






Document Title	TITLE: Security Upgrades Specifications – <b>Building Pelstore Security System (AC&amp;D)</b>
Number	SS-PROJ-SPE-0002
Date	31 October 2017

**APPROVAL & DISTRIBUTION**

	NAME	SIGNED	DATE
Prepared	Thwane M Position: Manager Security Systems, SSD		31-10-2017
Reviewed	Phalandwa D Position: Senior Security Systems Technician, SSD		31-10-2017
Accepted	Mostert M Position: Acting Senior Manager Security Services SSD		
Accepted	Singh S Position: Manager SANDIA Security Upgrades Project PE		31/10/17
Approved	Akortia C Position: Acting Senior Manager, NLM		31/10/2017
Distribution	NCS, SSD and PE Records and Quality		

## Abbreviations

CAS	Central Alarm Station
SAS	Secondary Alarm Station
SSD	Security Services Department
HS	High Spec
PPS	Physical Protection System
MP	Mega Pixel
CCTV	Close Circuit Television
IR	Infra-Red
WDR	Wide Dynamic Range
EG	Example
URI	Universal Reader Interface
POE	Power Over Ethernet
SIT	Site Inspection Test
SAT	Site Acceptance Test
POE	Power Over Ethernet
IP	Internet Protocol
SHEQ	Safety, Health, Environment and Quality
AC	Alternating Current
SABS	South African Bureau of Standards
OHSA	Occupational Health and Safety ACT
BOQ	Bill of Quantities
L	Length
Q	Quantity
LC	Local Controller
STD	Standard
NEA	Nuclear Energy Act
NECSA	Nuclear Energy Cooperation of South Africa
MB	Marshalling Box
TBM	To Be Measured

## Table of Contents

<b>APPROVAL &amp; DISTRIBUTION</b>	<b>1</b>
1. INTRODUCTION	4
2. BACKGROUND	4
3. PURPOSE	4
4. CURRENT INFRASTRUCTURE	4
5. SUPPLY AND INSTALLATION SCOPE OF WORK	5
5.1 INFRASTRUCTURE BACKBONE	5
5.2 SURVEILLANCE CAMERAS	6
5.3 ACCESS CONTROL	7
5.4 INTRUSION DETECTION	8
6. REQUIREMENTS	9
6.1 NECSA REQUIREMENTS	9
6.2 TECHNICAL REQUIREMENTS	10
6.3 ADDITIONAL REQUIREMENTS	10
7. SCOPE EXCLUSIONS	10
8. WARRANTY PERIOD	11
9. MATERIAL SPECIFICATIONS AND BILL OF QUANTITY	11
10. CONCLUSION	14

## 1. INTRODUCTION

Necsa is a state owned company and its mandate under the Nuclear Energy Act (NEA) includes undertaking and promoting research and development in the field of nuclear energy and radiation sciences and technology and, subject to the Safeguards Agreement, to make these generally available. **In line with section 29 of NEA, the act provides that the installations, sites, premises and land belonging to or under the control of Necsas are restricted areas. Therefore Necsas may make any arrangements it considers reasonably necessary for the proper protection of the site.**

## 2. BACKGROUND

NECSA is in the process of rolling out an integrated Cardax access control system and DVTEL surveillance system within various facilities. These upgrades are aimed at aligning the Necsas Physical Protection System (PPS) with international standards and norms pertaining to nuclear facilities. The Contractor shall commit to works specified herein for the upgrade of the security system at Necsas gates. These works shall include the supply, installation and commissioning as per Necsas requirements, manufacturer's guidelines, statutory requirements (e.g. OHSAS/SABS 0142) and best practices.

## 3. PURPOSE

The purpose of this specification is to stipulate all the requirements that the Contractor shall meet in order to provide a fit for purpose turnkey solution. This shall include the specification of equipment to be supplied, installation practices and adherence to the design, system commissioning and Site Acceptance Test.

## 4. CURRENT INFRASTRUCTURE

Necsa is in a process of upgrading physical and electronic security system at Pelstore facility in Pelindaba. Necsas security system currently runs on two platforms, the surveillance platform (**Dvtel Latitude version 7.0/Plugin Version 3.2.1.1 System**) and integrated access control, and intrusion detection system (**Gallagher version 7.40**). Pelstore facility shall be equipped with new distribution switch which shall connect Pelstore access switches to the main server room

located in the main security control room or Central Alarm Station (CAS). Where more clarification is sought by the contractor in terms of the existing infrastructure, the Contractor shall notify the Security Project Manager or Security System Manager. The contractor shall not be permitted to upgrade any software or hardware out of this scope on the current infrastructure without written permission from the Security System Manager.

## 5. SUPPLY AND INSTALLATION SCOPE OF WORK

### 5.1 Infrastructure Backbone

The new security system shall consist of access control, intrusion detection and surveillance system.

The Contractor shall:

- Connect all edge devices to the Dvtel/Gallagher servers through Power over Ethernet (POE) access switch to be installed at Pelstore security duty room office.
- Connect the access network switch to the Dvtel/Gallagher server through new distribution switch to be located at Pelstore security duty room office. The daisy chain of two or more access switches shall not be permitted unless authorised in writing by the technical competent authority (Client).
- Supply all equipment and devices including interface devices (GBIC) and media convertors necessary to integrate the new infrastructure into the existing infrastructure.
- Install all 24-port and 10-port POE+ Ethernet switches and mount inside 21U and 9U racks located at Pelstore security duty room office and battery rooms' passage.
- Pull the 8 pair single mode armoured fibre from security office duty room and terminate at predetermined positions along 500 m long battery room's passage.
- Install the 9U racks (back open) and 10-port network switches at the armoured fibre terminations.

- Connect all cameras in Pelstore facility battery rooms through the 10-port switches.
- Install the 24-port switch in the security office duty room.
- All the alarms requirements and names shall be given to the Contractor at a later stage

There shall be no installations to be carried out inside the battery rooms.

## 5.2 Surveillance Cameras

All surveillance cameras shall be installed with a field of view approved by the Security System Manager or delegated competent authority. The surveillance cameras shall be of the IP bullet camera type.

The contractor shall:

- Connect all cameras in the battery room passage to the Dvtel server through 10-port POE switch to be installed in the 9U wall mount cabinets.
- Connect all three switches in three different cabinets to the distribution switch in the security duty room office through a single mode 8-pair armoured fibre. All cameras power shall be POE and supplied by the Ethernet network switch located both at the Pelstore duty room office and battery room passage. Necsa Security shall furnish the Contractor with IP addresses and contractor shall be responsible for cameras configuration including IP allocation.
- Install camera data cables within rigid metallic housing (Bosal piping). All bends, boxes, and access points shall be of the same quality and type of rigid metallic housing. Cameras shall be integrated and operated by the **Dvtel Latitude 7.0 /Plugin Version 3.2.1.1 System**. All cameras shall be interpretable to Dvtel current platform and be configured within a tree appearing on the Dvtel system. The contractor shall also be responsible for setting up a tile layout in accordance with the Security System Manager or delegated competent authority approval. The contractor shall include camera position and IP addresses on the as-built drawing to be submitted at hand over.
- The camera shall provide a fail alarm on the Cardax system when not available. The priority of this alarm shall be for the System Manager or delegated competent authority discretion. All cameras shall be focused in

accordance with the most optimal field of view. In terms of the as-built document, the contractor shall provide a test report for each camera, configuration, IP address and description of the field of view. In addition all cameras shall be named on the system in accordance with the Security System Manager or delegated competent authority approval.

- All the alarms requirements and names shall be given to the Contractor at a later stage

### 5.3 Access Control

Access control to the various rooms within the Pelstore facility shall be controlled by the Cardax access control system. This system shall integrate all biometric readers into the existing Cardax system. The access control devices shall be integrated into the Cardax system using devices such as (but not limited to) Universal Reader Interface (URI) and Cardax HS controllers. In addition to the before mentioned, the contractor shall be responsible for the following in terms of the access control system:

- Supply and install of biometric readers
- Installation of all equipment necessary to integrate the access control equipment into the Cardax system
- Setup of access groups and access times in agreement with the Security Systems Manager or delegated competent authority
- Integrate access devices such as Magnetic Locks (Maglocks), Balanced Magnetic Switch (BMS), no touch exit buttons and break glass unit into the Cardax system
- Provide an As- built diagram illustrating all access devices, addresses and description of their physical location
- Setup access zones and access groups in agreement with the facility manager or competent authority.
- Upgrade all biometric readers with the latest approved firmware which has Gallagher bio license.
- Install all cables within rigid metallic housing (Bosal piping).

#### **5.4 Intrusion Detection**

The intrusion detection system shall include all detection devices (e.g. electromechanical switches such as tampers relays, mains fail relays, PIR and BMS. All sensors shall provide a tamper, open circuit tamper and closed circuit tamper alarm. The priority of these (High/Medium/Low) shall be configured in agreement with the competent authority. All alarms shall be allocated an alarm zone that shall be controlled by means of an alarm panel. In terms of specific equipment specifications for the intrusion detection system, the following shall apply:

- Install all Passive Infrared (PIR) Sensors of the dual technology type (Infrared technology and microwave)
- Install dual technology PIR sensors in term of recommended manufacturers specification in order to obtain the maximum and effective detection range
- Ensure that all door sensors contacts have a Balanced Magnetic Switch (BMS)
- Ensure that all equipment and component cabinets are equipped with mains fail relays, in case of power failure alarm shall be sent to CAS and SAS
- Install all equipment racks and cabinets with tamper switches , alarm will be sent to CAS and SAS in case of intrusion
- Ensure that the first point of connection found within a splice/joint box has a tamper switch.
- Ensure that each intrusion detection alarm shall automatically call up an associated camera (or cameras) within the Cardax system showing the pre and post alarm view
- Ensure that the intrusion detection configuration include the integration of a site map illustrating all devices such as intrusion detection and cameras
- Install the panic button in a security control room, in a location identified by Client or competent personnel
- Configure the site map to distinguish between armed and disarmed alarm zones
- Ensure that both battery room's passage entries and security duty room office are controlled by means of an alarm terminal.



- The as-built document shall include the test report and configuration of all intrusion detection devices
- Integrate all intrusion detection devices into the Cardax system by means of an alarm board, URI or controller expansion card

## 6. REQUIREMENTS

### 6.1 NECSA REQUIREMENTS

The Contractor shall, before undertaking any site works, adhere to the following:

Description	
<b>SHEQ Induction</b>	All Contractor staff that shall be performing on site works shall be SHEQ inducted. This shall be arranged with the project manager prior to the start of the project
<b>Work Permit</b>	The Contractor shall be granted a work permit by the facility manager prior to the commencement of daily works
<b>Safety File</b>	The Contractor shall have a safety file approved by the Necsa SHEQ representative. In addition the contractor shall have a safety officer.
<b>INS 0800</b>	The INS 0800 process shall be initiated and completed by the Necsa representative.
<b>Company Screening</b>	A positive company screening is required in order to perform any works. The security vetting office shall be furnished with all director/company owner identity documents and any other particulars they would require in order to do a company screening.
<b>Individual screening</b>	The Contractor shall undergo Necsa security. Failure to obtain positive security clearance the personnel shall not be permitted to work at Necsa site.

## 6.2 TECHNICAL REQUIREMENTS

Description	
<b>Gallagher Accreditation</b>	Contractor shall be a Gallagher channel partner and Lead technician assigned to this project shall be access technician certified.
<b>Dvtel Accreditation</b>	Contractor shall be a FLIR channel partner and lead technician assigned to this project shall be Dvtel Certified Technician.

## 6.3 ADDITIONAL REQUIREMENTS

The Contractor shall include in a quote, the decommissioning of old access control system, intrusion detection and analogue cameras at Pelstore facility

The contractor shall provide the following:

- Training for Necsa technical personnel on operation, troubleshooting, system set up and maintenance.
- The handover document shall be one bound copy (hard copy) and one soft copy and shall compose of the as built one line drawings for Gbus, network and fibre cables. It will also have camera, PIR, components cabinets and access readers' position. Quality of the document must be satisfactory and must be complete, files not meeting these requirements shall not be accepted.

## 7. SCOPE EXCLUSIONS

The contractor shall not be responsible for any electrical works i.e. from distribution board to the isolator, Necsa shall provide. The supplier shall be responsible for electrical works form the isolator to the load and only suffix (2-core and earth) power cable shall be used. The suffix shall be terminated on the termination block (Klipon terminals) inside the load box or cabinet.

The contractor shall not be responsible for the allocation of IP addresses and configuration of network switches. The contractor shall provide a table of devices requiring an IP address.

## 8. WARRANTY PERIOD

The contractor shall provide a three year warranty period on all supplied and installed equipment and devices. In addition, all workmanship provided for by the contractor shall be for one year warranty. Any equipment that is found to be faulty or defective and not because of human error or any act of God shall be swapped out within two business days.

## 9. MATERIAL SPECIFICATIONS AND BILL OF QUANTITY

Material	Qty	Specification
<b>Sigma Lite LCD Bio Finger Reader</b>	3	<ul style="list-style-type: none"> <li>▪ Morpho reader with up to 500 users -<b>SAF-SIGMA-L-PLUS</b></li> <li>▪ 26 bits Wiegand IN for external card reader</li> </ul>
<b>Gallagher Software reader upgraded Licence</b>	3	<ul style="list-style-type: none"> <li>▪ Gallagher reader Bio reader upgrade software Licence</li> </ul>
<b>Panic Button</b>	1	<ul style="list-style-type: none"> <li>▪ Panic Latch Push Button</li> </ul>
<b>Gallagher Controller</b>	3	<ul style="list-style-type: none"> <li>▪ Controller C6000 HS</li> </ul>
<b>Gallagher URI</b>	3	<ul style="list-style-type: none"> <li>▪ Universal Reader Module – Wiegand</li> </ul>
<b>Gallagher 8 channel I/O board</b>	1	<ul style="list-style-type: none"> <li>▪ Cardax 8 channel Interface board</li> </ul>
<b>Gallagher 24 channel I/O board</b>	3	<ul style="list-style-type: none"> <li>▪ Cardax 24 channel Interface board</li> </ul>
<b>Gallagher Arming/Disarming terminal.</b>	4	<ul style="list-style-type: none"> <li>▪ Remote Arming Terminal - Charcoal</li> </ul>
<b>Bullet Camera</b>	18	<ul style="list-style-type: none"> <li>▪ 2.1 MP Network Night Vision bullet Camera –N133-233</li> <li>▪ IR night Vision Range 100ft/30m in total darkness</li> <li>▪ 1/1.9"CMOS, 4-8mm motorized focal very focal lens</li> <li>▪ With mounting brackets</li> </ul>
<b>Camera License</b>	22	<ul style="list-style-type: none"> <li>▪ Single (1) Channel Flir/Dvtel Latitude camera Licence</li> </ul>
<b>Mag Lock</b>	8	<ul style="list-style-type: none"> <li>▪ 300 KG Mag lock complete with all mounting accessories.</li> </ul>
<b>Door Closer</b>	6	<ul style="list-style-type: none"> <li>▪ Heavy duty door closer.</li> </ul>
<b>Break Glass Units</b>	7	<ul style="list-style-type: none"> <li>▪ Green resettable call point door release.</li> </ul>

		<ul style="list-style-type: none"> <li>▪ Green plastic size 3.4 x 3.4 x 2 (LxWxH).</li> <li>▪ Frequency 45/65HZ</li> </ul>
<b>No Touch</b>	3	<ul style="list-style-type: none"> <li>▪ No Touch Exit button complete with all accessories</li> <li>▪ IR sensor</li> <li>▪ Durable stainless steel</li> <li>▪ Detection range 01 – 10cm</li> <li>▪ Twin LED indicators for sensor standby or approached</li> <li>▪ PT-500: 115mm (L) x 70(W)x 35mm (D)</li> <li>▪ Operational temperature -20 degrees – 55 degrees</li> </ul>
<b>Cabinet temper switch</b>	6	<ul style="list-style-type: none"> <li>▪ Normal open/close temper switch</li> </ul>
<b>Mains fail relay</b>	6	<ul style="list-style-type: none"> <li>▪ 220 V ac mains fail relay</li> </ul>
<b>Door Sensor Contact</b>	17	<ul style="list-style-type: none"> <li>▪ Must balance magnetic door contact.</li> <li>▪ Contact rating 250MA at 12V or 250MA at 24V.</li> <li>▪ Indoor and outdoor use.</li> <li>▪ Complete with all mounting accessories.</li> </ul>
<b>PIR – Motion Detection</b>	40	<ul style="list-style-type: none"> <li>▪ Digital Dual element sensor, 12 M X 12M wide angle motion detection complete with all mounting accessories.</li> <li>▪ Must have built in temper.</li> <li>▪ 110 ° viewing angle.</li> </ul>
<b>Components Power supply</b>	10	<ul style="list-style-type: none"> <li>▪ O\P 12V DC 6-8A with Back battery</li> <li>▪ Dan rail mount with battery backup connection.</li> </ul>
<b>Battery</b>	10	<ul style="list-style-type: none"> <li>▪ 12V,7A/hr</li> </ul>
<b>UPS</b>	4	<ul style="list-style-type: none"> <li>▪ 3000VA</li> <li>▪ 220 VAC 50HZ - 6 outputs.</li> <li>▪ It must fit in the camera box.</li> <li>▪ NECSA recommends PSS it is largely used at NECSA site and has proven to be stable.</li> </ul>
<b>Equipment Cabinet</b>	1	<ul style="list-style-type: none"> <li>▪ 21U Free standing Cabinet with wheels</li> <li>▪ Steel Door</li> </ul>
<b>Network Switch</b>	3	<ul style="list-style-type: none"> <li>▪ HP - 24 -port Gigabit POE+.</li> <li>▪ Managed network switch.</li> <li>▪ 10/100/1G /J9727A / (2920-24G-POE+)</li> <li>▪ Rack mount</li> </ul>
<b>Transceiver</b>	3	<ul style="list-style-type: none"> <li>▪ Single Mode Gigabit Ethernet SX mini-GBIC SFP Transceiver - Cisco</li> </ul>

		▪
<b>Transceiver</b>	3	▪ Single Mode Gigabit Ethernet SX mini-GBIC SFP Transceiver - HP
<b>Switch Cabinet</b>	3	▪ 9U Wall Mount back open Cabinet
<b>Components Box</b>	3	▪ C200105 Gallagher Dual Cabinet with Power supply, Cool Grey.
<b>Strong Door (emergency doors, duty room and entrance door)</b>	6	<ul style="list-style-type: none"> <li>▪ G1 38mm BRG Double antibandit doors</li> <li>▪ Door size 2040/800mm</li> <li>▪ 100/50/3mm door frame</li> <li>▪ Wall opening 2100/970mm</li> <li>▪ One door shall have a lock and the other shall have latch lock on top and bottom of the door</li> <li>▪ D-Type Stainless steel pull type handle with euro cylinder 5 pin double throw lock (both sides of the door)</li> <li>▪ 32/32mm M/S rebate</li> <li>▪ Aluminium roton type hinge</li> <li>▪ Door to the weather station must be equipped with emergency crash bar and must open to the outside</li> <li>▪ Must be equipped with heavy duty door closer</li> </ul>
<b>Double Entry Strong door</b>	1	<ul style="list-style-type: none"> <li>▪ G1 38mm BRG Double antibandit doors</li> <li>▪ Door size 2040/800mm</li> <li>▪ 100/50/3mm door frame</li> <li>▪ Wall opening 2100/970mm</li> <li>▪ Bullet proof door view frame 480/280mm for both doors</li> <li>▪ One door shall have a lock and the other shall have latch lock on top and bottom of the door</li> <li>▪ D-Type Stainless steel pull type handle with</li> </ul>

		euro cylinder 5 pin double throw lock (both sides of the door)
		<ul style="list-style-type: none"> <li>▪ Must be equipped with heavy duty door closer</li> <li>▪ 32/32mm M/S rebate</li> <li>▪ Aluminium roton type hinge</li> </ul>
<b>Electrical terminations</b>	TBM	<ul style="list-style-type: none"> <li>▪ Klipon Electrical Termination Block</li> </ul>
<b>Power cable</b>	TBM	<ul style="list-style-type: none"> <li>▪ Suffix Power Cable, 2.5 mm<sup>2</sup></li> </ul>
<b>Metallic steel Conduit</b>	TBM	<ul style="list-style-type: none"> <li>▪ 25mm Steel Bosal Conduit with all accessories</li> </ul>
<b>CAT 5 Communication cable</b>	TBM	<ul style="list-style-type: none"> <li>▪ Blue Cat 5 Cable</li> <li>▪ RJ45 connector - Blue</li> <li>▪ For access control</li> </ul>
<b>CAT 5 Communications Cable</b>	TBM	<ul style="list-style-type: none"> <li>▪ Red CAT 5 Cable</li> <li>▪ For Cameras</li> </ul>
<b>CAT 5 Communications Cable</b>	TBM	<ul style="list-style-type: none"> <li>▪ Yellow CAT 5 Cable</li> <li>▪ For Controllers</li> </ul>
<b>Mylar Pair Cable</b>	TBM	<ul style="list-style-type: none"> <li>▪ 3-Pair / 6-Core Cable</li> </ul>
<b>Cab tyre</b>	TBM	<ul style="list-style-type: none"> <li>▪ Power Cable</li> </ul>
<b>Single Mode Fibre + Patch lead + Rack mount Splicing cassette.</b>	TBM	<ul style="list-style-type: none"> <li>▪ Single mode Fibre with all accessories</li> <li>▪ Armoured 8 pair</li> <li>▪ Six Patch Leads (5 metres)</li> <li>▪ Splicing Cassette</li> </ul>

## 10. CONCLUSION

The design and device layout was developed by Security Systems Technical Team and shall only be made available to the appointed contractor. All measurements shall be taken during site inspection, and further questions or clarity to the specifications shall be answered during site briefing.