

High Priorities Project Proposals

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Proposed High Priorities Project Proposals

- **Building Programming**
- **Early Stage Energy Analysis**
- **Clash Detection and Provision for Voids**
- **Select and Procure Products**
- **Quantity Take-Off of Building Elements**
- **Phase Planning: Linking Objects, Schedule, and Organizations**
- **Handover of Facility Management Information**
- **Space Management, allocation of spaces**
- **Asset Management, assign objects**

Building Programming

- **Related to**
 - **(3) Architectural Programming:** Early phases of architectural programming, including time with customers, is more effective. Later processes of spatial relationship and massing are enhanced with existing automation. However, the output of such effort is greatly enhanced as more complete information is input into a BIM. Savings and improved product will amount to a 10% reduction in time for programming
- **Goal**
 - Focus on clients needs
 - Based on BPie http://iug.buildingsmart.org/resources/process-room-workshop-16-october-2012/BPie_IDM%20for%20programming_Tokyo_20121016.pdf/view
 - Add possibility to add national content
 - Need for IFC extension, SW implementation, certification, and data validation
- **Based on existing or ongoing IDM projects**
 - BPie (Lead NO, support CA, Nordic)
 - Architectural Programming to Architectural Design (US)?
 - Early Design AR3
- **Project leader**
 - Frode Mohus, Norway?

Early Stage Energy Analysis

- **Related to**

- **(11) Energy Analysis:** Energy analysis without BIM and the feedback loop that must be implemented does not acutely mimic real performance. The BIM Use of Facility Energy Analysis is a process in the facility design phase which one or more building energy simulation programs use a properly adjusted BIM to conduct energy assessments for the current building design. The core goal of this BIM use is to inspect building energy standard compatibility and seek opportunities to optimize proposed design to reduce structure's life-cycle costs. The potential value of this use case is to save time and costs by obtaining building and system information automatically from BIM instead of inputting data manually; improving building energy prediction accuracy by auto-determining building information such as geometries, volumes precisely from BIM; helping with building energy code verification and optimizing building design for better building performance efficiency and reduce building life-cycle cost. Implementation of BIM will improve accuracy by 80%.

Stage Energy Analysis

- **Goal**
 - Focus on early stage design, since the biggest impact can be made here
 - Inline with the requirements in EU regarding energy consumption
 - Use existing projects in US, Europe/Nordic
 - Make proposal for transition of ""real"" spaces to national rules for spaces, and try to eliminate national rules“
- **Based on existing or ongoing IDM projects**
 - HESMOS (FS, Benelux, Germany, Nordic, UK)?
 - Architectural Design to Building Energy Analysis, GSA-003 (US)?
 - Nordic Energy (NO, Nordic, US)?
 - Information Delivery Manual on Energy Retrofitting (Nordic) – stopped
 - Energy Analysis (NO) – stopped
 - Energy_assessment (US) – stopped?
- **Project leader**
 - Peter Katranuschkov? (HESMOS, Project Lead)

Clash Detection and Provision for Voids

- **Related to**

- **(17) 3D Coordination:** This BIM use is not limited to design as it is useful in all phases. Once an electronic model is produced it can be repurposed to support each need. Perhaps the most effective use is ensuring the owner understands the final product. This effort is where Clash Detection software is used during the coordination process to determine field conflicts by comparing 3D models of building systems. The goal of clash detection is to eliminate the major system conflicts prior to installation. The potential value is significant as it virtually eliminates change orders by better coordination throughout the building project through a model; it reduces and in many cases eliminates field conflicts; which reduces RFI's significantly compared to other methods; you can visualize construction prior to field activity; it clearly increases productivity and reduces construction cost; potentially less cost growth (i.e. less change orders) and there are many projects now with no change orders, it will decrease construction time, increase productivity on site and produce accurate as built drawings and a final model of the facility for use throughout its life. The savings on activities affected by this BIM use case are often upwards of 30%.

Clash Detection and Provision for Voids

- **Related to**
 - **(26) Consistency control:** While quality control has long been implemented in various ways historically, consistency control takes this a step further. Skill levels of the contractor are affected by many issues. Having specific information in the BIM related to installation certificates needed by contractors and installation processes stored in tools such as COBie will go a long way to ensuring that the installers are properly trained for the installation of complex products included in new facilities for items such as energy control and monitoring. Savings can be upwards of 50% for this function.

Clash Detection and Provision for Voids

- **Goals**
 - Focus on clash detection and provision for voids
 - include the use of BCF format
 - include information about the precision of the geometry
 - information about classification should be included specify how a cloud bases management system can work
- **Existing or ongoing IDM projects**
 - Digital interdisciplinary coordination between consulting parties (Nordic), only processes
 - Extended coordination view, (MSG)
 - Clash Detection (NO)
- **Project leader**
 - ?

Select and Procure Products

- **Related to**

- **(20) Product Library:** Having an on-line product library is not a new idea at all, the Internet has been providing this capability for some time now for most products. The capability to effectively accomplish this for the construction industry simply has not kept pace with other industries. Being able to compare products and look at detailed specifications has simply not been automated. A comparison to the travel industry is appropriate where you can choose and compare airlines, hotels and car rental companies. You can now also get feedback from other people related to product performance for a specific purpose. Once this occurs it will save 50% of the time to currently accomplish this task and it will be a more effective process.
- **(21) Product Selection:** A part of establishing the library is providing common criteria by which to compare items being procured. This again exists for many products and organizations such as the Consumer Union in the United States routinely test products for their performance. This information can then be used to choose the most effective product for the purpose. In some cases one does not need a product that lasts a long time if it is going to be replaced to update the look of a space as in hotels or merchandising where make overs may occur every five years. Yet in other cases you may want an item to last the life of the facility. The value of this is obvious in both initial and life cycle costing and savings of 50% for these phases are to be expected.

Select and Procure Products

- **Related to**

- **(22) Perform procurement:** The procurement process will be improved with BIM because information will be available electronically in a form that can be used directly by procurement tools. This will reduce error and eliminate re-entry of data into procurement systems. This will speed the process and can link into scheduling tools which will make just in time delivery a reality. Linking this with prefabrication will further automate the process. The delivery of bill of lading information to include product serial numbers will be important information automatically provided to COBie and to facility managers. These savings can amount to 50% for the business processes they cover.

Select and Procure Products

- **Goal**

- Focus on neutral objects
Exchange of product libraries (Thomas)
Identify properties that are need to purchase products
Add parametrics to IFC
SW implementation, certification
Define a system that could form the starting point for ""all"" libraries in SW products - Bjørns idea
Use information from SPie, Cobie, NBS and Norwegian library project“

- **Based on existing or ongoing IDM projects**

- Product Library (Coordinator Bill East, Roger Grant?)
- Spie (US)
- COBie (US. UK)
- Acoustic ceiling (Product Room)
- ? Norway

- **Project leader**

- ?

Quantity Take-Off of Building Elements

- **Related to**
 - **(4) QTO:** Using BIM to perform QTO activities is far more accurate from the electronic model. Standard QTO needs to be agreed upon. Once in broad use a conversion to a European approach where quantities are provided to contractors and sub-contractors makes significant sense. This will eliminate a significant amount of duplicated work later in the process. It is estimated that up to 300 QTO's are performed per project when counting contractors and sub-contractors. This could be cut to one per project and it would be automated. It could be updated electronically. This alone would cut 80% of the time of estimating.
- **Goal**
 - Basic QTO based on geometry for building elements, building services elements information on systems, classification should be included
 - use existing projects from BLIS,
- **Based on existing or ongoing IDM projects**
 - QTie (US)?
 - QTO (Nordic, Denmark)?
 - Cost Estimate (Norway)?
 - Design to Quantity Takeoff, BSA-001, (US)?
- **Project leader**
 - ?

Phase Planning: Linking Objects, Schedule, and Organizations

- **Related to:**

- **(29) Phase Planning (4D Modeling):** This BIM use case includes the process in which a 4D model (3D models with the added dimension of time) is utilized to effectively plan the phased occupancy in a renovation, retrofit, addition, or to show the construction sequence and space requirements on a building site. 4D modeling is a powerful visualization and communication tool that can give a project team, including the owner, a better understanding of project milestones and construction plans. The potential value of this is better understanding of the phasing schedule by the owner and project participants and showing the critical path of the project; the development of dynamic phasing plans of occupancy offering multiple options and solutions to space conflicts; integrating planning of human, equipment and material resources with the BIM model to better schedule and cost estimate the project; space and workspace conflicts identified and resolved ahead of the construction process; marketing purposes and publicity; identification of schedule, sequencing or phasing issues; more readily constructible, operable and maintainable project; monitoring procurement status of project materials; increasing productivity and decreased waste on job sites and finally conveying the spatial complexities of the project, planning information, and support conducting additional analyses

Phase Planning: Linking Objects, Schedule, and Organizations

- **Goal**
 - Basis functionality like linking object, schedule, and organizations
 - Include state/status information
 - Include the use of BCF-format
 - Bring SW for schedule into the game
 - SW implementation, certification and validation“
 - Location based sch.
- **Existing or ongoing IDM projects**
 - 4D, (NO)
 - Phase Planning (4D Modeling) (US) – BIM Execution Planning?
- **Project leader**
 - ?

Handover of Facility Management Documentation

- **Related to**
 - **(39) FM Documentation:** This information again is a subset of the record model and would be used for stocking critical parts for continuation of operations or possibly even disaster recovery. These are the items that may have long lead times but will very likely need to be replaced if a problem occurs. The need for this information is directly related to the critical nature of the facility. It may be implemented primarily for hospitals or data centers. Facilities that must be operational in case of an emergency. It is dictated by the DR/COOP for the facility. Having this information available for DR/COOP is incalculable in many cases but can ensure that a facility remains in operation. That facility may provide 911 service to a community or health care after a storm or earthquake.

Handover of Facility Management Documentation

- **Related to**

- **(31) Record Modeling:** Record Modeling is the process used to depict an accurate representation of the physical conditions, environment, and assets of a facility. The record model should, at a minimum, contain information relating to the main architectural, structural, and MEP elements. It is the culmination of all the BIM Modeling throughout the project, including linking Operation, Maintenance, and Asset data to the As-Built model (created from the Design, Construction, 4D Coordination Models, and Subcontractor Fabrication Models) to deliver a record model to the owner or facility manager. Additional information including equipment and space planning systems may be necessary if the owner intends to utilize the information in the future. The potential value of this capability will aid in future modeling and 3D design coordination for renovation, Improve documentation of environment for future uses, e.g., renovation or historical documentation, it will aid in the permitting process, it will minimize facility turnover dispute, it will allow for the ability to embed future data based upon renovation or equipment replacement, and provide owner with accurate model of building, equipment, and spaces within a building to create possible synergies with other BIM Uses. Having this data at ones finger tips will save 50% in the cost of this effort.

Handover of Facility Management Documentation

- **Goal:**

- Efficient management and operation of buildings relies on easy access to relevant updated information about the facilities. Computer-aided facility management and operation can improve efficiency, but it requires predefined computer-structured-interpretable information.
- Although advanced computer applications are commonly used during design stages, most of the information for facility management, maintenance, and operation is transferred in the form of traditional documents. The lack of a rich digital exchange of information is preventing the use of and need for model-based tools in facility management, maintenance, and operation. The potential savings are significant, since most of the total cost in a lifecycle for a facility is spent during the operation and maintenance phases.
- Identify missing objects and properties for facility management and operation in general. Add properties to the buildingSMART's Data Model and Data Dictionary and define a roadmap for adding objects to the Data Model. Ensure software implementation of an IDM for Facility Management.

The project will be based on results from the FMie project, which focuses on identifying and proposing quantities and properties for a selected group of building objects in relation to FM, eases the process of adding new properties to the Data Model and Data Dictionary in buildingSMART, and enables links between functional products in a classification system and building objects and their properties. As FMie is based on COBIE, all properties defined in COBIE are included.

Handover of Facility Management Documentation

- **Based on existing or ongoing IDM projects**
 - FMie (NO)
 - FM_handover (aquarium), (NO)?
 - Area information from project to FM (Nordic, Denmark)?
 - Basic HandOver to Facility Management, GSC-001 (US, GS, NO, Nordic)?
- **Project leader**
 - Inge Aarseth, (NO)?

Space Management, allocation of spaces

- **Related to**

- **(33) Space Management and Tracking:** A process in which BIM is utilized to effectively distribute, manage, and track appropriate spaces and related resources within a facility. A facility building information model allows the facility management team to analyze the existing use of the space and effectively apply transition planning management towards any applicable changes. Such applications are particularly useful during a project's renovation where building segments are to remain occupied. Space Management and Tracking ensures the appropriate allocation of spatial resources throughout the life of the facility. This use benefits from the utilization of the record model. This application often requires integration with spatial tracking software. Potential Value: More easily identify and allocate space for appropriate building use, Increase the efficiency of transition planning and management, Proficiently track the use of current space and resources, Assist in planning future space needs for the facility

Space Management, allocation of spaces

- **Goal**
 - Verify required objects are in IFC
 - Main function will be to manage spaces, use of spaces, location, time, organization
 - Make sure that required properties are includes/related to the spaces"
- **Based on existing or ongoing IDM projects**
 - Space Management and Tracking, (US), BIM Execution Planning?
 - Area information from project to FM (Nordic, Denmark)?
 - Move Management, USCG (US)?
- **Project leader**
 - ?

Asset Management, assign objects

- **Related to**

- **(32) Asset Management:** A process in which an organized management system is bi-directionally linked to a record model to efficiently aid in the maintenance and operation of a facility and its assets. These assets, consisting of the physical building, systems, surrounding environment, and equipment, must be maintained, upgraded, and operated at an efficiency which will satisfy both the owner and users in the most cost effective manner. Asset Management supports determining cost implications of changing or upgrading building assets, segregated costs of assets for financial tax purposes, and maintain a current comprehensive database that can produce the value of a company's assets. The potential value is to store operations, maintenance owner user manuals, and equipment specifications for faster access, including performance and analyze facility and equipment condition assessments, it supports maintaining up-to-date facility and equipment data including but not limited to maintenance schedules, warranties, cost data, upgrades, replacements, damages/deterioration, maintenance records, manufacturer's data, and equipment functionality, Provide one comprehensive source for tracking the use, performance, and maintenance of a building's assets for the owner, maintenance team, and financial department.

Asset Management, assign objects

- **Goal**
 - Identify missing objects in IFC
 - Add needed object and properties
 - Implement assignment of objects to time and organization
 - implement relation between objects and spaces/location
- **Existing or ongoing IDM projects**
 - Asset Management (US), BIM Execution Planning?
- **Project leader**
 - ?