Annex A

TERMS OF REFERENCE

ESTABLISHMENT OF SLSU's ENTERPRISE NETWORK INFRASTRUCTURE AND MULTI-MEDIA CENTERS FOR AN IMPROVED FLEXIBLE LEARNING MANAGEMENT SYSTEM IMPLEMENTATION

"PROCUREMENT OF SERVICES, EQUIPMENT & OTHER MACHINERIES WITH ACCESSORIES FOR THE INSTALLATION, TESTING AND COMMISSIONING OF FIBER BACKBONE AND WIRELESS INTERCONNECTIVITY"

INTRODUCTION

The proposed establishment of SLSU (Southern Leyte State University's Enterprise Network Infrastructure which primarily aims to further improve the Flexible Learning Management System implementation in the university. It is an enterprise network infrastructure that will connect each campus with the other campuses so that it will work as one network. It is an intervention that will lay down the foundation and support to the university's on-going initiatives to successfully implement the Flexible Learning Management System in which the existing cloud-hosted Learning Management System serves all the six (6) campuses of the university with nine (9) colleges and one (1) institute.

The fiber backbone of each campus is a foundation of the future establishment of a SMART SLSU. In addition, the university has migrated into a full-online registration system at the onset of the COVID-19 Pandemic, which also needs additional ICT investments to further enhance the User Experience in accessing this platform.

It is in this light that SLSU (Southern Leyte State University) is seeking for experienced, potential supplier/service providers that can provide our needed requirements for the provision of upgraded Fiber LAN hardware equipment and its components and the Wireless Backhaul System including but not limited to, configuring the hardware, knowledge transfer of hardware subsystem and monitoring, bandwidth management, network management system, backup power, solar-power sources, and others which can offer in a reasonable cost in accordance with provisions of Republic Act (RA) No. 9184 and its Revised Implementing Rules and Regulations (IRR).

SCOPE

1. The Awarded Bidder must provide supply of labor and materials for the Enterprise Network Infrastructure: Improved and Upgraded Fiber LAN hardware and software *(with complete components and accessories)* in all campuses *(Per attached MAPs - locators)*, including road trenching works for

the utilization of FOCs (Fiber Optic Cables), Solar Power Plant (for the usage of two repeater stations, *as indicated on the Wireless Backhaul Design*, P2P (Point-To-Point) Radios *(*must provide additional P2P Radios and will act as a *Space Diversity technique* to eliminate cancellation or loss of signal (Line-Of-Sight) on the receiving end' two (2) links to be aggregated on both sides, with its adequate vertical separation in case of failover link. This must be analyzed and surveyed before the actual implementation, which the backhaul connectivity is the critical part of the project). This equipment to be procured must be suitable for RF (Radio Frequency) propagating over water.

2. The Awarded Bidder must provide structured cabling service *(MDFs IDFs)*, installation of hardware equipment and networking devices, installation and configuration of point-to-point radio antennas *(including antenna brackets and accessories including pipes, if needed)* and other necessary accessories.

RATIONALE

1. As the SLSU (Southern Leyte State University responds to the unprecedented disruptions brought by COVID-19 Pandemic, the modalities in the delivery of teaching and learning, research and extension services including the support to operations are greatly affected. This scenario gives an opportunity for the university to strategize its operations, maximizing the utilizations of its limited resources in order to have an optimum outcome. However, with the current campus network status of the six (6) campuses, the delivery of flexible learning is not at its finest due to the limited Information and Communications Technology (ICT) infrastructure.

OBLIGATIONS & RESPONSIBILITIES

A. SOUTHERN LEYTE STATE UNIVERSITY

1. Assists the Awarded Bidder during the implementation stage.
2. Will inspect the equipment deployed and installed, integrity of the hardware, and must have complete component and accessories.
3. SLSU reserves the right to contact the Awarded Bidder for any defects and/or malfunctions of the supplied materials, which covers the agreed warranty period, including any/or negligence sought by the Awarded Bidder.
4. SLSU has the right to impose penalties to the Awarded Bidder in case of delays and/or irregularities of the service and performance of the All Hardware Equipment and Software Platforms due to the compatibility issues, data transport errors, obstructions, non-line of sight, if any or defective equipment based on the approved Bill of Materials.

B. BIDDER'S DELIVERABLES

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1. Provide and install IP Point-to-Point Radio Antennas (in both sides of the link) on the transmitting and receiving end.
2. Provide and install pure Solar Power Plant systems on three (3) Repeater Stations and must support at least 48-hours of backup power when no sunlight is available on existing DICT Towers to be used in the campus interconnectivity.
3. Provide technical knowledge and support on the IP Point-to-Point Radio Antennas' software dashboard for the configuration, monitoring and maintenance features.
4. Provide interconnection thru Wireless Network of the six (6) campuses *(Hinunangan, San Juan, Bontoc, Tomas Oppus, Maasin and Sogod Campus* as the main control).
5. Install Fiber Backbone and Fiber Connection to buildings on the six (6) campuses *(See attached MAPs – locators)*.
6. Responsible for the Installation and Configuration of all hardware components.
7. Hardware replacement for any defective equipment within the duration of the agreed warranty period.
8. Provide Structured Cabling service.
9. The Awarded Bidder shall guarantee that all the Supplied Networking Devices, hardware equipment, cables, accessories must have a warranty period of Three (3) years for part and accessories and One (1) year for services.
10. The Awarded Bidder must submit to SLSU all product documentation related to the supplied hardware equipment & its components *(i.e.: User Guide, Product Manual, Warranty Cards per equipment, etc.)*.
11. The Awarded Bidder must coordinate with SLSU after the installation of the new networking devices before connecting to the existing infrastructure.
12. The Awarded Bidder must provide all the requirements needed by SLSU the information of the products and/or materials used for the SLSU Campus Area Network Project thru email or hardcopies, the technical specifications of the product or equipment & operation guides.
13. The Awarded Bidder shall quote in Philippine Peso currency and should be VAT inclusive.
14. The Bidder must conduct an ocular inspection and survey (of the whole SLSU Campus Area Network project), so that they can formulate a list of BoM (Bill of Materials) in relation to the equipment to be installed, detailed Survey and Design Plan.
15. The Awarded Bidder must submit *as per Detailed Implementation Schedule* the proper, Daily, Weekly and Monthly Reports/Documentations to SLSU for careful review and validation.
16. Final As-Built Plan *with Schematic Line Diagram* and Final As-Built Plan on the Wireless Backhaul Connectivity *(if changes have been applied)*.
17. Final Network / Structured Cabling Diagram (in all campuses).
18. The Awarded Bidder must be responsible on establishing the SLSU's Network VLAN Configuration.
19. Proper End-To-End Tagging and Labelling *as per BISCI, ANSI, TIA-EIA Standards which is applicable in the Philippines.*
20. Certification Training on installed Network Switches, Firewall Security.

21. Conduct joint site maintenance and equipment inspection with SLSU personnel at relay sites and campuses.

C. BIDDER's QUALIFICATIONS

1. The Bidder must have at least three (3) years of experience in ICT Solutions, supply, delivery, installation, testing and commissioning *for all hardware and software* of network equipment, structured cabling system, solar power plant system, to integrate all six (6) campuses of SLSU (Southern Leyte State University).
2. The Bidder must have its own test equipment related to the project. *Must attach 'Proof of Ownership'* as indicated on the Bid Documents checklist.
3. The Bidder must have certifications to be provided:
    - All prospective bidders must be an authorized reseller of all equipment to be supported by a certificate issued by the manufacturer/distributor of equipment/materials.
    - All prospective bidders must be experienced and capable of rendering local technical services duly certified by the manufacturer/distributor.
    - The bidder must have at least Two (2) Licensed Electronics Engineer or Certified IT Specialist or any relevant ICT profession who are currently employed in the bidder's company, experienced and trained in the Survey and Design, Installation and Supervision, Testing and Commissioning, Integration of Microwave Backhaul Connectivity, Structured Cabling *(as per Structured Cabling standards applicable in the Philippines)*, Network Management System, Monitoring System, Security Platform *(i.e. On-premise and/or Off-Premise Enterprise Security Firewall Protection)*. These important documents must be presented.
    - All prospective bidders shall conduct a Site Survey and submit a certificate of site survey completed. A Site Survey Report and Design Plan must be submitted to the Engineering/ICT Team for review and it will be discussed on the preliminary meeting. The report must be detailed to avoid miscalculations and issues which will hamper the actual implementation stage of the project.
    - All prospective bidders shall submit their proposed Service Level Agreement (SLA) and will be reviewed by the BAC-TWG, Engineering/ICT Team.
4. All prospective bidders shall submit an Original Copy of Design Proposal, Brochures and other publications that supports compliance to the requirements.
5. Proposed Work Plan and Detailed Implementation Schedule for the Project *(PERT-CPM, Excel-based Implementation Schedule, MS Project, Primavera P6 or any platform that will show the detailed scheduled)* covering the whole period. Prospective Bidders are required to conduct site inspection. This is to ensure the reliability, security and efficiency of the required services that the bidder shall perform. Timeframe, tasks, milestones should be specified for each activity to be done daily, weekly and monthly basis.

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6. The Bidder shall be responsible and be held accountable for the removal and proper housekeeping of every working area, proper disposal of materials, waste generated by the project. Debris, surplus materials, equipment, etc. shall be removed daily. SLSU Representative will oversee this activity and proper waste management must be implemented *as per university policy.*
7. The Bidder must have a PCAB License (Philippine Contractors Accreditation Board) required by R.A. 4566 to perform telecommunications installation.

D. BILL OF MATERIALS

	ITEM DESCRIPTION	***UOM***	***QTY***
WIRELESS INFRASTRUCTURE			
1	IP Radio, Dish-type, 5GHz, *34dBi or 30dBi*	Units	32
2	IP Radio, 5GHz Carrier Radio with LTU Technology	Units	32
3	IP Radio Radome Isolator	Units	32
4	Intelligent WISP Control Point *with FiberProtect*	Units	6
5	Ethernet Surge Protector (ESD Protection for Outdoor High-Speed Networks)	Units	32
6	Stand-off Mount (Antenna Bracket with Adjustable Mount Angle)	set	32
7	Outdoor Battery Cabinet with Mounting Frame	unit	5
8	Battery, Gel-type, 40-AH,12V	pcs.	40
9	Solar Panel Monocrystalline 100w	Pcs.	30
10	*Accessories*	1 lot	
11	Ferrule Connector 2.5mm		
12	Battery Jumper Cable 25mm x 6mm		
13	Solar Power Cable 14/2		
14	Solar Panel Bracket (100w x 3)		
15	4x PoE Smart MPPT Charger		
16	Premium Line Category 6 U/UTP, Slimline Patchcord		
17	20ft Single Pole Tower 1.5" *(for SOGOD Campus)*	pcs.	3
18	40ft Single Pole Tower 1.5" *(for BONTOC Campus)*	pc.	1
19	60ft Single Pole power 1.5" *(for SAN JUAN Campus)*	pc.	1
20	80ft Single Pole power 1.5" *(for HINUNANGAN Campus)*	Pc.	1
	Accessories	lot	
1	CAT5e , Cable-Carrier, *Outdoor, Carrier-class shielded cable with Integrated ESD drain wire*		
2	CAT5e, Connectors, *shielded against ESD attacks*		
FIBER LAN INFRASTRUCTURE			
	MDF Components		
1	Design enhanced server Cabinet 42U	units	5
2	Fan tray for 800mm depth	units	5
3	19" Fixed Shelf for 800mm depth server cabinet	units	5
4	1U 19” Cable Management, Duct type, black	units	13

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5	1U 19" power distribution unit	units	10
6	Wall Mount Cabinet, height 12U	unit	1
7	German cooling fan, with three pins German-type	unit	1
8	1U Fixed Shelf for 600mm depth wall mount	unit	1
9	1U 19” Cable Management, Duct type, black	unit	1
10	1U 19" power distribution unit, w/ aluminum body	unit	1
11	UPS - 2KVA	units	6
12	Battery Pack - 2KVA	units	6
13	1Gbps Multi-WAN (3-ports) Router Balance 380	unit	1
14	Enterprise-level, Next-Generation Firewall	lot	1
15	Network Management Software *(for every campus)*	unit	6
16	POE+ Switch 24-Port	unit	6
17	Patch Panel, 24-Ports	units	6
18	SFP Switch 24P for MDF	unit	7
19	19” Rack Mounted ODF, 48-core	unit	2
20	ODF 24C SC-UPC SX with Tray	unit	3
	Accessories	1 lot	
1	SFP Module - SM-10G-BiDi		
2	2m 10G SFP+ DAC, SFP Cables		
3	SC/PC Duplex SM Adapter		
4	FO Pigtail SC-UPC 1.5 meters		
5	Fusion Sleeve		
6	Patch Cord Cat6 1meter Slimline		
7	RJ45 1G Module		
	MDF Components		
1	Wall Mount Cabinet, height 12U	units	100
2	German cooling fan, with three pins German-type	units	100
3	1U Fixed Shelf for 450mm	units	100
4	1U 19” Cable Management, Duct type, black	units	100
5	1U 19"" power distribution unit, w/ aluminum body	units	100
6	8-port, 150W, SWITCH	units	100
7	Access Point, 802.11ac, 3x3 MIMO Technology	pcs.	27
8	Outdoor Access Point, Mesh, dual-band, 3x3 MIMO, 802.11ac	pcs.	5
9	Access Point, 802.11ac-Wave2, 4x4 MIMO	pcs.	4
10	UPS, 650VA	units	100
	Premium Line 19” Rack Mounted ODF, 24cores		99
	Accessories	lot	
1	LC/UPC-SC/UPC Simplex Single mode, SC/PC Duplex SM Adapter, Ceramic Sleeve, Fiber optic pigtail SC-UPC, 1.5 meters, Protection Sleeve for Optic Fiber Fusion Splice		
2			
3			
4			
	EQUIPMENT		
1	5GHz AC Long Range Bridge, AP, CPE (with Dedicated Management Radio)	units	2

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2	FO Fusion Machine • FTTH Fiber Optic Splicing Automatic Intelligent Fiber Optic Splicing Machine Optical Fusion Splicer with Multi-language • latest core alignment technology with auto focus and six motors • industrial quad-core CPU, fast response • 5 inches 800X480 high resolution screen • magnification of 300 times • 5 seconds speed core alignment welding • 15 seconds heating • Large capacity lithium battery • Focus mode: Six motors Auto focus	unit	1
3	OTDR *[able to measure, 1310/1490/1550/1625/1650 nm (SMF); 850/1300 nm (MMF)]*	unit	1
	OSP Materials		
1	Fiber Optic Splice Closure, 48-core,Big, Dome Type	units	37
2	Pre-Fabricated Concrete Pole, 25-feet	units	37
3	Stainless Steel Strap 1/2 x 100ft	lot	
4	Buckles, Stainless Steel, 1/2 C-254		
5	24 Fiber Core SM, Armoured Multi Tube		
6	06 Fiber Core SM, Armoured Multi Tube		
7	Fusion Protection Sleeve		
8	PE Hose 2" meters/Roll - SDR11		
9	PE Hose 1" meters/Roll - SDR11		
10	FOC Warning Tape 3"		
11	Caution/WARNING Tape 3"		
	Other Local Materials		
1	Cable Gland, 13-mm	lot	
2	C14 Connector		
3	Expansion Shield with Log Screw 10mm (Long)		
4	Cable Clip 6mm		
5	Cable Tie 6x200		
6	Circuit Breaker, (Bolt-On/Plug-in), 20-Amps		
7	Electrical Tape (EVAT) PS Mark, Black, 19 mm x 16 m x 0.155 mm		
8	Electrical Metallic Tubing, Clamp, 1-inch		
9	Electrical Metallic Tubing, Clamp, 1/2-inch		
10	Fabricated FOC Dome Holder, *Pole Mounted*		
11	G.I. Wire #16		
12	Gang Box		
13	Ground Clamp, 3/4"		
14	Ground Rod, 3/4", 10ft		
15	Loop Holder		
16	Metal U-Guard - Galvanized, Sched40		
17	Phenolic Board, 3/4", 2-feet x 2-feet		
18	Phenolic Board, 3/4", 2-feet x 8-feet		

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19	Pre-Fabricated, Concrete Handhole, *with Concrete Cover*		
20	PVC Pipe 1"		
21	PVC Pipe 1/2"		
22	THHN #12 (Black)		
23	THHN #10 (Green)		
24	Tox and Screw, 6-mm		
25	Twist Lock Outlet and Plug, 30-Amps		
26	Reusable Ties & Straps		
	Engineering Services		
	Activities		
1	Trenching & Backfilling 400mm Depth	lot	
2	Excavation for Service Pole		
3	Erection of Service Pole		
4	Installation of Service Handholes		
5	Layout of Underground Conduits 2"		
6	Layout of Underground Conduits 1"		
7	Installation of FOC Warning Tape		
8	Installation of Riser Pipe from Hand Hole to Service Pole		
9	Installation of Metal U-guard to Service Pole		
10	Installation of Loop-Holder to Service Pole		
11	Mounting of IDF & Components		
12	Cable Pulling FOC 24C		
13	Cable Pulling FOC 6C		
14	Mounting of FOC Enclosure to Service Pole		
15	FOC Fusion Splicing and Testing		
16	Installation of MDF and Grounding		
17	Roughing Ins, Cabling, Termination from CB to MDF		
18	Installation of MDF Components		
19	Training - (Firewall, Fiber Splicing, Network Management-*Backhaul & Software-Defined Networking*)	1 lot	1

E. TECHNICAL SPECIFICATIONS

1. Cable Standard compliance should be:

- AZ/NZS 3080 – Generic cabling for customer premises ISO/IEC 11801.
- TSO/TEC 60794-1-2 – Fiber optic testing methods.
- ITU-T Recommendations – recommendations for G.651 OMI, OM2, and OM3.

2. Optical Fiber Specifications should be:

- Fiber Core - the optical fiber must have a 50/125-µm fiber OM3.
- Minimum Bandwidth – the optical fiber minimum bandwidth should be >2000MHz kilometer @ 850-nm laser & >5000MHz kilometer at 1300-nm overfilled LED.
- Numerical aperture – the fiber numerical aperture should be at a minimum 0.200 lus and minus 0.015.

- Core – core diameter: 50 plus and minus 3 µm.
- Zero Dispersion Slope – must be <0.101 ps/(nm^2-kilometer).

3. Termination Module:
- Mounting – the 19" rack mount fiber termination unit shall consist of a frame mountable housing for terminating and/or splicing fiber optic cables and allow for the organization of the fiber optic interconnections.
- Slots Termination - the 19" rack mounting unit should be either 12 or 24-ports for one (1) rack unit and can be either, a fixed position unit or have a slide or swing tray to improve access.

4. Patch Cords:
- Fiber Core – the patch must consist of one or two single, tight, buffered, multi-mode graded index fiber with 50-micron core & 125-micron cladding to suit the installed OM3 fiber optic cabling.
- Return Loss – the patch cord must have SPC polish, typical >40dB.
- Factory-Terminated Connectors – the patch cords should be factory terminated with LC ceramic connectors at each end.
- Minimum Bending Radius – the specification for bending radius should be 25-mm.
- Cable OD – the specific cable OD can be 2-mm or 3-mm.
- Tensile Strength – the tensile strength must be 45N
- Connectors – the connectors must be a multi-mode SC to LC patch cord.
- Cable Performance Testing – on the note of performance testing, the cable must support transmission speed up to 10Gbps at a distance of up to 550-meters with an 850-nm vertical cavity surface with IEEE 802.ae standard.
- Compliance – the components are designed and tested to conform to the fiber and cable performance requirements of TIA 568, ISO 11801, Telcordia GR-409-CORE and ICEA-596 standards. All cables have UL or ETL fire safety listings to either OFNR (UL-1666/CSA FT4) or OFNP (NFPA-262/UL 910/CSA FT6).

5. Cable Standard compliance should be:
- Modular Jacks meet or exceed ANSI/TIA-568-C.2 and ISO/IEC 11801 requirements
- Cable Qualification – qualified against IEC 61156-5 Cat.6. EN 50288-6-1 and TIA-568C.2
- Cable Size – the UTP Cable diameter must be 5.6-mm (AWG24)
- Other feature – the UTP Cable must have cross-web filler to separate the airs.

6. Patch Panel:
- Contact Plating Specification – the patch panel contacting plating of the modular jacks shall have a minimum thickness of 1.3-mtr of hard gold in accordance with FCC CFR47 Part 68.5
- Plug Insertion Life – the patch panel modular patch panel will have a plug insertion life of Level B, reliability to IEC 60603-7.

7. Patch Cord:

- Factory Prefabricated – Cat.6 patch cords must be machine fabricated.
- Matching – the type of patch cords and system leads shall be AWG28 or known commonly as small diameter patch cord.
- Documentation Termination Record – all terminations must be documented and properly delivered to the end-user upon turnover and will be the basis of maintenance and troubleshooting.

8. Horizontal Manager:

- Mountable to a standard 19" EIA Racks and Cabinets:
  - ✓ Copper conductors in the cable pairs are stranded for superior flexibility and compacted to a near-round shape for optimum signal strength.
  - ✓ Exceeds ANSI/TIA Cat.6 performance requirements.
  - ✓ Up to 32% smaller outer diameter than other patch cords.
  - ✓ Enhanced flexibility, which notably improves handling and circuit tracing.
  - ✓ Flexible strain relief boot maintains proper bend radius to ensure peak performance.

9. Compliant:

- The connectivity must be compliant to PoE meeting IEEE 802.3af and IEEE 802.3at for PoE applications. The Connectivity must be 100% performance tested for confidence that each patch cord delivers specified performance wire map, NEXT and return loss.

10. Network Infrastructure Hardware

- Core Switch Additional Module and Services Support
  - Must be compatible to the existing Core Switch (HP 10504 Switch)
  - Minimum requirements for exiting Core Switch:
    - ✓ Additional 1 unit, 24 Ports 1/10Gig Base-T Module
    - ✓ Additional 21 unit, 10Gig SFP+ Transceivers
    - ✓ Additional 3 Years, NBD Support and services for 10500 Swich
- IDF Switch
  - Minimum Specs, consists of a IU height switch with:
    - ✓ 48 fixed 10/100/1000 PoE+ Gig-T ports
    - ✓ 4 SFP+ fixed 1,000/10,000 ports
    - ✓ 1 dual-personality (RJ-45 or USB micro-B) serial console port
    - ✓ Dual Power Supply (redundancy must be included)
    - ✓ Full L2 with lite Layer 3 switch
  - Memory and Processor:
    - ✓ 2Gb SDRAM, Packet Buffer size: 4Mb, 512Mb flash
  - Performance:
    - ✓ Throughput: up to 190 million pps
    - ✓ Switching capacity: 216Gbps
    - ✓ MAC address table size, 32000 entries
  - Management:
    - ✓ Command-Line Interface (CLI)
    - ✓ Web Graphical User Interface (GUI)

- ✓ SNMPv1 / v2c / v3
- Security:
  - ✓ Access Control lists (ACL), RADIUS/TACACS+, IEEE 802.1X, MAC address lockout, Port Security
- Layer-2 Switching:
  - ✓ VLANs – provides support for 512 VLANs, and 4,094 VLAN IDs Jumbo Packet support: 9k from size.
- Other Features:
  - ✓ Must have Open-Flow support
  - ✓ Support virtual resilient switching fabric technology
  - ✓ Green IT Certification
  - ✓ Must have free software downloaded via the Internet

- IDF Switch *(other components)*:
  - Minimum requirements:
    - ✓ Comply 18 units of IOG SFP+ LC SR Transceiver
    - ✓ Comply Lifetime Warranty for the Switch

11. New DR Core Switch

- Minimum Specs, consists of IU height switch with:
  - ✓ 24 fixed 10/100/1000Gig-T ports with 4 SFP+ ports
  - ✓ 1 port Expansion Module slots
  - ✓ 2 Power Supply slots (Redundancy must include)
  - ✓ Full L3 Switch
- Memory and Processor:
  - ✓ 2Gb SDRAM, Packet Buffer size: 4Mb, 512Mb flash
- Performance:
  - ✓ Throughput: up to 200 million pps
  - ✓ Switching capacity: 280Gbps
  - ✓ MAC address table size 32000 entries
- Management:
  - ✓ Command-Line Interface (CLI)
  - ✓ Web Graphical User Interface (GUI)
  - ✓ SNMPv1/v2c/v3
- Security:
  - ✓ Access Control lists (ACL), RADIUS/TACACS+, IEEE 802.1X, MAC address lockout, Port Security
- Layer 2 & 3 Feature Set:
  - ✓ Layer 2: VI-AN
  - ✓ GARP VI-AN Registration Protocol
  - ✓ Internet Group Management Protocol (IGMP) and Mutlicast Listener Discovery (MLD) protocol snooping
  - ✓ Spanning Tree/MSTP, RSTP, STP Root Guard
  - ✓ Layer 3
  - ✓ Static IPv4 routing/IPv6 routing
  - ✓ Routing Information Protocol (RIP), *policy-based routing*
  - ✓ Open shortest path first (OSPFv3)
- Other Features:

- ✓ Support virtual resilient switching fabric technology
- ✓ Green IT Certification
- ✓ Must have free software update, downloaded via the internet

12. New DR Core Switch *(Other components)*

- ✓ Comply 2 units of IOG SFP+ LC SR Transceiver
- ✓ Comply Lifetime Warranty for the Switch

13. Wireless Access Point & Controller

- Minimum Specification for Access Point:
  - ✓ Must be, Dual-Radio, IEEE 802.11ac, 2.4 GHz MIMO (300Mbps max. rate) and 5 GHz MIMO (1300Mbps max. rate) radios, and three omnidirectional downtilt antennas.
  - ✓ Must be a Controller-based Access Point.
  - ✓ Must be compatible to the PoE+ Switch with IEEE 803.at compliance
- Antennas:
  - ✓ Three (3) integrated down-tilt omnidirectional antennas for 3x3 MIMO with peak antenna gain of 3.9dBi in 2.4GHz and 5.4dBi in 5GHz.
- Power:
  - ✓ Maximum power consumption: 13-watts (PoE) or 11-watts
  - ✓ Power over Ethernet (PoE): 48-Vdc (nominal), 802.3af/3at compliant source
- Minimum Specification for Controller:
  - ✓ Four (4) Dual SFP or 100Base-T Ports with 2 SFP+ Ports, supports up to 250 AP and 8,000 clients, with integrated AC power supply
- Performance and Capacity:
  - ✓ Must be support up to 250 AP license maximum
  - ✓ Must have firewall features for mobility wireless
  - ✓ Must have 6094 VI-AN supported
  - ✓ Must have 8,000 concurrent users
- Minimum Requirements for AP and Controllers:
  - ✓ Comply AP and Firewall license band on the AP qty
  - ✓ Comply with 1-unit IOG SFP+ LC SR Transceiver
  - ✓ Comply mounting/ceiling bracket for AP
  - ✓ Comply Limited Lifetime Warranty for the AP with 3-years support
  - ✓ Comply 3-years Warranty for WI-AN Controller

14. Network Management and Monitoring Software

- Network Management Software
  - ✓ NMS Platform is a comprehensive wired and wireless network management tool supporting the FCAPS model, providing for end-to-end business management of IT, scalability of system architecture, and accommodation of new technology and infrastructure. Allows for the addition of a variety of optional modules to extend platform capabilities. Supports the

management and 3rd-party devices and comes with an initial license for 50 managed devices with available additional node licenses.

- ✓ Wireless Management and Monitoring for the Wireless Access Point and Controller Management.
- ✓ NMS Server Specification:

Model	***Device Server***
Maximum Devices	500
CPU	1 x Intel XEON, E-5-2640, 2.5GHz
Physical Cores	6
Passmark Score	9761
RAM	32/38
Disks (RADIO Only)	6 x 146Gb, 15k RPM, SAS
Storage Capacity	
Maximum Input/Output Operations Per Second (IOPs)	2132

- Network Management Software *(Other Components)*
  - ✓ 100 Total Nodes License for NMS
  - ✓ 71 Total Nodes License for VSM
  - ✓ NMS Server must include with OS License

F. TRAINING REQUIREMENTS

Prior to the Final Acceptance, the Awarded Bidder shall provide operational workshop onsite on using the NMS Application and basic network management to at least six (6) DOJ MISD/Network Personnel for a period of at least two (2) days inclusive of food (AM snacks, lunch and PM snacks) and seven (7) pax Certification Training Certificate for the Network Switch Unit, Network Management System training, Fiber Optic Splicing, Wireless Backhaul System training and must be provided by the Certified IT Trainer.

1. System and Equipment Warranty

Warranty starts from the date of acceptance. Warranty includes version upgrades and updates.

Warranty coverage are as follows:

- 1-year Warranty for Structured Cabling System
- 1-year Warranty for IDF Switches
- One (1) year Warranty on the following:
  - ✓ Access Point
  - ✓ Core Switch
  - ✓ Wireless Controller
  - ✓ Workmanship
  - ✓ NMS Server

- ✓ Transceivers, Fans, and Power Supplies
- ✓ All other equipment/system not specifically not mentioned before

- 1-year, 8x5, Technical Onsite Support with 4-hours Response Time for Switch and Access Point during the Warranty period of one (1) year.
- Replacement of units shall be made operational and configured within twenty four (24) hours upon receipt of report through telephone call, SMS text, email or any other mode of communications within the warranty period.

The warranty certificates shall include the Service Level Agreement (SLA) and specific terms of the warranty that will be implemented during the warranty periods of every component.

2. Brand and Manufacturing

The brand must be a European or US brand to adhere to the global competitiveness and must be distributed here in the Philippines via a locally declared company with global standard certifications (e.g. ISO, ITIL and D&B) & at least two (2) Engineers, certified of the said product.

Prepared by:

Sgd.
Engr. Julius O. Paler
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Annex A

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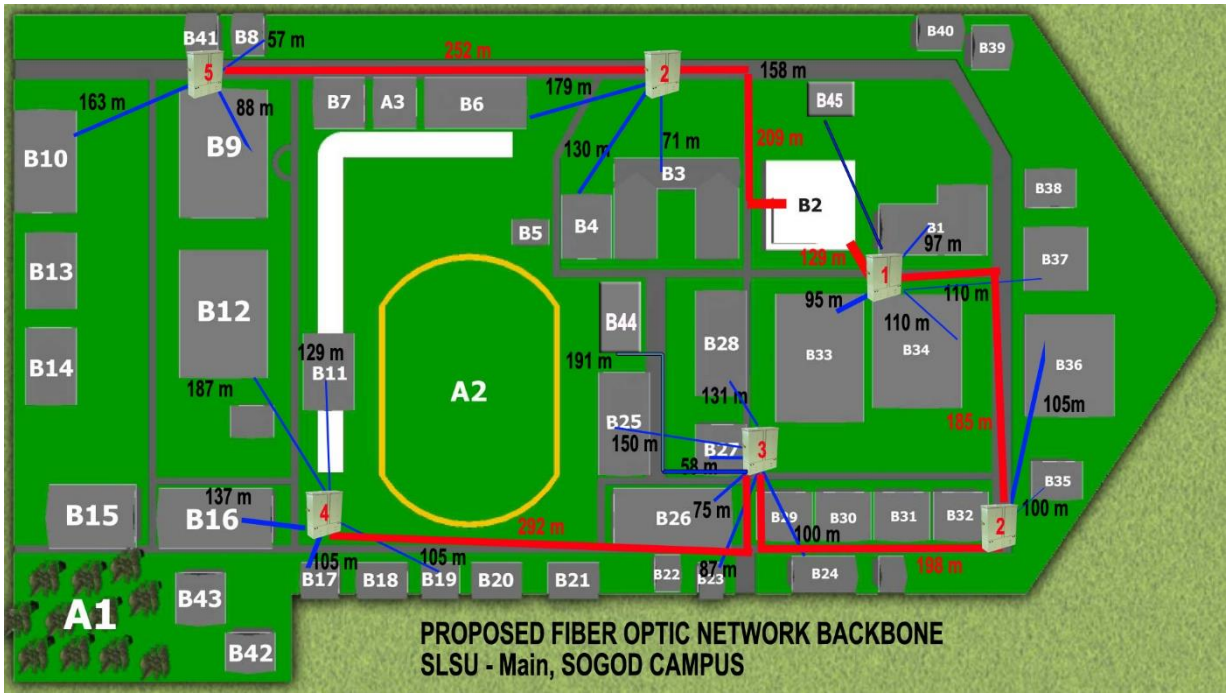
University President

Encls:

ANNEX A: Layout Design Diagram for Campus Fiber Backbone
ANNEX B: Layout Design Diagram for Campus Interconnectivity

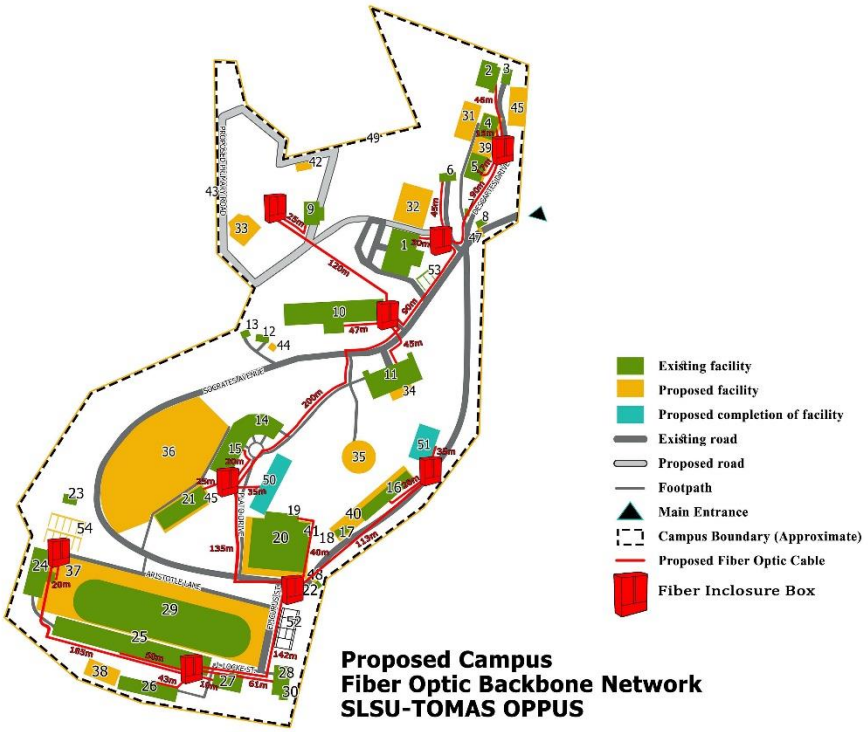
ANNEX A: Layout Design Diagram for Campus Fiber Backbone

SOGOD CAMPUS

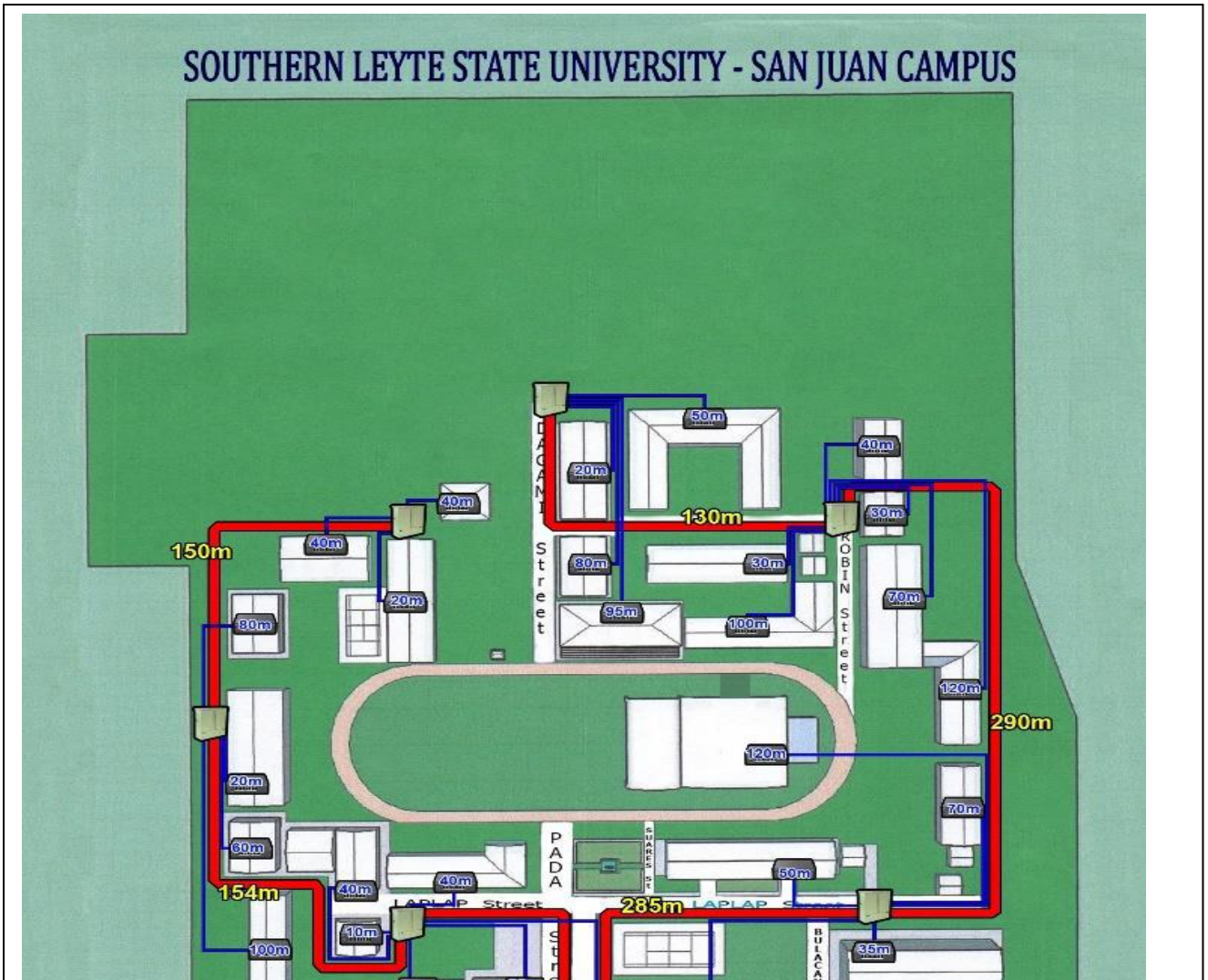


Annex A

TOMAS OPPUS CAMPUS

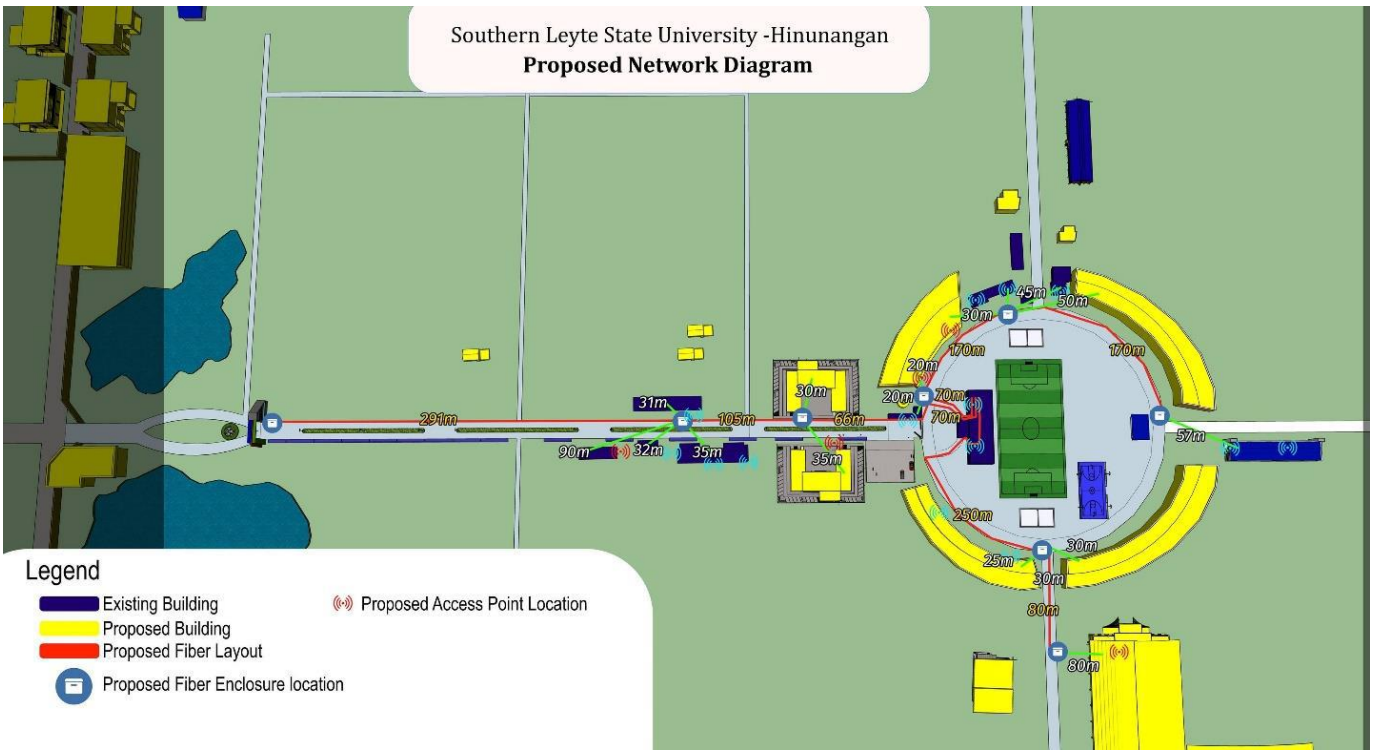


SAN JUAN CAMPUS

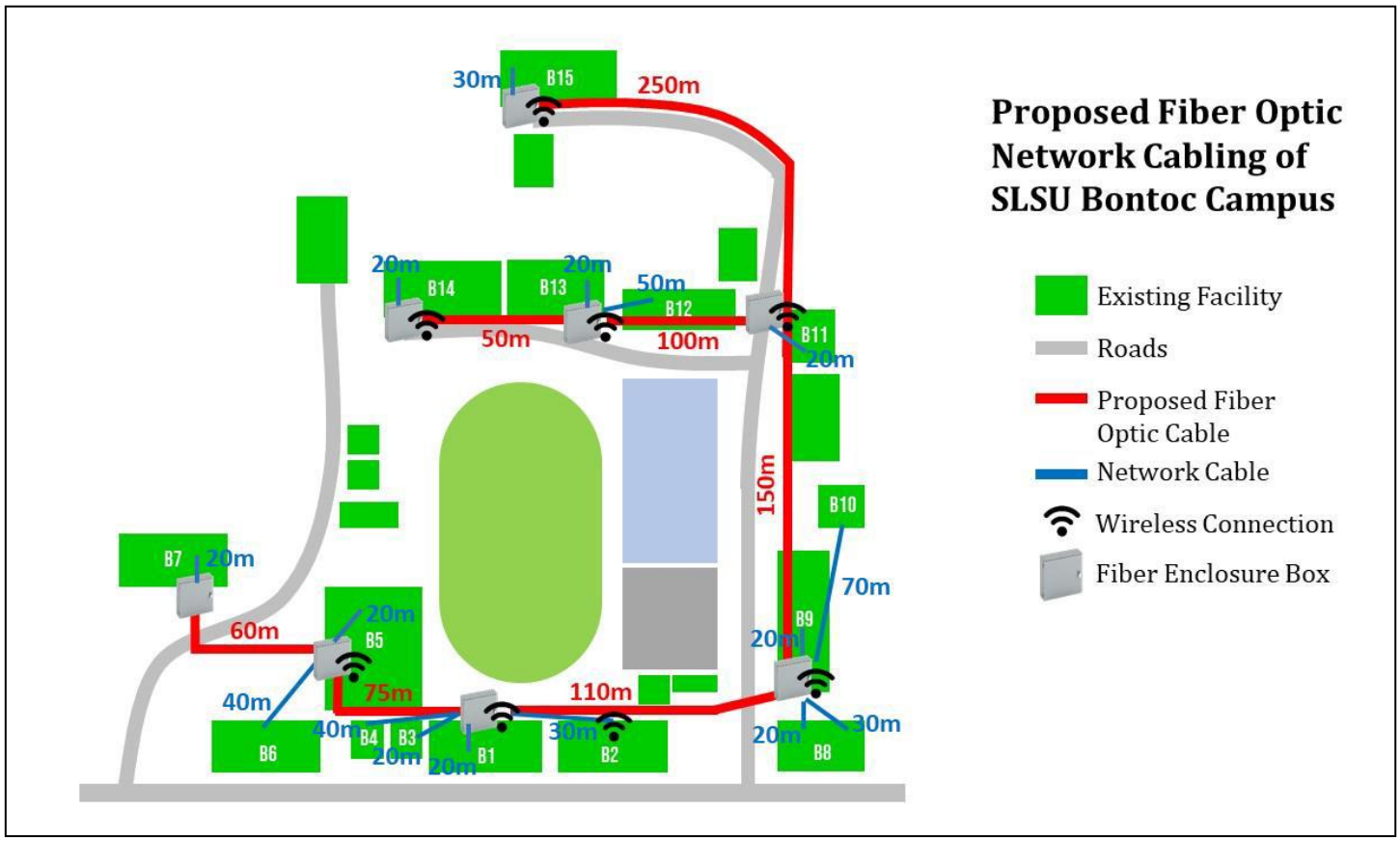


Annex A

HINUNANGAN CAMPUS



BONTOC CAMPUS



Annex A

ANNEX B: Layout Design Diagram for Campus Interconnectivity

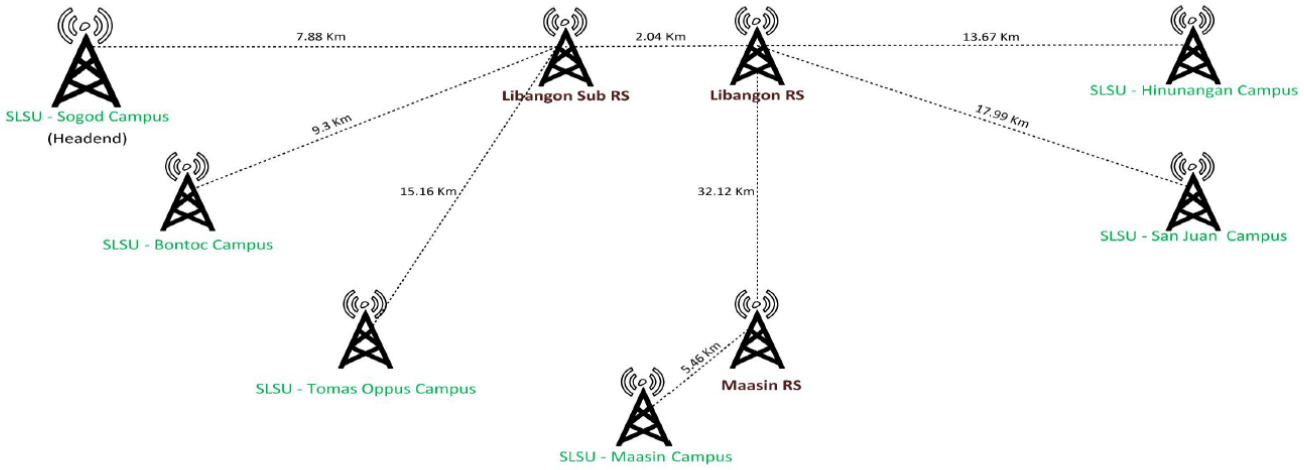


Diagram Summary:

SLSU - Sogod Campus will supply internet connection for all campuses.
All radio and switches (for RS) are 802.1q capable.
Libagon RS, Libagon Sub RS and Maasin RS are pure solar powered that can supply for up to 48hours.