integrating information systems for facility asset management in healthcare builds

By Jill Worley, MBA, Attainia Capital Planning Solutions and Bryan Semple, Vice President EMEA, Attainia Capital Planning Solutions

Hospital construction is finished. The contractor has handed over the keys. Final clean has been completed and the lights are on. Staff are recruited, trained and ready to receive the first patients. This is an exciting time for your organisation, but for Facilities and Clinical Engineering managers and staff, it will be a stressful time as well.

Stressful because much time and money has gone into the project, which now is up to the hospital staff to ensure a seamless transition from project to functioning facility. As Healthcare Technology becomes more central to the efficient, effective and safe running of hospitals, staff become responsible for ensuring this technology is used properly so that the hospital has sufficient medical equipment and that it has been correctly installed. Undoubtedly they have been working hard over the past few months inspecting, testing and calibrating equipment.

However, there are questions that will keep the Facility and Clinical Engineering Managers awake at night:

- Is all the equipment in the correct location?
- Has it all been tested, calibrated and asset tagged?
- Have serial numbers been documented?
- When does/did the warranty begin?
- How is the Service Start Date tracked?
- Has Accounting been notified of the asset for depreciation and asset financial reporting?
- How will we track and manage mobile medical equipment after opening day?

These are all questions asked of Facilities Management and Clinical Engineering in a new healthcare building, but where do they start to capture, consolidate and report these details? If these questions are not answered by opening day, the information may be lost for good. Managing data across design, construction, maintenance, operations and asset management has historically been a disconnected flow of information. In many cases, data is rebuilt in disparate, standalone information systems, even when it has been captured elsewhere in the process. Often no system is in place, with each stakeholder and department (facilities, clinical engineering, IT, contractor) managing data using the lowest common denominator system – Microsoft Excel spreadsheets.

Integration of data sources is a growing trend and technology is opening the gateways through which data can be normalised across platforms, allowing for a free flow of information from design to end-of-service.

Details pertinent to the design and build processes:

- What are the dimensions of required equipment and will it fit within the designated spaces and clinical workflow?
- What is the weight of this equipment?
- Is the project in a region or Country requiring seismic anchoring?
- Will the ceiling height impact the specification of the equipment?
- Does the equipment require mechanical, plumbing, electrical or structural accommodations?
- Does the equipment need to be connected to the emergency/ back-up power supply or require an uninterruptible power until a generator can start up?
- Does the equipment require special ventilation or airflow?

Design + Build

In the US, the Department of Veteran Affairs (VA) and the Department of Defense have worked together over many years to develop the Space and Equipment Planning System (SEPS) to support the design of new and refurbished healthcare facilities, which meet the VA's Healthcare Facility Guidelines. The resulting SEPS system contains many standardised data points such as intra-departmental workflows, room sizes, floor finish, air changes, room layouts and typical generic equipment attributes. However, until recently, this valuable information resource resided within the proprietary PC-based SEPS application.

The Space and Equipment Planning System to BIM (SEPS2BIM) initiative takes a major leap in employing Owner's organised, structured data to build BIM's. This process uses the VA's Space Equipment and Planning System (SEPS) to create web-based, 3D objects of spaces and equipment. This process leverages the subject matter expertise and data in the VA's Design Guides as well as provides a means to maintain the initial project baseline data for use in all aspects of the real property life cycle management.

An Application Program Interface (API) on MAX.gov enables other apps to be built on top of SEPS. The SEPS system uses unique database IDs that are assigned to spaces (departments and rooms), equipment, and corresponding BIM objects. These IDs can be used for tracking changes, adding new information and allow for bi-directional updates between applications.

Details pertinent to the equipment planning and procurement processes:

- Which manufacturers supply this type of equipment?
- What Models are available and how do they compare?
- Is there a standard make or model for the organisation?
- Are there local, regional, national and/or government contracts available for pricing?
- How will equipment purchases be aggregated to optimise capital spend volume, and subsequent discounts?
- When is the equipment needed at the job-site?
- Will the equipment ship direct, or to a warehouse or holding location?
- Who holds purchase responsibility for the equipment and are there more than one procurement entities and budgets for the project?
- How does the division of procurement responsibility impact the financial reporting of the project budget?
- Who is responsible for the installation of the equipment and is it included in the cost?
- Will the manufacturer participate in the installation process?

An Ecosystem taking advantage of the API on MAX.gov now includes Revit, NavisWorks, SketchUp, Onuma System, Graphisoft, and BIMobject. This new integration capability provides benefits to architects and planners as they now have access to the generic equipment specifications included in the SEPS database.

However, what is lacking is sufficient BIM-compliant data and technical specifications of medical equipment. Medical equipment planners are often introduced into the process in the late design phases, when many key design decisions have already been finalised. This is problematic and can either constrain the choice of equipment for selection or conversely require costly rework of designs to accommodate required equipment.

Applications like Attainia support the design and equipment planning process by providing access to a large volume of BIM data points. In a joint effort between Onuma and Attainia, the BIM hosted in Onuma are connected to Attainia's product catalog and product specification details. Bi-directional web services allow Onuma's floorplans to be updated and kept in sync with Attainia's room by room medical equipment and furniture specifications. The Onuma-Attainia connection for SEPS2BIM was a milestone in enabling access to equipment data in BIM at the very start of a project, rather than much later in the design process.

Details pertinent to the deployment and fit-up of equipment:

- When is equipment needed on site? Will delays on the part of the manufacturer impact installation timelines?
- Has the schedule changed since order placement, impacting the site's ability to accept delivery?
- Is there adequate access into the building to accept equipment and move it to its final destination?
- Will elevators be operational for deliveries? Are elevator car sizes sufficient for larger equipment?
- Is union labor required?
- Is the room where equipment will be installed complete, and has the room been "turned over" to the owner?
- Does the equipment require special security consideration inside the building once installation is complete?
- Is the in house engineering team scheduled to provide inspection, calibration and testing support?
- Is there a requirement for clinical IT connectivity testing?
- Has the equipment been asset tagged and details recorded in the CMMS?

Equipment Planning + Procurement

Once the hospital design has been completed and construction documents have been signed off, it is critical that medical equipment planners be engaged throughout the construction phase and supporting procurement.

The planner must then take the design specifications and find consensus with the project designers, architects, engineers, contractors, clinical stakeholders, and corporate and operational oversight teams. Through this process the generic specifications are fine tuned, to include both technical configuration, as well as functional, including additional accessories, options, components and services.

This phase of the project can last months or, in some cases, years. Designs will change, clinical needs will be re-prioritized and even Healthcare technology will change. It is critical that equipment planners continue to work and communicate with the architects, clinical staff ▷

and construction contractors so that they ensure the as-built facility and MEP services can support the selected equipment and that it can be installed without further rework.

The planner must manage hundreds of details for every piece of equipment, while leveraging pricing to finalise a procured piece of equipment. Equipment planning databases, whether proprietary in house systems or licensed through cloud based applications like Attainia, should be integrated with BIM and CAD-based systems to ensure the integrity of the design as well as with the hospital or healthcare system's corporate procurement system for the placing of purchase orders and processing of invoices.

Once a purchase order is issued, a whole new phase begins.

Deployment + Fit-Up

The coordination of the delivery, temporary storage and deployment/fit-up of equipment, and furniture, often falls to resources working on the job-site. Coordination can occur while substantial construction and equipment planning activity continues, so every delivery must be tightly managed to determine when equipment is needed and when the building is ready to accept delivery. If scheduling conflicts occur, off-site or interim storage can be required and additional costs and delays incurred.

For some larger scale projects, an off-site warehouse is necessary. For smaller projects, careful staging of the building will accommodate interim holding and secure storage of vital components until final install can be coordinated. In both cases, the deployment typically will occur simultaneously to the final equipment procurement, so the ability to synchronize data between planning/procurement and fit-up is critical.

Attainia recently partnered with HTS Inc. to integrate Attainia's PLAN application for capital equipment planning and budgeting to the HTS FreightTrain® FitUp™ module. This integration allows for the on-going planning and procurement of furniture, fixtures, and equipment, while enabling logistics at the job-site to track the receipt, storage, delivery, install and final acceptance (punch list) of equipment on a room by room basis.

Similar to the SEPS2BIM and Onuma integration, equipment identified and specified in the Attainia database can also be viewed in FreightTrain® FitUp™ via fully interactive colourised maps and Visual Fragnets for the project, allowing for easy navigation and validation of open issues on a room by room, equipment by equipment basis. The FitUp module is also mobile device friendly, allowing for offline tablets to be used on the job-site, where Internet connectivity is often intermittent, or non-existent.

Having the right tools in the field enables the fit-up team to gather new details such as serial numbers and asset tags as equipment is deployed to final destination rooms. The tracking of punch lists and owner acceptance will also assist in establishing the date equipment is ultimately put into service.

Both Attainia PLAN and HTS FreightTrain® FitUp™ provide data driven analytics, metrics and comprehensive reports. The systems are cloud based, providing secure access 24/7 and global access to all edit and view level team members, many of whom are often geographically separated and disconnected otherwise.

Details pertinent to asset management:

- Room in which equipment is installed (fixed assets)
- Cost centre to which equipment will be accounted
- Serial number
- Asset tag assigned
- Depreciation values
- Date put into service
- Estimated Useful Life
- Warranty start date & term
- Preventative maintenance schedules
- Repair history
- Work orders

Asset Management

Trying to track thousands of medical devices while capturing information such as serial numbers once the hospital has been handed over is a disruptive, time consuming process. Best practices adopted by many leading healthcare providers ensure this information is captured as part of the design, construction and fit-up process and is provided as part of the handover of the building and equipment.

Systems like FreightTrain® and MainSpring Healthcare Solutions can interface or import data from Attainia and establish foundational databases of equipment for new facilities. Many governments around the world now mandate the provision of BIM-compliant data as part of any publicly funded construction project.

Facilities Management and Clinical Engineering are expected to efficiently manage total lifecycle once equipment is put into service. Managing service performance, tracking location and availability of equipment, managing safety and compliance, planning for end of life and replacement all require strong decision support analytics. All of this results in streamlined processes and improved operational performance.

Over the course of the design, build, planning, procurement, deployment and fit-up of equipment, a project will have successfully and completely assembled the data necessary for Facilities Management and Clinical Engineering to assume ownership of all equipment, its maintenance, depreciation and ultimately, the life cycle replacement, at which time, the process begins anew, but more fully empowered with solid historical data.

Effective Integration

The capital equipment life cycle is a long and arduous path of data management from design to replacement. Through better integration of information systems, healthcare is going to begin recognising substantial time and cost savings, while providing for more efficient management of technology.

- Regulation: Increasingly, government and private healthcare facilities around the world are insisting that construction and equipment related data for new build and refurbishment projects is provided as part of the handover in BIM-compatible formats (e.g. COBIE).
- Adoption: Architecture, planning and construction firms are increasingly adopting BIM as a key tool for improving the efficiency and effectiveness of their design and construction activities, reducing risk and eliminating delays and additional costs associated with lack of accurate and transparent data.
- Integration: Key technology solutions, which previously operated in isolation can now be easily integrated to provide a cloud-based ecosystem, further speeding up design, construction, commissioning and transition activities and eliminating data integrity issues.
- Collaboration: Organisations involved in healthcare facility design and construction must adopt a more collaborative approach, sharing and integrating data in order to deliver quality healthcare environments on time and to budget. BH