Attachment I

Statement of Work (SOW)
Contract for Videoconference and Audio-Visual (A/V) Systems Integration
Sandia National Laboratories
October 2012

1 Introduction and Overview

The Contractor shall provide system videoconference and A/V equipment, integration and warranty service on an on-call and as-needed basis for Sandia's Videoconference and Collaborative Technologies (VACT) team in accordance with this SOW.

1.1 Background

Sandia National Laboratories (SNL) is a multi-program engineering and science laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the US Department of Energy's National Nuclear Security Administration (DOE NNSA). Sandia's missions include nuclear weapons systems research and development, as well as related activities in the national security arena, emerging technologies, and collaboration with industrial partners.

Sandia's VACT team provides corporate-wide multi-dimensional videoconference, collaboration, and audio/visual support to a diverse programmatic and customer base at Sandia's two primary locations in Albuquerque, NM (hereinafter referred to as SNL/NM) and its approximately 12,000 employees/contractors, as well as Sandia's Livermore, CA (hereinafter referred to as SNL/CA) location and its approximately 1,000 employees/contractors. VACT owns, operates, and maintains 27 corporate public videoconference rooms (14 at SNL/NM, 13 at SNL/CA), and provides support for over 250 programmatically owned videoconference systems corporate-wide. VACT also supports Audio/Visual (A/V) systems used in collaborative spaces and conference rooms. Sandia's VACT team also supports videoconferencing and A/V activities at Sandia's small sites in Washington D.C. and Carlsbad, NM

VACT's purpose is to facilitate the conducting of Sandia business by applying domain expertise to the collaborative communications needs of the corporation. VACT personnel assist, guide and facilitate customers in the effective use of collaborative tools through thorough and professional design, integration, maintenance and operations. VACT's goal is to enhance the collaborative communications experience for our customer's while minimizing disruption to workflow, schedules and meetings. VACT staff is skilled in crisis management and are called upon to solve complex communications problems quickly and adeptly.

VACT is divided into 4 functional teams (see Figure 1): Operations, Maintenance, Engineering (Design and Integration) and Technical Development (R&D). The Collaborative Systems Security function operates across the entire department.

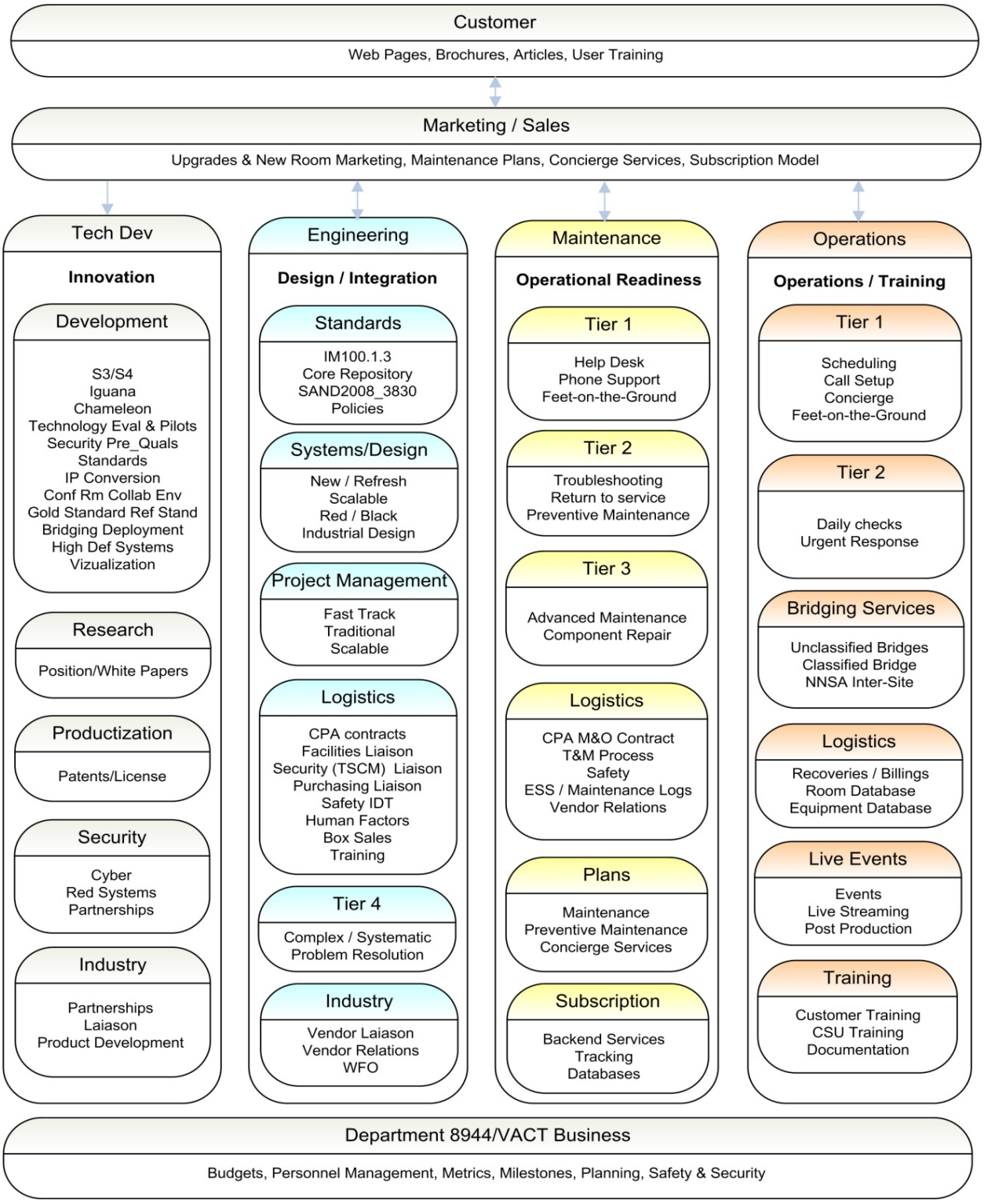

Figure 1 – Videoconference and Collaborative Technologies Functional Overview

Operations provides videoconference and room scheduling, room setups , help desk, onsite classified bridge operations unclassified on-site and off-site bridge services and training. Additionally, Operations provides Event Management services for organizations that require high-touch support for mission critical videoconference events such as the DOE/NNSA Quarterly Performance Review (QPR). Operations also supports desktop videoconferencing and provides user training.

Maintenance provides the coordination of system maintenance for rooms constructed under the VACT standards program and for legacy systems not constructed to standards. Maintenance and Operations are supported through a contract with an M&O Contractor whose personnel are onsite in Albuquerque.

Engineering/Integration sets equipment and system standards, designs and manages the integration of new and upgraded systems through a Contracting Procurement Agreement (CPA).Technical Development develops new technology and systems and works with industry to improve A/V and collaborative tools and products used by Sandia and other NNSA sites. Collaborative Systems Security is responsible for the overall security posture of the department, classified systems security plans and for working with Technical Security Counter Measures (TSCM) and other related security organizations on process, policies and procedures.

The primary goal of each group is to deliver excellent customer service in an effective, timely and consistent manner. VACT performance is continually monitored with the goal of maintaining a high level of customer satisfaction by continually improving performance, increasing efficiencies, and adhering to consistent processes in the delivery of services.

VACT partners with other sister Sandia internal organizations in the Integrated Management Services (IMS) and Integrated Information Services (IIS) to deliver comprehensive service to the customer. These sister IMS and IIS organizations provide services such as procurement, telecommunications, networking, facilities, logistics (shipping and receiving), physical security (badge and site/building access) and computer security. The Contractor shall work with these organizations in achieving mutual goals in the interest of providing efficient and timely service to the customer.

1.2 Scope of Work

The Contractor shall provide A/V and videoconference systems integration – the purchase, integration engineering, installation, testing, training and warranty of new systems – and the upgrade of systems that have aged and require technology refresh and individual components. Systems range in scale from desktop to group systems, conference rooms to auditoriums to Immersive Telepresence. Some work may include visualization theatre integration and upgrade. Sandia VACT will supply system architecture standards, system design requirements and drawings from which the Contractor shall develop system and facilities “build” drawings.

Sandia Corporation is made up of many disparate organizations, each with differing programmatic, funding, and communications requirements. While this SOW is designed to bring standards, homogeneity and consistency to AV and Videoconference integration, the logistics of the installation of components and systems under the contract will differ from site-to-site,

building-to-building, and room-to-room. It is the responsibility of the Contractor to understand and apply all the requisite facilities, security, safety and location specific requirements in the execution of the work under this contract.

The Contractor shall provide services and personnel to implement, execute and manage VACT integration activities at Sandia with a minimum of disruption to the workflow and schedules of VACT customers.

The Contractor is expected to engage in an ongoing dialog with the VACT Sandia Delegated Representative (SDR) to optimize the value of the integration activities to Sandia. The SDR's specific responsibilities are outlined later in this SOW, but the SDR is the Contractor's point of contact and is responsible for understanding the requirements of providing integration service to Sandia. The Contractor shall work with the SDR to optimize the management of this effort and to assist the SDR in his/her strategic and integration planning efforts. The Contractor is expected to add additional value to this program by determining which of their most successful practices and technology implementations are relevant to SNL and have the potential for improving overall service and cost effectiveness. While the following sections outline explicit services the Contractor is required to provide, the intent is to allow enough flexibility to provide Sandia the ability and agility to respond to what has been and is expected to be a dynamically evolving collaboration environment. The Contractor is highly encouraged to suggest new ideas and methodologies, and to partner with VACT Engineering on implementation of those methodologies.

2 Contractor Tasks

The table below outlines the Deliverable Task generated by an Event and its expected delivery date.

Event	Task	Deliverable	Schedule/Milestone
Contract Award Phase			
CPA Contract Award	1a	SNL Orientation and Training of Contractor	At earliest opportunity of Contractor and SNL.
CPA Contract Award	1b	Roles and Responsibilities Document by Contractor	30 calendar days after award of CPA contract.
CPA Contract Award	1c	SharePoint access to Contractor	30 calendar days after award of CPA contract.
CPA Contract Award	1d	Attend Sandia VACT weekly project meetings	Ongoing to end of CPA contract
FOCI and Q Clearances issued.	2	SNL secure systems orientation and training of Contractor by SDR	30 calendar days from FOCI and Q Clearances issue.

Project Phase			
End User Request	3	Contractor Site Visit with SNL VACT and End User	Typically 14 calendar days of notice to Contractor.
Meeting with End User (Standard System)	4a	Contractor Quote based on Sandia Standards. Contractor Quote is valid for 30 days.	7 Business days after End User meeting or negotiated w/SDR
Meeting with End User (Standard System)	4b	Contractor completed Site Survey and Facilities Requirements	7 Business days after End User meeting or negotiated w/SDR
Quote Received	5	SNL Quote Review	At earliest opportunity by SNL VACT
Quote Accepted by SNL SDR	6	SNL Proposal to End User.	At earliest opportunity of SNL VACT.
Formal Proposal Presentation	7	Presentation of Proposal/Quote to end user with VACT, Contractor and End User	At earliest opportunity of SNL VACT and End User
Formal Proposal Acceptance	8	End User Proposal Acceptance/Rejection to SNL VACT	At the discretion of the end user.
Purchase Requisition Created	9	Purchase Order placed	Procurement Departments' earliest opportunity
PO received	10a	Integrate Equipment	Upon Receipt of PO
PO received	10b	Project Gantt Chart	Within 5 business days of receipt of PO
PO received	10c	Systems Requirements Drawings for Facilities or Facilities tasks as appropriate	Within 10 business days of receipt of PO
PO received	10d	Network/Telecom Circuit Order information to Sandia VACT	At receipt of Codec by the Contractor.
Pre-build system at off-site location OR on-site if approved by SDR	11	Contractor documentation of successful FAT results to SDR	Prior to shipment of system
Schedule install date	12	Contractor Install Date scheduled with SNL VACT Project Manager	Prior to shipment of system

Ship system to site	13	Shipping Document to SDR	Completion of Task 12
Install system	14	Successful Site Acceptance Test (SAT) – NO punch lists process	Upon completion of system installation
SNL VACT System Certification Testing	15	System Certification Test Results to Contractor	At earliest opportunity by SNL VACT
Training (optional – per end user)	16	Quick Start Guide	At end user discretion
Documentation	17	As-Built CAD drawings and the installed, operational version of the any software (source code / un-compiled)	Due 14 calendar days after SAT
Project Signoff	18	Project Completion Document	Within 14 calendar days of System Certification (Task 15)

2.1 Task Details and Deliverables

Task 1a – SNL Orientation and Training of Contractor

- The Contractor will be trained on working in the Sandia environment including safety and security. The Contractor will be trained in VACT Engineering processes, procedures and standards including the Preferred Systems Catalog, system design and market basket component list.

Task 1b – Who does what when document

- Contractor shall provide, to the SDR, the names, contact information and chain of escalation for each person to be involved with projects for Sandia.
- Contractor shall define the role and tasks of each person as it relates to the scope of a project from initial quote request through project completion and including any sub-contractors who fulfill a project role.
- All Key Personnel shall be included in the report.

Task 1c - SharePoint access to Contractor

- VACT will orient the Contractor to the VACT Engineering SharePoint site. VACT will request Kerberos passwords for Key Personnel for access to SharePoint. Only Key Personnel will be provided access.

Task 1d - Attend Sandia VACT weekly project meetings

- Contractor shall use Sandia VACT generated Project-at-a-glance (PAAG) document for project status. Document is available in the VACT Engineering SharePoint
- Report status of quotes.
- Report status of material procurement
- Report status of Factory Acceptance testing (FAT)

- Report status of proposed installation date
- Report status of project issues

Task 2 – SNL Orientation and Training of Contractor, Secure Systems

- Sandia VACT Engineering will orient Contractor regarding the policies and governance regarding the design and implementation of classified systems.
- The Contractor's Project Manager, Lead Engineer, Lead Installer shall be present for the orientation at Sandia California facility.

Task 3 - Contractor Site Visit with SNL VACT and End User

- SNL VACT shall arrange a meeting between the end user, SNL VACT and the Contractor generally within 14 days of the End User request for a meeting. However, shorter response time may be requested depending upon project requirements.
- The Contractor's Account Representative and Project Manager shall be in attendance.
- Contractor shall attend meeting and gather system details within the bounds of Sandia Standards and perform a site survey.

Task 4a – Contractor quote based on Sandia Standards for the issuance of a Standard Purchase Order (SPO)

- The Contractor shall provide a quote for each project/system.
- The Contractor quote shall include the project name by location, building number, room number and system type.
    - Example: NM B892 R216 Class B
- The quote shall include a Project Statement of Work describing how the system will work and a room layout of the components.
- The quote shall include a list of all equipment to be used in the project with quantity and price.
- The Contractor shall include a list of all Customer Furnished Equipment (CFE) to be used in the project shown at $0 per item.

Task 4b – Contractor Site Survey

- A Site Survey shall be performed for every system quoted by the Contractor and shall be supplied with every quote.
- The Contractor shall document site conditions and requirements for system installation during the site survey based on the Site Survey form provided by Sandia.
- The Contractor shall sketch the room and document specific room features that may impact the installation such as; location of outlets, network, lights, HVAC diffusers, sprinklers, etc., and dimension the location of room features.
- The Site Survey procedures and documentation shall be approved by the SDR.
- At the end of the meeting with the end user and site survey, the Contractor shall have all information necessary to provide a Standard Purchase Order (SPO) SOW/Estimate and Site Survey.

Task 5 – SNL Quote Review

- The Sandia SDR will review and approve the Contractor quote and validate that the equipment meets Sandia's requirements and that the labor meets the requirement for the project SOW.

Task 6 - SNL Proposal to End User

- Accurate Quotes will be combined with VACT labor estimates into a Proposal sent to the end user by SNL VACT.

Task 7 - Presentation of Quote to end user and SNL VACT

- SNL VACT will arrange a meeting with the end user to review the System Proposal.
- Contractor shall attend the meeting in-person or via videoconference or teleconference.
- Contractor shall present the SOW Executive Summary to the end user.

Task 8 – End User Acceptance/Rejection [note 30 day valid quote/estimate/proposal]

- If the Proposal is accepted by the end user, SNL VACT will create a Purchase Requisition (PR).
- If a decision to accept the proposal is delayed, the End User will be given 30 days to accept a Proposal. After 30 days, the Proposal/Quote will expire and a new Proposal/Quote will be generated if requested.

Task 9 – Purchase Order Placed

- Sandia Procurement Department places the PO with the Contractor.

Task 10a – Integrate Equipment

- Contractor shall integrate, test and certify systems that meet Sandia VACT Standards as published in the VACT-Engineering Standards for all work performed at Sandia Corporation.

Task 10b - Project Gantt chart and meetings

- Contractor shall provide start-to-finish project management and planning.
- Contractor shall provide a Microsoft Project 2010 Gantt chart in the SNL format provided detailing the project milestones – Prebuild duration, FAT date, ship date, Installation start, Installation completion date, Training date and Project Acceptance date.
    - All projects shall be listed on one expandable MS Project worksheet.
- Contractor shall continually update the schedule based on SNL Facilities, SNL Network and SNL End User schedule.
- Contractor shall participate in VACT project planning weekly meetings and provide project status and reports.

Task 10c - Systems Requirements Drawings for Facilities

- For Class A and B VTC systems and small AV systems, Contractor shall develop a task list to be provided to Sandia VACT Project Coordinator outlining the electrical and structural work required prior to installation of the system. Task list is due to Sandia VACT within 10 business days ARO unless otherwise negotiated with the SDR.

- For Class C, Chameleon systems and Auditorium Contractor shall develop detailed installation drawings for each system that include: architectural drawings – when architectural drawings are requested by the SDR – rack elevations, room elevations, location of fire sprinkler heads, HVAC diffusers and floor plans, audio/video diagrams and control system diagrams. The audio/video/control diagrams shall include cable numbering schema that relates physical cable numbers to the drawings. Drawing package is due to Sandia VACT within 15 business days ARO unless otherwise negotiated with the SDR.

Task 10d - Network/Telecom Circuit Order

- Contractor shall provide videoconference codec information to VACT Engineering prior to shipment. The information includes: codec make/model, serial number and MAC address.

Task 11 – FAT test results to SDR

- Contractor shall provide a complete and successful Factory Acceptance Test (FAT) results, Addendum #__, to the Sandia SDR prior to system shipment.
- A successful FAT confirms the system functions according to the Statement of Work and Sandia VACT Engineering Standards.

Task 12 - Contractor Install Date

- Contractor shall verify the Facilities preparation is complete and complies with requirements and Sandia VACT Engineering standards.
- In cooperation with Sandia VACT and the End User, Contractor shall determine an acceptable installation date and duration.
- Contractor shall arrange for escorts when needed.

Task 13 - Shipping Document to SDR

- Contractor shall email a shipping document to the SDR prior to shipping the system.
- Shipping document shall show the Manufacturer, model number, and serial numbers of all equipment. Document shall also list the S-Tag numbers for applicable equipment.
- Shipping document shall show the shipping carrier and the quantity of boxes and crates.

Task 14 – Job Hazard Analysis

- Sandia VACT shall provide a Job Hazard Analysis (JHA) delineating the risks and risk mitigation associated with the work and the risks and risk mitigation associated with the work area.
- Contractors' installation team shall sign the JHA prior to installation.

Task 15 - Site Acceptance Test (SAT), NO punch lists process

- Contractor shall provide signed and dated Site Acceptance Testing (SAT) to the SDR.
- The Site Acceptance Testing (SAT) document, Addendum #__, is available on the VACT Engineering SharePoint website.
- The Contractor shall complete a Site Acceptance Test (SAT). The SAT will demonstrate completeness of the system with no punch list items and readiness for the customer to assume control of the system.

- No Punch List means that no further work is required for the system to function as defined in the Statement of Work and it is ready for Sandia VACT certification.
- The Contractor shall demonstrate to the SDR or the SDRs representative that the completed system is fully operational and that it fully complies with the Statement-of-Work for that project.

Task 16 - System Certification Test Results to Contractor

- Sandia VACT shall conduct System Certification using the form available on the VACT Engineering SharePoint website.
- Sandia VACT shall transmit the certification results to the Contractor.
- Contractor shall correct the issues found during the Certification process within 5 business days from date of Certification.
- Contractor shall retest the system using the SAT document to verify that system operates per the SOW. Retested system SAT document shall be transmitted to the SDR.

Task 17 – QuickStart Guide

- Contractor shall furnish a QuickStart Guide delineating basic operational tasks – dialing, video routing, sending graphics, etc. Contractor shall follow the Sandia VACT approved format located in the VACT Engineering SharePoint.
- Contractor shall provide the option of training the customer on the system provided. Training shall be no less than one hour when provided and shall include quick-start guides; hands-on training including connecting to other sites or rooms to allow the customer opportunity for real-world scenario training. ~~Training shall be conducted by a certified trainer.~~

Task 18 - As-Built CAD drawings, Software Code

- Contractor shall provide as-built drawings and documentation at the completion of the project. As-built documents shall be provided electronically and filed in the VACT Engineering SharePoint website. As-built drawings are system drawings that have been updated after the installation is complete to reflect the final installation wiring and placement of equipment in the room. As-built drawings shall reflect exactly how the system was installed and are due 14 calendar days after the completion of the project.
- As-built drawings are detailed system CAD drawings that include: architectural drawings – when architectural drawings are requested by the SDR, rack elevations, room elevations and floor plans, audio/video diagrams with cable labels, and control system diagrams.
- As-built documentation includes:
    - Control system un-compiled source code with release number and install date
    - The CHECKSUM shall be documented in a README file with the code
    - Audio DSP configuration code
    - Codec settings**,** serial number, release key, software version and expiration date; option keys, versions and expiration dates.
    - Display settings and the standards used to set the display settings including but not limited to brightness, contrast, color temperature, gamma, detail, and timing; fan settings, bulb settings, lumens output as measured on the screen, and any special settings required for the display to function to customer expectation.

Task 19 – Project Completion Document

- Contractor shall provide to the SDR a document which states the date of Contractor SAT and SNL VACT Certification.
- The workmanship on the integrated system shall be warranted by the Contractor for a period of 1 year from the date of the Sandia VACT Engineering Certification at no additional cost to Sandia. The warrantee period begins when the system has passed the Certification and is signed off by the SDR. For one year after the Certification, if the system fails to operate to the level as defined by the SAT and the failure is determined by the SDR to be caused by poor workmanship, the Contractor shall repair the system and return it to its SAT defined level of performance within 10 business days of the notification of the failure.

2.2 Contractor Key Personnel

The Contractor personnel listed below are key personnel and are considered essential to the work being performed under this contract and to the mission of the VACT team. Key personnel shall be employees of the Contractor and not subcontractors. The SDR shall approve the appointment of key personnel under this contract. Before removing, replacing, or diverting any of the listed or specified personnel, the Contractor must: (1) Notify the SDR reasonably in advance; (2) submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on this contract; and (3) obtain the SDR's written approval. Notwithstanding the foregoing, if the Contractor deems immediate removal or suspension of any member of its team is necessary to fulfill its obligation to maintain satisfactory standards of employee competency, conduct, and integrity, the Contractor may remove or suspend such person at once, although the Contractor must notify SDR prior to or concurrently with such action. Any member of the team that is removed will be identified by name and position and the Contractor will transfer the duties of that person to one of the Contractor's key personnel. This transfer of duties will be documented to VACT in writing within two business days from the date of the removal of the team member.

Contractor shall identify a single Point-of-Contact (POC) for work performed under this contract. The single POC shall provide non-interrupted access to company resources for the resolution of SOWs, quotes, projects and project status and information on status of orders.

The Contractor's Senior Account Representative, Project Manager, Lead Engineer and Executive Management will be compensated for meetings called by Sandia, whether via teleconference, videoconference or in person through the company's overhead budget.

Contractor Key Personnel shall have the ability to qualify for a DOE "Q" clearance.
Key personnel include:

- Senior Account Representative (typically the POC) (Overhead for meetings)
- Project Manager (Overhead for meetings)
- Lead Engineer (Overhead for meetings)
- Lead Installer
- Control Systems Programmer

All other Contractor personnel shall qualify for DOE “Q”, “L” or an Uncleared Contractor Badge. The assignment for the clearance level for non-Key Contractor personnel will be determined by the SDR.

2.2.1 Senior Account Representative

The Senior Account Representative (SAR) represents the Contractor to Sandia VACT and VACT end customers. The SAR meets the end-customer with the SDR designated VACT Engineering/Integration representative to determine the scope of the project, customer expectations, to communicate the VACT standards to the customer, develop the site survey and develop the quote/proposal for VACT review and presentation to the customer.

General Qualifications:

- Must be competent in AV, videoconference and collaboration technologies and network architectures.
- Must have working knowledge of electrical, mechanical, security, fire-protection systems relative to government buildings.
- Excellent verbal and written communication skills.
- Be available for in person or videoconference customer meetings and work at SNL/NM and SNL/CA.
- The ability to coordinate/oversee multiple projects with competing and changing priorities in multiple locations.

2.2.2 Project Manager

This position requires excellent organization and communication skills. The Project Manager (PM) will be responsible for each project timeline and the overall (rolled up) projects’ timeline. The PM must be thoroughly familiar with the pre-build/pre-test, FAT, system installation onsite and SAT process. In addition to supervising a technical team, this position interacts with the VACT engineering staff, end customers and construction contractors. The PM will meet on a regular basis with the VACT engineering team to review projects, project schedules and timelines, and deliverables, and work through any challenges in product/system delivery. The PM shall be available for customer meetings and at SNL/NM and SNL/CA in person or via videoconference as determined by the VACT SDR.

Qualifications:

- A minimum of 3 years as a project manager managing AV/VTC type projects similar in scope and size to Sandia.
- The ability to develop and monitor project schedules and timelines to identify and meet critical milestones.
- The ability to build positive relationships and trust over time through strong on-time delivery, high quality, continuous improvement and innovation.
- The ability to manage multiple projects, as many as 30 at one time, with competing and changing priorities, multiple end-users in multiple locations.
- The ability to manage activities and relationships with AV/VC installers and manufacturers.
- The ability to work directly with VACT Engineering personnel, Sandia Facilities, management and end users to determine schedules.

- Must have extensive experience with contractors and trades.
- Must know and use Microsoft Project.
- Must possess excellent organizational, verbal and writing skills.

2.2.3 Lead Engineer

The Lead Engineer (LE) will take the site survey information, the customer requirements, and the VACT standard product information and implement a system that meets the combination of VACT, Sandia Corporate and customer requirements. The LE will meet on a regular basis with the VACT Engineering Team to review efficacy of design, determine improvements that are appropriate and make recommendations for inclusion of new product into the VACT portfolio of products.

General Qualifications:

- A minimum of 5 years' experience as a lead engineer working on the design and implementation of projects contracts similar in scope and size to Sandia.
- Shall have industry certifications including at a minimum ICIA CTS-I (preferably CTS-D)
- Shall have certifications, knowledge of the operation and installation of the Required and Preferred Value Added Reseller (VAR) Relationships products (section 7.0)
- Experience as a high-level, enterprise solutions engineer.
- Must be competent in AV, videoconference and collaboration technologies and network architectures.
- Must be competent in the use of AV and network test equipment including, but not limited to, spectrum analyzers, luminance/colorimetry meters and random noise generators.
- Must have the ability to work in a fast paced environment and quickly turn around designs while guiding the implementation of those designs.
- Excellent verbal and written communication skills.

Detailed Qualifications:

- Knowledge of AV and videoconferencing analog and digital technologies.
- Audio visual knowledge in the areas of:
- Camera technologies (CCD/CMOS, Single Chip/Three Chip, HDSDI/DVI, 720p 60/1080i)
- Audio and echo cancellation including microphone technologies, echo cancellation methods and implementation switching, control, cabling, Internet connectivity and security.
- In-depth knowledge of computer interfaces and the routing of computer generated signals such as VGA and its analog derivatives, DVI, HDMI, DisplayPort and their derivatives.
- In depth knowledge of display technology including:
    - Projectors (3 chip/single chip), flat panel displays (plasma, LCD, OLED) and derivatives, rear screen technology, front screen technology and the ability to predict and measure light output from displays.
    - Must know how to balance displays to match colorimetry, color temperature, gamma, contrast and brightness between displays of different manufacturers and types.

- In depth knowledge of compression algorithms (H.264 SD, HD and SVC) and video standards including H.261, H.263, H.263 , H.263 , H.264 including call build and tear-down.
- Hands on experience with Cisco/Tandberg and Polycom codecs using the programming interface.
- Hands on experience with Gateway/MCU products including Cisco/Tandberg, Polycom and Radvision.
- An understanding of network class of service requirements and transport including TCP versus UDP, Diffserve, TOS, etc. Audio Standards - G.711, G.722, G.723.1, G.729, MPEG-4 AAC-LC, MPEG-4, AAC-LD, G.722.1 Annex C Protocols - H.323 v4, SIP, H.235 (AES), H.239 (dual video) H.243 (chair control), FTP, RTP, RTSP, HTTP, DHCP, SNMP, NTP.
- Solid experience with VLANS, LAN/WAN Design.
- Experience designing enterprise environments.
- A thorough understanding of class of service and QOS.

2.2.4 Engineer

Qualifications:

- A minimum of 3 years' experience as an engineer working on the design and implementation of projects similar in scope and size to Sandia.
- Industry certifications including at a minimum ICIA CTS (preferably CTS-I)
- Shall have certifications, knowledge of the operation and installation of the Required and Preferred Value Added Reseller (VAR) Relationships products (section 7.0)
- Experience as an enterprise solutions engineer is preferred.
- Must be competent in AV, videoconference and collaboration technologies and network architectures.
- Must be competent in the use of AV and network test equipment including, but not limited, to spectrum analyzers, BER test sets, luminance/colorimetry meters and random noise generators.
- Must have the ability to work in a fast paced environment.
- Excellent verbal and written communication skills.
- Be available for in person customer meetings and work at SNL/NM and SNL/CA.

Detailed Qualifications:

- Knowledge of analog and digital technologies.
- Audio visual knowledge in the areas of Camera technologies (CCD/CMOS, Single Chip/Three Chip, HDSDI/DVI, 720p 60/1080i).
- Audio and echo cancellation including microphone technologies, echo cancellation methods and implementation switching, control, cabling, Internet connectivity and security.
- Knowledge of computer interfaces and the routing of computer generated signals such as VGA and its analog derivatives, DVI, HDMI, DisplayPort and their digital derivatives.
- In depth knowledge of display technology including:

- Projectors (3 chip/single chip), flat panel displays (plasma, LCD, OLED) and derivatives, rear screen technology, front screen technology and the ability to predict and measure light output from displays.
- Must know how to balance displays to match colorimetry, color temperature, gamma, contrast and brightness between displays of different manufacturers and types.
- Knowledge of compression algorithms (H.264 SD, HD and SVC) and video standards including H.261, H.263, H.263 , H.263 , H.264 including call build and tear-down.
- Hands on experience with Tandberg and Polycom codecs using the programming interface.
- Hands on experience with Gateway/MCU products including Cisco/Tandberg, Polycom and Avaya/Radvision.
- An understanding of network class of service requirements and transport including TCP versus UDP, Diffserve, TOS, etc. Audio Standards - G.711, G.722, G.723.1, G.729, MPEG-4 AAC-LC, MPEG-4, AAC-LD, G.722.1 Annex C Protocols - H.323 v4, SIP, H.235 (AES), H.239 (dual video) H.243 (chair control), FTP, RTP, RTSP, HTTP, DHCP, SNMP, NTP.
- Experience with VLANS, LAN/WAN Design.
- Experience with CISCO routers and switches.
- Experience designing enterprise environments.
- An understanding of class of service and QOS.

2.2.5 Lead Installation Technician

Qualifications:

- A strong background in Audio Visual and Videoconference system integration.
- A complete working knowledge of today's AV & VTC analog and digital technology.
- Experience installing complex systems in executive offices and conference rooms and experience in working with executive staff.
- Must know how to operate all components in the systems built for Sandia and prove operational readiness.
- Shall have industry certifications including at a minimum ICIA CTS
- Shall have knowledge of the operation and installation of the Required and Preferred Value Added Reseller (VAR) Relationships (section 7.0)
- Familiarity with high-level, enterprise solutions required.
- The ability to work independently, meet deadlines and pay extreme attention to details.
- A high level of problem-solving ability and AV trouble-shooting skills.
- Must have the ability to meet project timelines and deadlines and clearly communicate project milestones.
- Must have highly effective communication and people interaction skills.
- Must have excellent verbal and writing communication skills.
- Must be available for work at SNL/NM and SNL/CA.
- Must be available to work on Sandia projects at other sites nation-wide as determined by the SDR and Contractor management.

2.2.6 Installation Technician

Qualifications:

- A background in Audio Visual system installations.
- A complete working knowledge of today's AV & VTC analog and digital technology.
- Experience installing complex systems in executive offices and conference rooms and experience in working with executive staff.
- Shall have knowledge of the operation and installation of the Required and Preferred Value Added Reseller (VAR) Relationships (section 7.0)
- Shall meet deadlines and pay extreme attention to details.
- Shall be a problem solver and possess good AV trouble-shooting skills.
- Must have highly effective communication and people interaction skills.
- Must have excellent verbal and writing communication skills.
- Must be available for work at SNL/NM and SNL/CA.
- Must be available to work on Sandia projects at other sites nation-wide as determined by the SDR and Contractor management.

2.2.7 Control Systems Programmer

Qualifications:

- The Control Systems Programmer shall have a minimum of 3 years as a "Authorized Certified Crestron Programmer" writing code for projects similar in scope and size to Sandia.
- Experience with AMX programming is essential.
- Must be available for in person work at SNL/NM and SNL/CA..
- Must be available to work on Sandia projects at other sites nation-wide as determined by the SDR and Contractor management.

2.2.8 Programmer, Iguana / Chameleon

Qualifications:

- A minimum of 3 years as a programmer working on the code for projects similar in scope and size to Sandia.
- Demonstrated experience in programming and a working understanding of Linux, Windows, Web 2.0, SQL, HTML5, JavaScript, and Perl. Linux/Unix system administration preferred.
- Experience in Crestron and AMX programming a must.
- Experience with Cisco/Tandberg Management System (TMS) is helpful.
- Must be available for in person work at SNL/NM and SNL/CA.
- Must be available to work on Sandia projects at other sites nation-wide as determined by the SDR and Contractor management.

2.3 Sandia VACT Key Personnel

The Contractor's primary point-of-contact (POC) for project work performed under this contract is the SDR. It is the Contractor's responsibility to know the limits of authority of those who the Contractor works with. The SDR shall be copied on all correspondence related to the work performed under this CPA.

The VACT Lead Engineer is available to provide clarification of the Sandia Standards, system architecture and design.

The VACT Project Manager is the contact for managing all project schedules.

The VACT Project Coordinator is the contact between the end-user and the Contractor to; assist in scheduling the room access, arranging of escorts, ordering network and Telecom, submitting Facilities requirements from Contractor to Sandia Facilities, and coordinating movement of shipped system to the on-site work location.

3 Other Information

3.1 Progress/Compliance

VACT requires the following from the Contractor in order to monitor progress and ensure compliance:

- Weekly Status Report (Contractor PM, LE, POC/Account Rep)
- Weekly Project Schedule (Contractor PM, LE, POC/Account Rep)
- Customer Meetings as requested (LE, POC/Account Rep)
- Ad hoc or as needed Project Management Team (PMT) Meetings (POC/VP)
- Quarterly Program Reviews (POC/Corporate VP)

3.2 Customer Service

Excellent customer service is reliable, timely, and personable and meets or exceeds end user expectations. The Contractor shall provide personnel who exemplify excellent customer service in all aspects of their work. The Contractor personnel shall respect the end users schedule, clearly communicate the schedule to VACT and the end user, dress appropriately for the work and environment, and honor the relationship between VACT and the End Users. The Contractor shall professionally represent VACT.

3.3 Volume of Business and Peak Demand Periods

While the OA is designed to provide services over the period of performance, the volume of work will vary. The quantity of work is highly dependent on Sandia overall budget and on individual programmatic funding. The Contractor shall develop business practices that allow for successful delivery of product under the OA while accounting for varying demands for services.

It is not untypical for most of the requests for Integration services and systems to be placed during the last quarter of the fiscal year (July through September). The Contractor shall calibrate system integration throughput from component purchases through installation and training such that the Contractor does not over commit resources during peak demand periods and fail on delivery. All work performed under an order must be complete within the FY that the order is issued unless it is part of a multi-year building program. The last day for work in the FY is typically the last weekday of September.

3.4 Escorting

Until the Contractor receives DOE clearances for access to Sandia sites, the Contractor will arrange for escorts from the SNL/NM and SNL/CA physical security departments by written notification to the Sandia Project coordinator of need for escorts 5 business days in advance of arrival on-site. When the Contractor personnel receive clearances, the Contractor personnel may at times escort other Contractor personnel to perform work on site. The Contractor shall not expect VACT personnel will be available for escorting services.

3.5 On-Site Transportation

The Contractor is responsible for supplying on-site vehicles for transportation of contractor staff, tools and equipment while performing work specified under this contract. The Contractor's vehicle(s) shall when driven on site, have company signage either painted on or temporarily attached to the side of the vehicle that clearly identifies the company name, address and phone number.

3.6 Facilities

There is a wide mixture of building types, age, and design at Sandia sites. Some buildings are new while some are over 50 years in age. Each building and room will require attention to the structure of the room, infrastructure issues, electrical requirements, ability to modify infrastructure to accommodate the system, restrictions on availability, security level within the room and the building, access controls, personnel who work within space and client requirements. Project timelines will be affected by the age and type of building where the system is being installed. It is the responsibility of the Contractor to coordinate with the Sandia Facilities Department to comply with Sandia building codes, national codes, and to work cooperatively with facilities requirements for drawings, mill work, infrastructure modification, and system installation.

3.7 CAD Drawings

All CAD drawings supplied by the Contractor shall be in Autodesk AutoCAD 2007 or later format and in full compliance with the design standards set forth by VACT. Each detailed design including facilities recommendations will be reviewed and approved by the SDR.

CAD Drawings intended to provide the Sandia Facilities Department with guidance on system conduit size and placement, power outlet placement, installation of mounting structures, placement and installation of tables, mill-work, speakers, lighting and lighting control systems and any other detail that impacts the work performed by facilities shall conform to standards supplied and agreed to by the Sandia Facilities Departments SNL/MN and SNL/CA.

3.8 Knowledge Management

VACT maintains knowledge management websites in support of all work performed by VACT. The Contractor shall have access to and use VACT SharePoint ^{TM} websites for the maintenance of records and room documentation.

3.9 Transmittal/Delivery/Accessibility

The Contractor shall provide all drawings and documentation to the SDR in electronic form and in hard copy when requested. Completed projects documentation including all as-built drawings

and software source code shall be provided on a ~~CD-ROM~~ per project and mailed to the SDR; or at the SDR's discretion, filed electronically in the VACT Engineering External SharePoint site.

3.10 Required and Preferred Value Added Reseller (VAR) Relationships

The Contractor shall provide equipment/supplies for which the supplier is a VAR. It is mandatory that the Contractor have ongoing, premium VAR relationships with the following manufactures:

- AMX
- Christie Digital
- Cisco/Tandberg/Codian (Collaboration and Videoconference Products)
- Clear-One
- Crestron
- Extron
- Panasonic (displays and cameras)
- Polycom
- RGB Spectrum
- Sharp

It is preferred that the Contractor has favorable VAR relationships with the following manufacturers:

- Adaptive Micro (Signage)
- AKG
- Altinex
- Audio Technica
- Beyer Dynamic
- Black Box (all products)
- Canon (all audio/video products)
- Chief Manufacturing
- Crown
- Da-Lite
- Digital Projection Incorporated
- Furman
- JBL
- JVC
- NEC
- Middle-Atlantic Products
- Meyer Sound
- Premier
- Quros (carts and custom tables)
- Rane
- RDL (Radio Design Lab)
- RP Visuals
- Samsung (audio/video products)
- Shure

- Smart Technologies
- Sony
- Steelcase (tables)
- Stewart Filmscreen
- Tannoy
- Tascam
- Vecta
- Wolfvision

4 Standards

Standards are the backbone of all work performed by VACT. The use of standards ensures that work performed under this contract provides Sandia with calibrated, repeatable and consistent results across all systems deployed. The Contractor shall apply and document the standards applicable to each system. Documentation shall be provided by the Contractor for but not limited to audio and video levels, display settings, codec settings and software code. The use of standards shall be consistent and repetitive for each and every system.

Achieving connectivity and compatibility extends beyond the integration of highly reliable VTC end-points –VTC systems represent only one aspect of Sandia's Unified Communications plans.

Applicable Standards:

- Sandia VACT Preferred Systems Catalog 2013
- Sandia VACT Engineering/Integration Equipment Market Basket
- Sandia VACT Classified (and derivatives) – OUO document available to Q-Cleared Contractor
- INFOCOMM International and BICSI AV Design Reference Manual First Edition 2006 (ISBN: 1-92886-34-5)
- Infocomm International AV Installation Handbook Second Edition: The Best Practices for Quality Audiovisual Systems (ISBN: 978-0-939718-22-1)
- ITU-T
    - G.711 Audio encoding at 64K bit/s (mu-law and A-law) uncompressed.
    - G.722 Audio CODEC. 7 KHz sample at 64K bit/s (HiFi voice)
    - G.723.1 Audio CODEC. Dual Rate Speed at 6.4 and 5.3K bit/s.
    - G.728 Audio CODEC. 16K bit/s speech
    - G.729 (A & B) Audio CODEC. 8K bit/s speech (Conjugate structure- algebraic code excited linear prediction or CS-ACELP to its friends)
    - H.221 Frame structure for 64 to 1920K bit/s channel in audiovisual services
    - H.221.1 Multiplexing and synchronization of multi-media information for audiovisual communications in ATM environment.
    - H.223 Multiplexing Protocols for Low Bitrate Multimedia standards
    - H.225.0 Media Stream Packetization and synchronization on non-guaranteed Quality of Service LANs (Call control and RTP/RTCP)
    - H.230 Frame-synchronous Control and Indication signals for Audiovisual systems
    - H.231 Multi-point Control Unit for Audiovisual systems using Digital Channels up to 2M bit/s

- H.242 System for establishing communication between three or more audiovisual terminals using digital channels up to 2M bit/s
- H.245 Control Protocol for Multimedia Communication (Terminal property exchange)
- H.261 Video encoding
- H.263 Video encoding (enhanced H.261)
- H.320 Framework for transmitting audio and video over circuit switched digital networks (primarily ISDN)
- H.321 Visual Telephone Terminals over ATM
- H.322 Visual Telephone Terminals over Guaranteed QoS LANs
- H.323 Visual Telephone Terminals over Non-Guaranteed QoS LANs
- H.324 Audio and Video over POTS at less than 20K bit/s
- T.120 Introduction to the audiographics and audiovisual conferencing recommendations
- T.121 Generic Application Template
- T.122 Multi-point communication service for audiographics and audiovisual conferencing service definition
- T.123 Protocol stack for audiographics and audiovisual teleconference applications
- T.124 Generic Conference Protocol
- T.125 Multipoint communication service protocol specification
- T.126 Still image protocol specification
- T.127 Multi-point binary file transfer protocol
- T.128 Audiovisual control for Multipoint Multimedia Systems
- G.722.1 Audio CODEC. 7 KHz sample at 24 and 32 K bit/s (hifi voice)
- H.239 - ITU standard for multiple video streams in a conference - to replace Tandberg's DuoVideo and Polycom's People+Content as a means of sending two video streams in a conference.
- H.264 - Latest video encoding - based on MPEG-4
- H.281 - Far End End Camera Control
- T.140 - Text chat with multimedia
- H.233 - Confidentiality systems for audiovisual service - H.320.
- H.234 - Encryption key management and authentication system for audiovisual services - H.320.
- H.235 - Security and encryption for H.323.
- H350- Directory Services for multimedia. Uses LDAP to store video, voice and collaborative multimedia information.
- H.324M - Annex C of H.324, however H.324M includes mechanisms for increased reliability for operation over error-prone networks.
- MPEG-4 AAC-LD - ITU Ratified High Quality (20Khz sample rate) Audio Algorithm.
- H.241 includes the new H.264 and H.239 without which an endpoint or an MCU would not be able to communicate on the above protocols.

4.1 VACT Room Systems Standards

The Contractor shall follow the policies, procedures, guidelines and standards for integration as outlined in the VACT-Engineering Standards. At the award of the contract, the winning contractor shall receive the Standards documentation.

4.2 Types of Systems

The Sandia VACT Standards documents details system architecture and product offerings to the Sandia community. Sandia VACT engineering has defined systems equipment and architecture for offices, small, medium and large video conference rooms and has developed a framework for all systems at Sandia. The Contractor shall provide pricing for these systems and the individual options available to these systems. These systems are comprised of specific equipment delineated by the manufacturers in Section 8 "Required and Preferred Value Added Reseller (VAR) Relationships". System architecture and product offering are detailed in the Sandia VACT Standards.

In addition to providing reference standards for VACT Engineering/Integration, the SharePoint website details best practices and lessons learned. The Contractor shall contribute the best practices through lessons learned on each project.

The architecture, high-level design, design requirements and system components for all systems shall be provided for all work under this contract by the SDR. In order to maintain designs that utilize the latest technology, the design requirements and system components will be reviewed from time to time by the SDR. System components, functions and process recommendations from the Contractor shall be reviewed by the SDR on an as-needed basis.

The Contractor and Sandia VACT engineering shall engage in a regular dialog on the efficacy of systems architecture and the components employed in these systems and work for continuous improvement in overall cost to the customer and appropriateness of system components.

4.3 Industry and International Standards

The American National Standards Institute (ANSI) publication "AV Installation Handbook – the best practices for quality audiovisual systems, Second Edition", published by INFOCOMM, 2009, and "The AV Design Reference Manual – First Edition", published by INFOCOMM, 2006 both detail best practices for audiovisual systems integration.

The Contractor shall follow all applicable national and international standards and guidelines published by Acoustical Society of America (ASA), Audio Engineering Society (AES), Electronic Industries Alliance (EIA), Institute of Electrical and Electronics Engineering (IEEE), International Communications Industries Association (ICIA), International Organization for Standardization (ISO), International Telecommunication Union (ITU), Society for Information Display (SID), Society of Motion Picture and Television Engineers (SMPTE), and Telecommunications Industry Association (TIA).

4.4 Integrated System Calibration

The Contractor shall use approved industry standard calibration processes and techniques for calibrating audio signal, acoustical audio, video, display illumination and brightness and data

signal levels with the intent to not overdrive any stage or to under drive any stage in the chain. The Contractor shall receive approval from the SDR for system calibration test equipment, processes and procedures.

4.5 VACT Gold Reference Videoconference Standard

VACT Engineering maintains a Gold Reference Videoconference Standard system by which every videoconference system is quantifiably calibrated. The Contractor shall use the VACT Gold Reference Videoconference Standard to calibrate videoconference systems audio and video levels and data transmission. VACT will train the Contractor on the use of the Gold Reference Videoconference Standard.

4.6 S4 – Sandia Security Selector (Sandia provided)

Every videoconference system shall incorporate the Sandia developed S4 – Sandia Security Selector and/or its derivative product(s) to manage the network, telecom and power to the system. At the award of the OA, the winning contractor shall receive detailed information regarding the integration of the S4. Sandia VACT shall provide the S4 to the Contractor for integration for endpoints. Any and all intellectual property (IP) related to the S4 – Sandia Security Selector remains the property of Sandia Corporation.

4.7 Iguana Control System

The Iguana Control System and its derivatives have been developed by Sandia for the user control of a presentation room and/or videoconference system. At the award of the OA, the winning contractor shall receive detailed information regarding the integration of Iguana. Any and all intellectual property related to the Iguana Control System (IP) remains the property of Sandia Corporation.

4.8 Chameleon Red/Black Videoconference System

The Chameleon Red/Black Videoconference System and its derivatives have been developed by Sandia. At the award of the OA, the winning contractor shall receive detailed information regarding the integration of Chameleon. Any and all intellectual property related to the Iguana Control System (IP) remains the property of Sandia Corporation.