

# MANAGING BY OBJECTIVES A RESEARCH INFRASTRUCTURE

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## Abstract

Elettra [1] is a research center operating a research infrastructure with two light sources: a synchrotron radiation facility (Elettra) and a free electron laser (FERMI@Elettra). With the mission to promote cultural and socio economical growth of Italy and Europe through basic and applied research, technical and scientific training and technology transfer, few years ago it has adopted a balanced matrix organization. This paper describes the tools, techniques and practices we used to manage this change and the results obtained. We will describe the Virtual Unified Office (VUO) [2] based on the Project Management Institute [3] standards, that todays allow us to manage by objectives the whole research infrastructure and in particular, the integrated management of initiatives (projects, contracts, operating activities, staff commitments, skills, appointment letters and of the assessment procedures. We will also describe how the VUO integrates the various source of information to manage a set of company indicators and a balanced scorecard which allow us to execute the strategy.

## INTRODUCTION

Elettra Sincrotrone Trieste is a multidisciplinary international laboratory of excellence, specialized in generating high quality synchrotron and free-electron laser light and applying it in materials science. Its mission is to promote cultural, social and economic growth through:

- Basic and applied research;
- Technical and scientific training;
- Transfer of technology and know-how.

We develop excellence by providing state-of-the-art services for high-quality, internationally recognized research, thus contributing to enhance the positive impact and relevance of science on society.). The main assets of the research centre are two advanced light sources, the electron storage ring Elettra and the free-electron laser (FEL) FERMI, continuously (H24) operated supplying light of the selected "colour" and quality to more than 30 experimental stations. These facilities enable the international community of researchers from academy and industry to characterize material properties and functions with sensitivity down to molecular and atomic levels, to pattern and nanofabricate new structures and devices, and to develop new processes. Every year scientists and engineers from more than 50 different countries compete by submitting proposals to access and use time on these stations. These are selected by peer-reviewed by panels of international experts on the basis of scientific merit and potential impact, and the winners are

granted valuable access time as a contribution to their research. Few years ago Elettra has been trasformed from a functiona to a matrix organisation in order to improve effectiveness (figure 1) with 9 groups of people with similar competences and 4 (recently 5) project clusters each one representing a project portfolio.

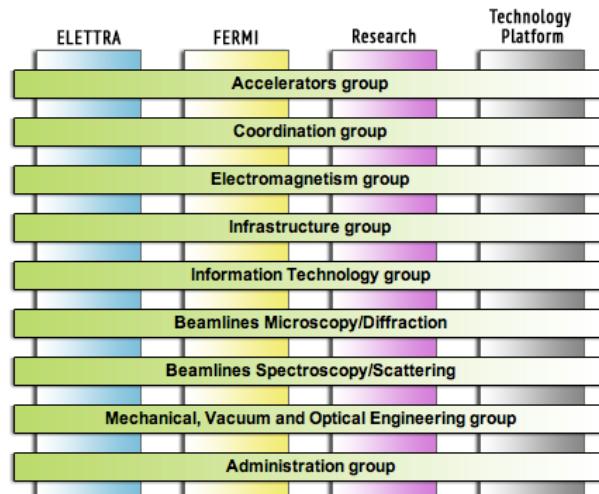


Figure 1: Elettra organisation.

People can be involved in structural activities, projects or contracts. The former are required to maintain base service and plants while the latter are related to new developments or to customer request via the Industrial Liaison Office.

Each group is coordinated by a group coordinator whose primary goal is to manage human resources.

Project Managers manage projects and hence are responsible for reaching the project objectives in time and in budget using the resources (including people) assigned to their projects.

Structural Activity are a sort of recurring projects whose primary objective it to maintain specific services or plants. Each structural activity is managed by an activity leader.

Cluster coordinators supervise project portfolios by monitoring and supervising progress of projects and projects programs. In case of conflicts in resource assignment and priorities they act as arbitrators.

A Strategic Committee contributes to define the company strategies and an Executive Committee with the participation of all the coordinators contributes to take all the executive decisions like allocating budgets, hiring people, buying expensive equipment, etc.

Matrix organisations are quite flexible but are also quite complex to be managed. The flexibility is required to be able to operate the above mentioned assets with a limited

budget and at the same time, search for additional funding opportunities to maintain the level of excellence of the research center.

Started as a web based tool to handle proposal submission, evaluation and scheduling the Virtual Unified Office is now a real scientific business management suite that integrates the various source of information to facilitate effective management of this complex research infrastructure.

## THE VIRTUAL UNIFIED OFFICE

Born in 1997 as a tool to digitalize the Users' Office the Virtual Unified Office (VUO) is based on the Oracle database and is coded mainly in pl/sql and runs on Linux with Apache and mod-owa. Just to get a flavour of the size of the system it is about 170 thousands rows of pl/sql, over 10 thousands rows of python/java, 323 tables. The VUO (figure 2) and integrates in a single portal all the important company systems from the ERP to the Virtual Laboratory to allow users to access remotely the Elettra scientific computing infrastructure. The description of the many packages and functionalities of the VUO is out of the scope of the present paper. In the following sections we will describe only the packages that allow us to manage by objectives Elettra.

The screenshot shows the VUO home page with a navigation bar at the top. Below the bar, there are several orange-colored boxes representing different functional areas:

- Login:** Includes fields for Username and Password.
- Strategic committee agenda:** Shows the year planning of the Strategic Committee.
- Resource booking:** Shows a calendar of meeting room usage.
- Calendar:** Details on Beamtime Allocation Calendar.
- Seminars:** Upcoming seminars at Elettra.
- Elettra Library:** Information on books and CDs.
- Publication Search & Submittal:** Details on publications and measurement runs.
- Visits to the Elettra laboratory:** Information on visitor registration.

Figure 2: The VUO home page.

## PROJECTS, CONTRACTS, ACTIVITIES.

Elettra has a matrix organisation. People can be assigned to more than a company initiative at a time. Projects, Contracts and structural activities can be described using the VUO projects suite. In this way it is possible to define goals, deliverables and performance indicators for every initiative. In this way it is possible to manage by objective the whole company. Some people is involved only into structural activities. Some people is involved only into projects. In general people time is partially dedicated to project and partially dedicated to structural activities. The former generally result in

services and equipment that has to be maintained when deployed by structural activities.

## PROJECTS IN DETAIL

Projects, Contracts and Activities are captured by similar structures in the VUO projects with minor differences. The standards of the project management institute [6] have been fully adopted by the VUO but despite the commonly used project management software this suite is completely integrated with the company ERP and the other administrative systems. It is in this way possible to let the system automatically calculate costs and budget when required purchases and human resource are defined. The user is guided in the preparation of the project plan by a web form based wizard. At first general information about the idea is collected. The user is requested to give the idea a name, define the objective, provide a short description, define the deliverables and the key performance indicators. Additional documents can be attached if needed.

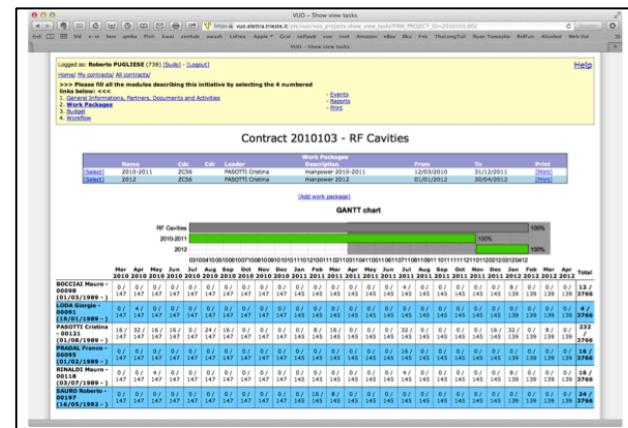


Figure 3: Project GANTT, work packages and staff commitments.

Afterwards, the user is requested to structure the initiative in work packages, to identify the persons they need to involve and in case hire (see figure 3).

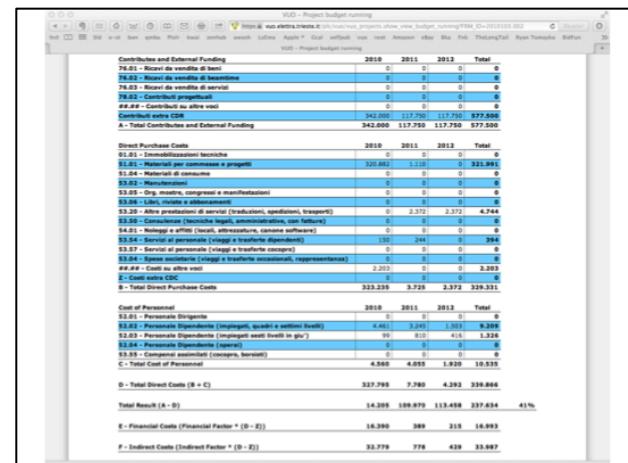


Figure 4: The financial plan of a project.

The user has to specify how many working hours per month the resource is needed.

In the last step the user is requested to plan the purchases, specify the possible sources of income (findings, if any) and prepare a sort of financial plan of the project (see figure 4). The cost of staff is calculated automatically by the system due to the integration with the company ERP.

Different versions of a project description are maintained by the system to capture every planning step and afterwards every baseline of the project till its closure.

### Submitting a New Company Initiative

A new project can be proposed by anyone in the company. After submission the idea described in the VUO passes an approval process described by the BPMN [4,5] diagram in figure 5. According to the type of funding and to the total cost of the initiative, different levels of evaluation are required. The Executive Committee and the Strategic Committee are the places where such decision are taken. A project commission generally makes and investigation and prepares the discussion for the Committees. The initiative is hence assigned to a specific cluster. The clusters group project according to the business logic.

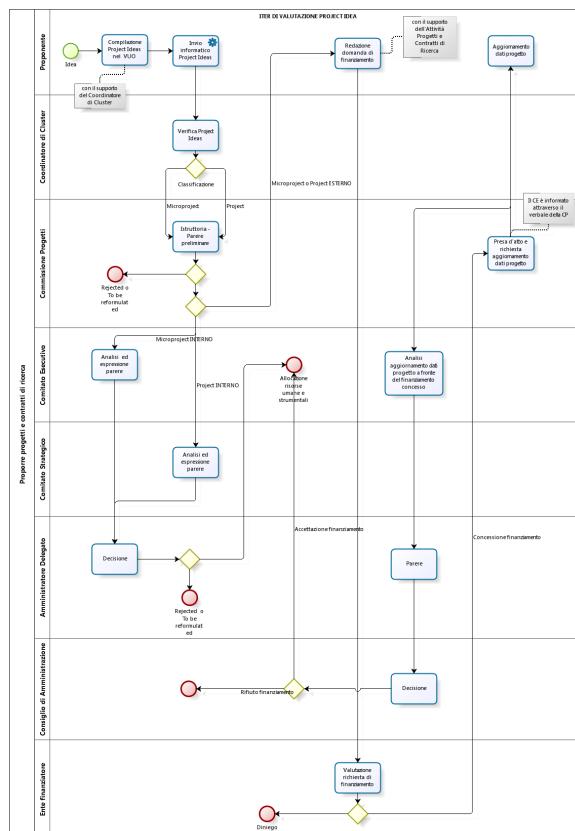


Figure 5: The project submission workflow.

### Managing a Company Initiative

When an initiative is approved and the financial and human resources are available it moves in the running state. Periodically it is evaluated according to the management process described by the BPMN diagram in figure 6.

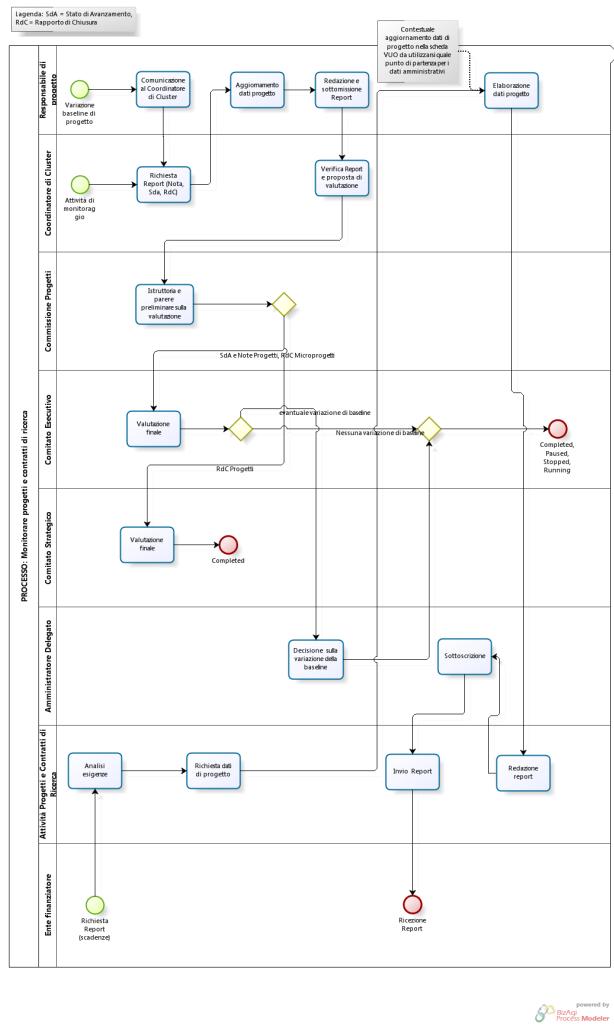


Figure 6: The project execution workflow.

During the execution phase the evaluations assess the initiative progress. A form of steering control is executed in case of problems. In the worst of the cases the initiative with bad performance can be cancelled before conclusion and its resources assigned to other initiatives.

If the initiative completes with success, the final assessment is used to learn and increase the company know how.

## SKILLS AND ASSESSMENT PROCEDURES

As stated above the core resource in a research infrastructure is the human resource. The VUO captures skills and competences of each employee and thus allow an easier selection of the right people to involve in a

specific initiative. The system is also used to guide training initiatives.

Periodically each employee receives a letter of appointment with specific goals related to each initiative. After the specified period (generally one year) the progress respect to the specified goal is assessed. The result of the evaluation is used to establish individual forms of incentive. Group level forms of incentives are currently assigned according to the results achieved by each project cluster.

## INDICATORS

The package VUO Indicators (see figure 7) is the core of a company balanced scorecard. The module allows an automatic or nearly-automatic collection of a set of key performance indicators related to economics and finance status, users and customers, internal processes, learning, innovation and level of reach of institutional goals.

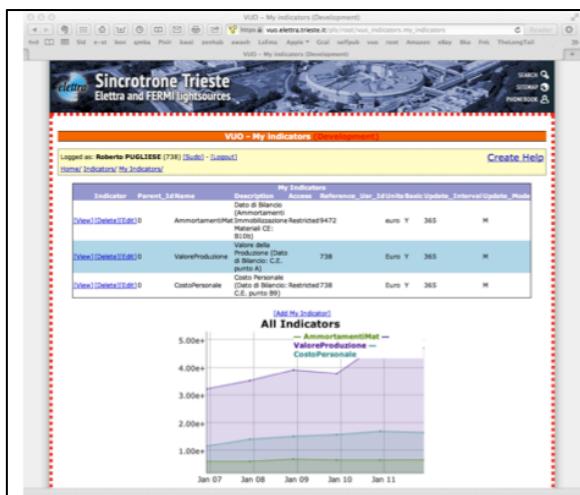


Figure 7: A personal dashboard defined using the VUO Indicators package.

The system is currently used to better understand the company performance. In the future it will be used to assign specific goals and effectively execute the company strategy.

## CONCLUSIONS

We have described the VUO, an extraordinary tools that helps the management by objectives of Elettra. We have described in more detail how the system allows description and management of all the company initiatives like projects, contracts and structural activities. We have also described how the VUO allows the management of the real core resource of a research infrastructure, the human resources, how it allows to keep track of staff commitments, skills and the available tools to define the personal letters of appointment and hence to perform a 360° staff evaluation. At the end we have described how the VUO allows implementing an effective hierarchical company wide balanced scorecard.

The tools described in this paper have been now operating for nearly two years. A parallel huge training effort has been used as a primary strategy to effectively manage the change. In the future we will keep improving the system with the goal to be effectively able to use projects, contracts and activities for the governance of the operating aspects of the center and the balanced scorecard to effectively execute the company strategy and hence transform the mission and vision in something more than few sentences published on the company website. A secondary goal is to transform the tools in a suite that can be easily used also by other research laboratories.

## ACKNOWLEDGMENT

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## REFERENCES

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- [2] Virtual Unified Office, <http://vuo.elettra.eu>
- [3] Project Management Institute, <http://www.pmi.org>
- [4] Object Management Group Business Process Model and Notation, <http://www.bpmn.org>
- [5] BizAgi process modeller, <http://www.bizagi.com>
- [6] A Guide to the Project Management Body of Knowledge (PMBOK® Guide)—Fourth Edition, ISBN: 978-1-933890-51-7