КОМПЬЮТЕРНЫЕ ТЕХНОЛОГИИ В ФИЗИКЕ

NICA PROJECT MANAGEMENT INFORMATION SYSTEM

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The science projects growth and changing of the efficiency criteria during the project implementation not only require increasing of the management specialization level but also pose the problem of selecting the effective planning methods, monitoring of deadlines and interaction of participants involved in research projects. This paper is devoted to choosing the project management information system for the new heavy-ion collider NICA (Nuclotron based Ion Collider fAcility). We formulate the requirements for the project management information system with taking into account the specifics of the Joint Institute for Nuclear Research (JINR, Dubna, Russia) as an international intergovernmental research organization, which is developed on the basis of a flexible and effective information system for the NICA project management.

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INTRODUCTION

Seven-year development program of JINR was approved at JINR in 2009. The strategic goal of the development program is to upgrade the JINR basic facilities and research.

One of the main directions of the development program is to create modern accelerators and storage rings, and experimental facilities for research on the fundamental properties of baryonic matter. The project, which was called NICA, was proposed to conduct this research. This project was adopted to implement at JINR since 2010.

The main goal of the NICA project is creation of a specialized accelerator complex and needed infrastructure.

Such scientific projects can be classified as very complicated, large and complex (Fig. 1). Project implementation period is more than five years. The project will cost more than 200 million dollars.

The complex and complicated projects like NICA require specialized project management information system (PMIS).

And at the first stage it was necessary to define a common approach to NICA project management and develop a set of common requirements for the NICA PMIS.

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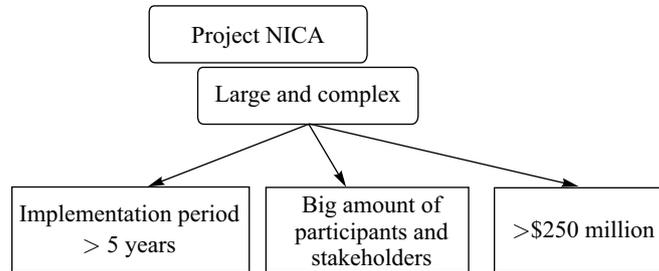
Fig. 1. Project NICA classification

NICA PMIS is a tool to automate project management with software specially developed for the JINR.

Program Project Management NICA PMIS improves the efficiency of project management at JINR by supporting the processes of project management. Management Information System has the following features:

— Task planning and monitoring of the project;

— Providing a "single picture" of all the projects at JINR for a balanced decision-making;

— Project Resource Management Program.

FIRST STAGE. PRELIMINARY ANALYSIS OF NICA PMIS

NICA project development system uses the basic ideas and approaches of PMBOK® [1]. These methods, approaches and tools can improve the completion of the project and reduce financial losses and the time of implementation of the project.

NICA PMIS is a program consisting of projects and subprojects, linked by a single goal.

The structure of NICA project (Fig. 2) is based on the principles of the hierarchy and a multi-layered structure where the first level represents subprojects, the second level — the
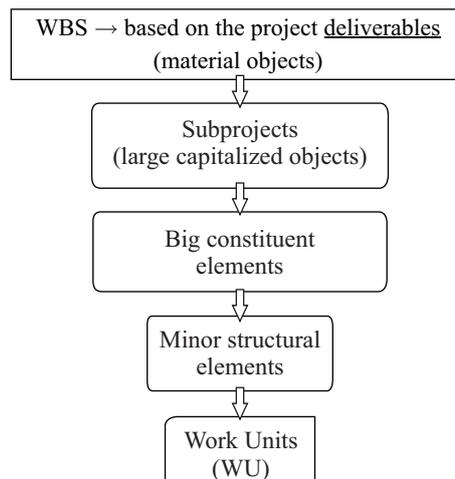
Fig. 2. The NICA project structure

major constituent elements, then smaller structural elements, equipment and activities, and the last level — work units.

FINANCIAL REQUIREMENTS

JINR is guided by the rules of the budget organization in accordance with the rules of formation and execution of the budget and local regulations. Therefore, JINR can be called the budget organization. This feature places a limit on the project. It is necessary to have an annual window and make adjustments in the work plan. Project budget is planned from the budget of the JINR, extra-budgetary resources from the Russian Federation and other countries (Germany, China, South Africa). Unfortunately, due to the more complicated economic situation in the European Union, there was a great deal of uncertainty in obtaining extra-budgetary funding as planned.

EXISTING PROCESSES OF THE ORGANIZATION

A positive factor for the project is the availability of JINR operating processes, such as:
— Accounting and management accounting;
— Procurement Management;
— Office of Communications.
Accordingly, it is necessary to develop a system within the existing infrastructure.

EXISTING INFORMATION SYSTEMS

At the beginning, the NICA project had a complex of administrative and information systems to support the following operating processes:
— Accounting and management (1C UPP, ADB2);
— Budget Planning and Control (BHT, ADB2, PTP);
— Personnel records (HRT, IRS 1C UPP).

SECOND STAGE. OPERATING SYSTEM APT EVM AT JINR

In 2010, JINR and CERN signed a formal agreement on the exchange of experiences and transfer of functional modules of information system APT EVM at JINR for using this system in the management of the project NICA. The APT EVM system was developed in the early 2000s as part of the complex AIS at CERN.

In the first step it was decided to conduct a pilot project of PMIS. The main goals of the NICA PMIS project are:
— Functional analysis of APT EVM;
— Identification of the possibilities of APT EVM.

The second step was made to install a separate module APT EVM at CERN site and JINR staff organized access to it.

FUNCTIONAL REQUIREMENTS

The NICA PMIS was operated for six months. According to the results, the pilot project made the following conclusions:

— EVM method should be used as the basic ERP system, but the use of this approach in terms of features of JINR calls for updating;

— system APT EVM can be used as a basic "back-end" module of EVM for NICA PMIS.

THE THIRD STAGE. IMPLEMENTATION OF APT EVM AT JINR

Flexible instrument was created by extending the existing PMIS system ADB2 for the needs of the NICA project, developed in the process of system APT EVM (Fig. 3). In addition,
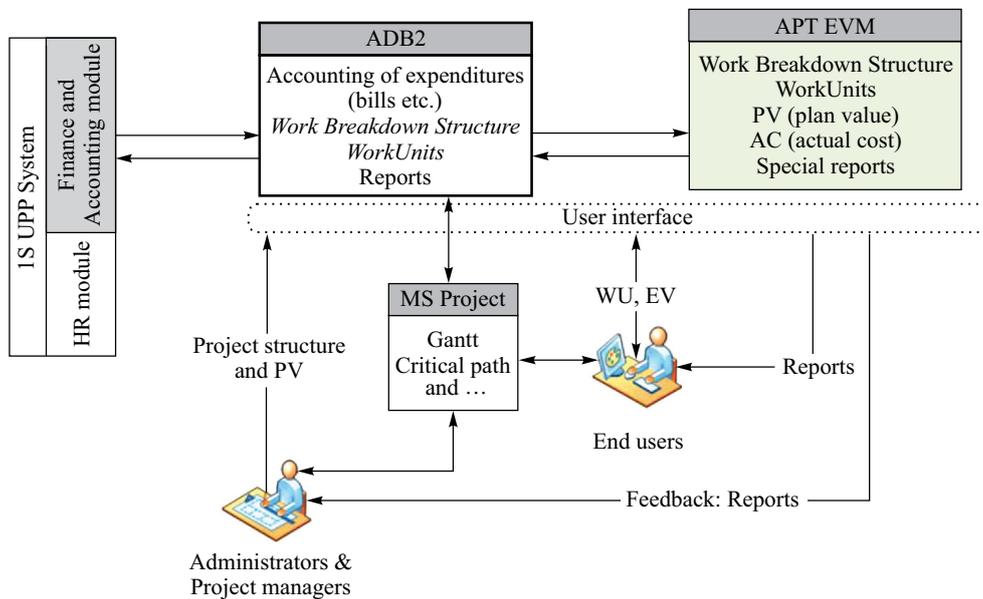
Fig. 3. The resulting scheme of work in the PMIS

the project plan is formulated to further expand NICA PMIS for the implementation of ADB2 integration with MS Project Prof [2, 3]. This approach has been implemented as follows:

— Work on modification of ADB2 and APT EVM was administered concomitantly (ADB2 at JINR, APT EVM at CERN);

— New functionality changes were added to ADB2 iteratively.

CONCLUSIONS

Since the beginning of 2015, the model NICA PMIS has been operated for more than two years [2]. It has the following features:

— Control of the project structure (WBS);

— Planning and replanning of the project work;

— Versions of project plans (baselines);

— Monitoring of the implementation of the project in terms of AC (actual payments) and EV (earned value);

— System alerts users via e-mail (for the timely report on the progress of the works);

— Charts by the method of EVM (PV, AC, EV).

REFERENCES

1. Project Management Body of Knowledge. 4th ed. www.pmi.org.

2. *Bashashin M.* AIS at JINR // School on JINR/CERN Grid and Advanced Information Systems, April 22–26, 2013; http://ais-grid-2013.jinr.ru/docs/25/8-JINR%20AIS%20(M.Bashashin)%20v.5.pdf.

3. *Kekelidze D.* EVM in Dubna // School on JINR/CERN Grid and Advanced Information Systems, April 22–26, 2013; http://ais-grid-2013.jinr.ru/docs/24/2-evm_jinr_presentation.pdf.