

GE Healthcare

Project Implementation Guide for Interventional Systems

Working together to get your new technology
online so you can begin providing patient care.



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Use of this Guide

Installation of your new GE Healthcare system requires that your site be prepared to comply with the product's unique site preparation requirements. Our mutual goal is to prepare for delivery and installation of your system in a timely manner.

GE Healthcare has extensive experience assisting customers with preparing their sites for the delivery and installation of their systems. This guide provides an overview of many of the usual site preparation steps GE Healthcare follows while assisting our customers during the preparation of their sites for the delivery and installation of their systems. This guide contains information on the following topics.

- Project Implementation
- Construction
- Site Evaluation
- Site Ready
- Project Team
- System Delivery
- Preliminary Plans
- Installation and Calibration
- Construction Plans
- Applications
- Plan Review
- Project Completion
- Close-Out Meeting

In addition, your site plan and design needs to incorporate the site planning information and requirements found in the applicable GE Healthcare pre-installation manual and the site-specific final equipment installation drawings for your system. Please contact your GE Healthcare project manager if you have not yet received a copy of the applicable GE Healthcare pre-installation manual. PDF copies of the GE Healthcare's pre-installation manuals, along with PDF copies of typical preliminary project drawings and typical final installation drawings are available for viewing and downloading at the following link:

http://www3.gehealthcare.com/en/Support/Site_Planning

You may find it beneficial to share and utilize this guide with your facilities team, system users, architects, engineers, contactors, or others involved in the design and construction of your site. Portions of this guide are repeated in more than one section for completeness of information within a given section.

Your GE Healthcare team is available to provide assistance with your project. Your GE Healthcare project manager is your GE Healthcare focal point during the project implementation process. Please contact your GE Healthcare project manager with any questions you may have.

Process Flow

An understanding of the process steps by team members supports the creation of an objective schedule. In order to do this, all team members should have a good understanding of the steps in this process. This guide describes the typical project implementation process steps and time required for each step. Determine if your project has special needs not addressed by this typical process flow and develop a specific schedule for your project. GE Healthcare will provide you with assistance during various steps of your site preparation project as indicated in this guide.



Figure 1 - Illustration of Process Flow

Process Flow (Continued)

This portion of the Process Flow section outlines additional task descriptions for each process step.

Note: This is not a comprehensive list of tasks or requirements in the project implementation process. You must work with your team to define all the specific tasks and scope for your site.

Select Site for System

Cycle Varies

- Finalize type of system to be installed
- Determine project type, such as new construction, addition, renovation, upgrade
- Gather system user inputs
- Facility planning involvement is critical
- The applicable GE Healthcare pre-installation manual and typical drawings will be provided to you by your GE Healthcare project manager
- Determine if a Certificate of Need or any special permitting is required

Select Design and Construction Team

Cycle 1–2 weeks

- Select an architect or qualified designer as early as possible
- Decide on Design-Build or Design-Bid-Build site preparation approach
- Conduct an on-site pre-bid meeting if the Design-Build approach is selected
- Consider medical system construction experience as a main criteria for contractor selection

Preliminary Floor Plan and Site Evaluation

Cycle 1-2 weeks

- Team collaboration
 - GE Healthcare project manager
 - Customer team
- Perform a complete site evaluation specific to your system type
- Perform a broadband (high-speed Internet) connectivity assessment
- Define filming, printing, and PACS interface requirements
- Review the system delivery route
- Select the desired system location and room configurations
- Your GE Healthcare project manager will develop a preliminary floor plan incorporating your input
- Your written approval of GE Healthcare's preliminary floor plan

Process Flow (Continued)

Develop Preliminary Project Plan

Cycle included in preceding

- Select an architect for input
- Define your project scope
 - Unique elements for your system configuration
 - Construction requirements
 - User inputs are critical
- Finalize the project floor plan
- Develop preliminary written project schedule to establish a planned first use date
- Agreement and commitment is required from all parties involved

GE Healthcare Final Installation Drawings

Cycle 1-2 weeks

- Your written approval of GE Healthcare's preliminary floor plan is needed to proceed with the site-specific final equipment installation drawings
- Your GE Healthcare project manager will coordinate with the GE Healthcare Design Center to complete the site-specific final equipment installation drawings
- AutoCAD and PDF files of the site-specific final equipment installation drawings are provided by GE Healthcare (prints are available upon request)
- GE Healthcare's final installation drawings are **NOT** construction drawings, but portions may need to be incorporated into the architect's construction documents/plans

Construction Drawings

Cycle 3-7 weeks

- Conduct an on-site design kick-off meeting
- Utilize the GE Healthcare pre-installation manual and equipment installation drawings
- GE Healthcare's project manager is available for support
- Facility Planning/Landlord involvement is critical
- Your architect/engineering team is responsible for applicable code and regulatory compliance
- Finalize the system delivery route and verify elevator load capacity rating, if applicable (your rigger and GE Healthcare's project manager input is critical at this stage)
- Hold periodic team review meetings



Process Flow (Continued)

Plan Review and Permits

Cycle varies

- Required governmental approvals vary by location
- Obtain construction bids, if using the Design-Bid-Build approach
- Identify and remedy potential risks to the schedule resulting from review and permitting delays
- Arrange permits to close street or sidewalk for delivery or rigging, if applicable

Pre-Construction Meeting and Finalize Project Schedule

Cycle 1 week

- Team collaboration is essential
- Pre-Construction Review:
 - Critical that contractor, all suppliers and subcontractors are present
 - Identify critical path events
 - Identify long lead items
 - Ensure all shop drawings for construction are complete
 - Finalize the project schedule while focusing initial efforts on the exam room, equipment room, and control room
- Schedule input and commitment from the entire team is critical
- Coordinate the project schedule with the rigging company
- Distribute appropriate construction drawings to all trade groups

Construction

Cycle varies (site dependent)

- Complexity of the project drives total project cycle time
- Order long lead time items
- Your GE Healthcare project manager is available for support and questions
- Communicate status updates to your GE Healthcare project manager
- Critical path items monitored and completed, such as:
 - HVAC operational
 - Power available
- Closely monitor site progress

Process Flow (Continued)

- Conduct required inspections and measurements
- Maintain planned completion date while focusing construction efforts on the exam room, equipment room, and control room
- Confirm system delivery route
- Hold periodic project team review meetings

Site Ready!

- Site Readiness Assessment complete, led by your general contractor and conducted with GE Healthcare's project manager
- Maintain planned completion date while focusing construction efforts on the exam room, equipment room, and control room
- General contractor completes the items on the construction punch list
- Schedule and finalize system delivery dates
- Verify broadband connectivity and IP addresses are obtained

System Delivery

Cycle 1-2 weeks

Your GE Healthcare system typically arrives through a 2-step delivery process so the equipment arrives on-site when it is needed. The 2-step delivery process and other key tasks are listed below.

- Final schedule notification sent to rigger and GE Healthcare project manager
- Coordinate temporary shoring, if needed
- Step 1: Certain system components typically pre-ship 2 to 6 weeks prior to delivery of the balance of the system components. The items that typically pre-ship are the main disconnect panel.
- Step 2: Delivery of the balance of the system components

Installation and Calibration

Cycle 2-3 weeks

- Identify trades that will be needed during mechanical installation, such as electrician, plumber, HVAC, facilities personnel
- Mechanical installation of the system
- Calibration completed by the GE Healthcare field service engineer
- Connect to the customer's network/PACS systems
- Connect to the broadband (high speed Internet and GE VPN)



Process Flow (Continued)

Applications Training and First Patient Use

Cycle < 1 week

- GE Healthcare applications specialist scheduled for on-site training
- Review TiP pre-training materials provided by GE Healthcare
- Identify staff members who will participate in training
- Provide supplemental personnel support to allow for the technologists' participation
- TiP Applications classes scheduled for technologists, if applicable
- Identify mix of exam types appropriate to the practice
- Ensure appropriate patient loads are scheduled

Close-Out Meeting

As the project is now essentially completed, it is time to do a final assessment of the project, identify key contacts, and reflect on what worked and what could be improved upon. Your GE Healthcare project manager will initiate a project close-out meeting to review the following:

- Review the project plan to ensure all tasks have been completed
- Review follow-up requirements
- Identify project positives/improvement areas
- Complete the hand-off to GE Healthcare Service

Site Evaluation

Overview

There are several ways to accommodate your GE Healthcare system at your site.

Some examples are the following:

- New Facility
- Building Addition
- Renovation
- Replacement of existing system or upgrade
- Leased Space
- PDC Cassette or Mini-Clinic



Figure 2 - Photo of New Facility



Figure 3 - Photo of Building Addition



Figure 4 - Photo of Renovation



Figure 5 - Photo of Leased Space

Site Evaluation (Continued)

The specific site you select influences the complexity, schedule, and cost of the project. Your GE Healthcare project manager will help you identify potential locations that could satisfy your patient flow requirements as well as GE Healthcare's space requirements.

Some questions to consider:

- What type of GE Healthcare system did you purchase?
- Is the system to be located at your existing facility or in a new independent clinic, medical office building, or leased space?
- Do you plan any future expansion into the surrounding area?
- Is the location appropriate for the system weight, size, vibration sensitivity, acoustics, and any other requirements specified in GE Healthcare's applicable pre-installation manual?
- What system location and layout provides the most efficient workflow for your staff and patient flow, including proximity to other facility functions and diagnostic imaging systems?
- Is space available in your existing building to renovate?
- Is space available to build an addition?
- Are you replacing or upgrading an existing system in an existing location?
- Is this an independent clinic constructed on site or a PDC Cassette/Mini Clinic?



Figure 6 - Photo of Construction



Figure 7 - Photo of PDC Cassette/PDC Mini-Clinic

Site Evaluation (Continued)

System Upgrades

If you are replacing or upgrading an existing system in an existing room, the existing radiation shielding must be tested for compliance with the applicable state and local radiation shielding regulatory requirements, including conducting any applicable surveys. This testing should be conducted prior to de-installation of the existing system. This testing will indicate the need for repair or modifications to the existing radiation shielding or the need for new radiation shielding. Repairing, modifying, or replacing the radiation shielding should be factored into your project cost and schedule. You may also have to make other room modifications to meet current siting requirements, such as cable concealment, egress, floor levelness, and floor support.

Site Vibration

The vibration environment at your site can affect the performance of certain systems. If applicable for your new system, you need to have your site tested for the existing vibration levels to assure your site complies with the requirements provided in the applicable GE Healthcare pre-installation manual. If your site does not comply with those requirements, appropriate corrective actions will be necessary prior to delivery and installation of your system.

Electromagnetic Interference

The electromagnetic interference and power quality at your site can affect the performance of certain systems. If applicable for your new system, you need to evaluate your site to ensure compliance with the requirements provided in the applicable GE Healthcare pre-installation manual. If your site does not comply with those requirements, appropriate corrective actions will be necessary prior to delivery and installation of your system.

System Delivery

The system delivery route needs to be reviewed to determine the following:

- If the floor support is needed along the delivery route during the delivery of the new system components
- If the delivery route corridors and doorways to the designated rooms have adequate width and height clearance to accommodate for the size and turning radius of the new system's components
- If the size and capacity of the elevators along the delivery route can accommodate the size and weight of new system's components

Consult your GE Healthcare project manager regarding questions you may have concerning your site or the delivery route.

You will receive a preliminary floor plan from your GE Healthcare project manager. That floor plan should be reviewed with your entire team. Your GE Healthcare project manager needs your written approval of that preliminary floor plan in order to authorize starting your site-specific final equipment installation drawings.

Project Team

Overview

You may find it helpful for applicable members of your project team to use this guide. Those team members may include:

- Senior Management
- Project Manager
- Architectural and Engineering Firms
- Construction Team
- Information Technology Representative
- System Users
- Other personnel that have visibility and an impact on the implementation the project

Your team's involvement is critical to the success of your project's design and construction efforts. It is very important to identify your specific team members and start team meetings early in the project in order to develop an appropriate floor plan and project schedule.

A well developed and executed project plan and schedule helps to minimize the possibility of delays in system delivery and installation, thereby potentially avoiding:

- Delays in scanning patients
- Cost overruns for construction

The capabilities of your project architect and contractors are critical factors to the overall success of your project. GE Healthcare can provide Design-Build services through its internal MedFACS team. These Design-Build services are provided at an additional cost based on a mutually agreed upon scope of work. See the GE Healthcare Support section for additional information regarding the services the MedFACS team can provide.

Selecting Your Design and Construction Team

Selecting the right design and construction teams is important to the outcome of your project. GE Healthcare's systems have unique and specific site preparation requirements. The design and construction professionals that you hire will need to use the applicable GE Healthcare pre-installation manual which is available through your GE Healthcare project manager.

When assessing the qualifications of the design professionals and the construction contractors, it is a good idea to consider the amount of experience they have with respect the design and site renovation or construction for the installation and operation of diagnostic imaging systems that are similar to your new system.

You need to determine if you will use the Design-Build approach or the Design-Bid-Build approach for your project.

Project Team (Continued)

Design-Build

For Design-Build you will be looking for a contractor that has design capability or a design team with construction capability. You would enter into a contract with a single company for both the design and construction services. This method will eliminate the need for a construction bid cycle after construction drawings and specifications are completed.

Design-Bid-Build

For Design-Bid-Build you would be entering into contracts with both a design firm and a general contractor. This approach may require additional project management from your staff to coordinate the activities between the other parties. This differs from the Design-Build approach where you usually have a single point of contact. This method will require obtaining construction bids after the construction drawings and specifications are completed.

Once you review the qualifications of the design firms and construction contractors, you will need to select a design firm to prepare the construction drawings and specifications. When the construction drawings and specifications are completed, you will need to select one or more of more contractors to bid on the construction work; they should be invited to a pre-bid meeting at the project location. The meeting attendees should focus on understanding the scope of the construction work, the existing site conditions, and the planned project schedule.

Your GE Healthcare project manager will develop a preliminary floor plan incorporating your input. The potential sites for your system need to be evaluated to determine if new or additional radiation shielding is required or if mitigation of existing vibration conditions is required. You may need to evaluate more than one location and room configuration to find a location for your new system that meets your requirements and is consistent with GE Healthcare's site preparation requirements.

Team Collaboration

Identify your project team members. For an effective site design, obtain input from all team members and users regarding workflow, patient flow, and facility configuration.

It is your responsibility to evaluate potential design professionals and contractors for your project.

GE Healthcare Support

GE Healthcare Project Manager

GE Healthcare provides project implementation support through your GE Healthcare project manager. This support for your project implementation process will be provided through the following primary activities:

- Assist in assessing sites for the location of your system
- Assist in developing a preliminary floor plan your system
- Provide an applicable GE Healthcare pre-installation manual and site-specific final equipment installation drawings that include the site preparation requirements that your architect and engineer should utilize when designing your site
- Provide your architect and engineers with assistance resolving questions regarding GE Healthcare's site preparation requirements
- Provide supporting information to your contractor(s) related to schedule development and construction planning
- Provide assistance when you conduct periodic site readiness assessments to determine the status of the site preparation requirements that need to be completed for delivery of the system
- Assist you with the coordination of the system delivery and installation activities
- Coordinate the close-out meeting

HPI Technical Support Group

GE Healthcare's HPI Technical Support Group lets you and your contractors connect live with GE Healthcare's system installation experts to discuss your system siting and installation questions.

Just give GE Healthcare's HPI Technical Support Group specialists a few simple items:

- Your name and contact information
- Your site name and location
- Your GE Healthcare project manager's name
- Project drawing number, if available
- The type and model of system being installed

You'll get answers to non-site-specific questions related to your system. GE Healthcare's HPI Technical Support Group specialists will relay any site-specific questions to the applicable GE Healthcare project manager for follow-up.

GE Healthcare Support (Continued)

The HPI Technical Support Group's line offers live coverage:

- Monday through Thursday, 7:00 a.m. to 6:00 p.m. Central time
- Friday, 7:00 a.m. to 1:00 p.m. Central time

Most callers will be connected immediately with a HPI technical support specialist. If not, you may leave a message and a technical support specialist will promptly return your call.

Toll-Free: (877) 305 9677

Or Online: http://www3.gehealthcare.com/en/Support/Site_Planning

GE Healthcare's Design-Build Services

GE Healthcare is able to provide Design-Build services our customers through GE Healthcare's MedFACS (Medical Facilities Construction Services) team. MedFACS provides GE Healthcare's customers with single-source responsibility for both the equipment and the design and construction services needed to prepare your site for the installation and operation of your new system. Through this process GE Healthcare is able to deliver a predictable project schedule and provide its design and construction services in compliance with GE Healthcare's site preparation requirements for your new system.

The construction is custom tailored to meet your needs while integrating the site preparation requirements for your new system and the conditions at the existing site. Typical MedFACS projects include single room renovations, multi-modality imaging departments, modular buildings, and small building additions/clinics. The MedFACS team utilizes proprietary detailed standard documentation to create a detailed site-specific scope of work and a site-specific drawing indicating the site floor plan. These drawings are usually either the preliminary project drawings prepared by GE Healthcare's project manager or the site-specific final equipment installation drawings. Once the MedFACS quotation is accepted, the MedFACS team will commence the performance of the design and construction services.

Please contact your GE Healthcare project manager if you would like to explore this matter further with a representative of the MedFACS team.

Roles and Responsibilities

The following individuals or firms, in conjunction with your team, will participate in the implementation of the project. Some of the participant's key project touch points are listed below:

GE Healthcare Project Manager

- Participate in the preliminary floor plan and site evaluation phase
- Participate in the construction kick-off meeting
- Periodic site visits
- Project progress report 30 days prior to the planned system delivery date
- Participate in the site readiness assessment prior to the system delivery

GE Healthcare Project Manager and Field Service Engineer

- System Delivery
- Mechanical Installation

GE Healthcare Field Service Engineer

- Calibration
- Acceptance

GE Healthcare Applications Team

- Applications training

GE Healthcare Sales, Project Manager, PACS Engineer, and Field Service Engineer

- Project completion, Service hand-off, and close-out meeting

Customer

- Maintain good communications among all team members
- Ensure all site-specific construction items are completed prior to system delivery
- Ensure that your representative is available at the site to accept and inventory the system components when delivered
- Secure rigging services, if applicable

Roles and Responsibilities (Continued)

Architect/Engineer

- Develop an overall floor plan for your site and coordinate with the GE Healthcare project manager
- Develop site-specific construction drawings and specifications
- Coordinate the design with the applicable GE Healthcare pre-installation manual and the site-specific final equipment installation drawings, ensuring all those requirements are incorporated
- Comply with applicable code and regulation requirements
- Coordinate plan review and approval processes necessary for applicable governmental approvals and construction permits
- Communicate with GE Healthcare's project manager regarding questions or changes with the following: floor plan, system selection, schedule changes, and other items that impact the project schedule and/or the site preparation

Contractor

- Develop the construction schedule and communicate to entire project team
- Obtain all required demolition and construction permits
- Keep the project on track with the construction schedule, ensuring all scheduled tasks are achieved by the scheduled dates
- Construct the site, manage sub-contractors, deliver the site consistent with the requirements in construction drawing and specifications, and complete it on time
- Coordinate/communicate all issues with your team, the project architects and engineers, and GE Healthcare's project manager
- Obtain all required demolition and construction permits and coordinate all required construction inspections
- Ensure that both the site readiness assessment and the site assessment checklist are completed prior to system delivery
- Coordinate the system delivery with GE Healthcare's project manager
- Comply with all applicable federal, state, local, and project site safety requirements and ensure the project site and system components are secure

Project Plan

Develop a Preliminary Project Plan

Early project planning helps enable on time project execution. The earlier you develop the plan, the earlier you can identify when your system will be available for patient use, as well as identify potential risks to your project and schedule.

- Get input from your architect, construction contractor, facilities team, technologist, landlord, and other project team members
- Review and consider the requirements for the installation of your new system specified in the applicable GE Healthcare pre-installation manual and typical drawings
- The major project elements and events and their durations and estimated dates should be identified as you develop your preliminary project plan
- Typical standard durations of the major project elements and events can be obtained from various sources, such as architectural/engineering design firms and the construction, mechanical, electrical, and other specialty contractors

Develop a Preliminary Project Schedule

- A written project schedule, even though it is preliminary, will help you establish a planned “first use” date for your new GE Healthcare system
- Incorporate the durations identified when you developed your preliminary project plan
- Identify any needed construction drawing review, approval, and permit processes so the applicable durations can be included in the project schedule
- Identify any required or potential zoning changes that may be needed. The typical durations required for such changes should to be included in the project schedule
- Your GE Healthcare project manager will assist you in preparing the initial system installation durations that can be included in the project schedule

Estimate Your Project Costs

- Your costs will vary based on type of construction, the construction schedule, your location, and the complexity of the project
- Preliminary cost estimates should be obtained from your architect and/or contractor once you have a developed a preliminary scope of work and floor plan

Project Plan (Continued)

Initial Project Definition

- Your preliminary scope of work, project schedule, and preliminary floor plan will become the basis from which for your design and construction teams can begin the detailed planning for your project.
- The scope of work, preliminary floor plan, and project schedule can be used to review, refine, and obtain the agreement of your team members.
- Once you have the agreement of your team members, your GE Healthcare project manager can start to plan your system delivery date.

Design Kick-Off Meeting

The purpose of this meeting is to communicate the preliminary project requirements, begin to set expectations, review the project schedule, answer questions, explore concerns, and begin the process of refining all of the project elements.

Usual Attendees:

- Customer team usually consists of:
 - Director of Radiology
 - Facilities Management
 - IT Representative
 - Technologist Representatives
 - Customer's Internal or External Design Team
- GE Healthcare team usually consists of:
 - Sales Representative
 - Project Manager
 - Field Service Engineer

For a Hybrid Operating Room consider adding the following customer attendees:

- Surgeons
- Head Nurses
- Infectious Control Representatives
- Third Party Providers of Operating Room Surgical Equipment

Meeting Prerequisites:

- GE Healthcare's project manager has received AutoCAD drawings of the site from customer's design team
- GE Healthcare's project manager has provided the applicable GE Healthcare pre-installation manual and typical final equipment installation drawings to customer's design team
- Send meeting agenda to attendees prior to meeting
- Communicate estimated length of meeting (usually 1 to 2 hours)
- GE Healthcare's project manager has provided preliminary floor plan drawings to customer

Project Plan (Continued)

Usual Agenda Topics:

- Introductions
- Discuss roles, responsibilities, and information flow
- Review initial preliminary floor plan drawings
- Discuss and identify the GE Healthcare system type on the order, note any changes required
- Project Implementation items to be discussed
 - GE Healthcare's project manager received preliminary site layout from customer's architect
 - Determine when a vibration study will be done, if applicable
 - Determine when an electromagnetic interference study will be done, if applicable
 - Determine if seismic anchoring is required
 - Discuss rigging requirements, if applicable
- Customer's written approval of GE Healthcare's preliminary floor plan drawings
- Identify a preliminary system delivery date, discuss the ramifications of changing the delivery date once it is finalized
- Identify when the construction drawings and specifications will be completed and determine the likely schedule for applicable governmental drawing reviews/approvals and the obtaining of construction permits
- Meeting Follow-up Activities:
 - Distribute a follow-up e-mail detailing expectations to each of the meeting participants
 - If seismic anchoring is required, obtain the seismic anchoring detail drawings
 - If electromagnetic interference countermeasures are needed, resolve how they will be addressed

Project Plan (Continued)

Gantt Chart

A Gantt chart is commonly used for developing and tracking project schedules. Some tasks are dependent and require completion of preceding tasks before they can begin. The Gantt chart provided below is a sample of a typical project schedule.

The duration of each task will depend on the type of project and specific site requirements. Your project team will need to collaborate and determine the tasks needed and duration of each task in order to create an appropriate schedule for your project.

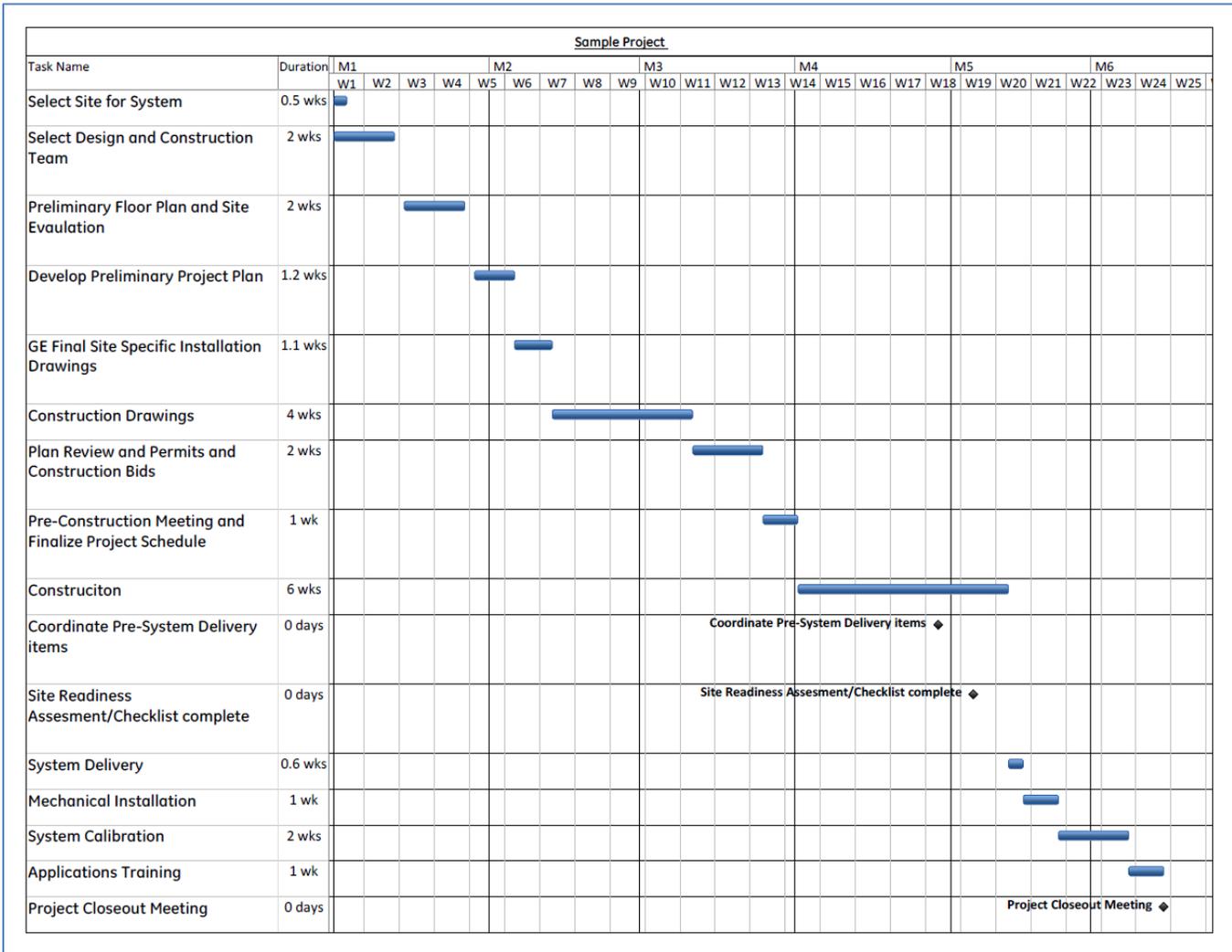


Figure 8 - Sample Gantt Chart (for reference only)

Project Plan (Continued)

GE Healthcare Site-Specific Final Equipment Installation Drawings

The GE Healthcare site-specific final equipment installation drawings and the applicable GE Healthcare pre-installation manual include the requirements your design team will need to incorporate into the project construction drawings and specifications.

Installation Drawings Features:

- The site-specific final equipment installation drawings are provided in both AutoCAD and PDF file formats for utilization by your design team. Hardcopy drawings are also available upon request.
- The GE Healthcare site-specific final equipment installation drawings are not construction drawings. Your architect and engineers must create the project construction drawings and specifications for your project that meet applicable local, state, and federal requirements.
- The GE Healthcare site-specific final equipment installation drawings indicate the configuration and interconnection of your system's components. Your architectural and engineering team will need to determine patient flow and other functional needs, such as dressing and waiting rooms, toilets, viewing rooms, lighting, electrical outlets, power feeders, HVAC, and other requirements that are specific to your project site.
- The requirements in the applicable GE Healthcare pre-installation manual must be carefully reviewed, understood, and incorporated into the project construction drawings and specifications by your architectural and engineering team.
- Any changes in the project design by you or your architectural and engineering team, contactor, or plan review agency require coordination with your GE Healthcare project manager. If that occurs and revised equipment installation drawings are needed, they can be prepared and provided.
- Your GE Healthcare project manager is available to answer questions regarding GE Healthcare's site-specific final equipment installation drawings.
- The GE Healthcare site-specific final equipment installation drawings may need to be revised to incorporate any mutually agreed upon project design and construction changes.

It is important to work with a competent architectural and engineering team and construction contractor who both have experience in medical facility design and construction for diagnostic imaging systems.

See the typical electrical installation drawing E1 sheet on the next page.

Project Plan (Continued)

Construction Drawings

The construction documents (drawings and specifications) describe and detail what is needed to prepare your site for the installation of your GE Healthcare system. Proper and accurate planning by your design team prior to this stage will reduce issues that might occur during the construction or renovation phase of the project.

It is helpful for you to conduct a design kick-off meeting to get everyone's agreement on the overall project scope and schedule. This meeting should be held at the project site to help facilitate any discussion around the existing conditions. The project architect, engineers, and contractor should all be invited to this meeting along with your facilities team and your GE Healthcare project manager.

Hospital or clinic staff, facility planning department, and/or landlord involvement is critical during the design phase to ensure any of their special requirements are incorporated and any needed internal reviews and approvals are obtained.

The construction documents usually consist of design drawings and written specifications. You will need to check with the state and local authorities having jurisdiction over any plan review and permitting processes to determine if the drawings need to be sealed by licensed design professionals. Those authorities may include reviews/approvals by the local planning and building department, the state planning and building department, the state fire marshal's office, and/or the state department of health.

Building Codes and Regulatory Compliance Requirements

Your design team is responsible for complying with the applicable building codes and regulatory requirements, including the Americans with Disabilities Act. This includes the applicable building codes and state health department requirements, as well as any other applicable regional design and construction laws, codes, or regulations.

Critical Design Elements:

The following is a list of critical design elements that often generate questions. While this list is not an all-inclusive listing of all critical design elements, it does contain a number of items that will require the design team's attention.

- Foundation design (e.g., seismic, vibration)
- Lighting in the exam and control rooms
- HVAC system designed to meet the system requirements specified in the applicable GE Healthcare pre-installation manual
- Recommended room sizes and ceiling heights
- System delivery route and access to the exam room, service clearances and egress clearances
- Floor loading during the delivery process, and staging areas for unloading the equipment
- Floor levelness and preparation
- Conduits, overhead cable trays, recessed cable ducts for system cables and interconnects
- Verify GE Healthcare system cable length

Project Plan (Continued)

- Junction box, electrical conduits, raceway size
- Power feeder requirements that comply with GE Healthcare's applicable power regulation and grounding requirements
- Main disconnect panel, verify how it will be sourced
- Uninterruptible power supply system, if one is required
- Personnel telephone equipment and services
- Broadband (high-speed Internet) connectivity
- Network connectivity

Requirements for many of these items can be found in the applicable GE Healthcare pre-installation manual or on GE Healthcare's site-specific final equipment installation drawings.

Project Plan (Continued)

Delivery Considerations for Design Team

Finalize the system delivery route during the construction drawing phase of the process. Make note of any doors to remove and if temporary floor supports are required along the delivery path during the delivery of the system components. This needs to be incorporated into the project during the design phase.

Plan Review and Approvals

Once the construction documents are completed, they may need to be submitted for review to the applicable state and local planning departments having jurisdiction for your location and those issuing construction permits.

Your design team is responsible for meeting all applicable code and regulatory requirements, as well as the applicable site preparation requirements for the system. The design team is responsible for coordinating any plan reviews and necessary follow-up activities with the applicable local state and local planning departments.

Note: Some jurisdictions may require periodic reviews during the construction drawing phase of the design process.

Plan Review and Permits

This part of the process has the potential for adversely impacting the project schedule. By hiring an architectural/engineering design team with experience in the medical field and site preparation for diagnostic imaging systems you may have the opportunity to avoid some of the pitfalls that otherwise might occur with an inexperienced design team.

The project schedule includes many tasks that have the potential to create delays and the construction documents planning department review cycle is one of them.

If you are using the Design-Bid-Build approach for your project, the plan review period would be a good time to obtain bids for the construction work. The bidding process can take several weeks depending on the complexity of the project.

The duration of the state and local planning review process varies widely, ranging from days to months, depending on your location, the type of facility, and the type of construction. State and local planning reviews for projects in hospitals can take longer than projects in a commercial setting. These review processes may require multiple reviews at different stages during the preparation of the drawings and specifications. During the planning review process, it may be determined that follow-up submissions and reviews may be required. In that event it may be difficult to avoid delays in that will adversely affect the project schedule. Once the construction documents have been reviewed and approved by the applicable agencies, your contractor will be able to apply for and obtain the appropriate construction permits.

There are some situations and jurisdictions where demolition permits are available. These permits allow starting the on-site demolition work prior to commencing the construction work, possibly improving the project schedule.

Your contractor will need to schedule inspections throughout the construction process. The inspecting authority having jurisdiction may also require a final inspection. When the inspection is satisfactorily completed, a certificate of occupancy can be applied for and obtained. In some situations the certificate of occupancy may be required before you can begin to scan patients.

In addition to obtaining construction permits, you may need to obtain a permit to close portions of the street or sidewalk to accommodate system delivery and rigging vehicles.

Project Plan (Continued)

Pre-Construction Review Meeting

Purpose:

Reinforce expectations, review specifications, and answer questions. Establish timeline and solidify the system delivery date

Recommended Attendees:

- Customer Team
 - Director of Radiology
 - Facilities Management
 - Networking
 - Technologist
 - IT Representative
 - Customer Design Team
- Contractor
 - Project Manager
 - Superintendent
 - Mechanical and Electrical Subcontractors
- GE Healthcare
 - Sales Representative
 - Project Manager
 - Field Service Engineer

Prerequisites:

- Contractor's construction schedule and construction drawings
- GE Healthcare site-specific final equipment installation drawings
- Send meeting agenda to attendees prior to meeting and communicate estimated duration, approximately an hour

Project Plan (Continued)

Agenda Topics:

- Introductions
- Discuss roles, responsibilities, and information flow
- Verify everyone has current version of the GE Healthcare's site-specific final equipment installation drawings
- Review GE Healthcare site-specific final equipment installation drawings page by page
- Discuss any changes in the system order that may affect the project design and construction work
- Review the system delivery route
- Review the rigging requirements, if applicable
- Review contractor's project schedule
- Identify and discuss how to handle any long lead material items related to the system installation
- Establish final delivery date agreeable to all parties
- Establish key GE Healthcare milestones in calendar days
 - 30 days prior to delivery date
 - 15 days prior to delivery date
 - 6 days prior to delivery date
- Discuss disposal of system packing material and return of dollies
- Discuss safety training and policy requirements and the security of the delivered system components

Follow-up:

- Plan site visits for milestone reviews
- Follow-up e-mail detailing expectations sent to each attendee with an attached checklist
- Communicate delivery date

Project Plan (Continued)

Other Pre-Construction Items:

Once you obtain construction permits, you are ready to begin the construction phase. Early planning, agreement, and commitment by all your project participants will help focus on the on-time delivery of your new system.

The pre-construction review meeting at the project location is a critical step to getting the entire team focused. This meeting is team collaboration and should include your representative, facilities or landlord representative, design team, the contractor’s project manager, and superintendent, and your GE Healthcare project manager.

Your contractor is responsible for the construction schedule and adherence to all construction-related drawings and specifications. Use this meeting to make sure all project participants commit to the current project schedule. If the parties cannot reach agreement on the current project schedule during this meeting, schedule a timely follow-up meeting to resolve any schedule issues and obtain consensus from all.

Publish the final written project schedule and distribute it to all members of the project team, including your GE Healthcare project manager. Your project schedule is instrumental in determining the start of the manufacturing process at GE Healthcare for your new system.

Topics to review	Facilities or Landlord Representative	Architect	Contractor	GE Project Manager
Review the Site Readiness Assessment Checklist for items that need to be completed prior to delivery of the system.				
Finalize construction schedule to meet system delivery dates.				
Set delivery dates for the system, including any pre-delivery items.				
Review scope of project and impact on cycle times.				
Highlight critical path events/long lead time items, such as HVAC equipment, permanent power for the system, power feeder, main disconnect panel, cable trays, electrical ductwork, and other long lead items.				
Identify roles and responsibilities for drawings, submittals, and review process in order to avoid schedule delays.				
Review the GE Healthcare site-specific final equipment installation drawings and the construction drawings in detail with all subcontractors, including the delivery requirements/route.				
Review and identify the delivery route and method for the system. Will a crane be utilized? Where will it be staged? Verify if a local street access permit is required and how it will be obtained by the delivery dates				

Table 1 - Example of topics to review/discuss (not an all-inclusive list)

Construction

The design and construction teams manage the construction at your site. If you are using the Design-Build method, you will most likely have a project manager and superintendent managing all aspects of the project.

If you are using the Design-Bid-Build approach, you will probably have separate contacts for both the design and construction portions of the project and will need someone to coordinate the interaction between them.

Key Items to Remember:

- Review the site readiness assessment checklist to monitor progress of the project
- GE Healthcare's project manager is available for system-related questions
- Project complexity influences schedule times and risks
- Inform your GE Healthcare project manager about any design changes relative to the system and associated equipment
- Confirm system delivery route
- Coordinate installation of broadband (high-speed Internet) connectivity
- Testing and/or inspections of anchoring and cable routing methods
- Floor levelness is critical and may affect image quality
- Provide critical status updates to your GE Healthcare project manager
- Governmental inspections related to construction permits and to satisfy the applicable department of health and other agency requirements may be required
- Continue to manage the completion date and focus on completing the construction of exam, equipment, and control rooms



Figure 10 - Photo of Preliminary Floor Work



Figure 11 - Photo of Concrete Work

Contact your GE Healthcare project manager when issues or changes in the design, floor plan, or project schedule occur.

Site Readiness Assessment

Critical items to be completed before delivery

Site readiness is critical for the efficient, on-time, and successful delivery and installation of your new diagnostic imaging system. Your responsibility, as the customer, is to ensure the site is ready on time for the diagnostic imaging system's delivery and installation. Coordination of the site preparation activities between you, your internal team, your contractor and design teams, and your GE Healthcare project manager is critical. The following checklist, although not all inclusive, is provided to assist you with identifying many of the critical site readiness elements that need to be completed before the delivery of your diagnostic imaging system.

	Check when complete	Notes/Issues/Action Plan
<input type="checkbox"/>	All room construction is complete, including priming and painting, and the site is dust free and secure	
<input type="checkbox"/>	Ceiling and lighting fixtures installed	
<input type="checkbox"/>	Permanent power and lighting installed and operating	
<input type="checkbox"/>	Network lines installed and operational	
<input type="checkbox"/>	The broadband (high-speed Internet) connection is operational	
<input type="checkbox"/>	HVAC equipment is installed and operational	
<input type="checkbox"/>	The site meets the applicable GE Healthcare pre-installation manual requirements for your new diagnostic imaging system	
<input type="checkbox"/>	The conduits, cable trays, raceways, and plumbing are installed	
<input type="checkbox"/>	Personnel phone lines and phones are installed and operational	
<input type="checkbox"/>	Applicable governmental inspections are completed	

Table 2 - Critical Predelivery Site Readiness Items

For a detailed description of the site requirements for each item, refer to GE Healthcare's applicable pre-installation manual for your new system.

Site Readiness Assessment (Continued)

GE Healthcare Site Readiness Checklist

In addition to the assessment items to be completed, a GE Healthcare Site Readiness Checklist will be completed by your GE Healthcare project manager and field service engineer prior to system delivery. They will identify any corrections/actions that need to be completed by the contractor/customer prior to system delivery. Your GE Healthcare project manager can provide a copy of the current GE Healthcare Site Readiness Checklist on request. The checklist below is a sample for reference only.

 GE Healthcare Site Readiness Checklist Rev 19					
Before using this document ensure you have the latest Rev from MyWorkshop on DOC0422752					
GEHC Global Order #: _____		Customer: _____			
GEHC PMI: _____		FE / Installer: _____			
The customer is responsible for proper site preparation regardless of any GEHC measurements/inspections/assessments.					
Inspection Date: _____		Storage in room ready?	PMI in room ready?	FE in room ready?	Comments If "N", enter comments or action plan
GEHC Minimum Requirements					
1	MR Magnet Delivery Requirements: Ensure cryogen venting system is available for magnet connection as defined by GEHC Pre-Installation Manual (PIM) requirements, exhaust fan system is installed and operational, 480V power, and chilled water supply is available 24x7 that meets system cooling requirements. External connectivity is available for magnet monitoring and phone service is available during delivery. Surface mount vibromat installed where required. Magnet room final flooring is in place.				
2	MR RF Screen Room Requirements: RF Screen Room is tested with copy of Test Report, emailed to SAdminCOEMB@ge.com, that it is compliant with GEHC specifications. Dock Bolt and magnet anchors (if applicable) installed using 2 part anchor. For HDx systems, blower box mount bolts installed by RF vendor using 2 part anchors				
3	State Regulatory Requirements: Facility registration number provided for states of <u>IL, KY, HI, RI, SC, TX</u> X-ray shielding plan and state acknowledgment letter provided to installer for <u>AR, DC, NC, SC, CO, & WA</u> . Site Drawing Requirements: Final version of equipment network and antenna, installation drawings (including red lined versions) verified to match actual room and has been provided to installer.				
4	Surface Penetration Requirements: Customer/Contractor scheduled to provide required drilling or cutting into floors, ceilings, and walls; OR surface penetration permit available and posted in the room when GEHC will perform the work.				
5	Pre-Delivery Route Requirements: The equipment delivery route from the truck to the final destination within the facility has been reviewed with all key stakeholders to safely meet the minimum requirements for equipment access, and all communications/notifications have occurred. Arrangements have been made for special handling (elevator, rigging, floor protection, fork lift, rollback truck, etc).				
6	Finished Room Requirements: Rooms that will contain equipment, including storage areas not in scan suite, are dust free. Provisions taken to maintain a dust free room. Precautions must be taken to prevent dust from entering rooms containing equipment when construction is incomplete in adjacent areas. All walls primed (final coat not needed on Day 1). Shielding, doors, and windows are to be installed. No contractor work being done during or after the installation that will cause dust in the installation areas or potential equipment damage. Room security to prevent unauthorized access and theft has been discussed with customer. The customer is aware of these security issues, implications and responsibility. For Storage: Room must meet PIM requirements for storage.				
7	Electrical Requirements: Lockable (LTO) Main Disconnect Panel (MDP) is installed per GE guidelines and system power is available. Conduits, electrical cable ducting/dividers/cable trays, and access flooring is installed in proper location and height. Surface floor duct and load-side wires can be installed at time of system installation. Validate outlet location and requirements meet specifications for device/equipment.				
8	HVAC Requirements: The HVAC/Chilled Water systems designed to maintain the environment per spec/PIM is at running state and appears to provide the desired environmental conditions including location of vents, temperature and humidity for system operation.				
9	Flooring Requirements: Floor is clean and prepared for final floor covering. Floor levelness/flatness is measured and within tolerance, and there are no visible defects per GEHC specifications. Confirm customer anchoring plan aligns with designed floor thickness. Final flooring installed where required for network racks.				
#	Ceiling Requirements: Unistrut (or equivalent) location, levelness and spacing is measured (or vendor confirmed) and consistent with the requirement of the installation drawings. Ensure unistrut and rails are not used as mounting surfaces. Ceiling grid is installed. Permanent lighting is installed and operational. HVAC diffusers are installed and connected to ductwork. Ceiling tiles installed per PMI discretion.				
#	Staging Requirements: Space has been identified to support the active installation process only. This area meets PIM/project book requirements. Storage space has been identified, if needed. This secured space would be used to store equipment indefinitely. If offsite, transportation plan has been developed at customer expense. This space must meet PIM requirements.				
#	Network Connectivity: Hardwire for network connectivity(network drop) is in place prior to delivery with specified network firewall configuration where required. Site Surveys for wireless mobile XR units have been completed.				
#	Medical Gases Requirements: Systems (hard piped or portable) in place to allow testing and calibration of equipment (anesthesia), including ventilation.				

Figure 12 - Sample Site Readiness Checklist (for reference only)

Delivery

The system's delivery includes all of the system's equipment and electronics for the exam, control, and equipment rooms. The delivery is coordinated with you, your contractor, and your GE Healthcare project manager. Final communications should be done to ensure that the loading dock is available, the delivery route is cleared for the equipment delivery, the exam, control, and equipment rooms are cleared of all contractor equipment, and the networking requirements are finalized with GE Healthcare's field service engineer. There are other preparation activities beyond site readiness that you need to coordinate with your GE Healthcare project manager.

Those items include:

- Scheduling GE Healthcare's early delivery items, if any
- Scheduling the specific day of the system's arrival
- Scheduling of riggers, if applicable
Note: Hiring the rigger is the responsibility of the customer. However, GE Healthcare's project manager will provide assistance with coordinating the rigging of the equipment
- Clearing of delivery pathways
- Identifying space for staging the delivered equipment
- Obtaining of any required delivery permits or street use permits
- Receipt and sign-off of the delivered system components

Contact your GE Healthcare project manager if you have questions regarding the delivery of your new system's components.



Figure 13 - Fork Lift Truck Delivery of Innova Equipment

Delivery (Continued)

System Delivery

Below is the typical flow of the events prior to and during the delivery of the diagnostic imaging system's components.

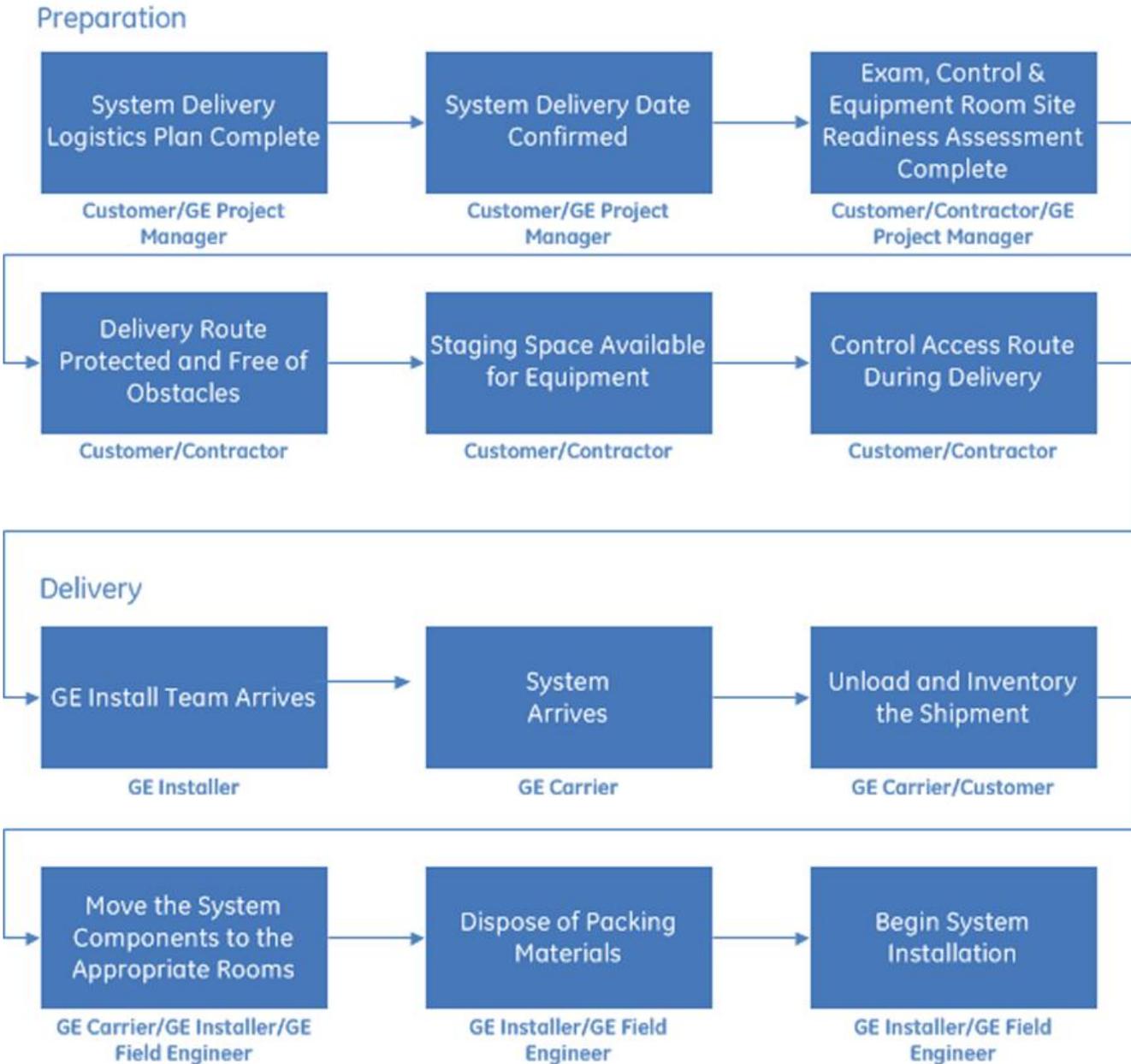


Figure 14 - Flow of Typical System Delivery Events

Delivery (Continued)



Figure 15 - Equipment Staging in Corridor



Figure 16 - Equipment Staging in Room

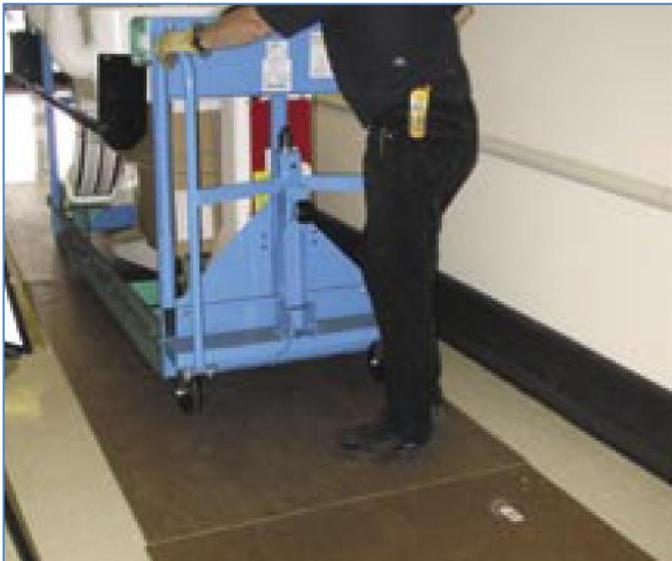


Figure 17 - Masonite Board Floor Protection



Figure 18 - System Delivery with Dollies

Delivery (Continued)



Figure 19 - Delivery of Gantry at Hospital



Figure 20 - Elegance Table Delivery



Figure 21 - Completed Innova IGS Room

System Turnover

Installation and Calibration

Once the system arrives at your site, a team of GE Healthcare installers or the GE Healthcare field service engineers arrive to install and connect the system components. A GE Healthcare field service engineer is also assigned to calibrate and test your system to verify it is operating in accordance with GE Healthcare's published performance specifications for that system.

Your broadband (high-speed Internet) service needs to be operational before the calibration activity begins. This enables GE Healthcare's diagnostic and applications support functions for your system to be activated and operational.

Schedule any applicable acceptance testing by your team to immediately follow completion of the system testing and calibration. If you require in-house testing of the system make sure you wait to schedule applications training until you complete your in-house testing. Coordinate your acceptance testing schedule with your GE Healthcare project manager and GE Healthcare field service engineer to prevent delays and last minute cancellations.

Application Training and First Patient

GE Healthcare's TiP (Training in Partnership) clinical applications training offerings enable you to utilize the full capability of your new GE Healthcare system. The TiP Applications team will contact you to set up your training.

Many training choices are available through the TiP training programs. They can be reviewed with and ordered through your GE Healthcare sales representative. The "Partnership" is your level of engagement in the training process along with GE Healthcare commitment to training.

Customers who plan and allow for the recommended time to train their technologists and radiologists are then positioned to utilize the full capability of your new system. Your team's level of engagement and dedication to the training process plays a major role in how effectively your new system is used.

GE Healthcare's TiP offerings provide continuing education credits for your staff if they follow the recommended training curriculum. These offerings will help enable your technologists and radiologists to optimize their procedures for image quality and improved productivity. For more additional information on TiP training programs please visit the below link.

<http://www3.gehealthcare.com/en/Education>

You are now ready to scan patients!

System Turnover (Continued)

Project Completion Close-Out Meeting

Purpose:

To verify that all project tasks have been completed and that any incomplete items are identified and promptly completed.

Usual Attendees:

- Customer team usually consists of:
 - Medical Director
 - Director of Radiology
 - Modality Supervisor
 - IT Representative
- GE Healthcare team usually consists of:
 - Sales Representative
 - Project Manager
 - Director of Service

Prerequisites:

- System installation is complete
- Applications training is complete
- Serial number of system recorded
- Unused applications days identified

Agenda topics:

- Status of project tasks
- Contact information reviewed
- GE Healthcare escalation process reviewed
- Future service level/programs reviewed
- Review equipment warranty details

Summary of Critical Items

This section contains a summary of critical items that need to be addressed for the installation of your new system. These items are provided to give a high level summary of system specific items you, your design team, and your construction team need to address.

Your site specific plan and design also requires the use of all applicable planning information and requirements specified in GE Healthcare's applicable pre-installation manual and its site-specific final equipment installation drawings for your system.

Please contact your GE Healthcare project manager if you have not yet received a copy of the applicable pre-installation manual for your system. Alternatively, you can view and download a PDF copy of the applicable pre-installation manual electronically at the following link:

http://www3.gehealthcare.com/en/Support/Site_Planning

This section contains information on the following critical items:

- Broadband and Network Connectivity
- Mechanical/Electrical Infrastructure
- Power and Grounding
- Floor Preparation
- Floor Levelness
- Floor and Subfloor Requirements
- Room Shielding
- Background Radiation

Summary of Critical Items (Continued)

Broadband and Network Connectivity

Broadband Highlights

- High productivity, decreased costly downtime
- Proactively addresses security
 - Customer controlled and auditable
 - Secure encrypted transactions
- Improved speed and reliability vs. modem
- Single point access, reduce telecom costs
- All IP-based products are compatible
- Virtual applications assistance and training
- Remote diagnosis

Your GE Healthcare project manager can assist you on the path to broadband connectivity. You will need to provide the name of your facility information technology contact person to your GE Healthcare project manager. This will allow your GE Healthcare project manager to initiate GE Healthcare's process that will assist you in getting ready for broadband connectivity at the time of your system's delivery.



Summary of Critical Items (Continued)

Mechanical/Electrical Infrastructure

Your GE Healthcare system has specific power, cooling, and HVAC requirements. Those requirements are provided in the applicable GE Healthcare pre-installation manual. These services must be available and operational at the time of system delivery.

Procurement and installation lead time for these items can average between 8 and 10 weeks; check their availability with your supplier. Your GE Healthcare project manager can assist you if you have questions regarding the environmental requirements.



Figure 22 - Innova Main Disconnect Panel

Summary of Critical Items (Continued)

Power and Grounding

System site preparation projects can involve extensive electrical work. The system requires that electrical raceways, conduits, and cable trays be installed for the cables that interconnect to the system's sub-systems.

The GE Healthcare final equipment installation drawings for your site will show a diagram of these interconnects. The interconnect diagram describes the cable lengths provided with the system. The applicable GE Healthcare pre-installation manual gives details of cable diameters for each cable. It is important that this information be considered during the design and layout of the raceway, conduits, and junction boxes. If alternate solutions are needed, they should be discussed with your GE Healthcare project manager.

Diagnostic imaging equipment has become increasingly sensitive to power quality and proper electrical grounding. This sensitivity is influenced by the increased speed and complexity of the data acquisition computers. In order to obtain the specified system performance levels and avoid issues related to image quality and reliability, it is extremely important to comply with the specific power requirements for your diagnostic imaging equipment.

Wire size of the power feeder conductors must be carefully determined and specified by your electrical engineer so the wire size complies with GE Healthcare's wire size requirements. Failure to meet those requirements could prevent your system from operating in accordance with GE Healthcare's published performance specifications that system. GE Healthcare's equipment installation drawings include a feeder table chart listing the recommended wire size for each of the conductors. The wire sizes listed in GE Healthcare's feeder table chart listing may exceed the wire size requirements specified by National Electrical Code. In all cases the wire sizes specified in GE Healthcare's feeder table chart listing must be used to avoid unacceptable levels of impedance.

There are often other questions regarding the following list of critical design elements during the design and construction phases of the project. Although this is not a comprehensive list of all potential critical design elements, your electrical engineer and electrical contractor will need to consider on the following:

- Design to meet current version of the National Electric Code for your location and facility
- Proper grounding materials along the ground path
- Proper ground and neutral bonding
- Size of ground wire
- Ground and circuit conductors run in the same conduit
- Single ground in the facility
- Ensure that wire termination connections are tight
- Ensure wires are terminated properly

Summary of Critical Items (Continued)

Floor Preparation

To ensure a quality installation of your system, the room floor must be level and its surface must be smooth. It is imperative that the system installation area, which includes the gantry and table area, be level and flat and comply with the requirements listed in the applicable GE Healthcare pre-installation manual.

Where possible, the entire floor of the exam room should be level and flat rather than just the system installation area. It is important to verify that the floor is both flat and level before system installation begins. Measurements should be taken left-to-right or right-to-left, front-to-back or back-to-front, and diagonally in either direction. Please refer to the applicable GE Healthcare pre-installation manual for the specific requirements.

The floor must be prepared so that it will comply with the floor loading requirements described in the applicable GE Healthcare pre-installation manual.

Important: The floor loading capacity must be confirmed by your structural engineer.



Figure 23 - Typical Discovery™ IGS Finished Floor

Summary of Critical Items (Continued)

Floor Levelness Survey

Floor levelness and floor flatness surveys must be completed prior to your system arriving on site to ensure floor complies with GE Healthcare's floor levelness and floor flatness requirements. Complete the survey following the detailed instructions provided in the applicable GE Healthcare pre-installation manual.

Contact your GE Healthcare project manager to obtain a copy of the applicable GE Healthcare pre-installation manual for your system.

Overview of Leveling and Flattening of the Floor Area

No fill material should be used to compensate for holes or depressions in the floor surface. If necessary, level and flatten the entire floor area. Please refer to the applicable GE Healthcare pre-installation manual for details.

The exam room floor must be leveled, and its surface must be smooth. Any deviations in levels may have a detrimental effect on the system performance and operation.

It is desirable for the floor in the entire room to be leveled and flattened in accordance with the requirements provided in the applicable GE Healthcare pre-installation manual. If this is not possible, then at a minimum it is imperative that the system installation area is leveled and flattened.

When the exam room floor is ready for installation, verify the floor surface (of the applicable area) complies with the floor levelness and flatness requirements specified in the applicable GE Healthcare pre-installation manual using the method specified in that pre-installation manual.

Important:

Customer is responsible for the structural analysis and mounting of the base plates. If GE Healthcare is required by the customer to mount the base plate, the customer's structural engineer needs to design and approve the mounting method and provide GE Healthcare with an engineering report indicating those mounting requirements.

Optima and Innova Floor Requirements

For the specific floor levelness and flatness requirements for Optima 323i, Innova IGS Single plane, and Innova IGS Bi-Plane systems please see the applicable GE Healthcare pre-installation manual.

Discovery™ IGS System General Floor and Subfloor Requirements

The Discovery™ IGS system has some unique floor and subfloor requirements. A monolithic flooring system is required.

Please contact your GE Healthcare project manager for a current list of certified applicators of monolithic flooring systems.

Summary of Critical Items (Continued)

Room Radiation Shielding

When using diagnostic imaging systems that generate radiation or use radioisotopes as part of the diagnostic procedure, appropriate barriers such as walls, lead-shielded glass, lead shields, must be installed to protect your staff, patients, and others from unnecessary exposure to radiation. GE Healthcare does not make recommendations regarding radiation protection. It is the customer's responsibility to consult with a qualified radiation physicist for advice on radiation protection for the rooms associated with diagnostic imaging systems that generate radiation or use radioisotopes. You will need to have that radiation physicist design the walls and needed safety barriers to assure the radiation attenuation complies with all applicable regulatory requirements.

Your qualified radiological health physicist needs verify the radiation barrier for applicable rooms is properly designed and installed, taking into consideration items such as the following:

- Scatter radiation levels within the exam room
- Equipment placement
- Weekly projected workloads (number of patients/day and techniques (kvp*ma))
- Materials used for construction of walls, floors, ceiling, doors, and windows
- Access to surrounding room areas
- Equipment in surrounding exam room areas (such as film developer, film storage)
- The need for and location of warning lights and door switches



Figure 24 - Stud Walls Ready for Installation of Lead Shielding

Optima CL323i System

When siting an Optima system you will want to ensure that you have ample space to site the following components in the exam room: gantry, table, monitors, radiation shield, surgical lighting, counter top with sink, and any other peripherals required by your technologist that will be used in the exam room. The technologist's control will be located in an adjacent control room with a clear line of sight to the patient when in the scanning position.

Additional space will be required for installation of your system and for clearances needed to service the system. Please see GE Healthcare's applicable pre-installation manual for system-specific requirements.



Figure 25 - Optima CL323i with Ergo Suspension Option

Room Radiation Shielding

The customer is responsible for consulting with a qualified radiation physicist for advice on radiation protection for the rooms associated with diagnostic imaging systems that generate radiation or use radioisotopes, and for the design of walls and safety barriers to assure the radiation attenuation complies with all applicable regulatory requirements. Please see the [Room Radiation Shielding section](#) for additional information.

Optima CL323i System (Continued)

Delivery of Optima CL323i System Components

The delivery of your Optima system usually occurs in one shipment. This delivery is coordinated between you, your contractor, and your GE project manager. There are other delivery preparation activities beyond having the site ready that need to be coordinated. These activities include:

- Scheduling GE Healthcare system early delivery items, if any
- Scheduling specific day of the system's arrival
- Scheduling the riggers, if applicable
(The rigging is the customer's responsibility)
- Clearing of the system delivery route
- Identifying space for the staging the delivered system components
- Written acknowledgement of receipt of the delivered system components
- If applicable, obtaining any permits needed for the delivery and/or rigging of the system components, including any street use permit that may be needed for the delivery of the system components



Figure 26 - Ergo Monitor Suspension (Optima System Only)

Innova IGS Single Plane and Bi-Plane Systems

When siting an Innova IGS system you will want to ensure that you have ample space to site the following components in the exam room: gantry, table, monitors, radiation shield, surgical lighting, counter top with sink, and any other peripherals required by your technologist that will be used in the exam room. The technologist's control will be located in an adjacent control room with a clear line of sight to the patient when in the scanning position.

Additional space will be required for installation of your system and for clearances needed to service the system. Please see GE Healthcare's applicable pre-installation manual for system-specific requirements.



Figure 27 - Innova Single Plane with Large Display Monitor



Figure 28 - Innova Bi-Plane with Large Display Monitor

Room Radiation Shielding

The customer is responsible for consulting with a qualified radiation physicist for advice on radiation protection for the rooms associated with diagnostic imaging systems that generate radiation or use radioisotopes, and for the design of walls and safety barriers to assure the radiation attenuation complies with all applicable regulatory requirements. Please see the [Room Radiation Shielding section](#) for additional information.

Innova IGS Single Plane and Bi-Plane Systems (Continued)

Delivery of Innova IGS System Components

The delivery of your Innova IGS system usually occurs in one shipment. This delivery is coordinated between you, your contractor, and your GE project manager. There are other delivery preparation activities beyond having the site ready that need to be coordinated. These activities include:

- Scheduling GE Healthcare system early delivery items, if any
- Scheduling specific day of the system's arrival
- Scheduling the riggers, if applicable
(The rigging is the customer's responsibility)
- Clearing of the system delivery route
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- Written acknowledgement of receipt of the delivered system components
- If applicable, obtaining any permits needed for the delivery and/or rigging of the system components, including any street use permit that may be needed for the delivery of the system components

Key Delivery Details:

- The Innova single plane gantry is largest component with dimensions of 109.8 in. long by 45.6 in. wide by 76.8 in. high while on the dolly
- The Innova LC gantry is the heaviest weighing in at 2,337 lb. on the delivery dolly



Figure 29 - Innova LC Gantry on Shipping Dolly



Figure 30 - Bi-Plane Gantry in Dolly

Innova IGS Single Plane and Bi-Plane Systems (Continued)

GE Healthcare Vascular System Components and Function

System Component	Main Function	GE Solution
Patient table	Patient support	Omega IV, Omega V, tilting, OR
Gantry	Image chain positioning	21, 31, and 41 cm Detectors
Monitors & suspension	Monitors positioning	Mavig, Ergo, OPEN, LDM
Control room devices	System control (protected from x-ray)	Depends on configuration
Tech room cabinets	Electronic components	Depends on configuration
Other devices	Additional diagnostic	IVUS, AW, Maclab, etc.
Accessories	Protection, support, etc.	Radiation shield, injector, etc.

Table 3 - Vascular System Components and Function



Figure 32 - Typical Innova IGS Examination Room

X-Ray Tube & Collimator

Patient Table
(Omega IV, Omega V,
Tilt Table, or OR Table)

Innova IGS Single Plane and Bi-Plane Systems (Continued)

Open Suspensions

Open suspensions are only used with certain image guided systems. Please check GE Healthcare's pre-installation manual for your new image guided system to determine if it is eligible for use with an open suspension. Only the monitors are provided with the system. The suspension booms are supplied and installed by the customer.



Figure 33 - Typical Open Suspension



Figure 34 - Typical Open Suspension

Innova IGS Single Plane and Bi-Plane Systems (Continued)

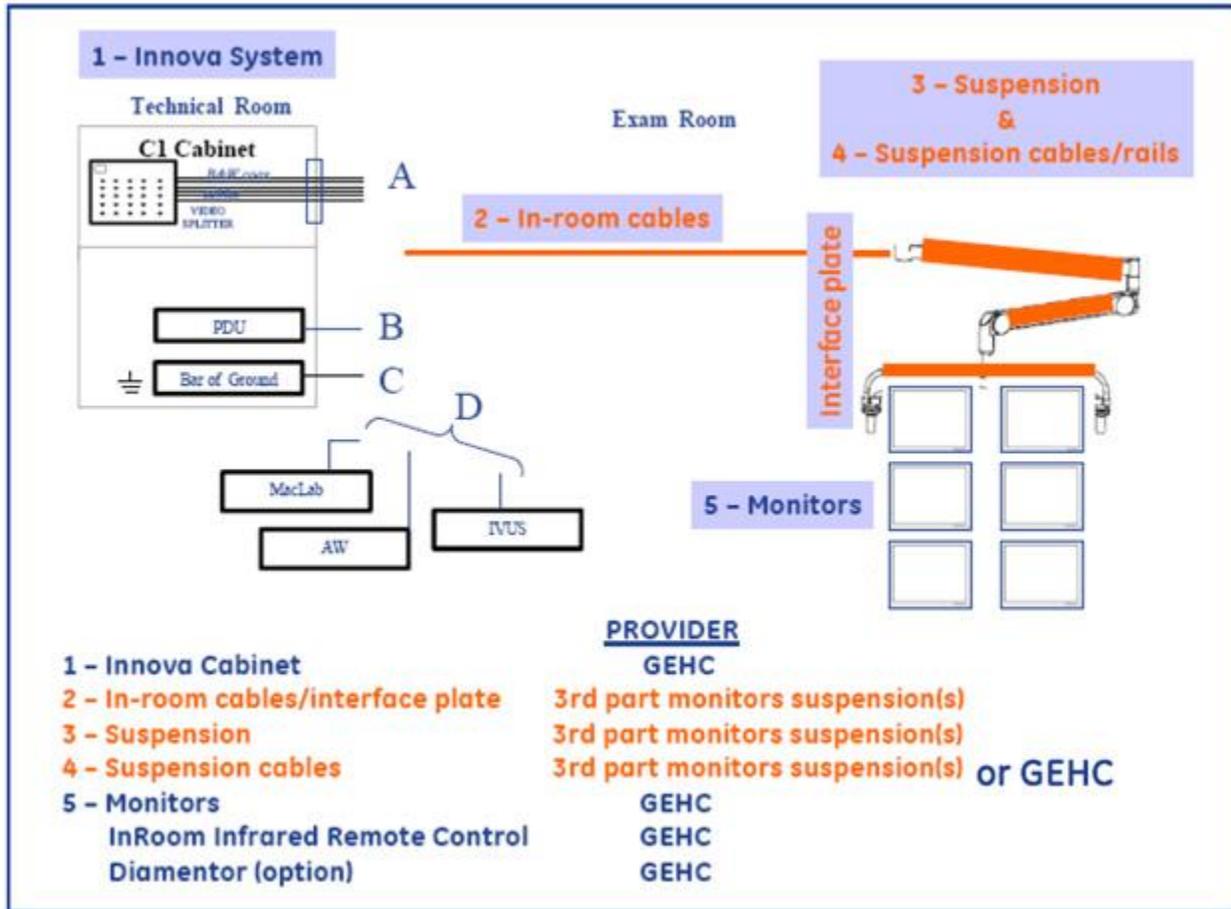


Figure 35 - Overview of Component Connections

Innova IGS Single Plane and Bi-Plane Systems (Continued)

Large Display Monitor Option

The large display monitor is only available for the IGS single plane and biplane systems.



Figure 36 - Typical Large Display Monitor



Figure 37 - Typical Large Display Monitor

Innova IGS Single Plane and Bi-Plane Systems (Continued)

User Interfaces

 <p>TSSC - Table Side System Control (2nd optional)</p>	 <p>Table Panning device</p>	 <p>Table Footswitch</p>
 <p>ITU - Intelligent Touchscreen Unit (option)</p>	 <p>Head end</p> <p>Omega V table extender (S18061AC - option)</p>	 <p>3D Mouse (option)</p> <p>3D Mouse (option)</p>

Figure 38 - User Interfaces (Figure 1 of 2)

Innova IGS Single Plane and Bi-Plane Systems (Continued)

Either smart box or smart handle is delivered

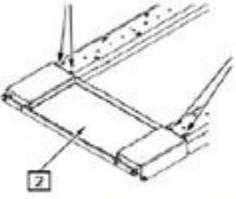
 <p>Smart box (mandatory option) (2nd optional)</p>	 <p>Smart handle (mandatory option) (2nd optional)</p>
 <p>Digital head holder (E6415AB) (Option mandatory for Neuro)</p>	 <p>Foot end Omega Foot end rail extender (S18061RE) (by default for Omega IV, optional for Omega V)</p>

Figure 39 - User Interfaces (Figure 2 of 2)

Room Preparation for Innova Single and Bi-Plane Systems

Innova Positioner Base Plate & Electrical/Water Interface Kits

To ensure proper Innova C-Arm installation, the base plate must be completely level. A base plate installation kit will be sent. This kit includes a template for the contractor to use for coring and/or drilling the mounting holes. It is the customer's responsibility to have the holes drilled and keep them clean. The attachment method and special considerations should be identified at this time as well. The customer should then coordinate activities with its structural engineer and GE Healthcare's project manager and installation team. GE Healthcare's installation team will pour a grout pad on the prepared floor to ensure levelness and provide clearance for installation of the gantry. GE Healthcare's installation team will then install and torque the mounting hardware.

More detailed information can be found in the applicable GE Healthcare pre-installation manual.

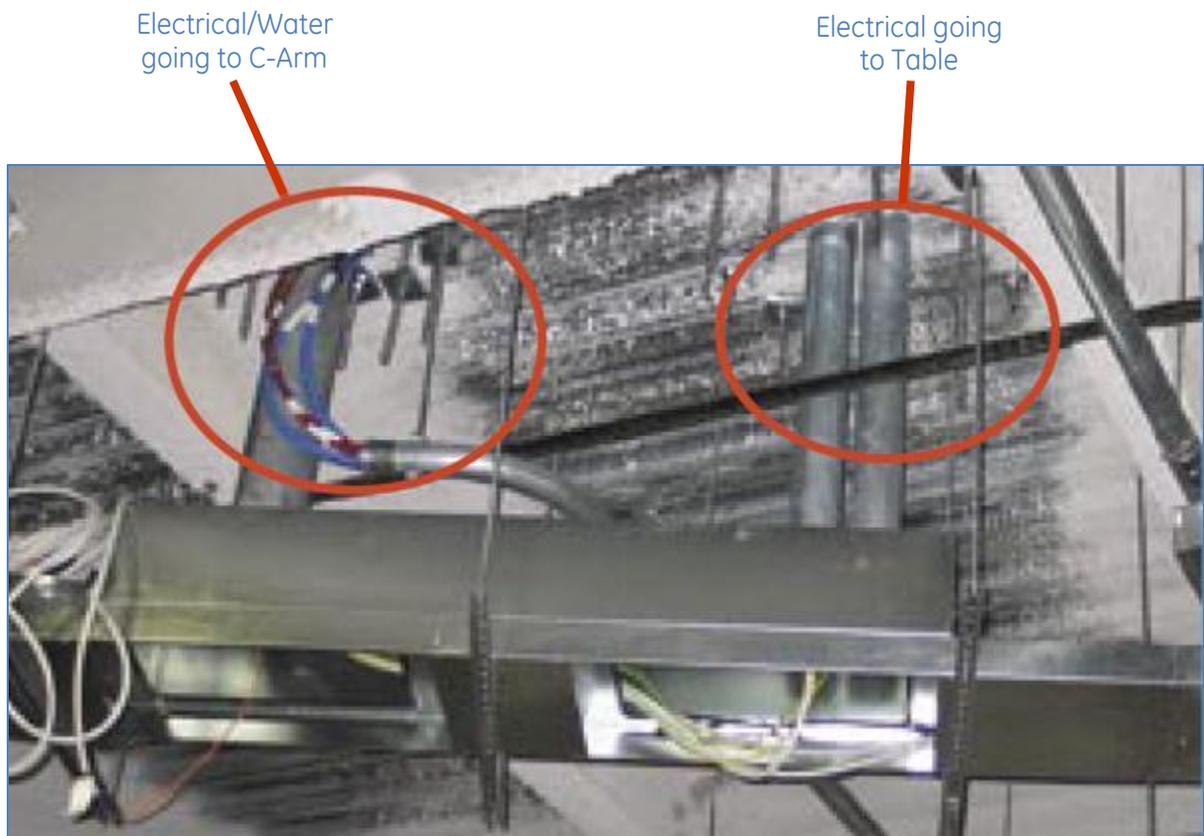


Figure 40 - Ductwork Installed Below an Above Grade Innova Installation

Room Preparation for Innova Single and Bi-Plane Systems (Continued)

Elegance Table Base Plate

The Elegance table base plate should only be used when initially installing an Omega 5 Angio table and then swapping out for the Elegance tilting table. This will allow for the tables to be swapped out without changing raceways, conduits or mounting. The table plate must be level and flush with the finished floor. This table plate is NOT needed if an Elegance Table is being installed initially or if an Omega 5 table will not be swapped out.

Room Size

Accurately measuring room size is critical in siting your new GE Healthcare Innova System. Usually three rooms are needed in your Innova Suite: exam, control, and equipment rooms. It is important to keep in mind the space that is needed to swing the C-Arm, move the table, and load the patient. Please refer to GE Healthcare's applicable pre-installation manual for room requirements.

Unistrut

Proper measuring of both the universal grid overhead equipment support system and the Unistrut components is critical to proper structural steel placement. Please refer to GE Healthcare's applicable pre-installation manual for the dimensional requirements.

More detailed information can be found in the applicable GE Healthcare pre-installation manual.



Figure 41 - Elegance Table Base Plate



Figure 42 - Innova Base Plate and Omega Table Contact Area

Room Preparation for Innova Single and Bi-Plane Systems (Continued)

Mechanical/Electrical Infrastructure

Your new Innova system has specific power, cooling, and HVAC requirements. Those requirements are specified in the applicable GE Healthcare pre-installation manual. The power, cooling, and HVAC services must be available at the time the Innova system is delivered.

Procurement and installation lead times for these items average 8-10 weeks; check with your contractor. Your GE Healthcare project manager can assist with interpretation of environment requirements.



Figure 43 - Main Disconnect Panel or Power Distribution Box



Figure 44 - System Cabinet in Equipment Room

Discovery™ IGS Systems

When siting a Discovery™ IGS system you will want to ensure that you have ample space to site the following typical components in the exam room: AVG gantry, table, monitors, radiation shield, surgical lighting, counter top with sink, and any other peripherals required by your technologist that will be used in the exam room. The technologist's control will be located in an adjacent control room with a clear line of sight to the patient when in the scanning position.

Additional space will be required for installation of your system and for clearances needed to service the system. Please see GE Healthcare's applicable pre-installation manual for system-specific requirements.



Figure 45 - Finished Discovery™ IGS Operating Room

Room Radiation Shielding

The customer is responsible for consulting with a qualified radiation physicist for advice on radiation protection for the rooms associated with diagnostic imaging systems that generate radiation or use radioisotopes, and for the design of walls and safety barriers to assure the radiation attenuation complies with all applicable regulatory requirements. Please see the [Room Radiation Shielding section](#) for additional information.

Discovery™ IGS Systems (Continued)

Structural Ceiling - Cable Management System Attachment to the Ceiling

There are two alternate methods of attaching to the ceiling:

1. Using a structure provided by the customer. This is typically the case for an operating room (surgical environment) where the use of rails is prohibited. The structure and the method for attaching it to the existing structure must be designed by the customer's structural engineer.
2. Using the cable management system intermediate rails provided with the system. This is the cable management system normally used in standard interventional rooms.

The ceiling structure is the customer's responsibility. Please refer to your site-specific equipment installation drawings and the applicable GE Healthcare pre-installation manual for the specific requirements.



Figure 46 - Above Ceiling Cable Management Support

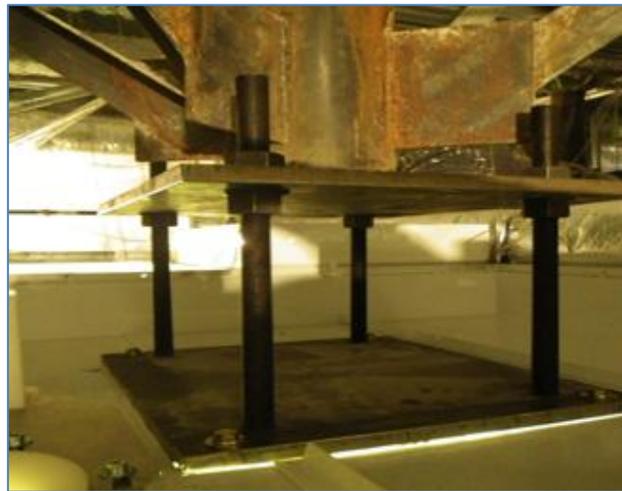


Figure 47 - Adjustable Cable Management Support Plate

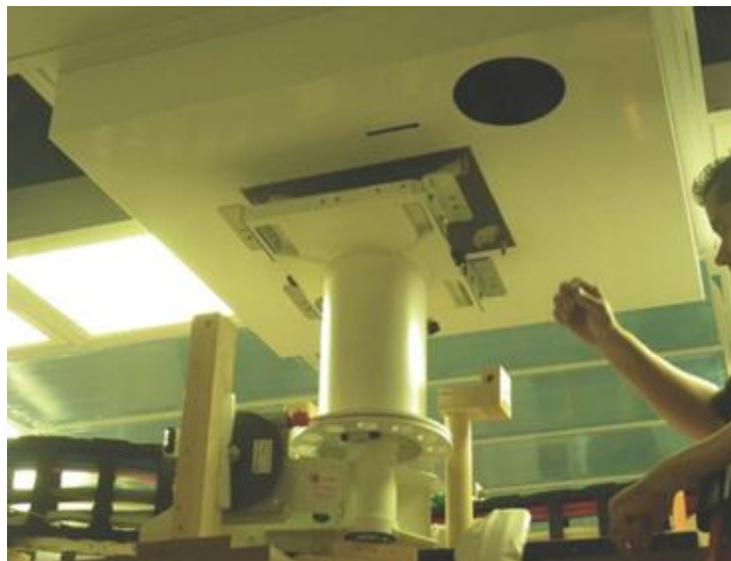


Figure 48 - Cable Management Support Ready to Attach to Support Plate

Discovery™ IGS Systems (Continued)

Delivery of Discovery™ IGS System Components

The delivery of your new Discovery™ IGS system usually occurs in one shipment. This delivery is coordinated between you, your contractor, and your GE project manager. There are other delivery preparation activities beyond having the site ready that need to be coordinated. These activities include:

- Scheduling GE Healthcare system early delivery items, if any
- Scheduling specific day of the system's arrival
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Figure 49 - Discovery™ IGS Exam Room in Progress

Discovery™ IGS Systems (Continued)

Ceiling Height

The recommended ceiling height for a hybrid operating room is 10.0 ft. The minimum recommended clearance height above the finished floor for any stationary object is 8'-11" to allow for travel of the Discovery™ IGS gantry and cable track.

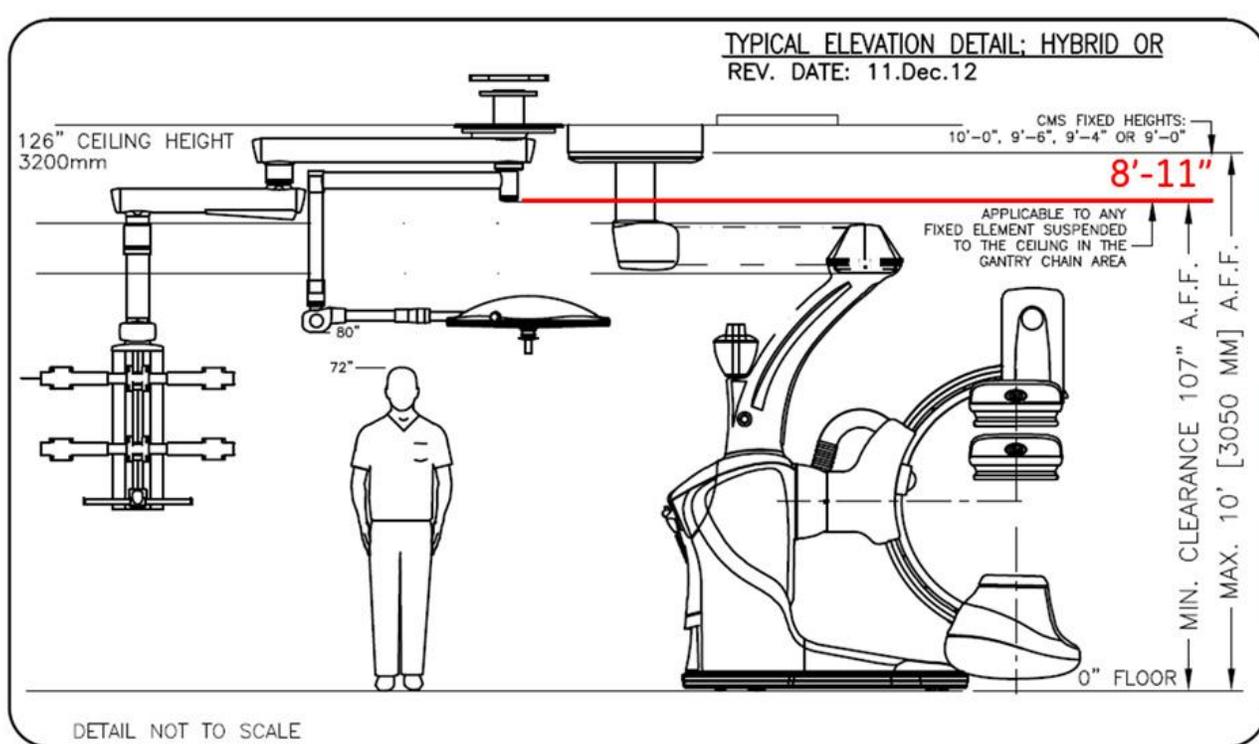


Figure 50 - Typical Hybrid Operating Room Elevation

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About GE Healthcare

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our broad expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, biopharmaceutical manufacturing technologies, performance improvement and performance solutions services help our customers to deliver better care to more people around the world at a lower cost. In addition, we partner with healthcare leaders, striving to leverage the global policy change necessary to implement a successful shift to sustainable healthcare systems.

Our “healthymagination” vision for the future invites the world to join us on our journey as we continuously develop innovations focused on reducing costs, increasing access, and improving quality around the world. Headquartered in the United Kingdom, GE Healthcare is a unit of General Electric Company (NYSE: GE). Worldwide, GE Healthcare employees are committed to serving healthcare professionals and their patients in more than 100 countries. For more information about GE Healthcare, visit our website at www.gehealthcare.com.

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