

## INDUSTRIAL SECTION CONVENOR'S REPORT

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Over the years this conference has gained a solid reputation as an appropriate rostrum for illustrating new concepts in the relations between industry and the scientific world and for introducing new technologies to a large assistance of junior and more experienced scientists. In fact, from the very beginning the founders of this endeavour announced: "The conference is aimed for promoting contacts among scientists involved in particle and fundamental physics, among experimental physicists in other fields and representatives from industry." Facilities at the Conference are designed to fulfil the task: space and general facilities are offered to industry representatives to display their products. This year a more accessible and luminous space arrangement was made available to the exhibitors. At the same time two plenary sessions have been dedicated to selected speakers to illustrate new trends in Technology Transfer, analysis of environment affecting our community, examples of historical successes in the merging of science and industry. We have identified in "GRID" and in "E-Publishing" two major promising areas where our Community will play a prime role as "User" and it was of the general interest to have them illustrated by two personalities directly involved in their development. The flow of knowledge is of course more massive from "Industry" to "Science" than vice-versa, but "Science" to "Industry" move offers an intensive added value. The technology transfer concept with the "Patents" as fund raising tool proved less glorious than expected. Trademark, licensing agreement and "Patents" can assure intellectual properties. But patent is an issue to be used cautiously. Evidence exists that much more efficient transfer of "Science" knowledge to "Economy" is achieved by venture capital move and start-up companies. These two facets of the Technology Transfer business have been covered by Routti's and Bourgeois's lectures. There are two examples of Companies who moved recently into the areas of interest of our community (Hourdakis and Intrasoft) and the examples of an Industry historically committed to a strong R&D effort (SAES-Getters). Finally a case of involvement of industry in a "Big Science" project (CMS) completed the palette of the contributions to this Industry Section. The full set of transparencies of the lectures, are filed and made available at the conference site: <http://hpl302.mib.infu.it/Conference2001.html>

## 1 GRID and E-Publishing

From the web to the Grid, i.e. the industrial potential of technology has been the theme developed by F. Gagliardi. After the phenomenal success of WEB, new steps in the technology have been: wide area networking becoming as powerful, as reliable and affordable as local area network; to day PCs with the power of an "old" computer center, an easy access to computer resources via powerful graphics and friendly interfaces. This suggest that time ripe for a new vision; the GRID concept seams to be the case. With its analogy to the electrical power grid it brings unlimited ubiquitous distributed computing, it gives transparent access to multi peta byte distributed data bases, it is easy to plug-in and the infrastructure complexity is hidden to the user. The large amount of data to be exchanged (  $10^6$  Pbytes/year in 2006) for the LHC computing, has motivated the decision of CERN to participate to the project. For E-publishing, C.Pettenati presented the current three publishing models: the traditional, the alternative and the "subversive" one, with examples and realizations in various disciplines and illustration of the debate underway about self-publishing . The case of library procedures for profiting of the e-publishing opportunities in term of enlargement of literary collections available to their readers is illustrated together with some comments on the internal library procedure and the external licensing negotiation. E-book emergence has an impact on the new Web economy and cost and benefits of the new publishing cycle have been discussed as well.

## 2 Innovation and technology transfer

Knowledge generated by scientific research has become one of the main driving forces of modern economies, as J.Routti has illustrated it. Information and telecommunication technologies allow global collaborations and networking. Together with new biotechnology and related service sectors, they are the principal generators of new employment. Complex issues facing society today require integrated multidisciplinary research to search for the best policies and strategic alternatives. International research collaboration gives leverage to research investments and is mandatory in many areas, such as global change, genetically modified organisms and telecommunication standards. The European Union research programs concentrate on such topics. Knowledge economies differ significantly from traditional industries. Their products have short life cycles and narrow time windows. The conversion of knowledge to economic and social benefit requires good innovation systems, including efficient technology transfer and linkages to venture capital. Researchers in

scientific institutes are not used, according to F.Bourgeois, to keep knowledge hidden from others and they are now encouraged to change from a "publish or perish" to a "patent (and publish) or perish" culture. The lecture has shown how combining the aspects of technology watch, non-disclosure, protection and exploitation with open communication and worldwide co-operation can be an enabling instrument in the ever-continuing process of research. Satisfactory patenting and licensing strategies for the particular case of publicly funded organisations has been discussed. Three different lightweight Technology Transfer structures likely to maximise returns without impairing basic science activities have been presented.

### 3 Industry contributions

SAES Getters has been the world leader in the getter production technology and science for over 45 years. This success has been strongly due to a continuous research effort presented by P. Della Porta. A brief history of the evolution of SAESs R&D activities was presented. The initial step has been the evaporable getters for the application in the electron tubes (valves or receiving tubes) and CRTs. The invention of the first industrial non evaporable getters has opened the way to applications in high physics machines from Tokomaks and accelerators like the large application in LEP. Cooperation with many large Research Centers of particle physics has motivated many research projects for the development of UHV pumps and new getter materials. The development of thin sputtered getter films, is opening a new technology on which SAES is working in co-operation with CERN. Indications were given on the motivation which are driving industrial research in comparison with the motivation for public research and the respective roles in the progress of science.

CMS is one of the two largest experiments of the LHC at CERN in Geneva. Because of its size and cost, performances have to be optimised with respect to the investment. This was the case presented by D.Campi. The CMS detector is built around a very large 4T superconducting magnet: it is composed by a 12000 t Yoke and a superconducting coil carrying a current of 20000 A at 4.2 K. Mechanical, electrical and electronic technologies are present in the project; most of the adopted choices are at the top of the actual state of the art. The talk has outlined the main features and the status of the project pointing out the challenging targets of this enormous "industrial prototype". In particular some of the activities developed with the industry have been described quoting those who went beyond the actual state of the art or even of our expectations. The results obtained so far should demonstrate the mutual interest of large-scale laboratories and industrial companies in making such

huge equipment. The representative of Hourdakis Electronics SA presented the Company's profile emphasizing the preliminary production of 22 DAQ cards for the Compact Mon Solenoid, made in collaboration with CERN and the "DEMOKRITOS Institute of Nuclear Physics". INTRASOFT International (S.Bodrato) is a successful European Information and Communication Technology (ICT), it employs more than 300 professionals in three countries with a turnover of 26.2 million Euro. From bases in Belgium, Luxembourg and Greece, INTRASOFT International serves local and international clients throughout Europe, both in the public sector (e-Government) and the private sector (finance, media, telco, and pharmaceuticals). The company provides solutions in the areas of: outsourcing, professional services, systems integration and data warehousing.