



## **Development of AESA™ (Acumentrics Easy Simple Network Management Protocol Application)**

### ***Background***

**Acumentrics, Inc.**, headquartered in Walpole, Massachusetts, has been recognized, since 1994, as a trusted market leader in RUPS™ (rugged AC and DC uninterruptible power sources) for harsh and combat environments, as well as heavy-duty industrial applications. The company is a preferred supplier of US-made power electronics to many of the world's largest prime defense contractors and Government agencies, delivering Total Power Solutions, when clean power is mission critical under extreme harsh conditions. [RUPS™ products](#) provide clean power conditioning and battery backup when reliability is mission-critical.

### **Capstone Design Project:**

To develop a user friendly (windows based) Linux platform GUI interface that will allow the end user to easily configure Acumentrics products and provide all the SNMP (Simple Network Management Protocol) commands and traps required per the SNMP V3 standard. The capstone team must keep in mind the end-user as a key feature. Our end users mostly are younger adults with minimal computer expertise and are working in a harsh environment and do not have a lot of time to expend on set ups.

Acumentrics will provide a COTS Select UPS with a fully develop SNMP GUI (ViewPower Pro) for the capstone team to use and benchmark to create a similar look and feel GUI application.

Acumentrics will provide the team with two Rugged Uninterruptable Power supplies to use during the development and testing of the GUI interface.

We are not defining the method used to create the GUI interface as we want to encourage student innovation and creativity to the maximum.



**Team Composition:** Three computer engineers and one electrical engineer.

**Team Members Skills Required:**

Strong drive, independence, and initiative are a must.

Linux programming experience.

GUI interface development experience.

Electrical Engineering basics.

SNMP (Simple Network Management Protocol) development experience is a plus.

Knowledge of capacitance measurement circuits, relays, opto couplers, rs485, ADCs, DACs, DC/DC converters, AC/DC Converters, switching regulators, and digital logic circuits ,DHCP, IP, and simple network configurations is beneficial.

**Team Composition:**

The Electrical Engineer will act as a system engineer to learn the basic functionality of Our Rugged UPS products, SNMP module outputs/inputs based on OIDs (see Acumentrics manual 91-0063 Rev H)

He will do all the actual testing of the systems to ensure the GUI is providing the required input/outputs and interfacing via the rj45 of the SNMP to the computer or laptop.

The Computer Engineers will be responsible for creating the GUI interface that will allow easy set up and provide the output data display on the computer or laptop. After the team has been selected, we will define roles and responsibilities down to the specific tasks and detailed deliverables.

**Deliverables:**

The main deliverable is to create a working prototype Linux based GUI interface that will provide the performance reporting of the UPS using the SNMP protocols. Along with the GUI, the students will provide a draft Manual that will detail the set up steps and functions of the GUI. Provide a final report and disk containing prototype GUI program.



**The task list below will provide some rough milestones required to successfully achieve this capstone project:**

- Test and become familiar with the SNMP GUI interface utilizing COTS Select UPS provided as a reference (ViewPower Pro).
- Document what is easy and what is hard to set up and use the GUI and UPS mention above. Use as a benchmark.
- Learn basic functionality of ANG1251 and ACG2500 RUPS. Document the outputs that are provided via the SNMP module.
- Test and document performance of current SNMP configuration utilizing the free manage engine GUI interface currently used on Acumentrics RUPS.
- Make a comparison between ViewPower Pro and our current set up process and manage engine interface
- Create a detailed list of SNMP GUI interface specification (developed interactively with Acumentrics, Inc. software and hardware engineers).
- Develop Product roadmap required to deliver a beta sample of AESA™ GUI interface. (Also developed interactively with Acumentrics engineers).
- Develop state machine and process flows for all reporting and trap management and how the GUI is interfacing with the RUPS
- Develop and program all GUI and set up windows driven (Linux) screens (look and Feel) from specifications and state machine maps.
- Program all hooks that comply with SNMP V2, V2C, V3
- Test newly develop GUI and set up interface document output. Create a CD or flash drive with program containing GUI and executable files to load into a Linux based computer)
- Develop Step by step User Guide Manual

For further information and questions, contact:

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### ***APPENDIX: More Information on Acumentrics & Products***

The modern military relies on computers and other sophisticated electronic equipment and relies on [RUPS™](#) to keep that equipment online in harsh environments. Electrical variance, surges, spikes, sags, and interruptions can cause communication breakdown and data loss, especially during the rigors of active duty.

Acumentrics design and manufacturing teams are experts at delivering Total Power Solutions, when clean power is mission critical under extreme harsh conditions. Whatever your power system needs are, from [RUPS™](#) electrical performance, rugged connectivity, cables, backplanes, PDU, transit cases, racks, battery technology and run time, communication interfaces, Acumentrics will adapt its offerings to your requirements, as it has done to many of the world's largest prime defense contractors and heavy industrial manufacturers.

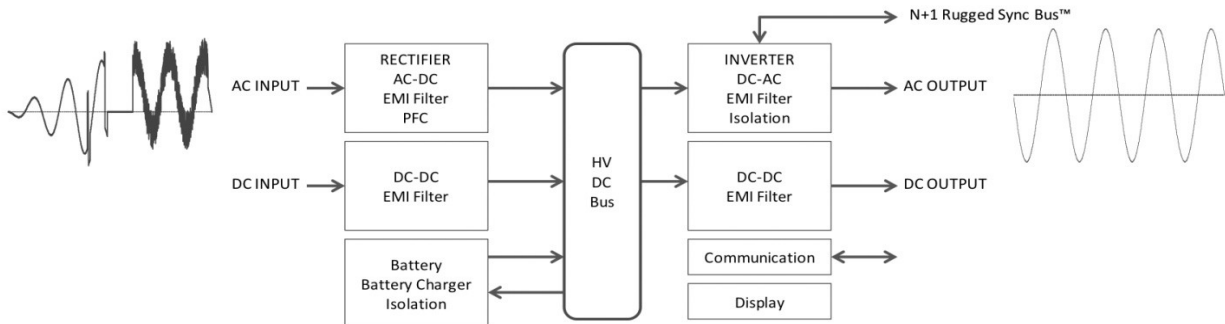
From the start, Acumentrics designed the [Rugged-UPS™](#) to provide clean AC or DC power supply in harsh environments, including dust, rain, wind, heat, cold, vibration, and shock and blowing sand. Our 1 kW and 2 kW UPS units are trusted worldwide in both military and industrial applications. Today, Acumentrics RUPS has an extensive portfolio of rugged power electronics products including Rugged-UPS™, power conditioners and power accessories, that can be mounted in 19" cabinets and in transit cases, with over 65,000 units deployed globally for:

Portable VSAT Communications, Deployed Forward Operating Base Command and Control, Vetronics power system for all vehicle based electronics systems, heltered and Portable UAVs Ground Control Stations, Light weight man portable power systems, Ships board and submarines, Airborne LiDAR, Industrial and Corporate Sites, Tidal Power Plants

**Acumentrics RUPS** offers four principal classes of Rugged Uninterruptable Power Supplies: **B2K (4U)**, **2U**, **1U (Rugged Blade)** and **COTS Select**. The first three are configurable for different applications and are offered with accessories including

battery chargers, battery packs, transport cases, mounting kits, cases and SNMP software. The **COTS Select** product is a more stripped down standard product currently offered in three size ranges.

All of Acumentrics four principal product lines are based on the same broad architecture:



### Other key Acumentrics features are:

- **Flo-Thru™**: Technology trademarked by Acumentrics: Unique heat sink tunnel design and gasket sealed enclosure provides maximum protection for components from the damaging effects of moisture, airborne particles, and other contaminants in the operating environment allowing very high quality and reliability.
- **Online dual conversion**: Creation of DC voltage, which is then converted to the needed AC or DC output voltage, protecting sensitive equipment from surges, spikes, brownouts, blackouts and noise. The output signal quality is independent of the input signal quality.
- **LFP Battery**: The latest Lithium Iron Phosphate (LFP) chemistry provides a Lead Acid Battery replacement with a very safe solution that provides a much longer run time (>2X) and is much lighter (X/2) with a storage time that is 3 to 5 times longer.
- **N+1**: Is the ability to deliver a fault tolerant power system by adding units in parallel with handshake functionality between units, that delivers a very clean power when one unit becomes non operational. It also supports the



navy ship zonal design architecture that is critical to deliver power to mission critical systems.

- **SNMP:** Simple Network Management Protocol provides the communication interface for exchanging information between network devices. This protocol is commonly used for military and DOD applications and also used in other industrial applications. SNMPv3 provides an addition of cryptographic security required for secure operations.

### ***Beneficial Links***

[https://en.wikipedia.org/wiki/Simple\\_Network\\_Management\\_Protocol/](https://en.wikipedia.org/wiki/Simple_Network_Management_Protocol/)

<http://www.acumentrics.com/>

[http://www.voltronicpower.com.cn/oCart2/files/manual/SNMP\\_manager\\_user\\_manual.pdf/](http://www.voltronicpower.com.cn/oCart2/files/manual/SNMP_manager_user_manual.pdf/)

[http://www.voltronicpower.com.cn/oCart2/index.php?  
route=product/product&path=24&product\\_id=98](http://www.voltronicpower.com.cn/oCart2/index.php?route=product/product&path=24&product_id=98)

<https://www.manageengine.com/network-monitoring/what-is-snmp.ht>

