

GUIDELINE: VIRTUAL COMMISSIONING

A. INTRODUCTION

- I.1 Purpose: The purpose of web-based or virtual commissioning is to provide a collaborative, cloud-based software platform which provides an easy-to-use, intuitive commissioning project management tool.
- I.2 Use: The tool shall be available to a wide range of participants, and not be limited to the sole use of the Commissioning Authority.
- I.3 Intent: Customized for building commissioning, the tool shall assist the commissioning team and related entities (which could include the owner team, O&M team, design team and contracting teams) in coordinating commissioning activities. But the tool is meant to be more than a coordination tool. It should also assist in improving productivity, enhancing collaboration, timely completion of tasks and deliverables, project communication, Operations & Maintenance information gathering, and more.
- I.4 Transfer of Knowledge: the site shall be a tool to assist in the transfer of knowledge from the design and construction team to the Operations & Maintenance team.
- I.5 Documentation: The commissioning authority shall upload and maintain up-to-date versions of all commissioning related documents on the web-site. When other parties create additional documents that directly contribute to the commissioning process, they shall also upload and maintain up-to-date versions of their documents on the site.
- I.6 Issues: Management of commissioning issues shall be available on the virtual site.
- I.7 Active/Inactive Project: The site shall be maintained as an Active Project until 12 months following Substantial Completion. At that time the site shall be placed in an Inactive Project state or mode, or offered to be transferred to the Owner as an Active Project. If the Owner accepts the transfer, then the Owner will be responsible for the costs to maintain the site. If the site becomes an Inactive Project, all files, tasks, messages, etc., will remain saved and intact, but will not be able to be accessed unless the project is converted back into an Active Project.
- I.8 The Commissioning Authority or its representative shall be the sole Administrator of the virtual commissioning platform, and shall be responsible for setting up and maintaining the site for the duration of the commissioning process, ending no sooner than 12 months following Substantial Completion.

B. GENERAL REQUIREMENTS

I.1 Summary

- A. Project branding: The project shall be clearly branded with the individual project name and one (1) representative logo. The logo is typically that of the commissioning firm.
- B. Simplicity and ease-of-use: Navigation shall be designed in a manner that allows a person unfamiliar with project management software to intuitively and easily navigate the site and locate the information or area they are seeking.
- C. Membership: the site shall allow an unlimited number of team members.
- D. Passwords: Each user shall have an individual username and password. Site protection shall be capable of hash based password security, inactive session time-outs and SSL-based security (the same security used by credit card pages and banking websites). Passwords shall be at least 6 characters in length and contain at least one number.
- E. Permissions: the site shall allow a wide variety of permissions, set on a company-wide and/or an individual user basis. Permissions or access levels shall range from View Only to full administrative rights for the project. Only an administrator can set-up/delete a project, set permissions, add/delete members, etc. The administrator shall determine the project's features.
- F. Discrete Projects: If a company or client has more than one project, each project shall be treated discretely; team members on project A will not be able to see or interact in any way with project B, etc. However, permissions shall have the ability to allow individual site members to view and participate in multiple projects, if the administrator enables that feature/function.
- G. Dashboard: If a company or user has multiple projects, then each user shall have a dashboard that provides a summary of all of their projects. Individual projects shall be selected from a list, each with their own separate interface.
- H. User Tracking: User activities shall be tracked. The user name and time/date of an activity shall be logged. The system shall be able to show the activities of all users to the administrator AND to all users. Activities are defined as and include: logins; creating/deleting/editing tasks or issues, as well as messages, notes and milestones; uploading/updating/deleting files, etc.
- I. Storage: The overall software platform shall have a minimum storage capacity of 5GB, and be expandable up to 50GB or more.

I.2 Data Center hosting the software shall provide:

- A. 99.995% availability.
- B. Overall design to sustain one or more worst-case failures with no critical impact on services.
- C. Multiple layers of surveillance and access control to protect against physical intrusion.
- D. Multiple active power distribution paths, including redundant components.

- E. Multiple, diverse power feeds from independent substations.
- F. Multi-megawatt diesel generator backup power.
- G. Multiple diverse communications resources.
- H. Facility-wide fire suppression systems.
- I. SAS 70 certified.
- J. Backups - Data shall be backed up twice daily. Project files shall be stored on hard drives in redundant array configuration so that even if a hard drive fails, another one will be on-hand to immediately take over. Files shall also be securely copied and stored at another location.
- K. Restricted File Access – Access to the files shall not be allowed to anyone beyond project team members who have been given access.
- L. Coding Guidelines and Checks
 - 1) Enforcement of strong coding guidelines
 - 2) Custom-built framework called SiteEngine
 - 3) SiteEngine secures all site pages and prevents access to unauthorized users
 - 4) All Ajax response action pages are secured against being called directly
 - 5) Included files cannot be linked to directly
 - 6) The SiteEngine Framework prevents access to all pages (except the login page) without authorization
 - 7) Query parameter checking is used everywhere to type-check and secure against SQL injection attacks
 - 8) URL and Form parameter checking is used everywhere to type-check user requests and secure against and prevent attacks
 - 9) All content that originates from a user is escaped with XSS filters preventing Cross Site Scripting attacks
 - 10) Uploaded user files cannot be linked to directly - they are streamed through our application server for security
 - 11) Integrated permission system prevents unauthorized access to objects
- M. Database
 - 1) The database shall have character escaping turned off
 - 2) Passwords shall be stored in hashed format - even with access to the database, passwords cannot be determined
 - 3) Multiple-line SQL statement execution shall be disabled to prevent SQL injection attacks
- N. Server Set-up

- 1) Error reports shall be automatically emailed to developers - this also shows any hacking attempts
- 2) High security SSL shall be used online for all logins and shall be an option for any host-it-yourself installation
- 3) Policies shall include routine changing of server access passwords
- 4) All OS and middleware security updates shall be applied and routinely checked
- 5) All unnecessary services shall be disabled
- 6) High strength passwords shall be used
- 7) Debugging shall only be available to registered IP Addresses
- 8) Execute permissions shall be disabled on web folder to prevent uploaded files from being executed
- 9) Files shall be stored in offline location

O. Hosting

- 1) Servers shall be in a highly secure location
- 2) Access to servers shall be limited to a few people
- 3) Firewall shall prevent access from unauthorized locations (except for port 80 basic HTTP)

P. Testing and Awareness

- 1) Constant monitoring of general internet security threats and viruses and ensure all updates and hot fixes shall be promptly applied
- 2) Use of various scripts and tools such as SQLPowerinjector to test interfaces shall be utilized

B. SOFTWARE DESIGN FEATURES

I.1 The minimum required feature set shall include:

- A. Browsers
- B. Dashboard
- C. Tabbed Browsing Experience
- D. Tasks
- E. Milestones
- F. Messages
- G. Track Time
- H. Upload Files
- I. Manage People
- J. Risk Register
- K. Email Integration
- L. Multiple Language Support
- M. Notebooks
- N. Resources
- O. Reports

I.2 Browsers: the system shall support multiple web-browsers, minimally including:

- A. On PC - IE 7,8,9, Firefox 3.5 or later, Safari 4 or later, Google Chrome, Opera
- B. On Macs - Firefox 3.5 or later, Safari 4 or later, Google Chrome, Opera
- C. On Linux - Firefox 3.5 or later, Google Chrome, Opera

I.3 Dashboard:

- A. Overview – Shall provide one click access to project overview
- B. Upcoming Milestones – Shall provide a mini-calendar view showing scheduled milestones due in the next 14 days (default). The calendar shall be capable of being expanded to be viewed in 7, 14, 30, 60, 90 and 120 day increments.
- C. Custom View – For multiple project users, each user shall be able to *star* projects to mark them as projects they are interested in. Switching to *custom view* shall only depict information on the starred projects
- D. Late Milestones – Shall list all milestones that have been missed across all projects.
- E. Latest Activity – Shall show latest activity across all projects e.g : Tasks, Milestones, Messages etc
- F. Quick Access Tabs – Shall have tabs (e.g., the kinds of tabs utilized in tabbed web browsers) that provide quick access to sections projects. Switch into *Project View* to view these sections on a per project basis
- G. Project Quick Selector – For multiple projects, allows the user to easily jump between projects they have access to.

I.4 Tabbed Browsing Experience – the user interface shall operate utilizing tabs.

I.5 Tasks – the Task function shall include the following features:

- A. Empty Task List- Newly created task list with option to add a task
- B. Your Assigned Tasks- Easily see which tasks have been assigned to you or other members
- C. Completed Tasks- All tasks that are completed are listed below the active tasks
- D. Re-Order Task Lists – Ability to go to the *Task List Ordering* page to move and prioritize task lists
- E. Move Tasks between Task Lists - Quickly and easily move tasks between task lists
- F. Create New Task List - Create new task lists
- G. Current Task Lists- Lists all this project's incomplete task lists
- H. Completed Task Lists - Lists all completed task lists for this project
- I. Milestones Assigned To - If a Task List is assigned to a milestone, that milestone is listed
- J. Quick Add - Add an unlimited number of tasks using a *Quick Add Tool*
- K. Task List Templates – Can create *Task List Templates*
- L. Due Dates – Assign a *Due Date* to each task
- M. Assign Multiple People - Assign just one or multiple people to a single task.

I.6 Milestones – the Milestones function shall include the following features:

- A. Current Project - The name of the current project being viewed
- B. Late Milestones - All the milestones that are late for this particular project
- C. Upcoming Milestones (7, 14, 30 or 60 days)- All the scheduled and upcoming milestones in the next defined number of days for this particular project
- D. All Upcoming Milestones - Upcoming milestones for this project regardless of date
- E. Completed Milestones - All milestones in this project that have been met.
- F. Create Milestone - Button to quickly schedule a milestone for this project.
- G. Task Lists - Task Lists assigned to milestones are listed for easy access.
- H. Add 10 at a time - Quick and easy tool for adding multiple milestones at once
- I. Push Future Milestones - Flexible options to push future milestones forward if you edit an existing milestone
- J. iCal Feed - Get your milestones showing on your Google Calendar, Outlook 2007, iCal App etc by subscribing to the *Milestone iCal Feed*.

I.7 Messages – a centralized communication center shall include:

- A. Message Categories- Messages can be grouped into easily accessible categories
- B. User Photo - Quickly identify the message poster by their photo
- C. Message Title-Click into view the full message and all replies

-
- D. Create New Message Category-Quickly and easily add to the basic categories per project
 - E. Create New Message- Create new messages nice and quickly
 - F. Private Messages - Make it private and hide it from others.
 - G. Edit Categories - Edit and Delete message categories from the same view
 - H. Reply By Email - Reply to messages, message replies and comments from within your email app. Email replies are attached to the message thread on the project site.

I.8 Track Time – the time tracking feature shall include:

-
- A. Tasks integration - Log time spent on any task directly from the tasks section of the site.
 - B. Per project / per user tracking - the time is logged separately across projects and users allowing comprehensive and customized reports.
 - C. Quickly Log Time - The interface is designed so the user can very quickly and easily log their time
 - D. Normal / Billable - Log both general time and billable time
 - E. Comments - Provide comments or a more accurate description with any entry
 - F. Downloadable - Time log reports can be download as PDFs
 - G. Across Project Reporting - Download a report for all users or per user across one or more projects in a given time range.
 - H. Export - Export reports and time log entries as either Excel, CSV or PDF

I.9 Upload Files – file uploading shall have the following features:

-
- A. Current File List - Lists the files currently selected with icons denoting their type.
 - B. Private Files - Mark files as private and they will not be shared.
 - C. File Notifications - Automatically notify clients or staff via email when uploading a file/files.
 - D. File Comments - People can leave comments on uploaded files. Notifications about these comments can be send via email.
 - E. File Version Control - Easily upload new versions of any files. The site shall manage the versions, including a comment system and options provided for each file version.
 - F. File Categorization - Every uploaded file must be placing in a category (a tag similar to a sub-directory), allowing an easy way to find the file later. File categories shall be managed with a quick and intuitive interface.
 - G. Add Files - Browse for more files and select multiple files using the mouse or CTRL and SHIFT keys.
 - H. Upload in One Go - Upload hundreds of files in one go.
 - I. Big Files are No Problem – No restriction on file size. The unique file uploader shall handle big files with ease.

-
- J. Progress Per File - See the progress of each individual file as it is being uploaded.
 - K. Overall Progress Bar - When uploading groups of files, the overall progress bar shall provide an idea of how long it will take.
 - L. Transfer Rate - See the size of all the files being uploaded as well as the transfer rate and progress while uploading.

I.10 Manage People

-
- A. Add Person - Quickly add new people and edit company details
 - B. Company Logo – Project shall be branded with a custom or user-provider logo
 - C. Add Company - Quickly add a new company and staff members
 - D. Business Card View – Allows each user to quickly find people’s contact details
 - E. Owner Company - Specify which staff have access to this particular project
 - F. Additional Companies – Access can be provided to additional projects
 - G. Permissions - Specify which areas of each project a client staff member can see and modify

I.11 Risk Register – The register shall include the following features:

-
- A. Register a risk with the system and rate the probability and impact of the risk occurring from 1 to 9. Specify which of these 3 areas the item could impact on - Cost, Schedule & Performance. The system shall calculate which are the most important threats to the project, and list them in order from most serious to least serious.
 - B. Intuitive - Easy to use interface shall require no training to use.
 - C. Instant Results - The risk chart is generated in real time
 - D. Downloadable - The risk chart is available as a PDF file to print out and take to your meetings.
 - E. PMBOK / PMP compliant - This is a modern approved methodology for risk assessment in projects.

I.12 Email Integration: The following features shall be included:

- A. Integrates with your email providing you with up-to-the-minute status reports, alerts and reminders.
- B. Integrates through Outlook, Apple Mail, Gmail, Yahoo or any other method.

I.13 Multiple Language Support: The following features shall be included:

- A. Choice of 24 languages
- B. Allows international collaboration
- C. Easily switch between languages – each user has the option to switch their language
- D. Intuitive Interface – each user feels more comfortable when using their most natural language

I.14 Notebooks – Notebooks shall allow any user to write a formatted text page that can be revised and edited by other team members. Notebooks shall also include:

-
- A. Intuitive interface - No training manual required.
 - B. Revision Control - Easy to use document revision control.
 - C. HTML Formatting -Use the comprehensive WYSIWYG editor to edit notebook pages
 - D. Unlimited Pages - There is no restriction on the amount of pages that can be created.
 - E. Downloadable - Documents can be downloaded in PDF format, ideal for printing or taking to a meeting.
 - F. Compare Revisions - See what changes were made between 2 revisions
 - G. Categorize - Categorize notebooks into categories
 - H. Comment - Collaborate on notebooks and notebook pages by leaving comments for the team
- I.15 Resources – The following features shall be included:
- A. The Resources tab in each project allows users to embed 3rd party applications, links and web pages in a popup window such as Google Documents, YouTube Videos, Standard Web pages, ProofHQ Proof tools and hundreds of over services we haven't even thought of!
 - B. The Resources feature is similar in layout and functionality to the Files tab. Resources can be grouped into Folders for categorization and listed grouped by date. Creation of resources is simply, easy and fast! The form to create a resource is broken into steps
 - C. The final resource can be viewed by clicking on the title and the resource opens in a new popup dialog right within Teamwork Project Manager
 - D. As with Files, Tasks, Notebooks etc, all resources can be commented on and marked private if you want only your company to see them!
-
- E. Any embeddable object can be pasted into the Code part of the resource creation dialog such as:
 - F. Full iFRAME code from provider
 - G. Flash OBJECT/EMBED code from provider
 - H. Single link item

C. COMMISSIONING ELEMENTS

I.1 The minimum required feature set shall include:

- A. Pre-organized files/tags for storing documents
- B. Task lists of the commissioning process, including assignment of responsibilities
- C. Task list of all main commissioning deliverables
- D. Schedule of major commissioning milestones
- E. Commissioning Issues Log
- F. Contact list of all commissioning-related personnel, including points-of-contact for the Owner, design teams, construction teams, and other relevant personnel and/or consultants
- G. Tutorials, as needed, to explain how the site works
- H. Links to relevant external websites and resources

I.2 The Commissioning Authority shall upload and maintain the following documents. The list presented here assumes a LEED Enhanced New Building commissioning project. The commissioning contract may supersede this list:

- A. Commissioning design reviews
- B. Commissioning submittal reviews
- C. Meeting Notes
- D. Commissioning Issues Log
- E. Commissioning Plan
- F. Pre-Functional Tests (PFTs)
- G. Functional Test Procedures (and/or Integrated Tests and/or Pull-the-Plug Tests)
- H. O&M submittal review
- I. Final Report
- J. LEED Systems Manual
- K. Opposite Season Tests
- L. End-of-Warranty Review
- M. Other relevant documents and/or drawings

I.3 Other Documentation – Other documentation may/shall include:

- A. Owner's Project Requirements (OPR)
- B. Basis of Design (BOD)
- C. Approved submittals and drawings
- D. As-builts
- E. Start-up and checkout documentation from contracting teams
- F. Warranty letters/certifications
- G. Spare parts lists
- H. O&M submittals

- I. Training sign-offs
 - J. Pictures and videos
 - K. Other relevant documentation
- I.4 Commissioned Systems – access for team members, and storage of commissioning related tests and documentation, shall be available for the following types of systems. This is a representative list only:
- A. Mechanical/HVAC
 - B. BMS/Controls
 - C. Electrical
 - D. Lighting
 - E. Testing, Adjusting and Balancing (TAB)
 - F. Fire/Life Safety
 - G. Building Envelope
 - H. Medical Systems
 - I. Call Station/PA Systems
 - J. Domestic Hot Water
 - K. Irrigation
 - L. Security
 - M. Telecommunication
 - N. Audio Visual

END OF DOCUMENT