Georgia Tech
Facility Management and Control System (FMCS)

I. PROJECT REQUIREMENTS

1. PROJECT SUMMARY

1.1. The Facility Management and Control System (FMCS) shall be maintained, and addition of new and renovated facilities by the Contractor per specification 15800, 15900, 15950 and 17400 and shall be comprised of Area Controllers (Network Engines) within each new facility. The AC and/or Network Engines will connect to the Georgia Tech's local or wide area network, depending on configuration, to a central server or distributed server. Access to the system, either locally in each building, or remotely from a central site or sites, shall be accomplished through graphic user interface (GUI) via virtual private network (VPN) TCP/IP network. Each AC and/or network engines shall communicate to controllers Contractors specification section 15800, 15900, 17400. It is the intent of this solicitation to obtain unit pricing for product and labor for small and large projects.

1.2. Georgia Tech utilizes an existing Johnson Controls Campus Wide Metasys Facility Management system which is used to remotely monitor, program and control the various on and off campus facilities, systems and equipment. The Metasys System includes over 80 Georgia Tech housing, Classroom, Campus Chilled Water System, GTRI research, and Off-Campus GTRI facilities on the campus wide Metasys network.

2. FMCS BUILDING CONTROLS CONTRACTOR

2.1. Contractor must agree to Mandatory Project Specifications 15800, 15900, 15950, 17400 and for each requirement listed below in this solicitation
  2.1.1. <u>Mandatory Site Manager</u>, this position is to be available 100% of the time at Georgia Tech (40 hrs/wk) to manage projects, schedule projects, provide cost estimates projects , coordinate systems and provide controls engineering support to Georgia Tech's project design engineers. This is a engineering degreed individual, with mechanical engineering design experience and FMCS experience. This position will be Georgia Tech's primary point of contact for all issues, coordination and opportunities. This position is not intended to be an all encompassing person. This position shall be able to pull on other Controls Company resources to accomplish these task. <u>The Contractor must provide Georgia Tech a copy of the Site Manager's resume' prior to beginning work. Georgia Tech reserves the right to approve or disapprove of the individual and request another Site Manager.</u>
  2.1.2. <u>Sales Engineering Services</u>
    2.1.2.1. In support of these potential future projects, the Contractor will be required to provide sales engineering services to Georgia Tech's staff, selected architectural and engineering firms at no additional cost. The sales engineering services required include but are not limited to:
      2.1.2.1.1. Review and advisement to Georgia Tech and its selected architectural/engineering firms of their project plans and specifications to ensure feasibility and effectiveness.
      2.1.2.1.2. Providing a detailed, itemized material and labor cost price breakdown to supply all materials and labor as per project plans and specifications being reviewed as a pre-project bid price.
    2.1.2.2. Upon agreement on a project scope by Georgia Tech Facilities Engineering, the selected architectural/engineering firm, and the control system supplier as to the feasibility and cost of the system, this cost estimate must constitute a pre-project bid price and shall be binding for that project. This binding controls system supplier price must be published in the bid documents as an allocation to the General Contractor for the specified controls system. The specifications must specify a sole source control system supplier.
  2.1.3. Subsequent addenda or change orders could effect the agreed upon control system scope and therefore the controls system supplier will be allowed adjustments in construction proposal cost. All cost estimates, and adjustments shall be based upon the data furnished in the Cost Proposal supplied in response to this solicitation.

2.1.4. Pricing for all projects large, small, renovations or new construction a Microsoft Excel spread sheet shall be provided to Georgia Tech Facilities Engineering which itemizes all material and labor and references the offeror's pricing proposal. This is required for all work no matter how it is bided, etc for Georgia Institute of Technology or any contacting entity related to Georgia Institute of Technology such as Georgia Tech Foundation or any related entities.

2.2. Software support: Contractor must provide all (OWS) Metasys servers, file server, controllers and any other supportive device of systems software updates on an annual basis at no cost to the owner.

3. RESPONSIBILITIES

3.1. FMCS Contractor must provide all aspects of the overall Georgia Tech Facility Management and Control System (FMCS) systems. These include, but are not limited to:

3.1.1. The TCP/IP level of the system architecture
3.1.2. All computer servers and operator workstations
3.1.3. Data logging and reports of FMCS data
3.1.4. Alarm presentation
3.1.5. Time scheduling algorithms
3.1.6. Graphical representation of data
3.1.7. Adjustment of application parameters (i.e., setpoints, schedules, temperature ranges)
3.1.8. Periodic adjustment of calibration offsets
3.1.9. Service and Repair of all existing FMCS equipment
3.1.10. Service and Repair of all FMCS equipment on new and renovated buildings after warranty.

3.2. In order to deliver these functions for the new buildings, the FMCS Contractor must provide in each building one or more area controllers (Network Engines) depending on the number of devices to be installed by the building controls contractor under specifications 15800.

3.3. The area controller (Network Engines) serves several key functions.

3.3.1. It executes time schedules and broadcasts occupancy commands to the building controllers that it serves.
3.3.2. It receives data from the building controllers and collects trends of the data.
3.3.3. It receives data from the building controllers, applies alarm criteria and transmits alarms to the operator workstation alarm handling software provided by the FMCS Contractor"

3.4. Coordination

3.4.1. The FMCS Contractor shall provide a network diagram to show where and how to connect bus and/or TCP/IP network to the existing FMCS network and network engines per specification 17400.

3.4.2. With the exception of time schedules or optimized start/stop algorithms, all applications shall be programmed within the building controllers. The coordination of schedules, occupancy, time, event, temperature schedules shall be coordinated campus wide through the existing Metasys ADX server for all new and existing FMCS systems.

4. SECTION 15950 ENERGY MANAGEMENT SYSTEM PREVENTIVE MAINTENANCE
4.1. Provide a description of the maintenance of the existing system and coverage of new building after warranty has expired. The number of people designated or available to support the site and their level of experience (educational and working experience) shall be identified and described.

> **JCI:** Johnson Controls and the Atlanta Branch have a strong commitment to post installation maintenance and support of our customer's Facility Management System. In fact, over half of the Atlanta Branch's revenue is derived from the servicing of Control System and Mechanical Equipment. The JCI Atlanta Branch is a recognized local leader in FMS/HVAC related services.

Customer Satisfaction is a corporate-developed and sponsored training and awareness process that reflects our commitment to quality by using ISO 9001 Six Sigma Processes. The hardware maintenance and software support plan for Georgia Tech will utilize concepts of ISO 9001 and Six Sigma applying formal and established documentation and measurement tools, stress teamwork through employee process improvement, and will continue to build upon the mutual trust and partnership already established between Georgia Tech and Johnson Controls.

A second dimension of our service and support program for Georgia Tech will be our Qualify Assurance (QA) Program. This is our formalized program of procedures and checklists established by GA Tech and Johnson Controls that ensure both parties are informed and satisfied with status of the preventive maintenance program and recognize the value of the results. The JCI Georgia Tech Account Manager will be responsible for administration of this program.

Quality Management:
Quality Management will be integral to our service and support management concepts and designed for the continuous improvement. Our TQM philosophy is summarized as follows:

• Georgia Tech will define quality levels of service and products and it is Georgia Tech whom we must satisfy.
• Excellent service, as defined by Georgia Tech, will be minimum acceptable standard to which we must perform.
• Excellence will be achieved through continuous and measured improvements in value, responsiveness, and quality of our work.
• The JCI team that serves the GA Tech site is experienced with facilities, systems, controls, engineers, and maintenance personnel and knows the high level of quality that this customer expects from a service provider. Our work environment will make maximum use of this experience base and permit each employee to participate in continuous improvement projects through team activity.
• We will recognize and reward the Georgia Tech Team appropriately for pursuing and attaining excellence.

Quality Assurance
Our Georgia Tech Team will administer the Quality Assurance Program which includes a Quality Plan and procedures for auditing the performance of operational elements. All our team members along with Georgia Tech will participate in developing and implementing this process, which will relate to every activity on the account.

Our resulting Quality Plan will be based on your requirements, applicable regulations, and our experience in similar operations.

Our Quality Plan includes:

Verification that scheduled inspections have been properly completed and that service providers have sufficient authority, access, and training to:
  - Identify quality problems.
  - Initiate, recommend and provide, solutions to quality problems.
  - Implement solutions.

Your Service Team Leader and Account Manager will conduct scheduled and unscheduled inspections and identify areas requiring improvement. Upon approval by the owner, these recommended improvements will be incorporated in the preventive maintenance plan documentation. This provides for a closed-loop documentation system that results in timely, complete, and effective performance.

The following is a list of features and functions administered by the JCI service team located at the Georgia Tech Site. Some of these items are integrated with Georgia Tech's Maintenance Management Software Program (MAXIMO) as it relates to service hardware and software responsibilities.

Planning and Scheduling
  · Assignment of Service Technician to a work order.

· Tracking of assignments by status (open orders, work in progress/partial completion, and work orders completed).
· Display assignments by date, order number and service rep.
· Ability to place a work order on hold, release a work order and void work orders.
· Daily Service Technician schedule and daily assignments.
· Incomplete work orders report
· Display Preventive Maintenance by next schedule date.

<u>Dispatching</u>
· Print work order forms (Blank forms for a type of equipment, or for a specific piece of equipment).
· The service team leader will be responsible for dispatching the proper number of qualified service technicians to complete the preventive maintenance work orders.

2. Reporting Responsibilities
The following management reporting system will be initiated to insure a high standard of service for Georgia Tech:

a. Unscheduled maintenance repairs/inspections will be made by the JCI Service Team Leader who may be accompanied by a member of Georgia Tech's Facility Maintenance Department.

b. Preventive maintenance schedules with notation of performance will be maintained for management control, inspection, and administrative review.

c. A monthly Summary of maintenance functions, accomplishments, and objectives will be prepared and presented for comments, additions, and concurrence of Georgia Tech.

d. A Joint Review meeting will be held monthly between representatives of Georgia Tech and Johnson Controls, Inc.

e. An annual report will be prepared and submitted to Georgia Tech each year. This report will summarize the facilities and systems that currently are not included in the preventive maintenance plan and are out of warranty. This report will be used by GA Tech's Facility Infrastructure Manager to determine how to adjust/modify the preventive maintenance plans annually to account for new facility additions.

3. Correction Action Responsibilities (Including Complaint Resolution)

Although our objective is performance perfection it is inevitable that occasionally we identify defects in JCI's performance. Our Account Manager is responsible for ensuring that any defects are corrected. We determine when corrective action is required based upon our objective criteria and not upon opinion. The steps we follow when taking corrective action to eliminate a defect are as follows:

• Compare work accomplished to our approved standards or accepted work methods.
• Dedicate immediate attention to correction of any defect, issue a work order for correction of identified problem.
• Establish a due date for correcting a defect and develop a long-term resolution.
• Verify that each defect is corrected and reported to Georgia Tech.
• Revise our standard work practices to incorporate any long-term resolutions we believe will improve our service to Georgia Tech.
• Communicate summaries of our corrective actions and long-term solutions to Georgia Tech on a monthly basis as part of our commitment to zero defect performance.
• Use our quality records, including those relating to corrective action, to control quality and take assertive proactive action to prevent defects in the future.
• Provide additional training for employees who may need to improve their skills.
• Ensure that employees understand exactly what is expected of them on the job.

<u>Rapid Customer Support</u>
The following is the a summary of the features available and administered by the Atlanta's Service Department for customer support. These represent the tools required to effectively and consistently provide quality service to Georgia Tech.

Software Support System
- Quick access and updating of customer file while customer is on phone.
- Audit Trail
  - All calls received from customer.
  - Time spent on call.
  - Person who handled the call.
- Data Elements
  - Ρεσολυτιον οφ χαλλσ ατ εντρψ τιμε ορ ατ α λατερ δατε.
  - Ιδεντιφιχατιον οφ μυλτιπλε χυστομερ σψστεμσ.
  - Automatic generation of programming request for problem fixes or enhancements. Support call and programming as requested.
  - Identification of any special equipment, tools, processes and skills necessary to verify quality.
  - Johnson Controls has advance data system capabilities in the field with the use of advanced service tools.
  - Receive and complete service calls in the field.
- Host-to-Host Paging
  - Automatically page the assigned technician via beeper.
  - Automatically escalation to the Atlanta Service management team if no response to after hours page.

Provisions for training and qualification of personnel performing activities affecting quality.

Johnson Controls will initiate a screening process of all its personnel to be utilized on the job. If desired, Georgia Tech can become directly involved in this screening process. To provide Georgia Tech with a level of comfort in the on-site personnel, the following employee rules shall be exercised at a minimum:

- All Johnson Controls employees on-site will hold the proper certifications and licenses of the trade, and will be properly trained/experienced.
- All Johnson Controls employees on-site will wear appropriate clothing, uniforms, and safety equipment.
- All Johnson Controls employees will observe a high level of ethical and moral standards.
- No employee will be in possession or under the influence of any substance that has been determined to be illegal under federal, state, or local law nor will they be in possession of any alcohol or fire arms. Possessions shall be grounds for immediate termination.

The Atlanta Branch of JCI has a diverse group of personnel that form a large net of support for all of our customers and projects. Although the entire Branch can be utilized to support Georgia Tech, a dedicated team has been formed to manage this account from installation through many subsequent years of useful service.

*The following pages contain the Georgia Tech Service Team Organization Chart along with an Atlanta Service Department Organizational Chart. Resumes for each of the key team members are included in **Section 6** of this Technical Proposal.*

Johnson Controls, Inc.   Phone: 770.666.0663
1350 Northmeadow Parkway Ste.100   Fax: 770.663.1490
Roswell, GA 30076

Scott Hitt - Building Environmental Specialist BES

Current Position	**Responsible for leading the Johnson Controls service and preventive maintenance team for the Metasys controls and mechanical systems at the Georgia Tech site. And reviewing all new controls system turnovers before customer sign off of jobs. Assist in technical support for the Metasys control system for the Georgia Tech personnel.**
Experience	**Recent Related Project** **Johnson Controls** **'98 - now Service dept. Atlanta, GA**

Dekalb Medical Center
'87-98 – Maintenance dept. Atlanta, GA

In the 12 years with Johnson Controls I have progressed from a System Rep IV to a Building Environmental Specialist (BES) In the Last 8.5 year I've been The Lead Service Technician on the Georgia Tech site working with the Facilities personal to maintain the Metasys system.

In the 11 years with Dekalb Medical Center I was reasonable for the maintenance of all mechanical equipment. And for the last 5 years over seeing the medical centers Metasys controls system.

Tanner Medical, Northside Hospital, Northside Cherokee Hospital, Piedmont Hospital, Floyd Medical
'98 – 2001 Atlanta, GA area
HVAC and operating room controls

State Farm Insurance, Home Depot
'98 – 2001 Atlanta, GA area
HVAC and server room controls

1998-Present   Roswell, GA
Johnson Controls

System Rep IV - Specialty Team for the Service Dept.
Building Environmental Specialist – for Georgia Tech site

Education	

U.S.Navy

Engineering plant operation and centrifugal chillers

Johnson Controls Institute

Milwaukee, WI
'96 Metasys ASC Engineering
'97 Metasys Hardware Troubleshooting
'99 DX-9100 Installation Engineering
'01 Service System Representative Level 1:
    AHU Devices – Service - Performance Certification
'01 Service System Representative Level 1:
    DX - 9100 – Service - Performance Certification
'01 Service System Representative Level 1:
    Integrator – Service - Performance Certification
'01 Service System Representative Level 1:
    UNT Devices – Service - Performance Certification
'01 Service System Representative Level 1:
    VAV Devices – Service - Performance Certification
'03 Metasys JC Basic
'04 Metasys Extended Architecture

Johnson Controls

Ray Nix – System Representative III

Current Position	**Responsible for performing the Johnson Controls preventative maintenance for the Metasys controls system at the Georgia Tech site.**
Experience	**Recent related project: Harris Wireless TEC Project, Perform Metasys System Preventive Maintenance and Coordinate Customer Monthly PM Turnover Meetings** **Johnson Controls** **Atlanta, Georgia** **2002 to present** **Service Dept.** **ALC Controls Inc.** **Kennesaw, Georgia** **Systems Analysis – Service Dept.** **1990 – 2002** **Performed preventative maintenance and service on Automated Logic's System 20/20.** **Honeywell Inc.** **Atlanta, Georgia** **Service Systems Specialist** **1975 – 1990** **Performed preventative maintenance and service on Honeywell's Delta 2000, Delta 1000, Delta 21, and Service Link Building Automation Systems. Also performed maintenance and service on Honeywell's W940 and W938 Fire and Security systems.**
Education	**Dekalb College** **Diploma** **Heating,Refrigeration and Air Conditioning** **Clayton College & State University** **Associate of Applied Science (A.A.S)** **Computer Networking Technology**

Honeywell Training :
Service System Specialist Curriculum
Delta 1000 Energy Management Programming
Automation 1000 Curriculum
Fire and Security Systems
Delta 21 and Honeywell Service Link Curriculum

Johnson Controls Training :
Metasys Hardware Architecture (OLM002)
Metasys Software Options (OLM003)
HVAC Introduction (LM17)
Metasys M3 Operations for N30/N31 (C-394-EN)
Engineering – HVAC Systems (C-622-EN)
ASC/C Tools Installation/Engineering (C-765-EN)

Tim Martin – System Representative II

Current **Position**	**Responsible for performing the Johnson Controls preventative maintenance for the Metasys controls system at the Georgia Tech site.**
Experience	**Recent related project: 430 10th Street AHU Controls, Metasys System Preventative Maintenance** **Johnson Controls** **Atlanta, Georgia** **2009 to present** **Service Dept.**

Barco Inc.
Duluth, Georgia
Engineering Technical Specialist
2001 – 2009
Worked with the advanced development and engineering team testing new products and designs

Southeast Imaging
Norcross, Georgia
Field Service Technician
1999 – 2001
Performed preventative maintenance and service on digital mammography and x-ray equipment.

Rockwell International
Duluth, Georgia
Engineering Technical Specialist
1986 – 1999
Worked with the development and testing of advanced weapon systems

| **Education** | **University of Arizona**
1 year
Electrical Engineering

Dekalb Technical College
1 year
Computer Programming

Johnson Controls Training :
Metasys Extended Architecture
HVAC Introduction (LM17) |

Chris Crook – System Representative II

Current Position	**Responsible for performing the Johnson Controls preventative maintenance for the Metasys controls system at the Georgia Tech site.**
Experience	**Recent related projects: Harris Wireless Controls Retrofit, Preventive Maintenance, NAA Apartments LEED Repairs** **Johnson Controls** **Atlanta, Georgia** **2008 to present** **Service Dept.** **Williams Electric Company** **Suwannee, Georgia** **Controls Hardware Installation** **2006 – 2008** **Hobby Linc Inc.** **Houstan, Georgia** **Shipping and Receiving** **2004 – 2006**
Education	**Gwinnett Technical College** **Diploma** **Heating, Refrigeration and Air Conditioning** **Johnson Controls Training :** **Metasys Extended Architecture** **HVAC Introduction (LM17)**

Atlanta Branch Service
Organizational Chart
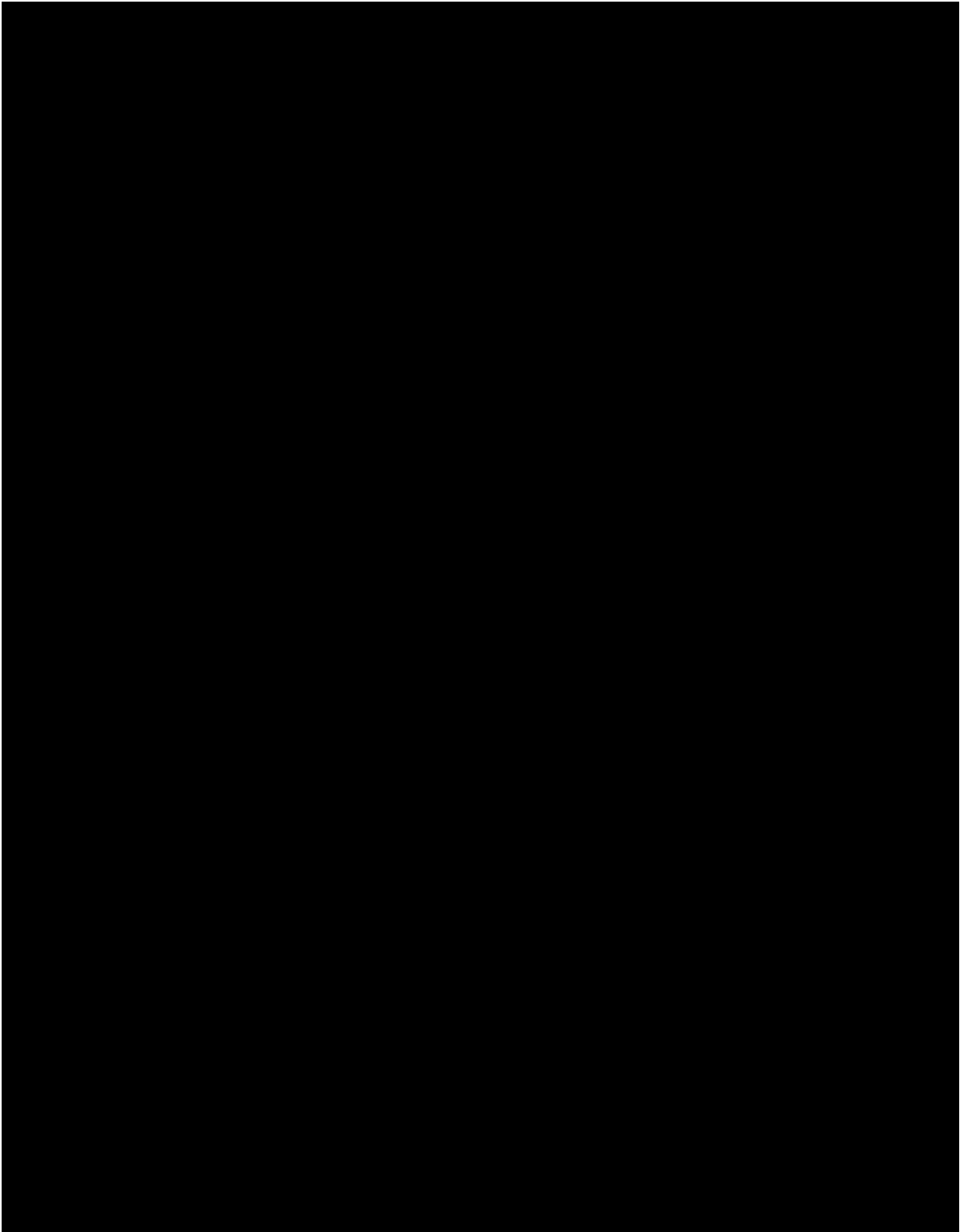
4.2. See document Section 'III. Existing Georgia Tech FMCS System 2009' which provides a list of all of the existing buildings and number and type of equipment installed in each building.

4.3. Hardware Maintenance Plan

4.4. Describe the proposed warranty/maintenance plan.

4.5. Description shall include plan for the following types of projects:

    4.5.1. New construction and its associated area controller equipment as pertains to Existing Building Controls scope.

    4.5.2. Existing building renovations and retro-fits.

    4.5.3. Expansion of existing installations.

    4.5.4. New construction and its associated monitoring and control equipment after warranty period of New Building Controls contract has ended.

JCI: JCI envisions and approaches all facets of installation whether new construction or retrofit to receive the same level of post installation service. No exceptions to our service policies or procedures should be made based only on the type of installation.

Johnson Controls proposes that the warranty/maintenance shall begin on the date of substantial completion of each system installation.

Johnson Controls recognizes the importance of a mutual determination of substantial completion. In addition, JCI recognizes that it is imperative certain events take place and are documented before substantial completion can occur. These events include:

• System Checkout

Each control input, output, and process within the installed system must be verified and documented to function properly. To ensure proper functioning of systems, Johnson Controls field personnel are educated in the areas of system verification and testing documentation.

• System Operations and Testing

Johnson Controls recognizes that a system installation cannot be declared complete until training has been provided to the facility operations and maintenance personnel.

• Georgia Tech Acceptance

Substantial completion cannot occur until agreed upon by Georgia Tech. Johnson Controls will be responsible for documenting its completion, and for receiving acceptance from Georgia Tech.

Johnson Controls will strive to perform its work correctly and completely before requesting Georgia Tech project acceptance.

When substantial completion is agreed upon by Georgia Tech and Johnson Controls, the warranty period shall commence. Attached is the form Johnson Controls typically utilizes at the GA Tech Site to document mutual acceptance of project completion.

Johnson Controls has great confidence in the reliability of its products. As part of this agreement with Georgia Tech, and due to this high level of confidence, Johnson Controls is offering to extend its standard one-year warranty to include an additional three-year extended warranty for many components for no additional charge.

<center>**GA Tech Site - Project Completion and Turnover Form**</center>

Project Name:

Project No:

JCI Internal Requirements – To be completed prior to GA Tech turnover process

- ☐ Hard copy of the OWS system screens
- ☐ All devices tagged
- ☐ All panels and JCI systems cleaned
- ☐ Operation and Maintenance manuals
- ☐ As-built control drawings
- ☐ Product data sheets
- ☐ Commissioning sheets
- ☐ Warranty letter
- ☐ As-built control drawings in panels
- ☐ Software and control drawings backed up on CD
- ☐ Training completed
- ☐ All software archived in the Atlanta office server

JCI Requirements for Georgia Tech – GT Rep. signature for receipt of manuals required

- ☐ Operator and Maintenance manuals
- ☐ Necessary copies to contractor
- ☐ 2 copies to Georgia Tech, Received by: Mike Leasure
- ☐ 1 copy to JCI service (Scott Hitt)
- ☐ 1 copy in trailer
- ☐ Schedule walk-through with zone manager
- ☐ Zone manager to sign this form to confirm all JCI requirements are complete
- ☐ Place a copy of this signoff sheet in each O&M manual

Signatures – Completion by the GT Zone Manager designates acceptance of the project

- ☐ **JCI Project Manager:**_____**Date:**_____

- ☐ **JCI Service Tech:** _____**Date:**_____

- ☐ **GA Tech Zone Manager:** _____ **Date:**_____

Comments

_____

_____

_____

<u>Warranty Plan</u>

The following table provides our Warranty Plan for products provided by JCI in the Hardware List. **A one-year (parts and labor) warranty for DDC controllers, sensors, etc. will be provided at no cost to Georgia Tech.** This warranty will include parts and labor for defective material change outs.

1.1.1 WARRANTY PLAN

	System Description	Page #	First Year Warranty	One-Year Material Warranty
	Area Controller	Section 4 - Appendix	As Specified	Included
	NIE-XXX	Section 4 - Appendix	As Specified	Included
	NAE-XXX	Section 4 - Appendix	As Specified	Included
	NCM-350	Section 4 - Appendix	As Specified	Included
	AHU-102	Section 4 - Appendix	As Specified	Included
	DX9100	Section 4 - Appendix	As Specified	Included
	UNT-XXX	Section 4 - Appendix	As Specified	Included
	VMA-XXXX	Section 4 - Appendix	As Specified	Included
	VAV-XXX	Section 4 - Appendix	As Specified	Included
	Temperature Sensor	Section 4 - Appendix	As Specified	Included
	Humidity Sensor	Section 4 - Appendix	As Specified	Included
	Liquid Pressure Sensor	Section 4 - Appendix	As Specified	Not Applicable
	Gas Pressure Sensor	Section 4 - Appendix	As Specified	Not Applicable
	Integrator	Section 4 - Appendix	As Specified	Included
	DT Display -Zone Terminal Unit	Section 4 - Appendix	As Specified	Included
	Relays	Section 4 - Appendix	As Specified	Included
	Associated Actuators	Section 4 - Appendix	As Specified	Not Applicable
	PE/EP Switches	Section 4 - Appendix	As Specified	Included
	DP Switches	Section 4 - Appendix	As Specified	Included
	FEC-XXX	Section 4 - Appendix	As Specified	Included
	NCE-XXX	Section 4 - Appendix	As Specified	Included

<u>Maintenance Plan</u>

The Preventative Maintenance Plan as specified in Section 17950 (Energy Management System Preventative Maintenance) of this RFP is outlined in Section 4, Appendix of this Technical Proposal.

Johnson Controls preventative maintenance program is structured to guarantee that through system analysis and scheduled maintenance tasks, Georgia Tech will continue to operate its facilities at maximum efficiency. The following Task Sheets are attached to provide an overview of the types of maintenance functions JCI performs on the various systems at GA Tech. These sheets are categorized by controller type.

METASYS™

Network Analysis Services

On a Scheduled Basis, as Indicated in the Agreement:

Check M-Web for connectivity.
Check all Metasys networks for off line devices.
Verify that data is tabulating in the diagnostic registers.
Verify the diagnostic errors and record.
Choose 3 NCM's and perform a hop count and record.
Choose 3 NCM's and perform a ping test and record.
Perform a Metascan analysis. Let the analysis run twice.

Provide a report summarizing Network Analysis results.

As Required:

Additional Tasks and/or Special Instructions:

Perform the Network Analysis tasks as appropriate to verify or discount suspected communications or Network throughput problems.
Perform the Network Analysis tasks as appropriate to evaluate the impact on network performance of various configuration options, as part of a proposed system expansion or modification.

Record and report all discrepancies to the appropriate personal.

METASYS™

Network Control Module (NCM)

On a Scheduled Basis, as Indicated in the Agreement:

Perform a task utilization test and verify the processor is running above 60% idle.
Check device logs for errors and clear them.
Verify device on-line status with the system.
Insure proper N2 communication, and correct as required.
Check LED's for proper power and status indications.
Check that battery submodule voltage is within limits (6.7-7.5 vdc) For NC 200's only.
Run 30 minute diagnostic test on battery and the battery power supply for NC 300's only.
Verify network card on-line status with the system.
Insure proper N1 communication, correct as required.
Check electrical connections and tighten as required.
Clean device surface and enclosure.

Clean enclosure exterior surfaces.

As Required

Check LED Indications to verify proper DC power levels, appropriate Transmit and Receive activity on the N1, N2 and L2 trunks, and to check for possible Error Code indications.
Inspect wiring for signs of corrosion, fraying and rapid discoloration.
Check voltage level of NCM Battery sub-module.
Cycle NCM power to initiate Self-Test Diagnostic.
Monitor LED sequencing for proper self-test displays or Error Code indications.
Remove excessive dust from heat sink surfaces.

Additional Tasks and/or Special Instructions:

METASYS™

AHU, UNT, and VAV Application Specific Controllers

On a Scheduled Basis, as Indicated in the Agreement:

AHU Application Specific Controller
Check terminations of all I/O device connections.
Clean interior and exterior surfaces.
Verify communication and operation of all I/O points.
Calibrate all I/O points.
Diagnose operational discrepancies for all I/O points and report them to area manager.
Verify proper operation and tuning all control loops.
Adjust operating setpoint. Verify stable control at new setpoint.
Return control to original setpoint. Verify stable control.
Make adjustments to control parameters as necessary for stable operation.
Record actual and adjusted values as required.
Create back-up of program in controller.
Verify on-line status of controller with Metasys.
Verify on-line status of data points with Metasys network.
Verify that controlled valves and dampers will stroke fully in both directions, sealing tightly where appropriate.
Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.

UNITARY Equipment Application Specific Controller
Check terminations of all I/O device connections.
Clean interior and exterior surfaces.
Verify communication and operation of all I/O points.
Calibrate all I/O points.
Diagnose operational discrepancies for all I/O points and report them to area manager.
Verify proper operation and tuning all control loops.

Adjust operating setpoint. Verify stable control at new setpoint.
Return control to original setpoint. Verify stable control.
Make adjustments to control parameters as necessary for stable operation.
Record actual and adjusted values as required.
Create back-up of program in controller.
Verify on-line status of controller with Metasys.
Verify on-line status of data points with Metasys network.
Verify that controlled valves and dampers will stroke fully in both directions, sealing tightly where appropriate.
Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.

VAV Box Application Specific Controller
Verify that ASC is in stable control at the desired value(s).
Where controller performance is in doubt:
-        Change set point value. Verify smooth, stable control at the new value.
-        Return set point to original value.
Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.

As Required
Verify/calibrate other points associated with these units where the need for possible "Corrective Maintenance" is indicated.

Additional   Tasks   and/or   Special   Instructions:

METASYS™

DX9100, FEC and NCE Controller

On a Scheduled Basis, as Indicated in the Agreement:

Check terminations of all I/O device connections.
Clean interior and exterior surfaces.
Verify communication and operation of all I/O points.
Calibrate all I/O points.
Diagnose operational discrepancies for all I/O points and report them to area manager.
Verify proper operation and tuning all control loops.
Adjust operating setpoint. Verify stable control at new setpoint.
Return control to original setpoint. Verify stable control.
Make adjustments to control parameters as necessary for stable operation.
Record actual and adjusted values as required.
Create back-up of program in controller.
Verify on-line status of controller with Metasys.
Verify on-line status of data points with Metasys network.
Verify that controlled valves and dampers will stroke fully in both directions, sealing tightly where appropriate.
Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.
Verify proper operation of local DT display.

Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.
Verify proper operation of local DT display.
Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.
Verify proper operation of local DT display.
Verify that controlled valves and dampers will stroke fully in both directions, sealing tightly where appropriate.
Verify the proper operation of critical control processes and points associated with this unit. Make adjustments if necessary.
Verify proper operation of local DT display.

Every Five Years

Replace memory retention backup lithium battery

METASYS™

Network Integration Engine (NIE)

On a Scheduled Basis, as Indicated in the Agreement:

Check the CPU usage; verify the processor is running below 50%.
Check the trend memory usage and record reading.
Check the object memory usage and record reading.
Check the object count and record reading.
Verify NIE device on-line status with the system.
Insure proper communication with integrated NCM.
Verify network card on-line status with the system.
List any corrective measures required.
Report all discrepancies to area manager.

As Required

Reset NIE and test power lost restart of server

METASYS™

Network Automation Engine (NAE)

On a Scheduled Basis, as Indicated in the Agreement:

Check the CPU usage; verify the processor is running below 50%.
Check CPU usage; verify the flash is below 100%.
Verify mother board temperature is below 67 deg C.
Verify CPU temperature is below 77 deg C (for NAE 5500 only).
Check the trend memory usage and record reading.
Check the object memory usage and record reading.
Check the object count and record reading.
Check the estimated flash available, record reading.
Check the battery condition and record reading.
Check LED's for proper power, status indications.
Verify NAE device on-line status with the system.
Verify proper communication with field controllers.
Verify network card on-line status with the ADX.
Check electrical connections, tighten as required.
Clean panel surface and enclosure.
List any corrective measures required.
Report all discrepancies to area manager.

As Required

Reset NAE and test power lost restart of NAE

METASYS™

Network Controller Engine (NCE)

On a Scheduled Basis, as Indicated in the Agreement:

Check the CPU usage; verify the processor is running below 50%.
Check CPU usage; verify the flash is below 100%.
Verify mother board temperature is below 67 deg C.
Check the trend memory usage and record reading.
Check the object memory usage and record reading.
Check the object count and record reading.
Check the estimated flash available, record reading.
Check the battery condition and record reading.
Check LED's for proper power, status indications.
Verify NCE device on-line status with the system.
Verify proper communication with field controllers.
Verify network card on-line status with the ADX.
Check electrical connections, tighten as required.
Clean panel surface and enclosure.
List any corrective measures required.
Report all discrepancies to area manager.

As Required

Reset NAE and test power lost restart of NCE

4.6. Spare Parts

   4.6.1. Describe the Contractor's plan to make spare parts available to the site, including JCI parts and parts for new buildings installed by Controls Contractor. This discussion shall include the size of the local spare parts inventory and location of the depot that is expected to service Georgia Tech. This discussion shall also describe the size or facilities required on site at Georgia Tech by the Contractor for the maintenance plan.

JCI: Most of our large customers do stock small quantities of spare products. Also, the technicians that JCI uses to perform preventive and repair maintenance at the GA Tech Site maintain a stock of commonly used spare parts on their vehicles. Although our Metasys system components are reliable, a small cache of products is advisable for emergencies. **A stock of spare parts will be maintained by JCI onsite.** Based upon our 10 years of experience maintaining the DDC systems at Georgia Tech, the following is a breakdown of our recommended spare parts program. The stock of spare parts will be automatically replenished as parts are used from this spare parts stock.

Operator Workstations: Our Operator Workstations including computers, printers, etc. are usually not stocked since the GA Tech, Facilities IT Department usually furnishes all computer hardware. If required, OWS repair components/devices are readily available and are purchased through Dell Computers.

Recommended Spare Parts List:

Part	Quantity	Part	Quantity
A11A-1C	2	XP-9102-8304	1
A70HA-1C	2	XP-9103-8304	1
AS-AHU102-0	1	XP-9104-8304	1
AS-AHU100-0	1	XP-9105-8304	1
AS-UNT110-1	2	XT-9100-8304	1
AS-UNT111-1	2	TE-67PP-1B00	2
AS-VAV110-1	2	Y65T42-0	1
AS-VAV-111-1	2	Y66F12-0	1
AS-XFR050-0	1		
AS-XFR100-1	1		
DPT-2015-1	2		
DPT2641-005D	1		
DPT2641-2R5D	1		
DX-9100-8454	2		
DX-9100-9890	2		
EPT-8000-2	2		
EPT-8000-4	2		
H-735	2		
H-908	2		
M9106-AGA-2N02	2		
MS-NCE-2560-0	1		
MS-NAE3510-0	1		
MS-NAE4510-0	1		
MS-FEU1610-0	1		
MS-FEU2610-0	1		
MS-IOM1710-0	1		
MS-IOM2710-0	1		
MS-IOM4710-0	1		
MS-IOM3710-0	1		
MS-VMA1610-0	1		
MS-VMA1620-0	1		
NU-NCM350-8	1		
NU-NET301-0	1		
TE-6000-100	4		
TE-6300-601	4		
TE-6300-602	4		
TE-6300-603	2		
TE-6300-604	2		
TE-631AP-1	2		
TE-632AP-1	2		
TE-6314P-1	2		
TE-6315P-1	2		
TE-6328P-1	2		
TE-67NT-1B00	2		
TE-67PT-1B00	2		
TE-67NP-1B00	2		
Y65T42-0	1		

4.7. Software Support Plan

    4.7.1   Describe the Contractor's plan for providing software support to Georgia Tech. It should include field components when necessary and all server applications (such as operator web interface software) upgrades to the latest release annually. The proposal shall recommend the level of on-site software support for the proposed system, and any cost involved beyond the mandatory requirement of no-cost to owner for complete system software upgrades, and the duties and responsibilities for all persons assigned on-site by the Contractor. The Contractor shall indicate the level of expertise such personnel must have. The proposal shall describe the normal corrective action that is taken from the time an installation experiences a software problem to the time a corrective action is made available to the installation. This description should include the procedure for applying corrections to the software supplied by the Contractor. The proposal shall also describe the procedure Georgia Tech would follow to request changes in the software. Contractor must agree to provide software updates at no additional cost to the Georgia Tech

JCI: Upon completion of a given project, the Metasys software has been configured to operate in accordance with the design documents and most system operational changes/adjustments can be made by Georgia Tech Maintenance Personnel. In the case of more complicated programming changes/revisions, a JCI Technical representative can provide these services on a case by case basis. If Georgia Tech foresees a need to alter software configurations on a routine basis; it may be necessary to have on-site technical representatives who will be responsible for all system operations including software changes. This representative will be an advanced JCI technician with extensive technical experience in the areas of mechanical systems and controls. He or she will have experience programming all components of the Metasys product line employed at the GA Tech Site from field controller through OWS.

Recommended Software Services: Network Analysis, Field Controller Software Maintenance, Building/Supervisory Controller Software Maintenance, IT Support for Metasys Products.

Network Analysis Services

Due to the size and complexity of the existing Metasys network installed at GA Tech, JCI recommends performing Network Analysis on a weekly basis:

A detailed list of recommended tasks to be performed during a weekly network analysis is included in Section 4-Appendix (Energy Management System Preventive Maintenance-Response to Specification 17950) of this proposal. In general, the following activities should be part of the Network Analysis Service.

Weekly:

1. Perform the Network Analysis tasks appropriate to identify communications deficiencies and network throughput problems.
2. Perform corrective actions as required to maintain system communications to all buildings and controllers at 100% operation.
3. Provide a weekly report summarizing Network Analysis results. Forward report of results to the Facilities IT Manager and engage in troubleshooting as required upon direction from one of the GA Tech Managers.

Field Controller Software Maintenance

In concert with the preventive maintenance performed on field control systems, controller software will be analyzed and adjusted as required to improve implemented control strategies for achieving environmental parameters and control objectives. Some examples of the software maintenance functions performed on field controllers are as follows:

- Analyze control loops and re-tune as required to achieve tight control.
- Adjust calibration parameters.
- Backup/updating of current software configuration parameters.

Building/Supervisory Controller Software Maintenance
In concert with the preventive maintenance performed on supervisory control systems, controller software will be analyzed to determine operational status and loading. Some examples of the software maintenance functions performed on supervisory controllers are as follows:

- Backup/archiving of current software databases.
- Check supervisory controller database for configuration errors.

IT Support for Metasys Products
One of the software services provided to the GA Tech Facilities IT Department by the JCI on-site service team is technical support to maintain the Metasys System network communications operating at 100%

Optional Software Services: Consultation Services, Software Subscription Service, Administration of Operator Work Stations.

Consultation Services
Establish Objectives: On an agreed upon basis, review with customer representative current comfort, control and energy optimization objectives.

Audit specific building locations for occupant and equipment environmental requirements.

Determine control parameters for each location, for both occupied and unoccupied periods.

Control Strategies: On a owner designated basis, analyze implemented control strategies for applicability in achieving environmental parameters and control objectives.

Analyze mechanical cooling, free cooling, and heating system integration strategies.

Analyze and recommend optimal runtime and night setback strategies to ensure environmental control, while reducing energy consumption.

Analyze equipment loads and recommend demand limiting and load rolling strategies that reduce energy consumption while ensuring comfort.

Set and review historical trend data recording and reports, to verify control during occupied and unoccupied periods.

Day-to-Day Operational Support Needs: On a daily or weekly basis analyze the day-to-day informational needs of the operations staff.

Assist in the design and implementation of alarm grouping and reporting strategies.

Assist in the design and implementation of system status displays.

Assist in the design and implementation of system status and management reports to aid in decision support for the Facility Management staff.

Analyze how temporary occupancy changes are implemented, and their impact on heating/cooling system integration.

Recommend alternate operational approaches and additional staff training options, as opportunities for enhancements are identified.

Software Subscription Service:
Johnson Controls continually adds innovative enhancements to its software that make it easier for you to increase the performance of your facility. With Metasys Software Subscription Service you will automatically receive these upgrades. This service ensures that:

· In accordance with the requirements set forth in this RFP, GA Tech will receive a minimum of one upgrade per year as they become available for each software package purchased

· New revisions will be compatible with your existing Metasys databases or a conversion process will be included.

If Georgia Tech wishes to add additional operator work stations our purchase new copies of software for their existing network, several different options are available for purchase of software.

Site License Service:

Site Licensing is now available for qualified customers requiring multiple copies of OWS Metasys software. Specifics of the program (clarification of what is considered a site, products that qualify, description of how the program operates, ordering guidelines, etc.) follows:

Under our program, a site is considered a Metasys installation that is within a relative geographical area and under control of a central authority. Projects that qualify under our program are installations that fall under the following typical scenarios:

· A single office building.
· A single company's office complex or campus in an industrial park setting.
· A college campus.
· A city school district.

Metasys software products that <u>qualify</u> under the site license program include:

· ADX Server Software and NAE Software (MS-ADXSWO-SCS)
· NIE 8500 Integration Software (MS-NXE85SW-SCS)
· Person Machine Interface (WS-SWOPMI-x0x)
· Graphic Programming Language (WS-SWOGPL-x0x)
· GPL HVAC Library (WS-SWHLIB-x0x)
· JC Basic (WS-SWOJCB-x0x)
· Metalink (WS-SWMLNK-x0x)
· All of the above as a combination in a "WORKS" package.

Five tiers/quantities of licenses are available: 1, 5, 10, 20 or 50 copies. These tiers/quantities apply to the qualified individual software packages previously listed or all of the qualified software packages in a "WORKS" combination. Since only five tiers/quantities are available, orders may be placed in a combination to meet a specific quantity.

Customers with a site license have two options to purchase revision level upgrades. The first option is to purchase individual site license revision reorders (-60x) at each major revision level. The second option would be to purchase a site license Software Subscription Service contract (-SCS) which would cover all major revision levels released within the year of the contract. A SCS can have annual renewals.

<u>Administration of Operation Work Stations</u>
If desired, JCI could assume full IT responsibility for maintaining and servicing all operator work stations.

Requesting Software Support:

<u>Requesting Software Modifications</u>
Corrective actions for software related problems on recently completed projects shall be handled in the same manner normal warranty calls are managed. The GA Tech Project Manager or Area Maintenance Manager will notify JCI of the problem and JCI will apply the proper corrective action.

If Georgia Tech desires a software modification be made to an existing program to revise the sequence of operation or enhance the performance of a particular system, the following procedure will be applied:

1. A Georgia Tech representative will contact the JCI/Georgia Tech Account Manager or other team member and describe the modification desired. The account team member will determine the scope of work required to implement the change and if there are any potential drawbacks or enhancements that should be considered.

2. The appropriate JCI/Georgia Tech team member will be assigned based upon prior experience/knowledge of the particular building and controller requiring modifications and the scope of work will be reviewed with the owner. If the required change is urgent, the problem will be addressed by the on-site team immediately.

3. If a problem is discovered which is beyond the Branch's ability to solve, the technical staff at the National organization in Milwaukee will be contacted. They will simulate your problem in a lab situation and deliver the branch a solution.

Having a JCI team of personnel on-site at Georgia Tech will guarantee Georgia Tech the quickest response and solution to problems that may arise.

5. TRAINING SECTION

5.1. Contractor must agree to provide training as described in this document at no additional cost to the Georgia Tech

5.2. Provide a description of the proposed plan for training on the proposed system. Include all proposed training plans the Project Proposal binder. The number of people designated or available to support the site and their level of experience (educational and working experience) shall be identified and described as well as a syllabus for each of the operators level training described below.

5.3. Operator's Training I

5.3.1. The first session shall be taught at the Georgia Tech site for a period of five (5) consecutive training days, within 60 days of the purchase order of the system. A maximum of eighteen (18) personnel will attend this course. The training session shall include instruction on the specific hardware configuration of the installed system and specific instructions for operating the installed system and interface with the equipment used for monitoring and control. Upon completion of this session, each student should be able to start the system, operate the system, recover the system after a failure, and describe the specific hardware architecture and operation of the system. This session shall include:

5.3.1.1. General system architecture
5.3.1.2. Functional operation of the system
5.3.1.3. Operator commands
5.3.1.4. Use and implementation of application programs, control sequences, and control loops
5.3.1.5. Color graphics generation
5.3.1.6. Data base entry and modification, including data bases required for communications
5.3.1.7. Reports generation
5.3.1.8. Alarm reporting
5.3.1.9. Diagnostics
5.3.1.10.   Use of Operator's Station Equipment.

5.4. Operator's Training II

5.4.1. The second training session shall be taught at the Georgia Tech site for a period of five (5) training days, ninety (90) days after receipt of purchase order of the system. A maximum of eighteen (18) personnel will attend this session. The course shall consist of "hands-on" training under the constant monitoring of the instructor. The instructor shall be responsible for determining the appropriate password to be issued to the student commensurate with each student's acquired skills at the beginning of each of these individual training sessions.

5.5. Maintenance Personnel Training

5.5.1. The maintenance training session shall be taught at the project site after completion of the Endurance Test for a minimum period of three (3) training days. A maximum of eight (8) personnel will attend the course. This training shall not be scheduled at the same time as any session of Operating Training. The training shall include:

5.5.1.1. Physical layout of each piece of hardware

5.5.1.2. Troubleshooting and diagnostic procedures

5.5.1.3. Repair instructions

5.5.1.4. Preventive maintenance procedures and schedules

5.5.1.5. Calibration procedures.

5.6. System Administration's Training

5.6.1. Provide a training session at the Georgia Tech site for a period of eight (8) days, fifteen (15) days following personnel responsible for system administration. A maximum of four (4) people will attend this training. This session must cover the advanced features and capabilities of the system. Topics to be covered shall include:

5.6.1.1. Custom software - algorithmic sequence development and implementation.

5.6.1.2. Optimization features.

5.6.1.3. Advanced energy management functions - development of software.

5.6.1.4. Demand limiting strategy development and implementation,

5.6.1.4.1. RTP demand reduction through campus wide immediate execution campus wide of resetting space temperature ranges, lighting level reductions, and others as developed to reduce energy demand.

5.6.1.5. Energy consumption monitoring reports and profiles.

5.6.1.6. Custom report generation.

5.6.1.7. Data base functions - to include data collection, trend logs and data export functions.