclusion

The evaluators believe that the project is comprehensive and sound in all aspects –scientific, technical, financial and managerial. The evaluators also observed a strong determination on the part of all partners to collaborate in order to make a success of the project, for the benefit of the cause of cultural heritage in Bulgaria. The comments included in this report only aim at further enhancing its effectiveness.

c. INSTRUMENTAL METHODS FOR INTELLIGENT DESIGN AND CHARACTERISITION OF ADVANCED MATERIALS (IMIDCAM)

This proposal has for goals to create a distributed research infrastructure for Intelligent Design and Characterization of Advanced Materials. It will be done by selecting instrumentation and experts from seven laboratories from the Bulgarian Academy of Sciences:

- IPC-BAS (Institute of Physical Chemistry)
- IGIC-BAS (Institute of General and Inorganic Chemistry)
- IC-BAS (Institute of Catalysis)
- IEES-BAS (Institute of Electrochemistry and Energy)
- IOCCP-BAS (Institute of Organic Chemistry with Center for Phytochemistry)
- IP-BAS (Institute of Polymers)
- CLAPHOP (Central Laboratory for Photoprocesses)

and laboratories from two Sofia Universities:

- FCSU (Chemical Faculty)
- FPSU (Physical Faculty)
- UCTM (Laboratory for Advanced Materials-University for Chemical Technology and Metallurgy)

Each unit in this structure provides a complete set up for instrumental investigations by combining the newest facilities of the specific kind acquired by the project partner institutions. In addition the experts involved in the activities of each unit of the infrastructure are mostly scientists with curricula showing international career development, publications in high-standard journals and high impact. The instrumental units provide a full set of experimental approaches for characterizing of solid and soft materials from atomic, molecular, structural, electrochemical, thermal, physical and physical-mechanical point of view. Each unit incorporates the newest equipment available within the partner institutions and combines complimentary methods necessary for complex characterization of various types of advanced materials.

It is clear that these ten units have a large pool of equipment and staff: there are 665 people in the seven laboratories of the Academy alone! A small fraction will be participating in IMIDCAM. There will be 52 experts from the various laboratories: 4 in Elemental Analysis, 15 in Molecular Spectroscopy, 3 in Chromatography and Mass Spectroscopy, 11 in Structure and Surface Analysis, 7 in Electrochemical Methods, 6 in Thermal Analysis and 6 in Measurements of Physical Properties. Experts will devote a maximum of 30% of their time to the project. They will be seconded by 52 operators (10 technical operators, 20 PHD students, 22 young researchers and post-docs) spending 50% of their time on the project.

II- AIMS OF THE PROJECT

IMIDCAM will help overcoming the problem of fragmentation in the Bulgarian research institutions with similar profile by putting in a single infrastructure their complementary

equipments and specific expertise that build altogether a complex modern system for characterization of advanced materials in support of their design and development. Exist research base in the consortia partners.

The IMIDCAM concrete aims are already included in the title:

- Integrating the available large scale facilities and unique equipment necessary for extensive characterization of new materials.
- Achieving a new quality of research investigation of these materials by combining and concentrating high level expertise and modern material resources.
- Providing open access to the DRIF for scientists belonging to the partner institutions.
- Making available open access to the DRIF for all researchers and industrial users at both national and regional levels.

The materials which will be supported by IMIDCAM include:

- Key materials for technology (six projects)
- Materials for energy conversion (four projects)
- Materials for biomedical applications (six projects)
- Materials for environmental protection (four projects)

Some of the already identified new trends in the development of advanced materials are:

- Investigation on design, preparation and photophysical characterization of monolayer protected clusters of noble metals modified with new specifically chosen organic fluorophores.
- Preparation of nanostructured transparent ceramics as a new tunable laser media
- Studies on nanoscale effects in layered oxides as a new approach to engineering of thermoelectric oxide materials.

The total budget necessary is 1O.385 MBGN (direct costs): 3.576 for personnel, 0.958 for maintenance and 5.850 for the upgrade.

The coordination of the activities of IMIDCAM will be implemented by a management board composed of the coordinator (V. Tsakova-IPC-BAS), three deputy coordinators (E.Zhecheva-IGIC-BAS, I. Timcheva-IOCCP-BAS and T. Spassov-FCSU) and eight managers of each instrumental unit (12 people in total).

COMMENTS AND RECOMMENDATIONS

- The first question that we have to answer is the following: is IMIDCAM a Research Infrastructure that should go on the Bulgarian Road Map? We would say yes for the following reasons:

- It allows the creation of a network of national research units with well-defined research objectives and opportunity for broad open access by scientists
- It is of national interest
- It should enable the recruitment of 20 students and 22 young researchers and post-docs.
- It is a first step for a possible integration in a European network.

- It will be a very difficult task because it is supposed to create a new structure in middle of big existing laboratories: who will define the priority to use specific equipment? The most important tool is flexibility. In the last 25 years, most of the new materials (high Tc superconductors, fullerenes, nanotubes, materials for giant magnetoresistance, new FeAs superconductors….) have been discovered by small groups!

- There are about 24 different projects of research: this is, from our point of view, too much for 15.6 (52x0.3) experts and 26 (52x0.5) operators. The consortia should set some priorities, with goals for every year.

- As a RI, IMIDCAM has to offer:

- Open access for measurements of physical, chemical and functional properties of specimens produced within institutions, partners of IMIDCAM, or within other national, regional or industrial research organizations.
- Education and practical training for bachelor, master and PHD students.
- Training specialists for mastering specific instrumental methods.

The time devoted to these activities should be specified: 10, 20%?

Who will be doing that: the experts or the operators?

- Relations with Industry

The sentences in the document are too vague; any commitment from companies should be provided.

- Personnel

It was surprising to see that there are only four young researchers among the 52 experts!
The evaluators appreciate the 42 positions for PHD students, young researchers and post-docs but we don't see any positions for engineers: however they are very important for sophisticated equipment and development.
Concerning the administrative staff, it should be re-discussed among the partners how to optimise the structure of this item. We acknowledge that the proposed research infrastructure is a distributed one and that the involved partners are coming from different entities, each with separate administrative tasks, however in case of laboratories from the Bulgarian Academy of Sciences it could be considered to assign jointly this type of staff. Moreover, parts of these institutions are located in one building.

- Management

In order to organize and implement the activities of IMIDCAM a management (MG) unit will be built. One full time occupied technical assistant and half-time occupied financial and legal officer will be appointed by the project. The MG unit will:
• organize the activities and coordinate the technical management of individual units
• link together all project components
• monitor the project implementation according to the indicative schedule
• ensure the distribution of financial resources and the administrative management of the project.
Annual external financial audit on the costs incurred through the project IMIDCAM is foreseen for all participating institutions. The audit will be organized by the management unit.
The project proposes a management board with 12 people (the coordinator, the three deputy and eight managers), however it should be stated how the consortia will deal with situations of conflict and who will take the final decisions?
For a RI of such tipe, one needs a finance committee (with some members from outside) and a scientific committee (with some international members) that meet once a year.

- Resources

When visiting the various laboratories, one can see very modern equipment like the 600 MHz for the NMR but also very outdated one, like the XPS. We found that the proposed budget for the upgrade is justified. Of course, the financial resources should follow flexible procedure for re-allocation, if needed, in order to secure that the budget is properly spent and that in case that some new items emerge during the implementation of the project, the consortia will be able to meet them.
We have the impression that some laboratories presented have a scientific production that does not correspond to the large number of personnel that they have, which means that some people are not very productive. It should be warranted that the composition on consortia is balanced and provide opportunities for creation of dynamic research group able to work on top-class research agendas.

In the document that we received, there is (page 8) the following sentence" *To our knowledge there are no open access infrastructures offering instrumental methods for design and characterization of advanced materials in the region"* can be seen To our knowledge, Bulgarian scientists can have access to all the synchrotron and neutron centers in Europe and if their proposal is accepted, the travel and the lodging are paid by an EU programme.

d. REGIONAL ASTRONOMICAL CENTER FOR RESEARCH AND EDUCATION (RACIO)

The proposed Research Infrastructure (RACIO) is bringing together the leading astronomical research and education facilities in Bulgaria: the Institute of Astronomy (IA) of the Bulgarian Academy of Sciences that runs the National Astronomical Observatory (NAO) at Rozhen and the Astronomical Observatory in Belogradchik (AOB), the Department of Astronomy of Sofia University "St Kliment Ohridiski" (SU) and the Astronomical Center of the Shumen University) -"Konstantin Preslavski."(ShU).

During the first meeting at the ministry, on Monday May 18, we received a document giving all the necessary information about RACIO (except for the publications list but we received this during the visit at the Astronomical Observatory of Sofia).
Our visit started on Monday 21st,at the Sofia Observatory where we were given some short presentations on:

- the Academy at NAO and AOB (36 Research Associates, 15 Astronomers, 12 Auxiliary staff including six Technicians, two Engineers and four Ph.D students) and the project RACIO by T. Bonev.

- the Department of Astronomy of SU (four Assoc. Profs, five Assist. Profs, four Research and Technical assistants and five Ph.D students) and RACIO by V. Golev.
- the Astrocenter at ShU (one Professor, two Assoc.Profs, two Assist.Profs, one Ph.D student) and RACIO by D. Kyurkchieva
-

This was followed by a round table discussion including scientists from the Academy and the Universities: K. Panov, R. Konstantinova-Antova, G. Petrov, G. Borisov, L Slavcheva-Mihova, A. Antonova, A. Strigachev….

Around 1PM, we left Sofia (with T. Bonev) for NAO Rhozen. Most of the research in Bulgaria is made at this site; the others are used for teaching and training, meetings and schools.

We started discussions with the astronomers at the observatory (E. Semkov, I. Iliev, N. Tomov and N. Petrov) and we had a visit of the four telescopes, with a demonstration on the coronograph, the only one that can work during the day. We came back after diner to the three other telescopes and we had the opportunity to hold discussions with very enthusiastic students and assistant professors (until 1.30 AM).

The main telescope of NAO - Rozhen is a two-meter reflector (recently re-coated) with an optical system Ritchey-Chretien-Coudé, made by Carl Zeiss, Jena. This is still the biggest telescope in South-East Europe (there is a 2.3 m one in Greece but, for the moment, it has not reached the expected results). It is equipped with a dual channel focal reducer (F/2.8), CCD Photometrics (1024x1024, px = 24µm) and CCD VersArray 1330B (1340x1300, px =24 µm). Both CCD cameras are nitrogen cooled. UNESCO-ROSTE has sponsored the second CCD camera has been sponsored for NAO- Rozhen. In the Ritchey - focus (F/8) direct frames could be obtained with limiting stellar magnitude 22m. In the Coudé - focus (F/36) spectra can be obtained with three different cameras: 18Å/mm, 9 Å /mm and 4 Å /mm. The spectral resolution is ~ 30000.
The second NAO-Rozhen telescope is a dedicated photometric telescope, 0.6 m Cassegrain. It is equipped with a USB, photon-counting, single-channel, computer-controlled photometer.
The NAO-Rozhen third telescope is a 50/70 cm Schmidt telescope for wide-field observations. This telescope is equipped with an SBIG ST8 CCD camera.
In 2005, a new 15 cm solar coronagraph was built and mounted in the solar dome of NAO. With this coronagraph, a new program of monitoring of the solar corona has started.

The actual fields of research are:

- the sun
- the solar system
- non-stationary stars
- chemically peculiar stars
- stellar atmospheres and envelopes
- stellar clusters and galaxies

There are many European collaborations including observatories or laboratories from, Germany, France, Italy, Finland, Norway, Belgium, Poland, Czech- Republic, Slovakia, Austria, etc.

Over the last years, there has been a strong development of the regional collaborations and a Sub-Regional European Committee (SREAC) with the participation of: Bulgaria, Greece, Macedonia, Romania, Serbia and MN, Turkey and Ukraine has been established. Two major scientific projects of SREAC have been supported by UNESCO_ROSTE. NAO-Rozhen is recognized as a regional center for astronomical research.

RACIO has a well developed local e-infrastructure. It will be connected to the rest of the world by integrating NAO into the Bulgarian Research and Educational Network which is the regional component of GEANT. RACIO will also use European e-infrastructures such as the AstroGrid (UK), the AstroGrid-D (Germany) etc., following the European Virtual Observatory initiatives. In addition, through a Bulgarian VO portal its control systems, observational data gathering and generated data bases will be designed using the most suitable VO standards with the aim to facilitate the open access to the European astronomical community. RACIO will be a part of the already existing grid e-infrastructure, the Bulgarian Grid Consortium. In fact, the RACIO partners are already members of this national grid initiative.

Finally, Bulgaria has been recognized as an associated member of ASTRONET (created by a group of European funding agencies in order to establish a comprehensive long-term planning for the development of European Astronomy).

II. COMMENTS AND RECOMMENDATIONS

This is the situation today. However, to continue to be competitive at national and international levels, the Bulgarian installations need a serious upgrade. The problem is rather simple: either Bulgaria is willing to be active in the field of Astronomy and Astrophysics or it moves out of the field.

We are completely in favour of an upgrade for the following reasons:

- It is a booming field, due to the possibility of having telescopes in all parts of the spectrum (γ- Rays, X-rays, Visible, Infra-red, mm waves) that produce complementary information in addition to the development of satellites and space telescopes.
- In almost all the countries, the number of science students is decreasing except in astronomy.
- It is a field that easily attracts the curiosity of the public
- In the region (Turkey, Bulgaria, Macedonia, Serbia, Romania and Greece) there is only one 2m telescope in operation and that means that Bulgaria can play an important role in South-Eastern Europe.
- There is very good collaboration between the groups of the Academy and the Universities which is not too common in Bulgaria (from what I have seen)
- The actual scientific production is good, especially with limited means.

What are the objectives of RACIO five years program?

- A new control system for the existing telescopes (0.75 M€).
- An echelle spectrograph (with a resolution of 45000) which will place the Rozhen Observatory at the forefront of astronomical spectroscopy (0.84 M€).
- A pair of 1.2 m Richey-Chrétien reflectors with the auxiliary instrumentation and robotization (+ the dome): this will allow scheduled scientific programmes like the robotelescope pair in in Potsdam or in Canarias (1.944+1.2 M€) to be performed.
- A renovation of some of the buildings (0.9 M€).)

This should seriously broaden the existing research topics and could be:

- Quantitative spectroscopy of hot massive stars
- Mass and radiation transfer in stellar atmospheres. Chemical evolution of the Galaxy
- Research on weakly studied and new eclipsing binary stars with oscillating components
- Activity and magnetic fields of very low-mass stars and brown dwarfs
- Activity in late type giants stars

- Extra solar planetary systems
- Astroseismology-non radial stellar pulsations
- Photometric, spectral and polarimetric study of the Solar system bodies
- Observations of Near Earth Objects
- Spectral Observations of W UMA type stars
- Spectral observations of cataclysmic stars

It is clear that RACIO will allow a much better integration of the Bulgarian telescopes in the European networks. In addition, it could be a valuable member of the European transnational access program OPTICON.

We have been asked to answer the following points:

- *Is RACIO a Research Infrastructure (RI)?*

  The answer is clearly yes. It presents obviously a national interest. It will be available to the full community in Bulgaria. It has a long-term plan with defined research objectives.

  Clearly, it should be on the Bulgarian roadmap

- *Categorization of RIs according to their significance:*

  It is a facility, built by Bulgaria, providing broad access to all scientists of national level but could be a unique facility in South-Eastern part of Europe

- *State of the art of the research infrastructures in Bulgaria*

  RACIO is mostly based on the Rozhen site but, on a smaller scale, some upgrade will be made in Sofia and in Shoumen, to enable the remote access to the modernized telescopes in NAO. Today, the facility is running well: the upgrade should not be a major problem (the competences exist) at the condition of a strong increase of the number of engineers, young researchers and assistant professors.

- *Common Objectives*

  RACIO is bringing together the leading astronomical research and education facilities in Bulgaria: the Institute of Astronomy (IA) of the Bulgarian Academy of Sciences that runs the National Astronomical Observatory (NAO) at Rozhen and the Astronomical Observatory in Belogradchik (AOB), the Department of Astronomy of Sofia University" St Kliment Ohridiski" (SU) and the Astronomical Center of the Shumen University) -"Konstantin Preslavski."(ShU).

Budget

Technologically, the implementation of RACIO involves the renewal and rehabilitation of the existing astronomical facilities in Bulgaria, and the construction of completely new components. The renewal and rehabilitation represents modernization of the control systems of the available telescopes. The planned new components are: (1) construction, manufacturing and commissioning of an echelon spectrograph for the 2-meter telescope and (2) purchasing of a two 1.2 m remote-controlled (in perspective robotic) telescopes (estimated cost 900 000 EU each) that will operate in fully unattented mode as a pair of robo-telescopes deciding about the best observing strategy on the fly. The single building (144 000 Euro) which will host them will also be automated.

The realization of step (1) will increase the usage effectiveness the 2-meter telescope and its reliability. The design of new control systems for the telescopes (750 000 EU) has already a pan-European character – by default, according to the legal regulations, it will be implemented after an open tender on European level. The thus acquired knowledge and skills will be a prerequisite for the future technological development of RACIO. The estimated costs for the echelon spectrograph are 840 000 EU.

Another important part of the RATIO plan is the building of a new observational facility on the territory of the NAO Rozhen. Preliminary design studies have shown that most suitable for the purpose is a pair of 1.2-meter Ritchey-Chrétien reflectors with corresponding auxiliary instrumentation at all four available Nesmith foci. The estimated costs of this auxiliary instrumentation and automation is approximately 1 200 000 EU.

The total construction cost is of the order 5.634 M€ and we believe that it is reasonable.

The operational costs over the next five years will be 6 M€.

This is an ambitious program, with a substantial increase of the running costs: this includes the salary for about 20 people. *Those 20 people are absolutely necessary because the actual distribution of personnel is completely unbalanced: there are only two engineers and six technicians!* The number of engineers should be multipled by four and the other positions should be used for technicians, young researchers and Ph.D students.

If Management is able to get the budget for the robo-telescopes, it should consider the possibilty of shutting down one (or two) of the existing telescopes.

The proposed management structure is fine but it should include a finance committee (with external members) and a scientific committee (including foreign members), as it is usual in a RI: they should meet once a year.

e. ALTERNATIVE AND RENEWABLE ENERGY SOURCES

The organizations that are partners in the network

1. Central Laboratory of Solar Energy and New Energy Sources at the Bulgarian Academy Sciences (CL SENES – BAS) – Photovoltaic and Photo-thermal conversion
2. Technical University Sofia – Wind energy, Energy efficiency, thermal pumps and hydro-energy
3. Institute of Electrochemistry and Energy Systems at the Bulgarian Academy Sciences (IEES-BAS) – Hydrogen energy and fuel cells
4. Black Sea Regional Energy Centre (BSREC) – Strategy for decentralized electricity production

When presenting the role and responsibilities of the partners, the evaluation team gets an impression of large separation approach, each group presenting its own research and interests. Some of the presentations do not provide any information on how their research teams will contribute to the overall project proposal implementation, rather just presenting current research activities and advancements.

It should be secured an integrated line, thus ensuring a coordination of tasks and respectively smooth project running.

The project is clearly made up of partners working on complementary but absolutely different topics under the umbrella of the renewable energy sources and energy efficiency. This can be noticed in the weak formulation of the coordination and management activities.

However, all proposed activities converge to a very clear target, concerned with development of RES & EE by promoting R&D capacities in Bulgaria.

Most of the partners show a very intense activity in terms of training, dissemination and service-oriented projects, mainly dealing with certification of commercial equipments or establishment of official certification procedures.

A further effort should be done in terms of improving the coordination among the partners in order to increase the efficiency of this investment.

The consortia partners were involved in different European networks. The specific objectives are: to create methods for monitoring and assessment, to find ways and instruments for their realization and to set premises for a national action plan in the field of renewable energy sources to be made in accordance with the suggested EU directives.

The scientific infrastructure of RES partners is continuously renovated during the last 10 years and specialized equipment was supplied through projects supported by international and national programs. In the last three years, some of the laboratories acquired modern research infrastructure, as modern spectrometers, which could substitute the outdated units, necessary for the investigation carried out. **We consider that for the RES project the existent infrastructure is not sufficient for achieving the proposed goals. Not even the equipments proposed for purchase will change the odds, as some of them require special functioning facilities which are not available to any of the consortium partners.**

The research teams have experienced personnel, with many senior researchers and specialists, but no young students or researchers are involved. Indeed, the research teams from all of the partners consist of highly experienced researchers and specialists, but all of them are of a established scientists, and very few young researchers or PhD students have been proposed as team members. **In our opinion, young researchers should be the main beneficiaries from investments in equipments and infrastructure, as they are the ones who will continue and promote research. Even the training within the project is generally for advanced specialists.**

The definition of the aims and objectives is clear, rationale and innovative and provides potential for added value toward solving socio-economic issues, service-oriented projects and training opportunities.
One of the first aims of the project is to develop a new type of solar cells. As stated in the project, an attempt will be made to improve solar cells based on different technologies like silicon, A_3B_5 heterojunction, organic polymers and electrochemical materials. Although the aim is ambitious, the lack of clean room facilities is a “nail in the coffin” for the success of the project. Furthermore, some of the project funds will be used to purchase thin film deposition equipment needed for the fabrication of solar cells, but the lack of clean room facilities renders these equipment useless.

The project is responding to one of the most important EU policies: development of reliable, clean, safe and economic energy system as an essential issue towards sustainable growth of European economy. Minimization of the environmental impact of the production and use of energy in Europe is one of the key action points of the EU’s Energy, Environmental and Sustainable Development Program. It also stresses that the economic development and

industrial competitiveness in Europe, while contributing to the improvement of the quality of life, respect the environment, as well.

The consortium consists of four partners with no common activities, the project itself being split into 4 separate projects:
CL SENES - Solar Energy – Photoelectric and Photothermal Conversion
TECHNICAL UNIVERSITY – SOFIA – wind energy utilization; utilization of low-potential water sources
IEES-BAS - Hydrogen Economics
BSREC – bioenergies
There are no given details regarding the management and coordination of the project. Even when asked, the members of the consortium could not give a straight answer regarding this aspect.
This is probably one of the weakest points of the proposal. The each institute's set of proposed activities show little or no overlapping with the others. As a consequence, each institute (and even each group within the same institute) has submitted a separate proposal and most probably, it will be developed with little or no interaction with the rest of the network.
A very brief description of the management structure is provided, just mentioning the creation of a Steering Committee and the signature of a Consortium Agreement, but little more.

The financial plan for the first 5 years is merely a list with the total budget per partner. However, as a general remark, it can be stated that the budget is well dimensioned and on-line with the target of the project.

- A specific remark about the IEES-BAS sub-proposal for a hydrogen generation lab: It's perhaps a too ambitious proposal, with a very long list of new capacities and new research lines to be launched within this network.
- Concerning the TU-Sofia CEA sub-proposal: There is an amount of 350.000 BGN (29% of the total) for the assignment of the conducting of questionnaire-based building stock survey. Probably, it's a necessary investment but, perhaps, the MES should ask for further explanations on its need and on the proposed contracting procedure.

In general terms it's a very good proposal and should be accepted with minor improvements. There is a weak formulation of management and coordination activities.

It’s not clearly stated the number of new positions to be funded through the project funding.
The requested funds are well dimensioned, but there is not a clear year-by-year investment plan.
I think this project could be the seed for the deployment of RES & EE technologies in Bulgaria with very promising social and economic further benefits, so it should be strongly supported.

f. BALKAN SOCIAL SURVEY

COMMON COMMENTS, BASED ON THE INDIVIDUAL ASSESSMENTS

Management

The projects do lack of a clear management structure. The coordinators of networks (consortia) are not assigned. Due the fact that they are large projects each project should have a scientific committee and a steering committee. Members of committees must come from partners, MERB, from potential users, (industry, however, it is not necessary that they participate in project financially), and from abroad. Each subtask should have a manager, who is responsible for managing of the project part. (In the proposals only contact persons are assigned.) Deadlines and reporting hierarchy must be set before the project starts. The scientific committee and steering committee must confirm eventual delays and changing of priorities. It is to recommend that an intellectual property management is included into project proposal (who are owners on new knowledge, for example patents, who can publish results, etc.)

Budget

The financial management of projects is a part of the management. The projects of this size require a good management and good surveillance. A crucial question is who legal entities responsible for financial management are. In all networks the partners are Universities and different institutes of Bulgarian Academy of Science (BAS). It is not recommended that entire budget is managed centrally from BAS.The praxis is that individual institutions manage the project budget. It seems that, at the moment, Universities are more flexible and appropriate to manage the financial part of projects. Another possibility is that individual BAS institutes become legal entities able to manage the finances. In general, the budget in the presented proposals is not adequately described. The MERB may require a detailed breakdown of the budget.

Human resources

The general impression is that the personal structure is not balanced. There are too many senior scientists and too few junior scientists. A general recommendation is to introduce temporary doctoral and postdoctoral positions. A broad political action is recommended to improve the social status of young researchers (higher salaries, availability of cheap housing, etc.). The present projects are infrastructural ones and it is recommended that only involved persons be financially supported within the project. The institutions should care that the personal structure working with infrastructure is well balanced, i.e., that enough young scientists are involved.

COMMENTS TO THE MINISTRY OF EDUCATION AND SCIENCE ON THE ORGANIZATION PROCESS FOR THE VALIDATION

It is important to have an electronic copy of the oral presentations during the meeting, so to receive them in advance

Some of the meetings started later in the morning, instead, the meetings should start at 9 am.

The committee must reserve 2 or 3 hours for closed sessions. After the first day meeting at the ministry, where we did not had time to examine again all the projects together.

It is also useful to have the possibility to hold discussions with the students and post docs, during a closed session.

Normally, the last 5 hours should be used by the committee to write a first draft, which is then circulated among the members.