

SATRPM, A CUSTOMIZABLE WEB-BASED PROJECT MANAGEMENT SOFTWARE

Vahid Faghihi
Texas A&M University
Construction Engineering and Management
Zachry Department of Civil Engineering
Construction, Geotechnical and Structures Division
3136 TAMU
College Station, Texas 77845-3136
savafa@tamu.edu

Julian Kang
Texas A&M University
Department of Construction Science
juliankang@tamu.edu

SATRAPHM, A CUSTOMIZABLE WEB-BASED PROJECT MANAGEMENT SOFTWARE

ABSTRACT

SatrapM is a web-based software package, aiming to help project managers to easily handle their construction projects via internet. This software is capable of handling all projects of an organization, in which all projects can be defined in EPS the same as users in OBS. A 3D accessing module links EPS, OBS and inherent functions in order to provide a secure environment for the data to be processed throughout the system. This paper intends to take a deeper look at capabilities of SatrapM in helping project managers to keep track of and control their construction projects as well as its potential future features.

KEYWORDS

SatrapM, Web-based Project Management Solution, Online Project Control

INTRODUCTION

SatrapM is designed to be a web-based solution to help construction project managers to manage their projects worldwide via internet. The inherent capabilities of this software enables project management teams to monitor project performance in all 9 areas of PMBoK . Beside project management teams, all other personnel of the company using SatrapM could be defined as OBS¹ of the company in the software. Beside OBS, SatrapM is capable of having EPS² to handle all projects existing in the company, and with a detailed accessing feature, it connects every member of OBS to proper projects in EPS; this feature makes certain functions in the software possible.

On the other hand, SatrapM connects to advanced project management software packages (e.g. Primavera and Microsoft Project) to import project scheduling and resources. These features make SatrapM specifically suitable for construction projects.

BACKGROUND OF SATRAPM

The concept of SatrapM as a web-based software to handle construction project management controls initiated late in 2004, as a M.Sc. thesis topic. In that document (summarized in a conference paper) the advantages and disadvantages of such an online solution to construction projects was examined (Faghihi, Virtual management in construction projects (Survey of applying virtual management in 4th Fath

¹ Organizational Breakdown Structure

² Enterprise Project Structure

Abad metro terminal), 2007). At the same time, pros and cons of this kind of management was evaluated in maritime projects (Faghihi & Besharati Givi, Implementation of virtual management in Iranian maritime projects, 2006) as well as earthquake disaster management (Vojoudi & Faghihi, 2005) and (Faghihi & Vojoudi, Introduction to virtual management in disaster management, 2008).

After several years of theoretical studies, in the first quarter of 2007, coding of the web-based solution software package started to fulfill the reporting requirements of IPDC³, which was then called VPMS⁴. Continuing to improve the software and adding to its abilities, the third version of it came out with the name of SatraPM in mid-2008 with several new features like Web2.0 compatibility, capability of having OBS and EPS, two-way data transfer with Primavera and Microsoft Project and Ajax⁵ implementation.

During improvement of SatraPM, extensive research was done on its abilities and benefits in optimizing power plant projects (Faghihi, Optimizing power plant project management processes by using SatraPM, 2008) and also its implementation in project-based organizations (Faghihi, Implementation of SatraPM in project-based state organizations, 2009). The current available version of SatraPM is 2.0.0β and available on <http://demo.satrapm.com>.

OVERVIEW OF SATRAPM AS A WEB-BASED SOLUTION

SatraPM is designed to manage projects exclusively via internet. An authorized user can easily manage OBS by adding or editing the structure as well as the users assigned in it. In defining EPS, the user builds the entire structure and adds projects to it exactly the way it is done in Primavera. Beside basic project information, an MPX format of project schedule exported from Primavera or Microsoft Project should be given to the software to add projects. After defining a new project and proper accessing rules between OBS, EPS and SatraPM functions, all required accesses are granted for the software to start working. These initial and one-time OBS and EPS defining similar to Primavera, could take not more than couple of hours, depending on the size of the organization and number of projects and users.

Based on the imported project schedule, the software provides several ways to update project data. These ways include: adding or editing any task's completion percentage, adding photos of current situation for each level of WBS and recording input texts for problems and solutions. By having these kinds of data, SatraPM updates project S-Curves and Gantt chart immediately. Further, it can export MPX file to be revised in Primavera or Microsoft Project. After revising and updating project schedule using one of those software packages, the new MPX file is imported to SatraPM and all the information (including revised Gantt chart) is updated. Since the amount of efforts needed for each activity mentioned above varies based on the size of the project, corresponding data has been provided for a case study described more later in this paper (for more detailed data please refer to (Faghihi, Optimizing power plant project management processes by using SatraPM, 2008) and (Faghihi, Implementation of SatraPM in project-based state organizations, 2009)).

³ Iran Power Development Company

⁴ Virtual Project Management System

⁵ Asynchronous JavaScript and XML

CORE FUNCTIONS OF SATRAPM

SatraPM is completely based on PMBoK and it covers all the 9 areas including its 56 standard forms. This software currently works in four languages and all data, including PMBoK forms, are presented in these four available languages.

To get deeper into capabilities of SatraPM, important abilities of it are listed as two main categories below:

Managerial features

- *Defining OBS-* Authorized users are allowed to define their Organizational Breakdown Structure and by adding and assigning proper users into the OBS, those users are capable of working with the software. The existing OBS can extend to unlimited levels to cover organizational needs.

- *Defining EPS-* All projects existing in an enterprise could be easily defined in EPS defining section of the software. In this part, an enterprise portfolio and its relevant projects are defined and the managing user can assign project schedules and information to specific projects.

- *3D accessing between OBS, EPS and Functions-* The advanced 3D accessing capability of the software allows extended and detailed rules and responsibilities to be defined. This feature meets all needed accessing equipment and SatraPM can work securely and safely.

- *Based on PMBoK 2008-* Taking into account one of the most important project management standards, SatraPM was formed based on PMBoK 2004 and updated to edition 2008 covering all the nine knowledge areas of project management defined in the standard. All existing tools in SatraPM are categorized in those nine areas to help project managers to better control their projects. These project management knowledge areas are Project Integration Management, Scope Management, Time Management, Cost Management, Quality Management, Human Resource Management, Communications Management, Risk Management and Procurement Management. (Project Management Institute, 2008)

- *Supporting 56 standard forms of PMI-* PMI has provided 56 forms to document necessary information in the above-mentioned knowledge areas. In addition to all of these 56 forms, SatraPM is capable of recording previous editions of each form for each project in its archive for later accesses. These archived forms are useful for further tracking of changes in projects and their documents.

- *Online updates S-Curve drawing-* Any changes in the completion percentage of any tasks has an immediate effect on the S-Curve of the project. This S-Curve could show cumulative time, project costs and the overall performance of the given project. Dashboards of SatraPM are always updated to help the project manager to have a better overview of how their project is going on.

- *Online Gantt chart view-* In addition to automatic updates of S-Curves, project Gantt charts are updated instantly after every change which takes place in the work completion percentage record. This Microsoft Project lookalike Gantt chart could be shown in different calendar types (i.e. Georgian and

Shamsi⁶ calendar).

- *Latest project status*- When a user enters any data from the project site into the software, the project's status changes in SatraPM. The project status is shown through different gauges including pictorial status gallery, textual status reports, several dashboard gauges and the Gantt chart and S-Curves—as mentioned before.

- *Project, Program and Portfolio dashboard view*- According to the defined EPS, SatraPM provides a separate page with cumulative data for included gauges for each project, program and portfolio. These gauges are measuring KPIs⁷ including CPI⁸, SPI⁹, QPI¹⁰, Risk, Stakeholder and Scope in addition to S-Curves and percentile performance tables.

Technical abilities

- *Extreme customizability*- Since SatraPM is programmed using PHP, it could be considered as an open-source software (however, due to marketing strategies, the codes are not available to the public). Based on the current platform, any changes in line with project management standards are possible to be applied in the software.

- *Proper connection with P3 and MSP*- SatraPM transfers project data (e.g. tasks, resources, resource assignments, completion percentage, calendars, etc.) within standard MPX¹¹ file format. With this type of connection, SatraPM can exchange data with Microsoft Project and Primavera as well as any other software working with MPX.

- *Ajax implemented*- Similar to all cutting edge web applications, SatraPM takes advantage of Web2.0 capabilities for better software performances in both graphic designs and programming technologies. Implementing Ajax in SatraPM provides a smooth workspace even with low bandwidth available.

- *Calendar view in different formats*- One of the main problems with many leading project management software packages is their limited ability to work with other types of calendars (i.e. Chinese or Arabian lunar calendar or Persian solar calendar). Overcoming this problem, SatraPM can be widely used by Middle Eastern users and projects.

- *Four languages*- Currently, SatraPM is presenting all its pages in four languages, i.e., English, Persian, French and Arabic. Any other language can be added easily to the software based on advanced platform design.

- *Supporting project calendar, resources, tasks and assignments*- The mentioned MPX file format can hold project information for each single project up to 250 calendars, 10,000 resources, 10,000 tasks and 100 resource assignments for each task. Although these could be counted as some sort of limitations, most of the projects can be handled through this amount of data. Having said that, the user can defined multiple project in the system's EPS and each of those can have the above mentioned data capability.

⁶ A solar calendar used in Middle East region

⁷ Key Performance Indicator

⁸ Cost Performance Index

⁹ Schedule Performance Index

¹⁰ Quality Performance Indicator

¹¹ Microsoft Project Exchange (MPX)

SOFTWARE REQUIREMENTS

Since SatraPM is a web-based software, all it needs to run is a proper web browser with a good internet connection on both the project sites and the company's headquarter. Also, for revising and updating project schedules, this software needs either Primavera or Microsoft Project.

The only technical server requirements for this software are a server having PHP compiler 5.0 or higher, MySQL 5.0 or newer, and Zend Optimizer 3.0 or above.

FUTURE FEATURES

The above mentioned functions are currently embedded in SatraPM and since there are still ongoing improvement processes, the following capabilities could be expected in near future:

- *More powerful connection with Primavera and MSP-* Since MPX usage is slightly outdated and has been replaced with XML¹² format, it is possible to upgrade SatraPM to this new and strong offline connection ability. With help of the XML data exchange format, any restriction to the amount of exchanging data will be removed and huge numbers of project information could be transferred from SatraPM to other software, virtually limitlessly without any limitation. Because the XML format is widely used both in online and offline software packages, adding this feature would help SatraPM to collaborate better with other software packages.

- *Live connection with Primavera database-* Primavera stores data in a database; in order to have a live data exchange with these data a connection to that database is needed. Recently its database has been changed from SQL to Oracle, which makes the connection a bit harder. It has been planned to establish this kind of connection with Primavera from SatraPM in recent future. Also more research is still required for this feature in addition to finding similar ways to connect to Microsoft Project Server data.

- *Accessing to EPS and OBS defined in Primavera and MSP-* By having a database access to either Primavera or Microsoft Project, EPS and OBS can be taken into SatraPM too. By using this feature, there would be no longer need to have built-in EPS and OBS for this software, and SatraPM can be integrated completely with these leading project management software packages.

- *Importing roles and responsibilities from Primavera and MSP-* SatraPM can satisfactorily and seamlessly work with Primavera and MSP by importing roles and responsibilities defined in Primavera or Microsoft Project along with EPS and OBS, and integrating them with functions and features.

- *Document management tool-* There is a document management tool in SatraPM which needs to be completed more for the purpose of gathering all project documents and archiving them for easy and online access. By completing this tools and adding an online viewer for expected project document formats (e.g. Word, Excel, PDF and etc.) users would not need any other software than SatraPM to go

¹² Extensible Markup Language (XML)

through their documents.

- *AutoCAD drawings viewer*- In order to obtain an advanced document management tool for construction projects, having an internal web-based AutoCAD drawings viewer would be a must. For this reason, several researches have been conducted to see requirements and abilities of such a technology. Also an interactive drawing tool integrated with project scheduling can help project managers and their team to have a better understanding of how their project is proceeding.

- *Internal communication between users*- Some initial steps of having internal communication for SatraPM users have been done; however, there still remains a lot of coding in order to turn SatraPM into a thoroughgoing communication tool. It can be used as an internal messaging system or emailing tool for users to get in touch with each other faster and more easily.

SYSTEM PERFORMANCE

The outcome of this research has been tested as a web-based software package on power-plant builder company as a case study (Faghihi, Optimizing power plant project management processes by using SatraPM, 2008; Faghihi, Implementation of SatraPM in project-based state organizations, 2009). The performed study was focusing on converting the traditional reporting system into a web-based, integrated and standard system that was created based on PMBoK reporting criteria (as defined in SatraPM). The company was constructing 58 different power-plant related projects on the research period.

In the conducted study, 8 different project status reports have been considered, which were covering all the required reports of the company. These reports were consist of 46 different report forms to be filled out and were as follow:

- Company-wide reports (7 report forms)
- Program reports (5 report forms)
- Power-plant reports (11 report forms)
- Weekly reports (5 report forms)
- Electricity transfer project reports (11 report forms)
- Financial reports (2 report forms)
- Managerial reports (5 report forms)
- Special reports (based on demand and occasion)

Based on the detailed study in the mentioned papers, it has been shown that more than 38,000 man-hour related to report generating, would be saved annually in addition to almost \$200,000 reduction in reporting processes each year. Also the elimination of paper-based reports, which will save up to 300,000 paper pages (near 35 trees considering 8500 sheets per tree (Conservatree.org, 2012)) each year, would be a good impact on the environment.

CONCLUSION

The above-mentioned functions and potential features of SatraPM reveal how this software can

enhance project management's quality and speed especially in the field of construction. Its compatibility with Primavera and Microsoft Project, together with its web-based nature, makes it possible to use SatraPM in a variety of projects of different structures and with varying requirements. Improvement of the software by adding and completing previously mentioned features could make it one of the outstanding web-based project management solutions in the market.

REFERENCES

- Conservatree.org. (2012). *Trees Into Paper*. Retrieved 04 15, 2013, from Conservatree: <http://conservatree.org/learn/EnviroIssues/TreeStats.shtml>
- Faghihi, S. V. (2007). Virtual management in construction projects (Survey of applying virtual management in 4th Fath Abad metro terminal). *3rd International Conference of Project Management*. Tehran, Iran.
- Faghihi, S. V. (2008). Optimizing power plant project management processes by using SatraPM. *4th International Conference of Project Management*. Tehran, Iran.
- Faghihi, S. V. (2009). Implementation of SatraPM in project-based state organizations. *5th International Conference of Project Management*. Tehran, Iran.
- Faghihi, S. V., & Besharati Givi, M. H. (2006). Implementation of virtual management in Iranian maritime projects. *Proceedings of the 2nd International Conference of Project Management*. Tehran, Iran.
- Faghihi, S. V., & Vojoudi, M. (2008). Introduction to virtual management in disaster management. *International Road and Structure Monthly Magazine*, 6(53), 30.
- Project Management Institute. (2008). *A Guide to the Project Management Body of Knowledge* (4th ed.). Project Management Institute.
- Vojoudi, M., & Faghihi, S. V. (2005). Traditional and virtual management in disaster management. *1st International Conference of Disaster Management*. Tehran, Iran.