

FOREWORD

Under the cover of this volume we join together the main scientific results of the Laboratory of Information Technologies (LIT) during the 2003 year.

The scientific programme inside LIT was done along the lines devoted in the Topical Plan for JINR Research and International Cooperation in 2003. The Laboratory staff participated in research work done within 13 topics at the project level and within 17 topics at the cooperation level. The basic activity of the Laboratory was developed in frames of the two first priority topics: "Information, Computer, and Network Support of the JINR's Activity" (topic 09-6-1048-2003/2007, leaders V.V.Ivanov, V.V.Korenkov and P.V.Zrellov) and in the field of "Computer Physics for Theoretical and Experimental Research" (topic 09-6-1041-2002/2004 headed by I.V. Puzynin and A.Polanski). The main results have been published in leading scientific journals, proceedings of scientific conferences, JINR preprints and JINR communications.

A number of scientific projects involving members of LIT staff have been financed by grants afforded by the Commission of the European Community in frames of the EU - Russia collaboration and INTAS. Twelve grants were afforded by the Russian Foundation for Basic Research (RFBR). Among them, seven were directed to the creation and development of information, computing and telecommunication infrastructure, while five supported various projects of scientific interest.

LIT was one of the organizers of the Focus Symposium "Quantum Physics and Communication", Dubna, 29 July - 2 August, and of the XIX International Symposium on Nuclear Electronics & Computing "NEC'2003", Varna, Bulgaria, 15-20 September.

A second issue of the "Information Bulletin of LIT" (JINR, 4-8160, Dubna, 2003, http://lit.jinr.ru/inf_bul_2/) was published.

A major achievement of the LIT and JINR as a whole during 2003 was the deployment of a single-mode optic fiber on the basis of which the 1000 Mbps Gigabit

Ethernet-based JINR BackBone became operational. The JINR-Moscow computer communication link that provides access to the Russian and international computer networks through RBNNet, was upgraded to 45 Mbps. The throughput of the international computer communication channel used by JINR has been increased up to 622 Mbps. Total incoming traffic was 19.89 TB (9.73 TB in 2002), while outgoing traffic was 24.43 TB (1.92 TB in 2002).

The development of the JINR Central Computer and Information Centre (JINR CCIC) has been in progress. The overall CCIC performance was 4.3 kSPI95, with an installed disk space of 7.7 TB, and a robotized tape library ATL of 16.8 TB.

In 2003, a testbed complex was designed at LIT for incorporation into the LCG infrastructure (LHC Computing Grid) on the basis of Grid-technologies, work was in progress on promoting Grid-technologies in experimental data processing. In cooperation with the Russian scientific centres, the project EGEE (Enabling Grids for E-science in Europe) has been agreed, with implementation since 2004.

In 2003, event mass production runs have been provided for the experiments CMS, ALICE, ATLAS and LHCb.

Work directed towards systematic development and maintenance of the earlier designed databases and information systems taking into account the user needs has been vigorously pursued. Work was also in noticeable progress on the development of Web tools on the JINR main information servers: www.jinr.ru and lit.jinr.ru. Strong support of the main general-purpose FTP server faxe.jinr.ru was provided. This server was updated for support and dynamical load of anti-virus software also. Members of the LIT staff provided necessary work for the JINR's STD AMS on the software and centralized support of administrative databases.

For the first time in the history of the Laboratory, an extensive sampling of the research done in the fields of computational and applied mathematics in cooperation with other JINR Laboratories is provided. It reflects the key role played by LIT in providing an extensive mathematical support of the experimental and theoretical research conducted at JINR. This support can be summarized in a few lines as follows:

- mathematical description and algorithmic reformulation of the physical models such as to meet the requirement of computing the solution in polynomial time;
- development of methods and algorithms able to extract physically insightful information from experimental data;

- simulation of physical processes within experimental installations;
- creation of efficient and reliable hardware adapted software;
- return of meaningful outputs able to give insight into the input physical problems.

It is our hope that the results of the research work collected in this report will be useful to the scientific community of JINR and JINR Member States to throw new bridges for joint scientific collaborations in the years to come.

The Editors