



Deployment Guidelines: Audiovisual Communications Technologies (AVCT)

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Deployment Guidelines: Audiovisual Communications Technologies (AVCT)

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Approval

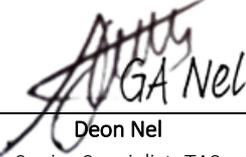
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Foreword

This document forms part of an AVCT best practices guideline and solution selection process enabling cost-effective procurement and deployment of ICT by Government and SITA using transversal procurement processes. The goal is to enable Government to procure and deploy appropriate technology solutions for its business requirements. The Deployment Guide is intended to inform the ICT architecture of Government departments in terms of usage models, hardware and infrastructure requirements. It supports any procurement vehicle for AVCT (e.g. Transversal Contract 2008).

Complete, turnkey AVCT solutions are in view, including all required components and associated services (e.g. consultation, design, supply, installation, training, support and maintenance).

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1. Introduction and background

The most basic Government need addressed by the **Audiovisual Communications Technologies (AVCT)** technology domain is providing support for computer-based presentations, as used in conferences, meetings and training. A portable or permanently installed projector is the minimum requirement for this application. At the other end of the scale, the rising cost and environmental impact of travelling, as well as the impact on productivity, have forced Government to investigate alternative meeting methods. Remote conferencing solutions such as voice- and videoconferencing have matured to the point where realistic use can be made of these technologies to reduce or even eliminate the need for travelling. Given sufficient infrastructure (i.e. network bandwidth), AVCT can increase productivity and help reduce costs and stress on the environment. AVC technologies also support Government's mandate to provide public services, including informing citizens via signage solutions, supporting public events, managing security or disasters via control centres, or simply recording meeting proceedings with a portable recording device.

Technology Advisory Services (TAS) publishes these deployment guidelines as part of a SITA initiative to enable efficient and cost-effective use of ICT in Government. The guidelines are an output of the unit's standard research, evaluation and consultation processes, and are developed in collaboration with clients, suppliers and manufacturers.

The document recommends deployment practices for the AVCT technology domain (comprising Conferencing, Imaging & Display, Collaboration & Information Sharing, Playback & Recording, AV Signalling, Control & Device Management), and provides guidelines, standards and advice for the effective selection and deployment of appropriate technologies and solutions. The main purpose of the Deployment Guide is to inform end users about best practices and cost-effective, optimal utilisation of available solutions.

Both **normative** and **informative** guidelines are proposed. Informative guidelines point out best practices and other helpful information, while normative guidelines **must** be followed by Departments. Any deviations from normative guidelines may result in audit findings.

These guidelines are not intended to replace Departmental ICT policies and processes, but complement and augment them, while focussing on adding value during the entire ICT lifecycle. Applicable guidelines should be used in conjunction with other related documentation, including any relevant internal policies, Transversal Contract Engagement Models, contract conditions, definitions and technical specifications.

Many specialised or niche requirements are not addressed in the document, and should be handled on a case-by-case basis, with input from TAS where required. A **sample RFQ** is included in Annex B, to be incorporated into Requests for Quotation/Proposal.

Experience with Government requirements and requests for quotation shows that many Departments copy specifications from industry information, instead of writing their own. This practice typically compromises fairness and an adequate definition of the actual business requirement, whereas the SITA process requires unbiased specifications and an emphasis on business needs. An **AVCT Requirements Checklist** is included in Annex A to help Departments define their business needs adequately. The Checklist is also available for download as a separate document from the Certification web page.

1.1 References

The following documents are referred to in this document, or have an impact on the implementation of the processes described herein:

- ❖ Legal framework:
 - The Constitution of RSA, Act 108 of 1996
 - Public Finance Management Act (Act 1 of 1999, as amended)

- State Information Technology Agency Act (Act 88 of 1998, as amended)
- SITA Regulations, 23 September 2005
- National Treasury Practice Note no. 5 of 2009
- ❖ Contracts: new transversal bids for Servers and Storage solutions have been published, and the resulting contracts will establish the following:
 - Master Agreement: AVCT contract (Contracts 2008 and 2009)
 - Engagement Model: AVCT contract (Contract 2008 and 2009)
- ❖ Processes and documents:
 - Technology Certification Process (eNSQS-00144), version 3.3, November 2018
 - SITA Product Certification: OEM Memorandum of Agreement (eNSQS-00145), version 1.6, November 2018
 - SITA Product Certification website www.sita.co.za/prodcert.htm:
 - Latest versions of technical specifications for all technology domains
 - All related information, documents and forms
- ❖ Related research:
 - TAS Research Report: Procuring ICT Products from Retail Stores vs. Transversal Contracts, version 2.0, February 2017

1.2 Standardisation

Standardisation helps Government to achieve the ICT House of Value (as defined in the Government Wide Enterprise Architecture), which includes economies of scale, interoperability, reduced duplication, digital inclusion, universal design and security. Standards can be defined and implemented at various levels, including the following:

- ❖ **Open industry standards (*de jure*):** These include standards such as those published by the IEEE, IETF and ISO/IEC, e.g. TCP/IP, USB, PCI, HTML, ODF, ISO/IEC 60950 and RFC 3261. These standards are required for basic interoperability in the ICT environment. Interoperability standards in Government are stipulated in the Minimum Interoperability Standard (MIOS), as well as other formally-accepted specifications, either per Department or Government-wide.
- ❖ **Generally-accepted vendor and industry standards (*de facto*):** These are not open standards, but they are so widespread that industry must conform to them to meet interoperability requirements. Environments and applications such as Microsoft’s Windows and Office products may be included here. Like open standards, these standards also enable interoperability, but more by virtue of their wide deployment (e.g. Windows is estimated at >90% penetration in the desktop computing sphere) than formal

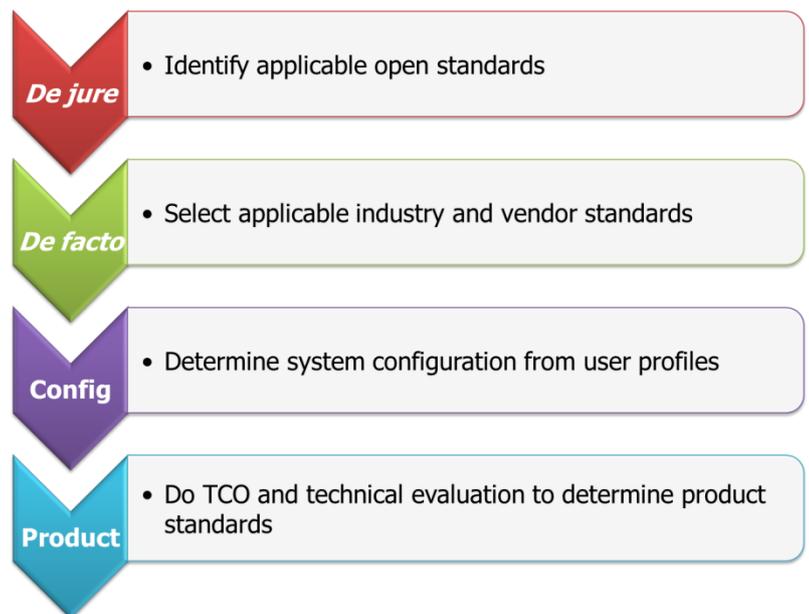


Figure 1: Standards selection process

standardisation. Other examples of this are Android in the mobile device space, or Dante in the AVCT domain.

- ❖ **Configuration standards:** This is where an organisation defines a specific configuration of device per user functional profile. Configurations should primarily be informed by business needs. This standard can be used as a procurement and communication tool within the organisation. For example, a single master configuration file can be used to configure a family of AVCT devices uniformly to reduce system management effort and costs.
- ❖ **Product standards:** Configuration standards can apply to selecting a standard brand and model that conforms to the stated configuration requirements. This can ease the burden associated with ICT operations such as procurement, support, logistics and maintenance. For example, maintaining several different product standards is more expensive in terms of user productivity and IT effort to manage multiple software configurations. Departments are encouraged to standardise down to product level to reduce complexity and improve interoperability within the Department.

This document recommends a process whereby Departments can move from *de jure* standards through *de facto* and configuration to arrive at product standards that meet business requirements.

1.3 Design principles

Based on Government’s technology and business goals for ICT procurement, the following principles were incorporated into the design of all technology domains:

- ❖ Support for the ICT House of value:
 - Security
 - Interoperability
 - Reduced duplication
 - Economies of scale
 - Digital inclusion
 - Lower cost
 - Increased productivity
 - Citizen convenience
- ❖ Best-fit solutions for client requirements via usage profiles.

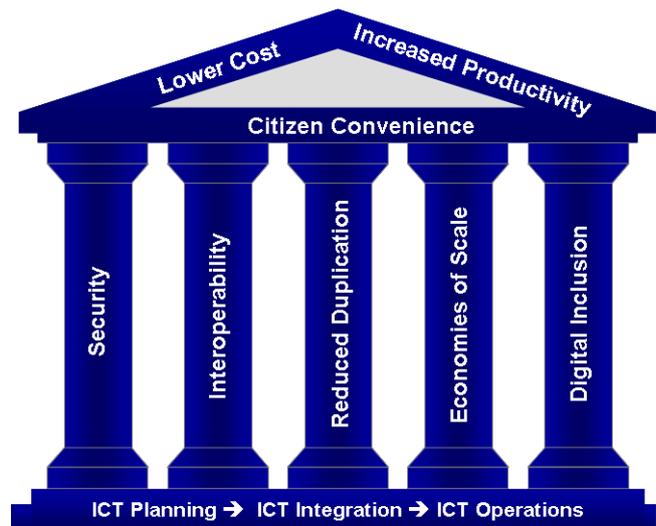


Figure 2: ICT House of Value

- ❖ Industry standards.
- ❖ Scalability and upgradeability.
- ❖ Enterprise-class functionality and design, including security and manageability.
- ❖ Integrated service offering: standard on-site SLA included in all solutions.
- ❖ Environmental sustainability.
- ❖ Support for all mainstream operating environments for end-user computing.
- ❖ Specification is product- and brand-agnostic, focussing purely on industry standards and functionality.
- ❖ “Equal or better” principle: products with functionality equivalent to or exceeding specifications are acceptable.
- ❖ Lowest possible technology baseline based on requirements: solutions that exceed specifications require Government to spend money on unnecessary functionality and capacity.

- ❖ Standards and specifications approved by appointed Government bodies, e.g. GITOC structures such as SC-ITSM.
- ❖ Local economic development:
 - Support for regional procurement, service and support to build skills and capacity in the local ICT industry by mandating OEMs to train and certify SMME/BEE suppliers.
 - Ensure sustainability for suppliers, including small regional players: empower BEE/SMME organisations to build a sustainable business supplying and servicing Government infrastructure.
 - Support local industry (e.g. manufacturing) where appropriate.

1.4 Processes

1.4.1 Product certification

According to the SITA Act, the Agency must certify ICT goods and services to ensure that they conform to ICT standards, security policies and Government requirements.

To support this mandate, SITA has developed, in collaboration with DPSA, GITOC and Government stakeholders, a Technology Certification Process (TCP) according to which specific classes of products can be certified. At the time of writing, these classes of products include the following technology domains, with the domain under discussion emphasised.

Domain	Components
Personal Computing Devices	Desktop PCs, Mobile PCs, Desktop displays, and Mobile devices (Tablets, Smartphones, eReaders).
Peripherals	Printers, Multifunction devices, Scanners, Digital cameras, Auto-ID (Barcoding, Card devices), Optical storage (DVD duplicators), Small peripherals and Consumables.
Audiovisual Communications (AVC) Technologies	Conferencing and Collaboration Solutions, Display and Imaging, Recording, Playback and Speech Processing, and AV signalling, Control Systems and Management
Servers & Storage	Servers (Rack-mount, Tower, Blade), Primary storage and Secondary storage (Disk to Disk, Tape and Archiving).
Networking	Switches, WLAN, Routers, Backhaul, Cabling (Copper and Fibre-optic).
Infrastructure	Equipment Racks, UPS, Generators, Cable ducting, trenching and routing.

Table 1: Certified technology domains

The Technology Certification Process requires OEMs to register with SITA, and thereafter submit their products for certification according to the standard product evaluation process. Products are measured against approved specifications and, if compliant, certified and listed in a Certified Products Database. OEMs are encouraged to get their products certified at their earliest convenience.

Government often requires integrated solutions spanning multiple areas and technology domains. For example, PCs may be required as part of an AVCT solution for a Department. These PCs must be certified according to the requirements of the PCDs domain, even though the broader solution is procured via the AVCT domain. Equipment from the different domains must be integrated and supported by an OEM-approved service provider or supplier.

The diagram below illustrates relationships between certified technology domains and indicates procurement contracts that have been established by SITA for Government use.

Government Transversal Technology Domains

Platform Diagram v5.6, © SITA, May 2018
www.sita.co.za/prodcert.htm



Figure 3: Platform Diagram

The latest version of the Platform Diagram is available at www.sita.co.za/prodcert.htm.

1.4.2 Technology evaluation and management processes

Technology domains are developed, evaluated and managed via a specific process and philosophy. The Constitutional requirements of fairness, equitability, transparency, competitiveness and cost-effectiveness are incorporated into all levels of the process. Government's MIOS and MISS standards also inform the domain specifications. Domains are updated regularly via a collaborative process, with input from research, industry players, OEMs, Government bodies (GITOC) and end-users.

Technology evaluation process

Technical evaluation of products submitted for certification comprises both theoretical and physical evaluation via the following processes:

- 1) **Theoretical evaluation:** Technical verification of mandatory functionality, done in conjunction with the OEM during a product certification meeting. Only products that comply with all mandatory requirements are certified.
- 2) **Tech TCO:** Calculation of Technology TCO based on supplied cost information and component pricing.

- 3) **Physical test phase:** Laboratory tests and/or demonstrations of products and solutions (depending on domain and category).
 - a) Validate supplied information via system tests and verification.
 - b) Verify interoperability via compatibility tests.
 - c) Measure performance using industry-standard benchmarks as well as methodologies developed in-house.
- 4) **Documentation:** Issue a formal product certificate to the OEM, capture certification details in a database of certified products, and store all submitted product information and test results.

Technology management process

Technology management is done on a continuous basis, and includes continually updating the technology specifications (typically on a six-monthly or annual basis), certifying new products offered to Government, and replacing existing products with updated models.

Updates to specifications, minimum configurations, industry standards, etc. are managed via a formal Tech Update process. Tech Updates are published to the user community and industry, including OEMs and AVCT suppliers for input before implementation. All changes to the technology specification must be used as an input to any procurement or pricing exercise, which ensures that Government has a fair basis for performing in-house price and cost analyses.

Certification of new or replacement products are initiated by the OEM via a formal certification request, after which the new product is evaluated and certified via the standard Tech Lab process. Once the new product has been certified, the previous product may no longer be supplied to Government.

The technology management process is described in the document **Technology Certification Process** (see **References**). This process is mandatory for all technology domains within the TCP scope.

Certification process documents, forms and domain detail specifications are available at www.sita.co.za/prodcert.htm.

2. Overview of AVCT domain

The purpose of the AVCT technology domain is to specify and certify suitable solutions for deployment within Government, in support of any procurement vehicle established in this space (e.g. Transversal Contract 2008).

2.1 Scope

The AVCT technology domain comprises the following categories and technology types, which inform the building blocks to be used to create AVCT solutions:

Conferencing and Collaboration Solutions	
Video Endpoints	Videoconferencing solutions and devices
Voice Endpoints and Conferencing Systems	Voice and conferencing solutions and endpoints, including IP phones and delegate systems
Conferencing Peripherals	Conferencing devices such as headsets, speakerphones and video bars
Conferencing Infrastructure	Video and voice infrastructure, including IP PBX
Audio-Visual Collaboration Solutions	

Display and Imaging	Projectors, Large-format Displays, Collaboration and Information Sharing, Display Wall Solutions and Components, Cameras and Visualisers
Recording, Playback and Speech Processing	Audio, video and rich media recorders, media servers and speech processing solutions
AV signalling, Control Systems and Management	Room automation, control systems, device and signal management, including AV over IP
Non-ICT components	
Audio components	Audio portion of AVCT solution, e.g. amplifiers, speakers, microphones
Video components	Video portion of AVCT solution, e.g. switchers, scalers, extenders
Services	AVCT-related services, including consultation, installation, training, support, maintenance, operations, etc.
Infrastructure	Power, soundproofing, furniture, air conditioning, network cabling, etc. (to be deployed in collaboration with Public Works where applicable)

Table 2: Categories in the AVCT domain

Detail specifications for all these categories and technologies are available for download from www.sita.co.za/prodcert.htm. Non-ICT components of an AVCT solution are not certified, but can be acquired as part of a total solution.

2.2 Domain goals and criteria

The following overall goals and evaluation criteria are integrated into the design of the AVCT technical specification. Inputs from component manufacturers (e.g. displays, audio and video components), OEMs, industry research institutions (e.g. BMI-T, Gartner, IDC), and the client base (including GITOC TTT) form an important part of the process.

- ❖ Lowest Total Cost of Ownership. Supply chain regulations require Departments to measure TCO as part of the procurement process. TCO is dependent on the client and business requirement, and therefore an RFP/RFQ process must be used to define client needs on an *ad hoc* or project basis. To ensure the best possible TCO, the following elements are specified and/or measured during evaluation:
 - Usage profiles based on business requirements.
 - Reliability, availability and serviceability (RAS) of all solutions, including MTBF and MTTR ratings.
 - Comprehensive countrywide on-site SLA with upliftment options.
 - Manageability: Remote management, automated failure alerts, remote diagnostics and updates.
 - Duty cycles, work volumes and usage profiles.
 - Environmental factors such as power consumption and cooling requirements.
 - Other elements impacting productivity, including quality and usability.
- ❖ Service levels:
 - Comprehensive 3-year on-site warranty and 8-hour SLA. Infrastructure technologies (e.g. MCUs) require a 5-year SLA as minimum.
 - Supplier training and certification by OEM.
 - Enabling of supplier service and quality levels via OEM process.

- Dispute resolution between Government and industry.
- ❖ Performance and functionality: by taking into account low-level technology architectures, the best possible solution can be ensured for Government applications.
 - System architecture and functionality (e.g. 64-bit with virtualisation support).
 - Connectivity capabilities and options (e.g. WLAN and Bluetooth).
 - Processing capabilities (e.g. codec and throughput capabilities).
 - Upgrade options and accessories (e.g. storage, connectivity, control systems).
 - Security capabilities (e.g. physical locks, encryption, secure management).
 - Compatibility and interoperability (both hardware and software) via ISV and OEM certifications (e.g. Microsoft, Cisco).
 - OEM-level certification according to specific standards (e.g. ISO/IEC quality and environmental standards).
 - Product-level certification according to SABS-endorsed electrical safety and radiation standards.

- ❖ Fair (“apples to apples”) comparison baseline for solutions, measured against an open, product-agnostic specification.

2.3 AVC solution design

The AVCT domain supports the acquisition of Audiovisual Communications Technologies and Solutions, including Video- and voice conferencing units, conferencing infrastructure, display devices, collaboration tools, playback and recording tools, audio and video components, and control and signalling systems. Associated services, components, accessories, partner models and accreditation mechanisms form part of the domain design.

The domain caters for complexity at both ends of the spectrum: a simple product acquisition may be done (e.g. purchasing just a projector or VC software), but more often clients may require a fully functional turnkey solution such as a boardroom or control room solution with all services and technologies integrated.

The diagram illustrates the relationship between AVCT components or products and the services rendered by suppliers to arrive at a full solution satisfying Government requirements. The process flow starts with a detailed client requirements specification, after which technology components are integrated into a design by the supplier, and delivered as a fully working solution.

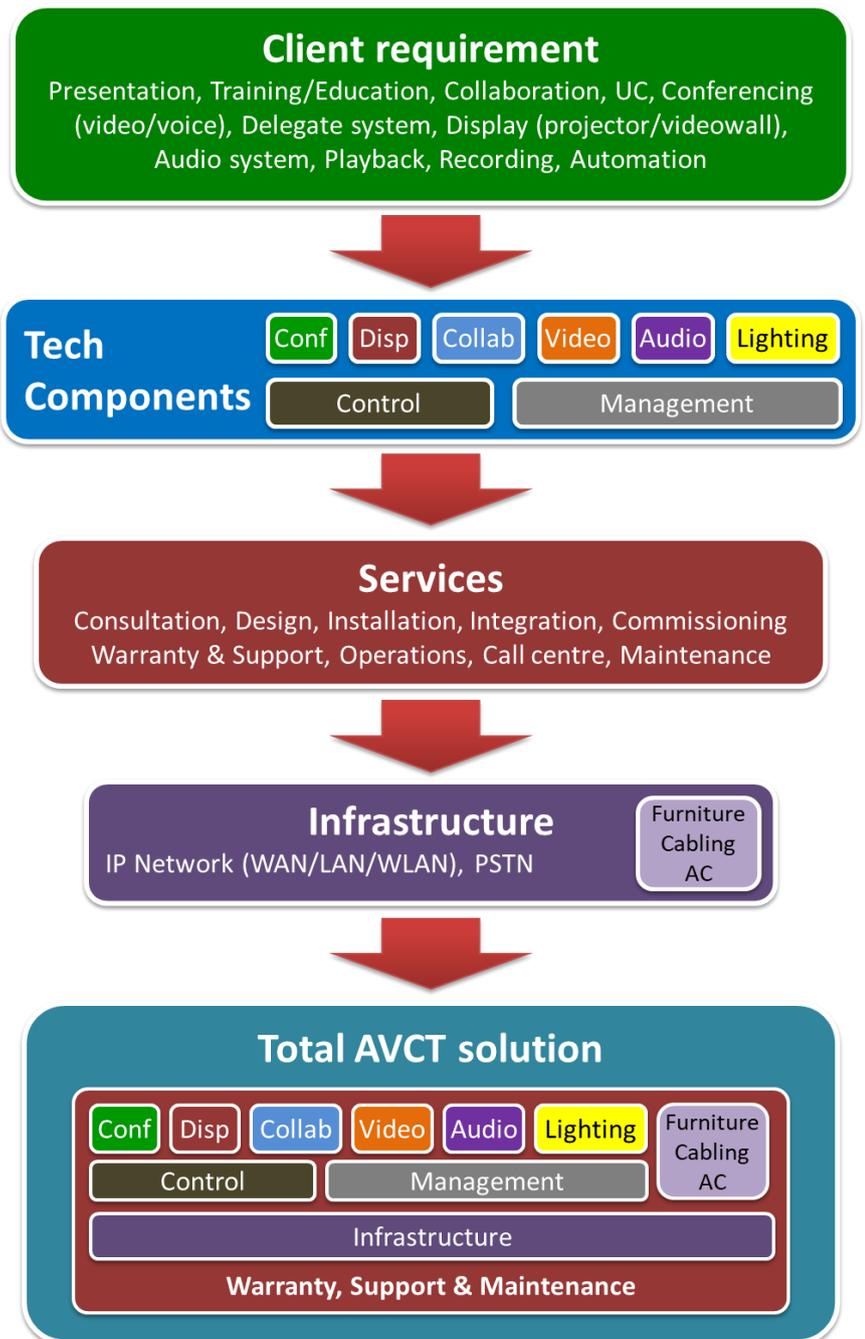


Figure 4: Turnkey solution focus

As can be seen in the “Turnkey solution” diagram, technical requirements and components make up only a small part of the total solution. Complete, fully functional turnkey solutions are in view in all cases. Contractors must take responsibility for the entire end-to-end solution, including consultation, design, installation, service and support.

The international AVCT standards body AVIXA illustrates the relationships of the various phases of an AVCT project in the following diagram. Note that the customer’s solution requirements are central, and must be prioritised at all times.

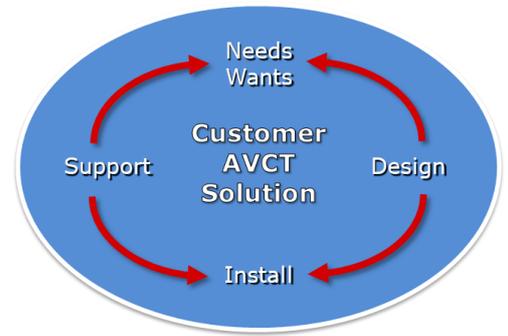


Figure 5: Customer centrality

2.4 Domain components and usage profiles

The components of the AVCT domain and related usage profiles as per the latest version of the detail specifications are listed below.

The usage profiles serve as an initial guideline to determine what type of system is required for a specific use case or type of user. The primary determining factor in selecting any AVCT system is the **business requirement**, or how the system will be used. To keep costs as low as possible (in line with the PFMA), the basic principle is to select the smallest available system that supports the required functionality.

The ICT-based components listed below will form part of the technology management cycle (i.e. be subject to product certification and Tech Updates). The list of categories and technologies may be expanded or adapted over time, depending on SITA and government requirements. Any changes will be made in collaboration with Government and industry, and will only be implemented once approval has been given by the relevant GITO Council authority.

2.4.1 Video Endpoints

Item	Description	Usage profile
VC_Desktop	Personal VC system	Personal videoconference system with integrated camera, display and audio, supporting integrated or external (software) codec
VC_Room1	Small room VC system	Videoconference system for a small meeting room or "huddle space" (up to 5 participants), with camera, display and audio, supporting integrated or external (software) codec
VC_Room2	Medium room VC system	Videoconference system for medium-size, more complex meeting rooms (up to 15 participants), with camera, display and audio, supporting integrated or external (software) codec
VC_Room3	Large room VC system	Videoconference system for large, complex meeting rooms (more than 15 participants), with camera, display and audio, supporting integrated or external (software) codec
VC_Soft	Software-based VC system	VC, meeting and messaging application with support for video and audio peripherals. Support for multiple client platforms, including desktop/laptop, web and mobile devices; prefer on-premise support for cloud systems

Table 3: VC end-point usage profiles

2.4.2 Voice Endpoints and Conferencing Systems

Item	Description	Usage profile
Phone_IP1	Basic IP phone	Basic IP-based desk phone with handset, UI and single network interface
Phone_IP2	Advanced IP phone	Advanced IP-based desk phone with handset, UI and dual network interfaces

Phone_Soft	Soft phone/UC client	Voice or UC application with support for multiple client platforms, including desktop/laptop, web and mobile devices; prefer on-premise support for cloud systems
Conf_Voice1	Basic IP voice conference system	Basic IP-based voice conference system for small rooms
Conf_Voice2	Advanced IP voice conference system	Advanced IP-based voice conference system for larger or more complex rooms
Conf_Delegate	Delegate system	Scaleable digital delegate system with support for 10+ meeting participants; includes chair and delegate units and conference control system

Table 4: Voice end-point usage profiles

2.4.3 Conferencing Peripherals

Item	Description	Usage profile
Conf_Headset	UC headset	Integrated hands-free device (headset) for use with desk, mobile or soft phones in IP telephony and UC systems; wired or wireless connectivity
Conf_Audio	UC peripheral - speaker / handset	Portable or installable audio peripheral (e.g. speakerphone or handset) for voice conferences; USB or bluetooth connectivity
Conf_Video	VC peripheral - camera + mic + speaker	Portable or installable videoconferencing peripheral with integrated camera, speaker and mic (e.g. "video bar") for video and voice conferencing; USB or bluetooth connectivity

Table 5: Audio and video peripherals

2.4.4 Conferencing infrastructure

Item	Description	Usage profile
MCU_Soft	Software-based or virtual MCU	Software-based or virtual Multipoint Conference Unit with transcoding and continuous presence functionality, support for voice conferencing and IP endpoints
MCU_Appl	Appliance-based MCU	Hardware (appliance-based) Multipoint Conference Unit with transcoding and continuous presence functionality, support for voice conferencing and IP endpoints
VC_Gateway	VC protocol gateway	Gateway appliance for interfacing videoconferencing, IP telephony and UC protocols and applications, e.g. SIP, H.323 and UC solutions
VC_Gatekeeper	VC gatekeeper	H.323/SIP-compliant gatekeeper appliance providing VC access control and translation services
VC_FW	VC firewall traversal solution	NAT/firewall traversal solution for video- and audio conferencing
PBX_IP	IP-based PBX	PBX system for voice over IP telephony (VOIP) solutions

Table 6: Conferencing infrastructure usage profiles

2.4.5 Projectors

Item	Description	Usage profile
Proj_Basic	Basic projector	Entry-level, low-cost data/video projector for budget-conscious environments

Proj_UltraP	Ultraportable projector	Ultraportable data/video projector for applications that require small size and/or light weight
Proj_Mid	Midrange projector	Versatile professional data/video projector with reasonable portability, supporting ceiling-mount and rear-projection options
Proj_Adv	Advanced large venue projector	Advanced high-brightness data/video projector for large venues such as auditoriums or training centres

Table 7: Projector usage profiles

2.4.6 Large Format Displays

Item	Description	Usage profile
Mon_AV	Large format AV display	General-purpose large-format display for office and enterprise audiovisual applications such as meetings and conferences
Mon_LFD1	Basic large format display	Basic large-format display for digital signage applications with medium duty cycle
Mon_LFD2	Advanced large format display	Advanced large-format display for digital signage applications with high duty cycle
Mon_Med	Medical diagnostic monitor	Advanced display for medical diagnostic applications (e.g. X-ray, CT, MRI)

Table 8: Display usage profiles

2.4.7 Collaboration and Information Sharing

Item	Description	Usage profile
IA_Dis	Interactive display	Interactive display (LFD/projector) with collaboration and communication tools including drawing, handwriting, image capture, annotation and sharing
IA_Touch	Interactive touch device	Interactive touch device/surface supporting external display (e.g. stand-alone board/panel overlay/projection surface/attachment), with collaboration and communication tools including drawing, handwriting, image capture, annotation and sharing
IA_SW	Interactive software	Software for interactive displays, with collaboration and communication tools including drawing, handwriting, image capture, annotation and sharing
Presenter1	Wireless presentation switcher	Wireless presentation switcher to share meeting room resources (e.g. displays) among multiple client devices for meeting collaboration
Presenter2	Wired presentation switcher	Wired presentation switcher to share meeting room resources (e.g. displays, audio) among multiple client devices for meeting collaboration
Dig_Signage	Digital signage solution	Digital signage solution for digital content creation, distribution, management and display

Table 9: Collaboration and Information Sharing

2.4.8 Display Wall Solutions and Components

Item	Description	Usage profile
VidWall1	Basic display wall	Entry-level pre-defined display wall solution with light duty cycle (8-

	solution	16 hours/day), including all required components (displays, control/management, cabling, services, etc.)
VidWall2	Advanced display wall solution	Advanced pre-defined display wall solution with continuous uptime design (24x7) for mission-critical environments, including all required components (displays, control/management, cabling, services, etc.)
VidWall_Ctrl1	Basic display wall control system	Basic display wall control system, supporting at least 8 displays, with aggregated (combined) display area; support for various display technologies, including LCD and DV-LED
VidWall_Ctrl2	Advanced display wall control system	Advanced display wall control system, supporting at least 32 displays, with aggregated (combined) display area; support for various display technologies, including LCD, Projection Cubes and DV-LED
VidWall_Panel	Display wall module - LCD panel	LCD-based flat-panel display optimised for display walls
VidWall_Cube	Display wall module - Projection cube	Projection cube-based display wall module with 24/7 design life for mission-critical applications
VidWall_LED	Display wall module - DV-LED	DV-LED-based flat-panel display wall module

Table 10: Display wall usage profiles

2.4.9 Cameras and Visualisers

Item	Description	Usage profile
Cam_Web	Advanced web camera	High-quality web camera for enterprise-focussed VC applications
Cam_VC	VC camera	High-quality video camera supporting videoconferencing in various size meeting rooms, including PTZ and fixed FOV
Cam_Vis1	Basic visualiser	Basic desktop visualiser (document camera)
Cam_Vis2	Advanced visualiser	Advanced visualiser (document camera) with integrated presentation surface and light source, or ceiling-based system

Table 11: Cameras & Visualiser usage profiles

2.4.10 Recording, Playback and Speech Processing

Item	Description	Usage profile
Rec_VC	VC Recorder	VC recorder with playback, streaming and archiving functionality
Rec_Media	Rich media recorder	Rich media recorder for capturing audio and video
MediaSrv	Media server	Media server with content management, playback, streaming and archiving functionality
Rec_Voice	Digital audio recorder	Digital audio recorder for voice and meeting recording
Rec_AudioSW	Audio recording software	Audio recording software for voice and meeting recording
Speech_SW	Speech processing software	Speech to Text and Text to Speech software for voice control, dictation and content access

Table 12: Playback & recording usage profiles

2.4.11 AV signalling, Control Systems and Management

Item	Description	Usage profile
AV_Mgmt	AVCT system/venue management	Device and resource management/scheduling system (software or appliance-based) for managing, controlling and/or scheduling of venues, devices and other resources
AV_Control	AV control system	Control system for AVC venue automation, including intelligent control processor with connectivity and APIs for device control programming; includes UI components such as keypads and touch panels
AV_Signal	AV signal routing	Signal routing, extending and switching devices for various media, protocols and technologies, including data, audio and video; HDBaseT options
AVoIP_Audio	Audio over IP systems	AV over IP devices for audio signals, e.g. Dante or AES -- transducer (source/target) and transceiver devices as well as audio routing, processing, etc.
AVoIP_Video	Video over IP systems	AV over IP devices for video+audio signals -- transducer (source/target) and transceiver devices as well as signal routing, processing, etc.

Table 13: Signal and control usage profiles

2.4.12 Non-ICT components

The non-ICT technology component will not form part of the technology management cycle. However, to ensure a **complete, turnkey solution** is offered to the client, suppliers must submit quotations and technical information on these as part of the proposal for specific client solutions.

Audio components

Audio portion of AVCT solution, e.g. amplifiers, mixers, processors, speakers and microphones (forms part of non-ICT components, and therefore does not require certification). Components and requirements must be defined per project in *ad hoc* RFQ/RFP.

Video components

Video portion of AVCT solution, e.g. processors, switchers, scalers, extenders and converters (forms part of non-ICT components, and therefore does not require certification). Components and requirements must be defined per project in *ad hoc* RFQ/RFP.

Other components

These include non-ICT playback/recording devices such as media players, satellite TV receivers, control system peripherals (e.g. keypads, screen and infra-red TX/RX, screen and lighting control), projection screens and other AV components and accessories.

2.4.13 Services

Services that can be rendered as part of an AVCT solution include, but are not limited to, the following:

- ❖ Needs analysis
- ❖ Design
- ❖ Supply and Delivery

- ❖ Installation and configuration
- ❖ Integration
- ❖ Commissioning
- ❖ Familiarisation and training
- ❖ Operations
- ❖ System management
- ❖ Support and Maintenance
- ❖ Consultation
- ❖ System programming
- ❖ On-site tech resource
- ❖ Meeting moderation
- ❖ End-of-life services

2.4.14 Infrastructure components

In addition to technology and service components, the following infrastructure may be required as part of a complete AVCT solution:

- ❖ Network cabling
- ❖ Air-conditioning (installation and control)
- ❖ Lighting (installation and control)
- ❖ Curtain and blinds automation
- ❖ UPS and other power requirements
- ❖ Soundproofing
- ❖ Furniture supply and shopfitting
- ❖ Painting and carpets
- ❖ Structural modifications

For network cabling existing transversal contracts must be used where possible, while other components and/or integrations may be quoted via RFP/RFQ according to Treasury regulations, in association with Public Works.

Any of these components that form part of an AVCT solution must be specified and priced separately from the AVCT components in the RFP/RFQ, allowing the client to adhere to regulations in terms of acquisitions outside of tenders. The total amount for these components may not exceed R500 000 as per National Treasury regulations, or the solution must be published as a an *ad hoc* bid.

Components that form part of the proposed AVCT solution that are available via other contracts (e.g. PCDs on Contract 2005) must be procured from these contracts as far as possible, and integrated into the solution.

2.5 Domain value-adds

The following AVCT domain features add value to Government ICT acquisition processes by mandating minimum requirements that support local ICT initiatives and requirements.

- ❖ Because of the critical nature of Government's communications infrastructure, very stringent technical and quality standards are specified for all AVCT devices. Manufacturing and environmental standards ensure high-quality solutions that support Government reliability and environmental drivers.
- ❖ Compatibility with network standards and protocols such as DNS, DHCP, IPv4 and IPv6.
- ❖ Compatibility with current and legacy video encoding and compression standards (e.g. ITU-T standards H.264 and H.265).
- ❖ A strong emphasis is placed on systems management, allowing support staff to remotely monitor, configure, update and troubleshoot devices, saving on labour and travelling costs, and minimising downtime.
- ❖ Countrywide, **5-year on-site warranty** with NBD **repair** SLA for all systems (Zone A only; Zones B and C extend the repair time to 2 and 3 working days respectively). To further ensure maximum availability, SLA upgrade options are also mandated for all products, which can be procured at the client's discretion.
- ❖ Certified products, components and solutions are available for direct procurement from a selection of accredited suppliers.
- ❖ A full range of upgrade options, components and accessories is available with each solution. This includes communications and media options, software, accessories, etc. Suppliers are required to build complete solutions for Departments with these options.
- ❖ Where applicable, compatibility with standard operating systems and environments (including Windows, Linux, etc.)
- ❖ Software licences for all basic functionality as specified are included in the Base Price. Additional software functionality may be licensed via component price lists as submitted by the OEM during certification.
- ❖ Firmware updates for all components for the duration of the specified SLA, at no cost to the user.

2.6 Bundled accessories and services

Each AVCT Item and/or solution is specified as a **fully working configuration** with a minimum set of mandatory bundled accessories and services. For example, all display devices are bundled with standard cables, stands or mounts for displays, or carry bags for projectors. None of these components may be left out by suppliers, but Government may substitute the default components with alternatives or upgrades if required (e.g. a larger carry bag, or a wall mount instead of a desk stand.) Departments must ensure that the business requirement is stated in full in the RFQ/RFP to ensure that the supplier's proposed solution includes all components for a fully working, turnkey solution. This includes additional non-standard requirements such as upgrading the standard support SLA). The Annex has additional details on this.

The specification prevents suppliers from quoting or delivering incomplete solutions (e.g. leaving out required cables or components), and suppliers are mandated to deliver and working, turnkey solutions.

Mandatory support SLA: all AVCT solutions must be bundled with the standard specified **on-site support SLA** included in the price. To ensure the lowest possible TCO for Government, the warranty and support **cannot** be unbundled from the price.

2.6.1 Service delivery zones

These zones are geographical areas within South Africa where product and service delivery are required by Government. Areas are designated as **Zone A, B or C**, depending on proximity to large centres. Consult the Annex for geographic and turn-around time details

In addition to the 1/2/3 business-day repair time, the specifications require a **4-hour call acknowledgement**, during which period the service provider must contact the client and acknowledge receipt of the support ticket.

3. AVCT selection guidelines

3.1 Business requirement

The most important principle in deploying any ICT-based system, including AVCT, is that the **end-user requirement** must determine the type of system or device that must be procured. This effectively means that the device must be able to perform the required function in the end-user environment (e.g. a video wall for a security control centre, or an interactive projector for a classroom).

Once the business requirement is met, secondary considerations such as additional functionality, cost, security, etc. must be factored in as well. But the primary determining factor must be the value the system will bring to the end-user's process or function.

The basic philosophy when specifying any type of device or system is to procure the lowest-end system that meets all business requirements. Buying a higher-end system than what is absolutely required is not an effective use of funds in terms of the Constitution.

- ❖ According to Gartner¹, digital meeting solutions can be used to
- ❖ Eliminate geographic barriers for intraorganizational, customer and community communications.
- ❖ Increase employee engagement for remote workers and team cohesiveness by using video and digital whiteboards.
- ❖ Reduce business travel expenses and employee inconvenience.
- ❖ Support work from home on a full- or part-time basis.
- ❖ Train remote participants in multiple locations.
- ❖ Deliver corporate or departmental communication events, such as employee town hall meetings.
- ❖ Automate the recording and transcribing of meeting discussions, action items raised and decisions reached.
- ❖ Ensure greater business continuity in times when employees are separated from each other and the business for any reason.

Defining the requirement

Before documenting the specification, end-user needs, venue details, required functionality and other considerations (e.g. aesthetics) must be captured. This must exclude any product and or low-level technical detail. Focus must be placed on what business problem the solution will address from a functional perspective. Factors to incorporate:

- ❖ Primary purpose of the venue
- ❖ Human vs. technical needs
- ❖ Number of simultaneous users of the venue (e.g. number of seats in a boardroom)
- ❖ Video and audio requirements
- ❖ Collaboration needs (interactive displays, sharing of information)

¹ Gartner Magic Quadrant for Meeting Solutions (G00451190), 12 October 2020

- ❖ Remote collaboration (e.g. distance learning)
- ❖ Possible future needs
- ❖ Computing and other devices to be integrated into the solution (e.g. computers, tablets)

3.2 General principles

The following general principles must be followed to specify, evaluate and select AVCT solutions.

- ❖ Specify and deploy **fit-for-purpose** solutions and technologies for specific business requirements (e.g. mobility or performance). Fit-for-purpose solutions enable efficiency and reduce TCO.
- ❖ Business requirements and RFP/RFQ specifications must be brand- and product-independent. Specifications that contain product-specific elements will not be allowed, unless a Department-specific standard, approved by the delegated authority as per NT guidelines, is in force.
- ❖ Detail product specifications (e.g. CPU clock speed in Ghz, exact dimensions and weight) should **not** be used to define an end-user requirement. The business need must be defined based on actual usage requirements.
- ❖ The AVCT domain focusses on enterprise-level devices: this means that manageability, compatibility and longevity of systems and accessories are maximised while TCO is minimised. Systems designed for a retail or consumer environment will not meet this requirement, and will not be certified.
- ❖ Bundled services: ensure that the standard services are included in the solution specification. These include initial training, and on-going support and maintenance for the SLA period.
- ❖ Where possible, Departments should standardise on brand and model to reduce complexity, minimise TCO and maximise interoperability, business continuity and user productivity.

3.3 Solution-specific considerations

This section summarises considerations for specific solutions and technologies. More detailed guidelines are captured in Annex C for reference by Departments when publishing a specification.

3.3.1 Videoconferencing and collaboration

- ❖ Number of sites that need to communicate
- ❖ Number of users per venue
- ❖ Venue design, including lighting, cameras, audio and display
- ❖ Network infrastructure
- ❖ Integration and interoperability (solution design)
- ❖ Services: Training, maintenance and support

3.3.2 Display solutions

- ❖ Purpose of display: e.g. training/education vs. meetings
- ❖ Venue design: e.g. huddle space vs. auditorium vs. classroom
- ❖ Type of data to be displayed: e.g. presentations, videos, multiple simultaneous sources (control centre scenario)
- ❖ Size limitations: e.g. ceiling height, length of venue

- ❖ Sources to display (inputs): laptops, AV devices, tablets/smartphones

3.3.3 Display walls

The type of display wall required is determined by the application and what the solution will achieve for the end user. Display walls are used in various different scenarios in Government, ranging from small and simple solutions for office signage to high-end, advanced 24/7 control rooms for military, security, utility or transport applications, as well as museums, conference rooms and other applications where a single display is insufficient.

Duty cycle is one of the most important considerations, since a 24/7 application requires significantly different technologies and design features. Interactivity, criticality and live content also need to be considered.

Other considerations include lighting, environment, physical space, power and connectivity requirements.

3.3.4 Collaboration solutions

- ❖ Education vs. enterprise use
- ❖ Sharing of content with remote sites
- ❖ Incorporate content from wireless devices
- ❖ Technical issues such as multi-touch, remote control
- ❖ Integrate video and audio from presenter/teacher

3.3.5 Cameras

- ❖ Type of video/images to be captured: e.g. lectures, videoconference, documentation, 3D objects
- ❖ Integration with existing video/audio/computer systems
- ❖ Mobile vs. fixed installation
- ❖ Resolution and zoom requirements

3.3.6 Playback and recording

Primary type of recording:

- ❖ Video vs. audio
- ❖ Meetings
- ❖ Lectures
- ❖ Conversations
- ❖ Dictation and transcription
- ❖ Personal notes

How the recordings will be stored and shared is an important issue that must be incorporated into the solution design.

3.4 System management tools

These tools or systems can enable Departments to contain costs by allowing accurate tracking, control and costing of ICT systems. Departments must stipulate exactly which products or devices must be managed as part of the request. Costing must be carefully examined to ensure a cost-effective deployment that will save operational costs without increasing capital/licencing expenses disproportionately.

As with other software licencing, it is recommended that Departments procure licences to cover the entire SLA period for the devices to be managed (at least 3 years). Periodic payments typically increase risk, administrative overhead and inefficiencies compared to a single up-front payment. This results in a higher TCO, which is in contravention of the cost-effectiveness mandate of the Constitution.

3.5 Security

The security architecture of any AVCT system is a vital component of the total solution. Standards are in place for security, but practical measures also need to be taken (e.g. access control), and the configuration of devices must be done in accordance with industry best practices.

Possible threats or risks include unauthorised listening-in via a connected VC unit or management node, unauthorised use of AVCT infrastructure, leaking of sensitive information via recording mechanisms, etc.

The following security recommendations apply to all network-attached devices and systems:

- ❖ Enable user authentication or access control
- ❖ Set a strong administrator password
- ❖ Disable unused ports and systems (e.g. FTP, POP)
- ❖ Set passwords for all remotely accessed services
- ❖ Disable USB ports if they are not used
- ❖ Enable hard drive encryption
- ❖ Securely erase all storage devices (e.g. embedded hard drives) before repair or disposal
- ❖ Change the default SNMP community strings
- ❖ Monitor and manage devices using a standard, secure management tool

3.6 General guidelines and requirements

- ❖ Departments must keep in mind possible additional requirements for complementary products or services, for example software development to enable room AV automation, or integration with existing networks/systems.
- ❖ Make use of disposal services offered by OEMs for end-of-life products.
- ❖ UPS recommendation: for environments with unstable power or with a large number of mission-critical devices, a suitable UPS must be deployed to support AVCT solutions. UPSs for these requirements are certified via the Infrastructure domain.
- ❖ To ensure stable power for AVCT solutions, equipment racks must be properly electrically earthed as required by SANS regulations.
- ❖ Enable power saving on all devices, including amplifiers, projectors and displays. To save electricity costs and minimise the environmental impact, devices must enter a low-power sleep state when not in use.

- ❖ Make provision for training, including establishing policies that require training and accountability to ensure that end users are able to make full use of new capabilities offered by deployed systems. Support personnel usually also require training when new technologies are implemented.
- ❖ All networked devices must be secured as thoroughly as possible: at least the remote management interface must be password-protected to prevent attacks. All default passwords must be replaced with a complex string, as per Departmental/Government standards. Devices with WLAN (802.11) connectivity must be configured according to the WPA-2 security standard.
- ❖ Support is available for previous versions of operating systems, making it possible to maintain existing Departmental standards in terms of drivers for older devices. When procuring any peripheral device, Departments must specify which OS will be used to ensure driver support.
- ❖ As far as possible, only OEM-approved, high-quality consumables such as pens, lamps and batteries should be used. Using poor-quality alternatives could result in decreased reliability and/or performance, an increase in TCO, or even damage to the device (e.g. low-quality or counterfeit projector lamps).
- ❖ All required audiovisual and communications interconnects (e.g. audio and video cabling) must be delivered as part of the total solution, and must be installed according to OEM standards.
- ❖ Device security:
 - As per SACSA guidelines, only non-classified communications may be done via unsecured channel.
 - Password-protected and encrypted communications must be used for the device's management interface.
 - All hard drives and other storage media must be securely erased before disposing of or re-allocating the device.

4. Engagement guidelines

The AVCT domain specifies minimum requirements in terms of service delivery, security, response times, etc. Clients and suppliers are urged to familiarise themselves with these requirements in terms of their respective rights and responsibilities.

4.1 Department guidelines

As detailed as the SITA certification process is, it cannot measure individual client requirements without including variables applicable to specific Departmental scenarios. By definition, this cannot be done in a transversal initiative, as the specification caters for all of Government for a multi-year period (typically). Therefore, a process must be followed to specify and select the best solution for specific client needs. SITA TAS can provide additional data and a consultation service to develop the criteria for a Departmental evaluation.

To ensure an open and fair process, the process may not favour any brand, product or supplier. An exception to this rule is where Departmental standards are used to lower TCO, as recommended elsewhere.

Departments are encouraged to use the following guidelines and variables in specifying solutions. Clauses that must be included in requests are included in **Annex A** for reference. These are normative guidelines, and as such **must** be followed by Departments making use of transversal contracts.

4.1.1 Business requirements

Before procuring and implementing any solution, Departments must define how, where and for what it will be used for. The functional requirement must be stated up-front as part of the procurement process. A detailed list of considerations is provided below.

- ❖ According to National Treasury regulations, Departments are not allowed to use product specifications provided by suppliers when publishing a requirement. The specification must be defined based on actual business needs.
- ❖ Business requirements, not technology, must drive ICT acquisitions. This is to ensure that costs are contained and specific business needs are met. All business requirements must be specified up front, including a functional description of the required solution, including for example monthly volumes, deployment environment, etc.
- ❖ Government offices are located all over South Africa, and provision has been made for localised service delivery. Departments must stipulate the required locations of service provision to determine which suppliers can provide support to the client. The zones of service delivery must be taken into account during this process. E.g. if a Department requires service delivery in the Eastern Cape, only suppliers with a direct presence in that province should be considered, unless no such service provider exists in the region.
- ❖ In case of complex solutions, a thorough needs analysis process must be followed prior to publishing an RFP/RFQ to the panel of suppliers. This must include at least an indication of high-level business requirements, and address functionality integration needs. Site inspections by suppliers, a preliminary design, and a “reality check” may need to be included.
- ❖ For complete systems or solutions, the RFP/RFQ must cover at least the following:
 - An overview of the solution and a high-level list of components, including which of the existing infrastructure and components would need to be upgraded or replaced.
 - Installation and configuration of complete solution.
 - Integration into existing infrastructure and functionality.
 - Commissioning of system and formal acceptance by client of a complete working solution.
 - Training of user’s operational staff for day-to-day running of system.
 - Support of entire solution, including warranty, service and maintenance. A basic SLA should be defined up front in the RFQ.
 - Maintenance of solution (both preventative and reactive). A regular preventative maintenance cycle should be stipulated where possible.
 - Required warranty, maintenance and support for the solution (both preventative and reactive).
 - Possible future upgrades with open standards-based interfaces.
- ❖ In the case of installed turnkey solutions, the supplier’s proposal must include at least the following elements:
 - Complete solution design, including venue layout, control system, video, audio and connectivity.
 - A complete list of materials, including which of the existing infrastructure and components would need to be upgraded or replaced.
 - Support and maintenance proposal.
 - High-level project plan including the following phases:
 - Installation and configuration.
 - Integration.
 - Commissioning.
 - Training
- ❖ Complete pricing schedule incorporating a breakdown of all mandatory and proposed cost elements.

- ❖ Existing infrastructure and environment must be fully documented in the RFP/RFQ, or suppliers must be given the opportunity to do a site inspection. Details that must be documented per venue include:
 - Drawings and measurements of the venue.
 - Type, number and position of network points.
 - Number and position of power outlets.
 - Availability of and access to venue for installation services (both daytime and after hours), and the criticality of the venue's services (can it be taken out of commission for the required installation time?).
- ❖ Any customer-furnished equipment or third-party equipment in the venue.
- ❖ Future-proofing of the required solution must be planned for to ensure the maximum value for the investment, as well as to guarantee interoperability with future technologies and protocols.
- ❖ Selection of the most suitable alternative must be based on the lowest TCO calculated using the user requirement as input.
- ❖ Departmental standards should be used to expedite procurement of approved devices, while only exceptions (deviations from the standard) need to be explicitly motivated and approved by internal ICT committees.

4.1.2 Sizing and performance of solutions

- ❖ As with reliability and performance, the configuration and operational parameters of a system largely determine TCO, or cost-effectiveness. Capital costs and on-going costs (consumables, service, support, etc.) vary widely based on many factors. Licensing costs for additional required functionality (e.g. additional software functionality) must also be calculated. All these factors must be incorporated in the requirement to ensure a real-world comparison of total cost. Clients are encouraged to do a multi-year TCO comparison (a minimum of 3 years) as part of the process.
- ❖ Sizing of solutions must take into account actual business needs, including all requirements and variables such as document volumes or mobility requirements. Guidelines from integrators, software developers and OEMs must be used to specify the solution and required performance. Existing and planned network infrastructure must also be taken into account when specifying the solution.
- ❖ System configuration, including component specifications such as connectivity and capabilities needs to be correctly specified based on end-user requirements.
- ❖ When proposing a solution, suppliers must provide a complete list of all SITA-certified Items. This is addressed in detail later in the document.

4.1.3 Solution certification

- ❖ Compatibility and vendor certification (in addition to the basic AVCT specifications) should be made prerequisites in any RFP/RFQ. While base compatibility with industry standards is catered for by the detail specification, any unique or specialised requirements must be addressed by the supplier proposal (in conjunction with SITA if required).
- ❖ The reliability of a solution is often directly related to system complexity. Environmental factors such as venue design, network and electricity reticulation also play a significant role. In addition, the reliability of individual components affect system availability. For highly-available solutions, redundancy and other RAS requirements must be specified up front.
- ❖ After completing the installation of an AVCT solution, suppliers are required to formally commission the solution, with formal acceptance of a working solution by the client. Clients can request audits where

exceptions are raised about functionality: in case of a dispute or complaint, SITA can be involved to verify whether the solution fulfils stated requirements.

4.1.4 Communications infrastructure

Departments must ensure that the existing network infrastructure is capable of handling the VC solution before roll-out. Videoconferencing end-points and infrastructure are just a sub-set of the complete solution, which also requires infrastructure and human elements. Also, VC will be only one of the applications requiring network infrastructure, and will often compete with other applications, and have a significant impact on network performance. As all communications and media converge onto IP-based infrastructure (e.g. IP telephony, fax over IP, surveillance, etc.), more pressure will be placed on the network, and only good planning will ensure adequate service for all applications.

- ❖ VC network (typically shared with other services due to infrastructure costs): TCP/IP with QoS
 - A VOIP-enabled TCP/IP infrastructure is required, catering for time-sensitive media types such as voice and video.
 - Quality of Service (QoS) must be configured and enabled on the WAN to enable reliable and usable VC over IP.
 - Adequate, guaranteed LAN and WAN bandwidth for the required level of video and audio quality (could be anything from 512Kbps to 4Mbps depending on requirement). Specialised applications such as Telemedicine may require higher bandwidth than these minimums. HD video requires a minimum of 2Mbps, while a secondary data stream would push this even higher.
- ❖ Firewall policy and configuration have a significant impact on VC via TCP/IP. Typically VC systems require a large range of IP ports to be opened on the firewall in order to function. This is typically not allowed by organisational security policies. A “firewall traversal” solution is a partial solution, however it also impacts on policy, as it offloads a part of the firewall security to a third-party box. SITA and Government’s strict VPN/firewall policies need to be investigated to check for support of IP videoconferencing.
- ❖ A Design Authority, consultant or supplier may need to be sourced to investigate the suitability of the network and existing environment for the proposed AVCT solution. The skill set and track record of this consultant must be vetted as part of the process.
- ❖ SITA’s network has the potential to enable Government Departments to communicate effectively via VC and VOIP. The configuration of VPNs between Government Departments and SITA needs to be considered as part of designing any VC solution. Interconnecting requirements will vary between different Departmental networks, depending on the network design and NGN connectivity.

4.1.5 Operations

- ❖ Users must be trained, practised and comfortable with AVCT system setup and functions.
- ❖ A delegated, trained support person must be available at all times for any help required by users of the venue. All venue accessories, cables and operation must be managed by this person.
- ❖ A call centre must be available at the supplier where all solution-related issues can be logged and escalated for action. 24-hour SLAs obviously will require a 24-hour call desk.
- ❖ All loose in-room devices (e.g. projectors, cameras, remote controls, etc.) must be tracked to ensure that AVCT functionality is not lost when equipment goes missing. Backup systems (e.g. wall-mount controls) should be designed into the system up-front.

4.2 Supplier guidelines (normative)

Where applicable, certified suppliers are required to adhere to the following normative standards when supplying products certified via the AVCT domain:

- ❖ The final responsibility for a working solution rests with suppliers and OEMs. An incomplete specification by Government does not absolve suppliers of this mandate. However, if Departments specify a detailed bill of materials, or prescribes to industry in other inappropriate ways, this responsibility reverts back to the client.
- ❖ Suppliers must ensure that all required information is gathered from Departments before quoting for or delivering a solution. This is to ensure that Government's business needs are met by the proposed solution, and that only complete solutions are offered.
- ❖ Suppliers must recommend that Departments negotiate SLAs over and above minimum uptime specifications for mission-critical systems.
- ❖ Suppliers must inform Departments of best practices in terms of deployment, SLAs and operations.
- ❖ Suppliers must commit to only proposing suitable and appropriate solutions given Government's business requirements.
- ❖ Only certified products and services may be offered to Government via the AVCT domain, as stipulated in the SITA Act and NT regulations.
- ❖ Suppliers must be certified to supply, install, support and maintain each individual product in the solution offered to Government.
- ❖ Registration of all product warranties must be done by the supplier after delivery of a solution. Government will not be required to register products for service to be eligible for warranty claims and support as per domain conditions.
- ❖ As part of the SLA, warranties for the individual components that make up the AVCT solution (e.g. projectors, amplifiers) must be managed by the supplier on behalf of the client.

4.3 OEM responsibilities (normative)

SITA has concluded an MoA (Memorandum of Agreement) with more than 120 OEMs at the time of writing. The MoA commits manufacturers to a mandatory level of support, quality and development of local industry. OEMs participating in the product certification process have the following responsibilities:

- ❖ Take primary responsibility for the entire technical evaluation process (product certification), including informing partners of progress if required.
- ❖ Participate in the technology management process as per domain conditions (refer to **Technology Certification Process**, and **OEM Memorandum of Agreement**)
- ❖ Ensure that appropriate, suitable solutions are offered to Government based on the stated business requirements.
- ❖ Take responsibility to determine the appropriate parts required to build a working solution, and communicate this to all OEM partners.
- ❖ Support all their partners in terms of certification, training and regional service provision.
- ❖ Provide all required information to SITA, such as technical details and product roadmaps.
- ❖ Ensure that all partners supplying the OEM's products will adhere fully to the technical spec and solution requirements, either via training, management systems or auditing.
- ❖ Ensure that the optimal configuration for the stated user requirement is delivered by suppliers.

- ❖ Maintain the certified product database, ensuring that all products listed are current, and updating those that have been replaced or superseded.
- ❖ Restrict the number of configurations of a specific product offered by all suppliers to a single configuration (i.e. that a single configuration of a particular model will be offered by all suppliers). SITA will engage the OEM during the process in support of this goal.

If the supplier fails to perform according to specification, the accountability will devolve onto the OEM automatically. Failure to comply with these guidelines will result in corrective action by SITA.

4.4 RFP/RFQ process

A critical procurement principle is that Departments are not allowed to use specifications provided by suppliers when publishing an RFQ. The requirement needs to be defined based on actual business needs.

The following high-level procedure should be followed when engaging suppliers:

- ❖ Ensure that all applicable guidelines in this Deployment Guide are followed.
- ❖ Determine and **document detail requirements** (see guidelines and requirements sections for specific information around this).
- ❖ Verify **appropriate sizing** of requirement before publication.
- ❖ Approach SITA for **advice** (if required).
- ❖ A bill of materials may **not** be specified, as this places the burden of a working solution on Departments, instead of bidders.
- ❖ Domain Item names (e.g. PC3, MF4, Srv1) may **not** be specified to clarify the requirement, since this prevents bidders from offering similar or superior alternatives.
- ❖ As discussed earlier, define a list of **evaluatable**, mandatory business criteria to be included with the RFQ. This includes for example requirements for additional components (e.g. docks, advanced displays or extra storage), services such as regional delivery, installation and maintenance, or upgrades from the base specification to meet additional performance requirements.
- ❖ **Publish request** with documented requirement. All information about requirements, infrastructure, constraints, etc. must be shared with all respondents, i.e. if new information becomes available during adjudication, all respondents must be allowed to update their responses. Any requirement not stipulated up front may not be used to adjudicate bid.
- ❖ Suppliers may only quote solution components, equipment, accessories and upgrades that were listed in the product detail specification at certification. This is to ensure that the solution is made up only of certified components.
- ❖ Evaluate RFQ in terms of TCO, BEE and compliance with requirements (technical). The **PPPFA 90/10 or 80/20 principle** must be utilised in this process. Departments are encouraged to tailor TCO calculations for their specific environment. It is important to verify during the technical evaluation that **all mandatory components** (e.g. 3-year support) are included in the quoted price, using the submitted bill of materials or pricelist. This is to ensure a fair, apples-to-apples cost comparison.
- ❖ Award to the most **suitable bidder**, i.e. the one with the highest-scoring bid that complies with all requirements.

The Engagement Model has more details on this process.

4.5 Solution and supplier selection

The following criteria must be considered when selecting a product and supplier:

- ❖ The OEM, supplier and product need to meet the requirements shown in the Venn diagram: only solutions in the white intersection may be considered for selection.
- ❖ The supplier must meet the following requirements before their bids can be considered:
 - Certified to supply products via the appropriate contract (information on the SITA website can be used to verify this).
 - Certified in the province where the solution must be delivered/installed.
 - Certified to supply the required product Category and Item.

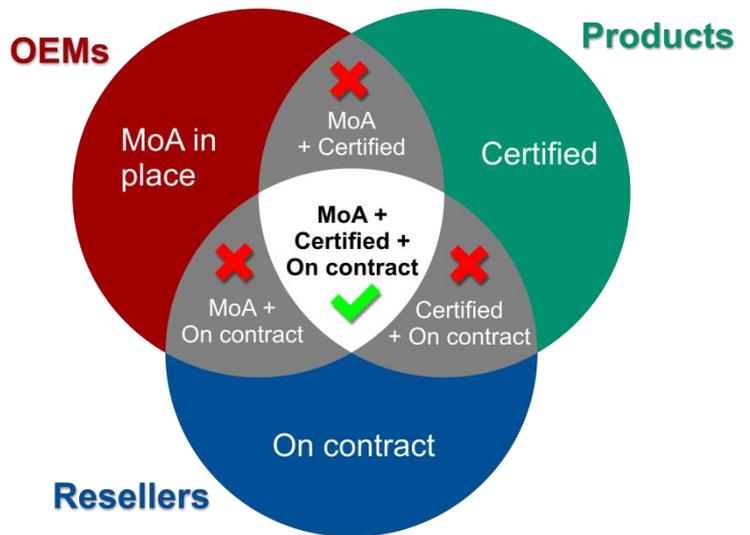


Figure 6: Requirements for supply to Government

- ❖ Certified by the OEM to supply the specific products offered in the request (filtering of information published on SITA’s website can be used to verify this).
- ❖ The supplier must be capable of providing, commissioning and maintaining a solution of the required scale.
- ❖ The offered solution (both technology and scope) must meet the client’s business needs.
- ❖ Certification of products and resources (solution-level, OEM-level, skills-level, etc.) for specific platforms and applications.
- ❖ Client’s current installed base: moving to a new supplier and/or product range may increase TCO by impacting on existing certifications, training, logistics and compatibility.
- ❖ Supplier skills and experience.
- ❖ Support for and understanding of client’s unique requirements.
- ❖ Service issues such as delivery and repair times.
- ❖ Other soft issues (support footprint, regional distribution, etc.). Provincial goals may be incorporated here as part of the 90/10 principle.

5. Services, best practice and deployment guidelines

This section provides an overview on best practices in terms of deploying solutions via the AVCT domain. As most of these solutions offer significant capabilities and capacity, care should be taken to have the correct implementation framework in place.

5.1 Policies and/or strategies

The following policies and/or strategies should be in place to inform business practices, technology requirements and procurement initiatives:

- ❖ Security policy in terms of information and physical access control
- ❖ Information management policies and strategies:
 - Data management policy
 - Storage and backup strategy, policy and procedures

- Archival policy
- Disaster recovery (DR) policy and strategy
- ❖ Infrastructure management policy
- ❖ Support strategy
- ❖ Maintenance strategy:
 - Ceding of SLA to in-house service providers may be done at purchase time, depending on existing agreements that Departments have in place.
 - Transfer of maintenance contracts should be done to in-house service providers after the standard 5-year SLA expires.

5.2 Guidelines for mission-critical systems

- ❖ Maintenance and support SLAs must be entered into for specific response/repair times and uptime for entire system, not just hardware.
- ❖ Downtime intervals should be scheduled for preventative maintenance on all equipment to ensure optimum functioning.
- ❖ The call/failure escalation procedure for each solution should be followed when downtime occurs. The procedure must be visible to operational staff to ensure quick response in case of failures.
- ❖ All OEM-provided fixes, patches, updates and alerts (affecting hardware, firmware and software) should be acted upon and implemented as recommended to ensure the best possible availability and reliability from the systems.

5.3 Service and support

- ❖ Service and support requirements must be addressed thoroughly by the client via service level agreements (SLAs). For more complex or mission-critical solutions, upgraded SLAs must be specified in the RFQ/RFP and negotiated as part of the procurement process.
- ❖ Detailed support and maintenance requirements must be stipulated up front as part of the specification.
- ❖ Up-to-date certification of service providers is vital to maintain OEM warranties: technician certification for some OEM products have to be renewed annually.
- ❖ Most OEMs commit to supporting a product for at least 3-5 years after being discontinued. Government can partly address this concern by opting for a more comprehensive SLA up front.
- ❖ Countrywide delivery is included as a mandatory component in all technology domains. Required delivery times must be negotiated with the supplier, and non-performance can be managed by involving the appropriate SITA resources. Delivery and/or installation of complex solutions or systems must be project-managed in conjunction with the supplier or solution architect.
- ❖ Changes to any ICT infrastructure (e.g. network or server configuration) should only be done by certified resources, whether internal or contracted. This will ensure that all changes are done in a controlled way, and system reliability is maintained.
- ❖ To ensure maximum reliability, integration and functionality, Departments are urged to procure solutions from a single supplier or consortium instead of buying different components from different suppliers. A single point of contact (call centre) must already be established at the supplier for all maintenance and support. This principle becomes even more vital for mission-critical installations such as control rooms or high-profile conference venues.

- ❖ Maintenance for existing AVCT infrastructure must be quoted as part of a full solution proposal including upgrades of the existing infrastructure. The new supplier takes on the maintenance of legacy units as part of the full solution offered.

5.4 Best practices

- ❖ Certification of products to be interoperable with third-party solutions (e.g. a VC endpoint certified by a UC vendor) needs to be taken into account during the RFQ process. Departments run the risk of losing certification when selecting non-supported configurations, which could seriously impact system reliability and a Department's recourse in case of failures. The recommendation is therefore that the entire existing infrastructure be stipulated as part of the RFQ process to enable suppliers to offer a suitable solution. In some cases a qualification process may have to be done before a solution can be certified as "supported".
- ❖ From a security perspective, installations must be hardened and optimised beyond the standard installation. Government requirements as documented in the MISS must also be followed.
- ❖ Additional installation services are available to complement proposed solutions. It is highly recommended that Departments make use of these services for complex solutions, specialised devices, or where in-house skills are not available. If required, these services must be requested in the RFQ.
- ❖ SSA guidelines must be followed in terms of data protection w.r.t. storage devices (e.g. hard disk drives) at disposal or when failures occur. In general, storage devices containing Government data may not be removed from Government premises under any circumstances. Erased disk drives or portable media must be certified to be securely erased before they may be removed from Government premises. Hard disks must be erased to at least the **US DoD 5220.22-M** standard, or an alternative security level acceptable to the Department.
- ❖ Select appropriate solutions for specific requirements. At the lower end where the risk is less, low-cost products are adequate for Government's requirements. Conversely, at the higher end, higher-priced products are required to satisfy Government's reliability requirements.
- ❖ OEM warranties usually exclude accidental or user damage (dropping a touch panel on the floor, or not cleaning projector filters). Any failures not directly caused by faulty materials or workmanship are typically not covered by the warranty. Departments must carefully note what is covered by the device warranty when putting a system into production.
- ❖ In order to facilitate asset and financial management, technology solutions that control, track and trace devices should be considered as an add-on service. This includes fleet management solutions or hardware tracking technology.
- ❖ Suppliers must ensure that all supplied cables conform to the relevant industry standards to ensure safety and compatibility. E.g. USB cables must be certified by the USB Implementers Forum (<http://usb.org>). Departments should not purchase "cheap" or counterfeit cables that are not certified, since these can damage expensive devices. Poor-quality cables delivered by OEM-approved suppliers will be the responsibility of the supplier or OEM (including resolving any issues caused by these cables), unless Departments used cables not approved by the OEM. Gender changers or adapters should not be used, since these usually affect signal quality negatively.
- ❖ Detail planning and project management of the complete roll-out is vital to ensure control over timescales, budget and a quality installation.
- ❖ Checks and sign-offs must be done before continuing with subsequent phases.
- ❖ Just-in-time procurement of VC equipment is preferable (lengthy installations sometimes cause AV equipment to be out of date at installation time).
- ❖ The order of installation is important: changes to the venue (carpets, lighting, furniture) must be done before AVCT equipment is installed.

- ❖ The so-called “analogue sunset” was supposed to happen some time ago in the AVCT industry. This represents the final transition from analogue signalling to all-digital transmission, including all audio and video signals. This means for example that analogue connections such as VGA and PAL will be replaced by all-digital connections such as HDMI or DisplayPort (DP). Today many signals can be carried over standard network cabling, addressing many distance and cable management issues. However, Departments must take note that all-digital AVCT solutions require additional or different skills, equipment and integration processes than what were used previously. Provision may also have to be made for legacy analogue connections to ensure backward compatibility.

6. Conclusion

In order to function effectively, Government requires audiovisual communications solutions. The AVCT technology domain supports the establishment of a transversal procurement vehicle for a baseline technology platform that attempts to cater for at least 90% of Government’s AVCT requirements. Following the guidelines in this document should enable Government to make use of AVCT to its maximum potential in supporting Departmental ICT and service delivery goals.

A thorough analysis of user requirements **must** be done to ensure that a fit-to-purpose AVCT solution is procured. In general, a solution specification should be stated in **plain English**, focussing mostly on business requirements, avoiding unnecessary detail technical specifications. SITA can assist Government in this analysis with advice, guidelines and focussed cost models.

SITA is committed to supporting Government in its procurement initiatives by ensuring that domain and contract conditions are maintained, and Department technology requirements are met by continually revisiting the specifications and making adjustments where required. SITA’s emphasis on the technology aspects enables Departments to focus on their business requirements and the value they can derive from a particular solution. Any inputs in this regard may be forwarded to SITA using the contact details provided below, or escalated via other channels (e.g. TTT, GITO Council, SITA Customer Relationship Managers).

More information and contact details

The latest technical information, specifications, forms, and the latest version of this and other documents can be downloaded from the SITA Product Certification web page:

www.sita.co.za/prodcert.htm

TAS contact persons for product certification, advisory services and technology domain information:

Name	Role	Contact details
Deon Nel	Technology consultation and certification	deon.nel@sita.co.za 012 482 2136
Izak de Villiers	Technology consultation and certification	izak.devilliers@sita.co.za 012 482 2749
Hlengiwe Mosokotso	Certification requests, Lab coordination and communication	tas@sita.co.za 012 482 3333

Annex A: Sample RFP/RFQ Clauses

This Annex provides standard clauses that Government users must include in their RFPs/RFQs to ensure that specific technical and contractual requirements are met in terms of the transversal process.

Using a standard RFP/RFQ template as a basis, the following information must be inserted into the Technical/Solution part of the RFQ, which defines the specification for which suppliers must quote.

MANDATORY	Comply	Do not comply
<p>Bidder commits to implement and follow all conditions and specifications as defined by the contract framework. This includes all technical and solution requirements listed in the transversal bid document, all requirements in this RFP/RFQ, and the latest technical product specifications.</p> <p>No services, features or capabilities listed as “standard” (included in the price) in the bid and technical specifications (e.g. on-site support SLA) may be excluded from the RFP/RFQ, and no RFP/RFQ conditions may override or cancel out any bid conditions or specifications.</p>		

MANDATORY	Comply	Do not comply
<p>The responsibility for delivering a complete, working solution will reside with the Supplier, not the end user. The Supplier will be fully accountable for the system configuration and correct implementation, notwithstanding any possible shortcomings in the specifications or RFP/RFQ.</p> <p>The relevant OEMs must fully support Suppliers in delivering working solutions to Government. The Supplier will be accountable for the final solution, service and support.</p>		

MANDATORY	Comply	Do not comply
<p>Bidder must be certified by SITA as a supplier approved on the relevant transversal contract (e.g. Contract 2009).</p>		
<p>Substantiate: Attach proof that bidder is approved by SITA for this contract.</p>		

MANDATORY	Comply	Do not comply
<p>Regional applicability: Bidder must be certified on the relevant contract for product supply and service delivery (as applicable) in the province where the solution must be delivered/installed.</p>		
<p>Substantiate: Attach proof that bidder is approved by SITA for this region.</p>		

MANDATORY	Comply	Do not comply
<p>Bidder is certified by SITA to supply the proposed product brand(s), Category (e.g. Projectors or Conferencing), Item (e.g. Phone_IP1) and specific product offered in the proposal/quotation.</p>		

Substantiate:
Attach proof that bidder is approved by SITA for this Brand, Category and Item.

MANDATORY	Comply	Do not comply
The bidder will supply only SITA-certified products for this bid, i.e. products that are listed on the SITA product database. Supply of non-certified products will constitute a breach of contract, and will result in punitive measures. The individual product certificates for the offered products must be attached to this bid.		
Substantiate: Attach all relevant product certificates.		

MANDATORY	Comply	Do not comply
Bidder is certified by OEM to supply the specific products offered in the RFP/RFQ.		
Substantiate: Attach proof of OEM certification.		

MANDATORY	Comply	Do not comply
All major parts and components that form part of the solution must be quoted separately in the pricing schedule.		
Substantiate: Pricing schedule must be completed with individual pricing for each mandatory component.		

MANDATORY	Comply	Do not comply
Stipulate how supplier skills and experience will be evaluated (e.g. list of clients, reference sites, years of operation)		
Substantiate: Attach documents proving required criteria.		

MANDATORY	Comply	Do not comply
Design, project plan and bill of materials (BOM) must be delivered as part of RFP response		
Substantiate:		

MANDATORY	Comply	Do not comply
All additional accessories specified by the client must be included in the quoted price. If not included, suppliers will be required to supply these accessories at no cost to the client.		

Annex B: Solution-Specific Guidelines

This Annex captures detailed guidelines, principles and best practices for specific solutions and AVC technologies. Departments must incorporate these into their solution specifications and designs, where applicable.

1. Conferencing solutions

1.1 Venue design

The layout of the room is vital to ensure a good VC experience. The cameras on VC units typically support zooming and panning, but only a part of the room can be covered at any one time. Having the camera view move during the meeting can be distracting, and it may require an operator or some form of automation. Also, rapid switching between speakers, as is natural in meetings, is difficult to support if this requires panning and/or zooming.

Therefore, laying out designing the room so that all participants are in view of the camera lens at all times is important. A longer room with a V-shaped table is recommended by most AVCT integrators over a shorter, wider room.

As a general rule, the room and table layout should allow as many attendees to face the camera as possible. In addition to facing the camera, delegates should not have to turn away from the conference table while participating in the VC. Obviously, a round table would have more delegates with their backs to the camera, consequently leaving less of the table useful in a VC scenario. The diagram below illustrates this concept.

An alternative can be to define preset positions for the camera to pan and zoom to, which can be done by interfacing the audio system to the VC system to allow automatic camera switching or zooming. However, zooming is not always optimal, given that speakers' positions can vary, and a person can be blocked from view by another person sitting closer to the camera.

A third possibility can be to have multiple cameras, with each allocated a dedicated display so that the delegates looking at a certain display can be captured via an associated camera. This requires more advanced VC codecs and careful venue planning and design.

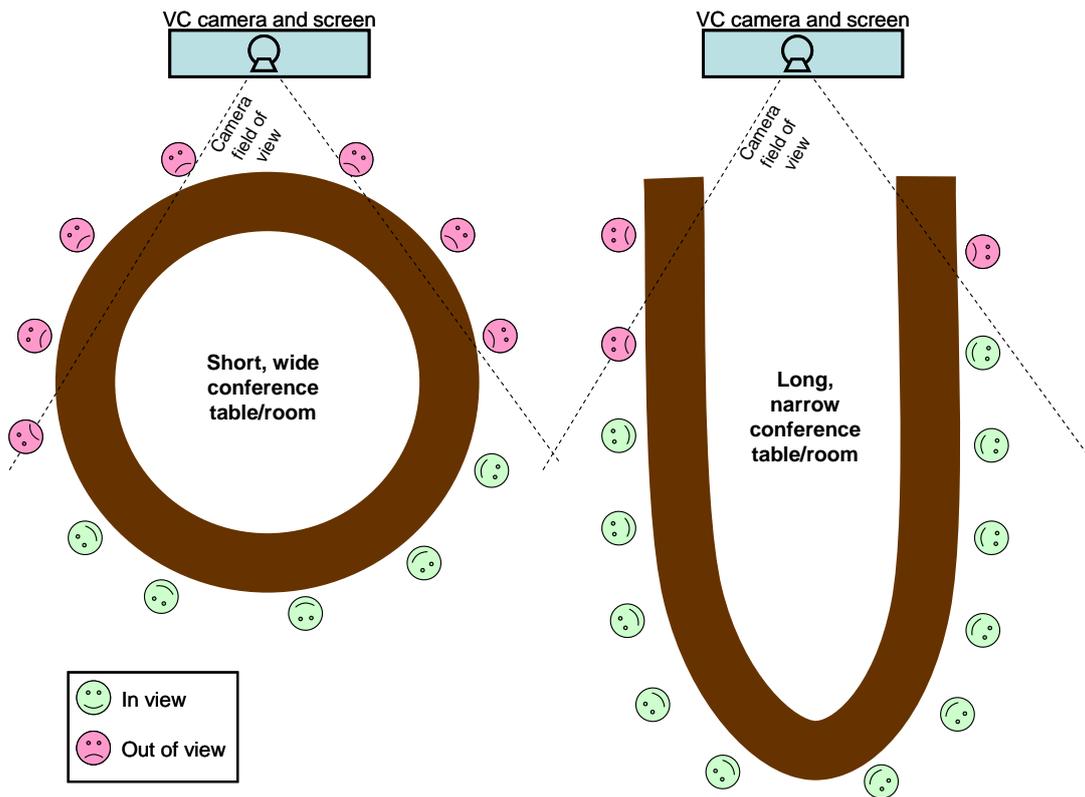


Figure 7: VC room and table layout

Some venues are very long, with boardroom tables to match, which creates practical problems for screen size and viewing distances. Given the guidelines provided earlier on display viewing distances, it would be impractical in most boardrooms to install a display with the required size to cater for a user sitting 12 metres away, for example. The only practical solution in such an environment would be multiple displays positioned around the room.

An example of a sub-optimal videoconferencing venue design is shown below:

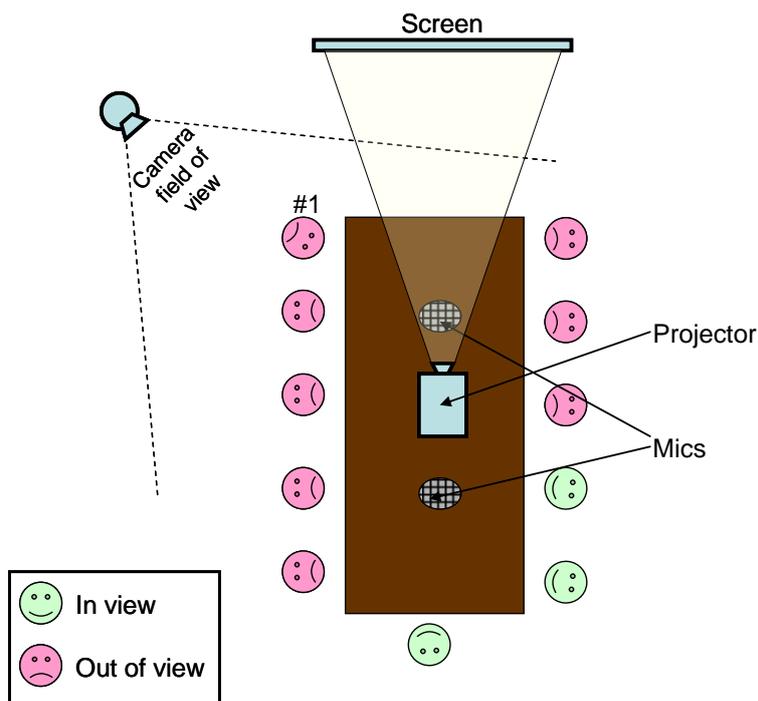


Figure 8: Sub-optimal VC room layout

In this hypothetical room (which mimics real-world examples), very few of the participants are optimally placed. Since the camera is not located near the screen, whenever a participant looks at the screen, he/she looks away from the camera. To make matters worse, the poor camera placement means that almost half of the participants face away from the remote participants. In addition to that, any of the “red” participants who looks towards the screen or camera would influence voice quality, since the microphones are not placed correctly in terms of the screen or the camera. For example, participant #1 is facing towards the camera, but cannot see the screen, and his voice will not be picked up by the microphone. The projector is placed on the table, and its noise and heat also interfere with the videoconference. In this room, only the three green participants have a reasonable chance of facing the screen, camera and microphone at the same time, allowing for an effective VC.

Additional considerations for venue design and layout:

- ❖ Room lighting must match display light output to ensure a comfortable viewing environment. Light levels must match the user requirement for the room: e.g. videoconferencing needs higher light levels than presentations.
- ❖ Display size of large-format monitors or projectors must be properly matched to the size of the venue to ensure comfortable viewing distances.
- ❖ Room audio needs to be considered in detail (see below)

1.2 Audio configuration

- ❖ Microphones and speakers must be optimally placed to allow for comfortable audio levels, including that all delegates can be heard at approximately the same volume level.
- ❖ The positioning of microphones and speakers must be done so as to eliminate or at least minimise audio feedback and echo. Feedback occurs when a microphone receives a louder signal from a speaker than from a primary source. Echo typically occurs when the local audio is retransmitted via the remote microphones to the local speakers.
- ❖ Depending on the size of the group and room, it may be possible to eliminate local “voice lift” (i.e. amplifying the voices of in-room delegates). This will help eliminate both feedback and echo.
- ❖ Noise from in-room devices such as the air conditioner must be taken into account when designing the audio system. All noise sources and levels must form part of the solution design.
- ❖ Designs of delegate systems must take into account the actual usage scenario: for example, in some venues and applications the “push-to-speak” model is problematic.

1.3 Technical requirements

The following components must be in place to enable successful VC:

- ❖ Good-quality camera
- ❖ Good-quality microphone and speakers
- ❖ Adequate bandwidth to the venue/codec (including QoS for IP solutions)
- ❖ For non-embedded solutions, a system with adequate computing resources to run the VC codec.

1.4 Physical infrastructure

Infrastructure components that are required for a working VC installation include:

- ❖ Dedicated venue (otherwise select a roll-about/mobile system for use in multiple venues).

- ❖ Adequate network infrastructure, including QoS and sufficient bandwidth.
- ❖ Adequate power reticulation.
- ❖ Air conditioning that falls within acceptable parameters from an audio perspective.
- ❖ Furniture and room layout (existing or new) that suits the specific AVCT requirement. Furniture requirements must be handled as part of the complete solution, and should form part of the venue design.

1.5 Voice conferencing and delegate systems

The following criteria must be used to determine the requirements for a delegate conferencing system:

- ❖ General:
 - Number delegate positions
 - Active vs. passive delegates (i.e. speakers vs. attendees who just need to listen)
 - Chairman functionality
 - Size of the table/tables in the venue
 - Distances: cable lengths (controller to delegate unit, control room to system), and audio coverage for other attendees.
 - Guest/podium microphone
 - Free-standing, portable or permanently installed system
- ❖ Installed systems:
 - Integration with furniture (e.g. holes to be drilled in tables)
 - Type of floor, ceiling and walls
 - Availability of power
 - Flush-mounted or tabletop delegate units
 - Layout: single element vs split layout
- ❖ Features and services required:
 - Recording
 - Interpretation
 - Number of languages
 - Distance to Interpreter stations
 - Voting
 - Display of messages or voting results
 - Access control to system or voting function
 - Intercom function between Delegates/Interpreters/Chair
 - Computer control:
 - Microphone management
 - Message distribution
 - Attendance register
 - Delegate database

- ❖ External connections:
 - Additional speakers (e.g. visitors, breakaway rooms or press)
 - Displays (projector or LCD screens)
 - Video cameras
 - Audio transport to another venue

1.6 Etiquette

The following practical guidelines for successful conferences were adapted from a document developed by Government Departments.

- ❖ Speak up: if you mumble and cannot be heard by the person next to you, the people on the far end will also have a problem hearing you.
- ❖ Dial in 10 minutes before the session starts. This will allow enough time for setup, address any issues, and reduce stress or anxiety before the meeting.
- ❖ Be seated before the meeting and relax.
- ❖ Mute the far end microphone before dialling in (only the host should be audible). Un-mute the microphone when making a comment or when prompted.
- ❖ Ensure that the video image includes the speaking participant at all times, and that the participant looks into the camera to indicate active participation. This can be done by zooming and panning, or by deploying multiple cameras and displays.
- ❖ Do not be nervous, as this is bound to exacerbate any issues experienced, and reduce the effectiveness of the conference.
- ❖ Do not make recurring gestures as they will be magnified in the video signal and distract other participants.
- ❖ Do not fidget with pens, pencils, papers, glasses, spare change or any other object that can make an audible noise which can be transmitted over the VC link.
- ❖ Do not speak unless you have been given permission to speak.
- ❖ Do not place your laptop or notepad on top of or in front of the microphone in a way that will interfere with audio quality. Also be careful with in-table microphones, as they can be damaged easily by contact with hard objects such as laptops.
- ❖ No cell phones should be allowed in the video conference as it may interfere with the VC hardware, and will also distract other participants.

2. Imaging and display

2.1 Screen size and viewing distance

A major consideration for any type of display, be it a boardroom projector, interactive whiteboard in a classroom or even a control room display wall, is specifying the correct viewing distance so that displayed content can be easily viewed, read and processed by participants or users. For example, it is reasonable to believe that procuring a high-resolution display ensures a good-quality picture. However, while this is true in abstract terms, in practical use the type of content (e.g. presentations, documents with small text, maps, graphics), the room size, number of users, and the distance from the display to the user all could cancel out high display resolution.

Human visual acuity determines the amount of detail that can be perceived at any given distance. Therefore, some display size and distance combinations do not benefit from higher resolution at all. If very small details are going to be displayed, higher resolution may be required, but a lower resolution may be sufficient for content with larger elements such as videoconferencing or presentations. While the price could easily double when purchasing a high resolution display, no value may be derived from the high resolution if users are too far away, or inappropriate content is displayed.

To address this issue, AVIXA has created a standard used for determining screen size known as the **4/6/8** rule. This rule states that ideal viewing distance, in correlation with room size, should be four, six or eight times the height of the screen, depending on whether **analytical viewing**, **basic viewing** or **passive viewing** are required. The diagram below illustrates the rule in a classroom environment.

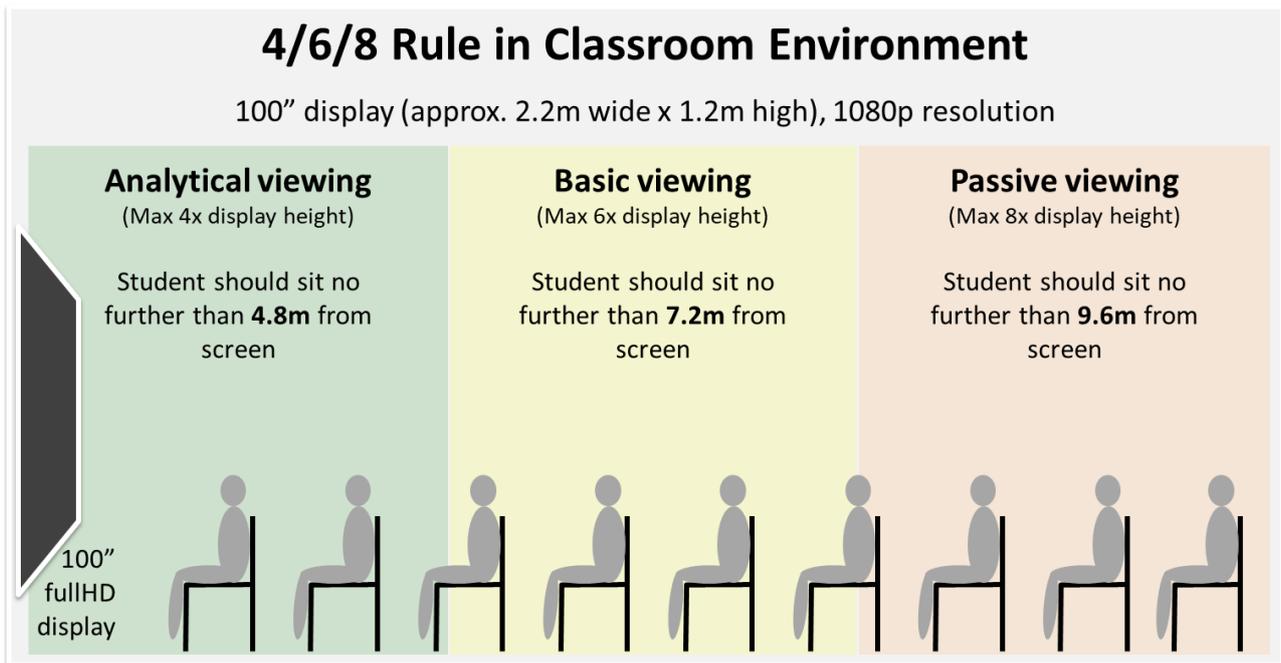


Figure 9: 4/6/8 display size rule

In addition to viewing distance, display resolution also plays an important role. A user with normal vision can distinguish details no larger than 1 minute of angle. This physical limitation determines the optimal viewing distance for any display solution, allowing derivation of a size/distance ratio for specific resolutions as detailed in the table.

Based on this, the optimal distance for a 60" FullHD monitor can be calculated to be around **4 metres**. Since the entire audience is unable to be positioned at the same distance, some compromise needs to be made depending on the type of content that will be displayed. If small details such as text is used, all the users will need to be within the 4m distance, while large content such as presentations or video will allow the maximum distance to be increased.

Resolution	Ratio to screen height
720p (HD or XGA)	4.5
1080p (FullHD)	3
2160p (4K or UHD)	1.5
4320p (8K)	0.75

Table 14: Optimal display viewing distances

The type of content that is displayed must also be considered: if project plans or spreadsheets are presented, the viewing distances will be significantly shorter than for presentations with large text, or video content, for example.

2.2 Projectors

A projector-based display is significantly more scalable and cost-effective for any given size: whereas LCD-based flat panel display sizes vary from 40–100+ inches diagonal, a projector-based display can be up to 500” in size. In terms of cost, a 100” LCD display can be ~R150000, while a high-end projector that can show a picture 3X as big can cost less than R30000.

Care should be taken to specify the appropriate projector for the business requirement. Ensure that retail-focused home theatre or gaming projectors are not selected, since these will not meet typical Government needs. Considerations when selecting a projector include:

- ❖ The type of data/media that will be displayed (presentations, documents, training, spreadsheets, images, video). This determines the following:
 - Resolution (standard vs. high)
 - Aspect ratio (4:3 vs. widescreen)
- ❖ Brightness required (environment with controlled lighting vs. room with very high ambient light)
- ❖ Inputs (HDMI, VGA, DP, USB, wireless, MHL)
 - Devices to connect (PC/laptop, tablet, smartphone, flash drive, interactive whiteboard, VC system, video switcher)
- ❖ Mobility (permanent installation vs. portable vs. ultraportable for regular travel)
- ❖ Network connectivity (wireless, cabled)
- ❖ Throw distance: typical distance from projector to screen (compare a long throw distance for a large auditorium vs. a classroom with interactive whiteboard requiring ultra short-throw)
- ❖ Specialised requirements: 3D imaging, long-distance connectivity (e.g. HDBaseT)

Projection screens

A vital part of any projection solution is the surface on which the image is projected. Using a boardroom wall or a whiteboard will result in sub-optimal viewing, and should be avoided if possible. The following factors influence the type of screen to be installed:

- ❖ Size and aspect ratio
- ❖ Gain factor and apparent brightness
- ❖ Viewing angle
- ❖ Screen type and material (projector resolution, colour accuracy, uniformity, borders)

Significant thought must be given to the type of projection screen, as this decision could make or break the effectiveness of the venue.

3. Cabling limitations

Every AVCT cable and its attendant communication protocol has a specific design length for a given frequency or bandwidth. If this limit is exceeded, the solution will work unreliably or not at all. The maximum design length limits for several AV standards are listed below:

Displayport	10m
DVI	5m
Ethernet (Cat5/6)	100m

USB 2.0	5m
USB 3.0	4m
USB 3.1	1m
HDMI	8m
Line-level audio	45m
Speaker audio	150m
Serial (RS232)	15m
VGA	30m
HDBaseT (1080p)	100m
HDBaseT (2160p)	40m

Table 15: Cable length limitations

Over the past several years, many different ways of extending cable lengths have been introduced, including standard technologies such as HDBaseT, and also OEM-specific solutions. In general, more and more signals are being passed via the IP network, or at least via standard Cat5/6 cable, which provides lower costs and more flexibility w.r.t. design and installation.

4. Solutions

4.1 Control rooms

Once the business requirement has been thoroughly documented, the following factors and criteria need to be considered:

- ❖ Outputs required from the control room (business value)
 - Threats and risks the system will have to deal with
 - Types of media, inputs, sensors to be catered for in the control room
 - Define requirements for monitoring platform
- ❖ Extent to which software functionality can be used to relieve operator burden (e.g. virtual guard tours)
 - Video analytics, automated alarms, statistics (e.g. people counting)
- ❖ Physical considerations such as location, room size, viewing distances, access control, lighting
 - User ergonomics (lighting, furniture, workstations)
- ❖ Duty cycle: 24/7 vs. office hours only
- ❖ Communications: primary and backup links
 - Bandwidth required to/from the control room
 - Remote control and access, sharing of information
- ❖ Storage and archiving of video footage
- ❖ Backup power in case of power failure
- ❖ Service and support for all components of the solution (e.g. video wall, cameras, security) with defined SLA

4.2 Digital signage

- ❖ Business value for the solution (goal to accomplish)
- ❖ Target audience

- ❖ Types of content
- ❖ Management (device and content)
- ❖ Support resources (media, skills, infrastructure)

Annex C: Requirements Checklists

In order to support Departments in specifying the appropriate technology solutions and devices, SITA has prepared Requirements Checklists for specific types of solutions. These can be downloaded from www.sita.co.za/prodcert.htm and filled in to document business needs.



Requirements Checklist: Data/Video Projector

This checklist is to be used by Departments to document business requirements when publishing a request to industry for a **projection** solution. The checklist will help define the business requirements, enabling suppliers to provide informed solution designs and bid responses.

Business requirements				
For example: "Projector for a training venue that seats 50 students." Or "Portable projector for day-to-day presentations – must fit in existing laptop bag." Or "High-end projector for large auditorium; mounted on ceiling. Full presentation audio included."				
Functional requirements (tick with ✓ where applicable)				
Portability:		Devices to connect:		
Fixed/permanent installation (e.g. auditorium)	<input type="checkbox"/>	PC / laptop	<input type="checkbox"/>	Smartphone/tablet <input type="checkbox"/>
Shared projector (carried between venues)	<input type="checkbox"/>	Interactive whiteboard	<input type="checkbox"/>	USB flash drive <input type="checkbox"/>
Ultraportable (regular travel, small projector)	<input type="checkbox"/>	Video switcher	<input type="checkbox"/>	Videoconference codec <input type="checkbox"/>
Type of information to be projected:		Venue lighting constraints:		
Presentations	<input type="checkbox"/>	Controlled lighting (no outside/ambient light interference)		<input type="checkbox"/>
Documents (Word, PDF)	<input type="checkbox"/>	High ambient light interference (e.g. school classroom)		<input type="checkbox"/>
Training material	<input type="checkbox"/>	Typical boardroom (bright ambient light)		<input type="checkbox"/>
Images (photos, diagrams)	<input type="checkbox"/>	Venue size/throw distance:		
Video	<input type="checkbox"/>	Large venue (e.g. auditorium, large training room)		<input type="checkbox"/>
High-detail data (spreadsheets, reports, project plans, engineering diagrams)	<input type="checkbox"/>	Typical meeting room/boardroom/classroom		<input type="checkbox"/>
		Small venue with short throw distances		<input type="checkbox"/>
Audio requirements:		Resolution & aspect ratio: (if technical info is available)		
Presentation audio (occasional)	<input type="checkbox"/>	XGA 1024x768 (4:3)	<input type="checkbox"/>	FullHD 1920x1080 (16:9) <input type="checkbox"/>
Amplification of presenter's voice	<input type="checkbox"/>	WXGA 1280x800 (8:5)	<input type="checkbox"/>	WUXGA 1920x1200 (16:10) <input type="checkbox"/>
Full audio for video	<input type="checkbox"/>	WXGA 1366x769 (16:9)	<input type="checkbox"/>	UHD 3840x2160 (16:9) <input type="checkbox"/>
Site inspection required? (for fixed installations)				Yes <input type="checkbox"/> No <input type="checkbox"/>
Additional requirements (list or describe as needed/applicable)				
Special display requirements, e.g. 3D/stereoscopic content				
Accessibility for maintenance and repairs (e.g. mounted on high ceiling)				
Estimated throw distance from screen to projector				
Number and type of inputs required: HDMI, VGA, DP, USB, wireless (Android/iOS/Windows), MHL, HDBaseT				
Network connection required (management link for installed projectors, wireless, etc.)				
Video and audio sources to integrate (e.g. videoconference system, amplifier and speakers, Media player, room PC, DSTV)				
Control system: automated screen and projector power-on required?				
Projection screen: size, ceiling/wall-mount, motorised, rear-project, etc.				



Requirements Checklist: AVCT Solution

This checklist is to be used by Departments to document business requirements when publishing a request to industry for an AVCT solution. The checklist helps to define the parameters and goals for the solution, enabling integrators to provide informed designs and suitable bid responses.

Summary of business requirement			
For example: "Weekly 2-hour video/audio conference with 6 branch offices around the province, since travelling costs are too high. Presentation material must be remotely viewable, as well as physical exhibits that must be shown to the group. Meetings must be recorded and archived for audit and communication purposes."			
Date of delivery: required finalisation of solution			
Type of venue (primary classification/use case)			Tick with ✓
Boardroom / meeting room	<input type="checkbox"/>	Office	<input type="checkbox"/>
Auditorium	<input type="checkbox"/>	Classroom / training room	<input type="checkbox"/>
Functionality required			Tick with ✓
PC presentations (in-room)	<input type="checkbox"/>	Audio playback (e.g. podcasts, speeches)	<input type="checkbox"/>
PC presentations (from remote venue)	<input type="checkbox"/>	Video playback (e.g. streaming, satellite TV)	<input type="checkbox"/>
Videoconferencing	<input type="checkbox"/>	Audio recording (e.g. meetings)	<input type="checkbox"/>
Audio conferencing	<input type="checkbox"/>	Video recording (e.g. meetings, training, conferences)	<input type="checkbox"/>
Changes to room lighting	<input type="checkbox"/>	Soundproofing/dampening	<input type="checkbox"/>
Room automation (e.g. control lighting, curtains, device power, etc.)	<input type="checkbox"/>	Infrastructure upgrades to support AVCT solution (e.g. air conditioning, network)	<input type="checkbox"/>
Technical requirements			Tick with ✓
Site inspection required? (recommended for complex solutions)		Yes	<input type="checkbox"/>
		No	<input type="checkbox"/>
Number of venues to connect (audio and video conferencing solutions)			
List types of media that will be used in the meetings and conferences (e.g. video, documents, reports, presentations)			
In-room audio system:		Presentation	<input type="checkbox"/>
		Video/audio conference	<input type="checkbox"/>
		Delegate	<input type="checkbox"/>
Video standards/systems/cloud applications to integrate:			
H.323 VC	<input type="checkbox"/>	Jitsi	<input type="checkbox"/>
Teams	<input type="checkbox"/>	Zoom	<input type="checkbox"/>
Other: _____		<input type="checkbox"/>	
Network connectivity required (WAN / WLAN / WWAN)			
Video and audio sources to integrate (e.g. VC, Media player, Laptop, DSTV)			
Describe envisioned display setup (e.g. Projector, LCD, Video wall, Interactive, combinations)			
Number of laptop and other inputs required. Also specify device types envisioned (e.g. PC/Mac/Linux)			
Wireless presentation from mobile devices			

Annex D: Technology Domain Details and Technical Specifications

All information regarding the Items and Categories established via the Technology Certification Process is available as part of the detail technical specifications. Categories, Items and specifications will change as the domain and end-user requirements evolve. This information, as well as the latest Tech Update and detail technical specifications can be downloaded from the SITA Product Certification web page at www.sita.co.za/prodcert.htm.

Bundled and Optional Accessories

Since the scope of transversal AVCT solutions is so wide, it is impractical for this Guide to list all possible combinations or address or possible scenarios. Therefore, a general list of accessories that **must** be delivered as part of any AVCT solution is provided instead. Any additional accessories, services or components must be addressed in the RFP/RFQ, and included in the solution design by the supplier.

Accessories, components and services that must typically be bundled to ensure a complete, fully working solution according to the client's requirements and standards include:

- ❖ All required power and signal cables
- ❖ Any component required for proper functioning of the system or a component (e.g. camera and codec in a VC solution)
- ❖ All interfaces required by the specified solution
- ❖ Remote or cabled controls (if applicable)
- ❖ Batteries (if applicable)
- ❖ Any software application or driver required for proper functioning of the system or a component
- ❖ Stands, brackets, mounts or cable ducts (e.g. for speakers or displays, if applicable)
- ❖ Standard warranty and SLA as specified
- ❖ Proper design and planning of the solution
- ❖ Delivery and installation
- ❖ Commissioning
- ❖ Basic introductory training on the system

Optional accessories and components that must be stipulated by the client or proposed by the supplier:

- ❖ Upgrades to the base system
- ❖ Additional functions or upgrades of functionality (e.g. resolution, storage, connectivity)
- ❖ Additional inputs or sources
- ❖ Additional services such as consultation, advanced training or operations
- ❖ Migration of data from previous system
- ❖ Installation of additional software or functionality not included in the primary solution
- ❖ Any other component, accessory, upgrade or service not specified in the AVCT Technical Specifications at www.sita.co.za/prodcert.htm.

Annex E: Abbreviations, Terms and Definitions

Abbreviations

AV	Audiovisual
AVCT	Audiovisual Communications Technology
AVIXA	Audiovisual and Integrated Experience Association (formerly InfoComm)
BEE	Black Economic Empowerment as defined by Act 5 of 2000.
DP	DisplayPort
DR	Disaster recovery
DVD	Digital Versatile Disc
GITOC	Government IT Officers Council
H.320	VC over ISDN networks
H.323	VC over IP networks
HDMI	High Definition Multimedia Interface
ICT	Information and Communications Technology
IEC	International Electrotechnical Commission
IPT	IP Telephony
IpvX	Internet Protocol version (e.g. IPv6)
ISO	International Standards Organisation
ISV	Independent Software Vendor
IT	Information Technology
LAN	Local Area Network
LCD	Liquid Crystal Display
LFD	Large Format Display, a professional display designed for enterprise use, typically with higher duty cycle and system management capabilities
MCU	Multi-Conferencing Unit, a video bridge that connects multiple VC end-points
MIOS	Minimum Interoperability Standards
MISS	Minimum Information Security Standards
MoA	Memorandum of Agreement
MTBF	Mean Time Before Failure: measured for entire system with all mandatory components
MTTR	Mean Time To Repair: measured with engineer on-site with spares in-hand; swap-out also acceptable
NAT	Network Address Translation
NBD	Next business day
NIST	National Institute of Standards and Technology
NT	National Treasury
OEM	Original Equipment Manufacturer, or properly delegated legal entity representing a product brand in South Africa. Unless noted otherwise, the term includes the concepts of Brand owner and Legal entity (see Brand owner, Legal entity)
OS	Operating system
OSS	Open Source Software

PC	Personal Computer, including desktop and mobile systems
PCD	Personal Computing Device, one of the certified Technology Domains
PCI	Peripheral Component Interconnect
PFMA	Public Finance Management Act
PPPFA	Preferential Procurement Policy Framework Act
QoS	Quality of Service
RAM	Random-Access Memory
RAS	Reliability, Availability and Serviceability
RFQ/P/B	Request for Quotation/Proposal/Bid
ROE	Rate of Exchange
RSA	Republic of South Africa
SACSA	South African Communications Security Agency
SANS	South African National Standard
SCM	Supply Chain Management
SC-ITSM	GITOC Standing Committee on IT Service Management
SIP	Session Initiation Protocol
SITA	State Information Technology Agency
SLA	Service Level Agreement
SMME	Small, Medium and Micro Enterprise as defined and interpreted by Act 102 of 1996.
SSA	State Security Agency
TAS	Technology Advisory Services
TCO	Total Cost of Ownership: all costs associated with an ICT solution, including capital, labour, services, running costs, etc.
TCP	Technology Certification Process
TTT	Technical Task Team, a sub-committee of the GITOC SC-ITSM
UC	Unified Communications
USB	Universal Serial Bus
UPS	Uninterruptible Power Supply
VAT	Value Added Tax
VOIP	Voice Over IP
WAN	Wide Area Network
WLAN	Wireless LAN (IEEE 802.11), also known as WiFi

Terms and Definitions

Term	Definition
Accessory	A component or subcomponent that complements or increases the capability of the offered solution. This could include software, additional parts, auxiliary products, etc.
Add-on	Component or product that complement or increase the capability of the offered product.
Base Price	The total price for all components included the Base System as specified in Paragraph A of the technical specification (Standard Components in the Excel spreadsheet).

Term	Definition
Base system	All components included the Base System as specified in Paragraph A of the technical specification (spreadsheet).
Brand owner	The legal entity representing a product in South Africa. Legal entity status implies that the supplier is not the manufacturer of the product. The brand owner takes ultimate responsibility for branding, marketing, distribution channels and product direction. Single point of contact for Government (see Legal entity, OEM).
Category	A collection of technology Items (products) representing a functional area, such as Projectors, Audio Conferencing, Recording, each containing a collection of Items. (see Item).
Channel partners	All enterprises that operate in the market as small and medium sized enterprises. An example of a channel partner is a value-added supplier that provides industry-specific software solutions and services.
Codec	Coder/decoder for AV signals
Consumables	Components that have a defined life span (e.g. based on number of pages or hours used) or are consumed during the normal operation of the supplied product, including printer ink, toner, photoconductors, etc., or lamps, batteries, belts, rollers, maintenance kits, etc.
Distributor	Official channel warehousing and distribution, logistics partner appointed by the brand owner.
Component manufacturer	A third-party manufacturer of ICT components that form the basis of complete systems or solutions supplied to Government by OEMs. This includes, for example, CPU manufacturers such as AMD and Intel, drive manufacturers such as Seagate and Western Digital, or software vendors such as Microsoft, Red Hat or VMware. Components from third-party manufacturers cannot be certified directly via the TPC, but are offered by OEMs as part of a complete solution.
Installation	Unpack system, configure, plug into power and network, integrate into venue and ensure proper operation. Installation excludes migration of software and data from previous system.
Installation charge	The price charged by the OEM's partner to install the product in the client environment. This includes unpacking, connecting cables, power-up and user acceptance. May be required as part of the base solution price, depending on solution category or end-user requirement.
Integrator	A skilled and experienced supplier who is able to integrate the new solution into existing infrastructure or make the solution work with other solutions.
Item	Lowest-level technology subdivision in the technology domain as represented in the technical specification, e.g. VC_Soft, Proj_Basic. A product must be offered at Item level. Multiple products may be offered for each Item. Items are organised into Categories, e.g. Conferencing, Display Devices, Recording, etc. (See Category).
Legal entity	As defined by SA law, the sole OEM-appointed representative for a product brand in SA. Not necessarily the importer or distributor. (see Brand owner, OEM).
Minimum requirements	In terms of the technical specification, the lowest level of capability that will perform the required function as defined in an RFQ/RFP or client requirement. Exceeding this level is allowed, but not reaching this level will result in disqualification. (See Minimum specifications).
Minimum specifications	A specification representing a minimum technical capability. Improving on minimum spec is allowed at all times, while not complying to minimum spec will result in disqualification. For example, if 4GB storage is specified, 8GB would be accepted, but 2GB would not be. Suppliers must at all times configure offered products to meet minimum specifications (See Minimum requirements).

Term	Definition
Model change	Replacement of an existing product by a new product due to the existing product having reached end of life, or no longer meeting requirements. A formal SITA process must be followed by OEMs to request and perform a model change.
OEM	Original Equipment Manufacturer, or properly delegated legal entity representing a product brand in South Africa.
Repair	Any action taken by the OEM or service partner to ensure that a working solution is available to the client within the specified turnaround time. This can include physically repairing the system on-site, or swapping out the system or a faulty component.
Required	What the Client needs as a complete, working solution. Due to the transversal nature of the technical specification, detailed requirements cannot be addressed fully, but must be defined based on end-user requirements on a per-project basis.
Service zones	<p>Geographical areas within South Africa where product and service delivery are required. These areas are designated as Zone A, B or C, depending on proximity to large centres. The zones are defined as follows, along with the required business-hours SLA:</p> <p>Zone A – Next business day repair: The entire Gauteng Province, as well as in or within 50km from major cities or Provincial capitals, i.e. Cape Town, Gqeberha, Buffalo City, Bisho, Bloemfontein, Durban, Mmabatho, Polokwane, Kimberley, Pietermaritzburg, Ulundi, eMalahleni and Mbombela.</p> <p>Zone B – 2 business day repair: In or within 50km from major towns, i.e. Naledi (Welkom), Umtata, George, Makhanda, Thohoyandou, Madibeng, Klerksdorp, Ermelo, Standerton, Ladysmith, Oudtshoorn, Richards Bay, Saldanha, Upington, Worcester, Potchefstroom and Beaufort West.</p> <p>Zone C – 3 business day repair: All towns and rural areas not included in Zone A and Zone B where services may be required. Zone C includes the entire country not covered by Zone A or B.</p> <p>Examples of exclusions to the on-site service requirement include equipment deployed or used on ships or other vehicles, and areas outside the immediate borders the RSA.</p>
Supplier	Final value-added step in the channel before the end user. Compare with Solution provider
“Support for”	A capability that a product must enable, but must not necessarily have built-in or included in the base configuration without an optional accessory or upgrade.
Tech Update	Periodical refresh of technical specifications during as Government requirements change.
Technical support	A technical service rendered for out-of-warranty work, or work related to, but not covered by, the services specified as included with offered products.
Technology management	A process by which the technology specification is updated, upgraded or “refreshed” to reflect industry advancement or changes in user requirements over a period of time. The process is managed by SITA in conjunction with clients, OEMs and other role players.
Technology-based TCO	Measurable costs over a defined period of time that can be directly associated with the evaluated technology or equipment (e.g. capital, maintenance, support, installation, power and cooling, consumables, etc.)
Transversal Contract	<p>A term or period contract established for more than one Government department or public body, with one or more approved suppliers for the supply of information technology goods or services over a period, required.</p> <p>The purpose of a transversal Contract generally can be stated as addressing 80–90% of Government requirements, reducing the need for <i>ad hoc</i> tenders. Transversal Contracts exclude niche or special requirements by definition, and there will consequently always be a need for some <i>ad hoc</i> Contracts.</p>

Term	Definition
Upgrades	Components or subcomponents that have the purpose of expanding the capacity of the offered product, including RAM, hard disks, CPUs, etc. Upgrades are typically expansions that can be done inside the system chassis (e.g. printer duplexer or additional RAM). “Fork-lift” replacements of systems are not seen as upgrades. Upgrades are not necessarily after-market operations. A base system may be upgraded with additional capacity at purchase time.
Warranty	All certified products must be warranted to be free of material and workmanship defects for the period specified in the Item technical specification. Any defects of this nature will be rectified (via repair or replacement) at the expense of the supplier under the terms specified in the Item technical specification, while maintaining minimum system availability as specified. All parts, labour and travel costs will be covered by the supplier for the extent of the warranty period. The warranty period commences from date of delivery of the product in good working order at the end-user’s premises. Consumables are not covered under the warranty, except for a reasonable expectation of performance per component (e.g. batteries). Damage due to shipping is covered under the warranty. Preventative maintenance should be done by Suppliers to ensure that SLAs are maintained.
Warranty and support	<p>As per detail technical specifications, the following SLA conditions apply to the AVCT domain:</p> <p style="padding-left: 40px;">Standard warranty and support included with all supplied systems and products (as defined and qualified per technology category/Item): Countrywide on-site with full coverage (parts and labour for entire Item, upgrades and accessories) during office hours (7:30 - 17:00), with next business-day repair (according to Zone definitions) for 3 years (36 months) from date of delivery.</p> <p>Certain AVCT categories that are designed for a longer lifecycle (e.g. display walls) are specified with a longer SLA (typically 5 years).</p>