



Shulins' Solutions

The background features a high-angle, night-time photograph of a construction site. Workers in hard hats and safety gear are visible on a complex network of scaffolding. The scene is illuminated by warm, orange-red lights, creating a dramatic atmosphere. A large, stylized red lightning bolt graphic with a white outline is superimposed over the left and center of the image, pointing downwards.

**Stellar  
ECLIPSE**

**Site Monitoring System**



# Shulins' Solutions

## About Shulins' Solutions

Shulins' Solutions provides unique monitor, control and protection solutions for transmission sites, drone-based tower inspections and a full range of consulting services based on years of practical experience on the ground building and operating broadcast facilities. Shulins Solutions solves problems with an attention to detail that only comes from firsthand experience in the field. All of our products and services come from the point of view of the user, and are crafted with the passion of a lifelong broadcaster.

**Shulins' Solutions are built on three pillars:**

**Stellar Eclipse** broadcast site monitoring platform provides a systems approach to monitoring and protection of RF systems from simple to complex featuring the exclusive VSWR Sentinel protection technology.

**sUAS Drone** based tower structure visual and infra-red surveys provide an indispensable tool to diagnose the health of RF systems and tower structures without the risk of climbing the towers.

**Broadcast Technology Consulting** to meet the demands of broadcasters specializing in remote control solutions, studio design and construction, antenna protection systems and ratings metrics.

**The entire Shulins' Solutions team of experienced broadcast professionals stand ready to help you tackle even the most challenging problems. Let us put our experience, knowledge and passion to work for you.**

## Meet Paul Shulins

Paul founded Shulins' Solutions based on his passion for broadcasting and bringing products and services to market that go beyond great specs and cool features to cover all the challenges familiar to a chief engineer in the trenches. Paul's been there, done that and got the tee shirt!

Paul served as Vice President and Chief Technology Officer for Burk Technology and was the Director of Technical Operations for Greater Media's Boston, Massachusetts five FM Radio Stations for twenty-nine years. He has been a Chief Engineer for more than 30 years – chances are good Paul has seen what you are seeing.

Paul has long lead technical innovation, sometimes even being on the "bleeding edge" with many firsts, including one of the first major market studio consolidations in the late 90's and early HD Radio® systems from the top of Boston's Prudential Center. Over the years, he has designed and constructed many custom, on-air program playback systems and technical facility monitoring and control systems to address real world challenges that you just couldn't solve with off the shelf products.

Paul is passionate about industry education; chances are you have read something he has written, he is a frequent contributor to many industry publications, authored several chapters in the 11th edition of the NAB engineering handbook and is a regular presenter at industry, NAB, IEEE and SBE events.

Paul earned a Bachelor of Arts degree from the University of New Hampshire System with majors in physics, chemistry and natural sciences. He is a lifetime certified member of SBE and currently serves as Vice President of the IEEE Broadcast Technology Society.

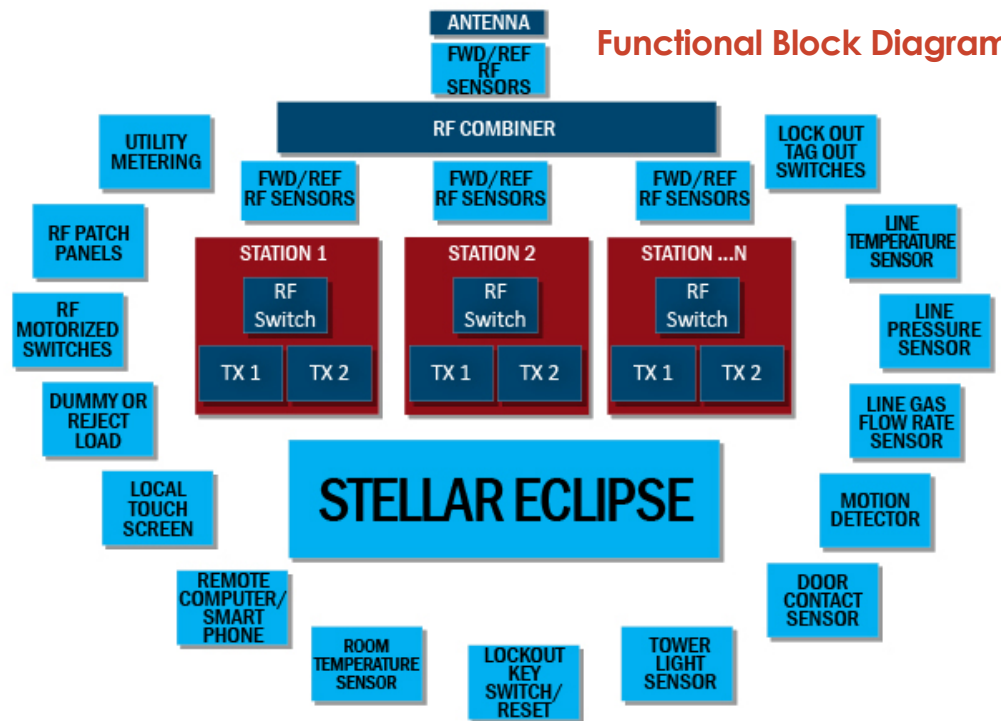


**In his spare time (what's that?) Paul is a private pilot, skier, photographer, and is a published astronomer who remotely collects deep sky images through his Arizona observatory.**

# Stellar ECLIPSE



## Functional Block Diagram



Today, many major TV and radio stations share common antenna sites often with complex combining networks that demand monitoring and protection beyond a simple remote control. To protect these significant investments, broadcasters need a proactive solution to not only provide next level of monitoring, logging and control, but a comprehensive VSWR system for maximum protection. While most modern transmitters have VSWR protection they only protect the transmitter, leaving the rest of the system exposed to costly damage.

Stellar Eclipse with our exclusive VSWR Sentinel is designed to protect and monitor these systems by constantly monitoring the VSWR on all inputs and outputs to the combiner system, refreshing these values many times every second. Anytime a VSWR is detected that exceeds a preset threshold, hard relay interlock relays are controlled that can open interlocks on connected transmitters. RF power is then removed from the system when an unsafe condition exists, thereby eliminating or minimizing costly damage.

### Stellar Eclipse Leaves the Others in the Dark

Affordable Site Monitoring and VSWR protection for single or multiplexed TV and FM transmission systems

- Modular design so the system can grow as you do
- Carefully tracks transmission line gas pressure with options for gas flow rate monitoring
- Proactively monitors dehydrator/nitrogen generator run times to prevent costly surprises
- Flexible Motorized RF switch control and status built in eliminating extra costs
- Simple connections for building security, electrical consumption, and tower light monitoring

### Proven reliability protects your investment

- On the air protecting hundreds of stations and hundreds of millions of dollars of revenue
- Ideal for new builds or a simple upgrade to existing installations
- Easy bypass of critical transmitter interlocks for maintenance

### Flexible cloud based remote access

- Secure SSL and password protected Web Access to real time and historical data
- Limitless user accounts for web data access
- Secure cloud based data storage for all parameters
- Provides alarms via text message and email for any parameters that fall out of tolerance

### Comprehensive VSWR Sentinel for maximum protection

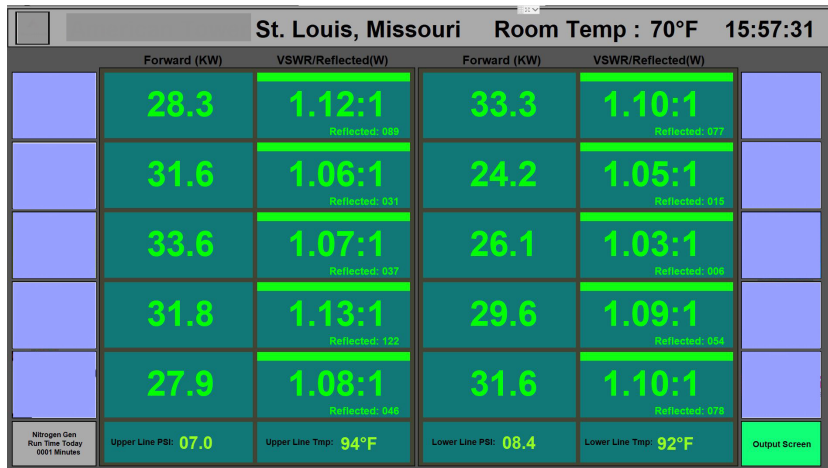
- Opens transmitter interlocks within 100 milliseconds of a VSWR being detected above the desired threshold
- 3 Strikes automatic reset logic included
- Interlocking of RF patch panels and lockout/tag-out switches
- Secure key-switch to lockout RF during tower climbing activities

On site installation, calibration and training included

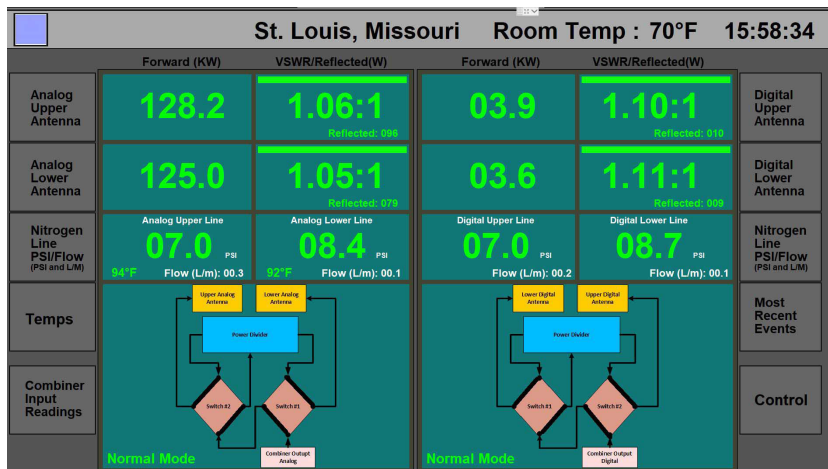
# Advanced Global Monitoring and Control

In addition to local control, Stellar Eclipse can be controlled from anywhere in the world with an intuitive, browser-based graphical user interface (GUI) over TCP/IP via a telecom or network connection with password protection. A rear RJ-45 jack is provided for LAN/WAN connection.

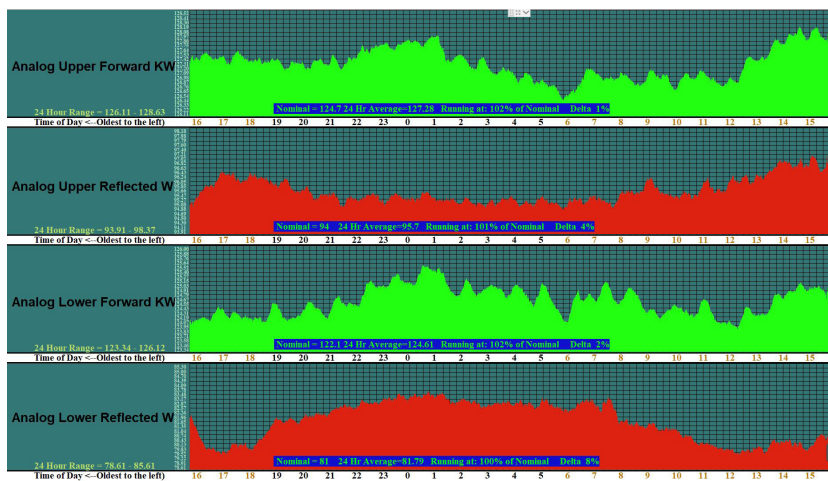
- Real-time public web pages are produced that show all critical values, and they are refreshed every few seconds. Each user can have access to real-time information via a web portal simultaneously.
- Employs artificial intelligence to examine data and make decisions about alerting operators and controlling interlocks, based on real-time data.
- Secure cloud Based Historical logged data is available remotely via a web portal to examine trends graphically.
- Cloud-based heartbeat monitoring assures the system is operating and connected to the internet 24/7
- Secure SSL and password protected Web Access for real-time and historical data
- Limitless user accounts for web data access
- Provides alarms via text message and email for any parameters that fall out of tolerance



Main system overview screen showing combiner inputs - forward power, reflected power, and VSWR displayed for each station. This can be customized to include station call letters and logos.



Display of combiner outputs showing all critical parameters along with motorized RF switch positions and modes of operation.



Extensive graphical displays capture critical values over time to allow for trend analysis.



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## Seattle, WA

Last Updated : 3/30/2021, 6:02:31 PM

### Combiner Outputs

[View History](#)

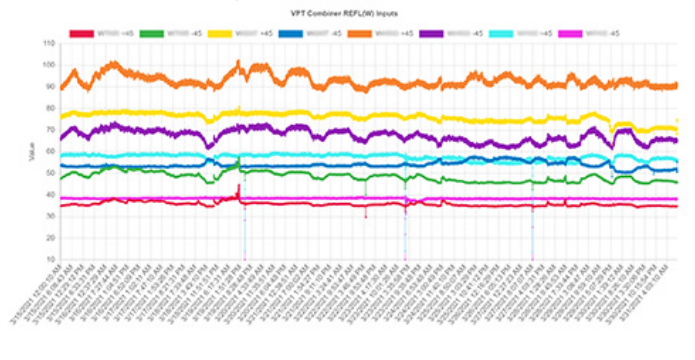
Source	FWD(kW)	REFL(W)	VSWR	Interlock
Combiner Out	94.9	16.4	1.03:1	✓
Analog Upper	28.5	221.2	1.19:1	✓
Analog Lower	63.4	369.8	1.17:1	✓

### Inputs

Source	FWD(kW)	REFL(W)	VSWR	Interlock
Input 1	15.0	92.5	1.17:1	✓
Input 2	17.2	46.0	1.11:1	✓
Input 3	17.8	111.8	1.17:1	
Input 4	14.8	32.8	1.10:1	
Input 5	16.0	25.9	1.08:1	
Input 6	15.5	75.2	1.15:1	

Real time data (updated every few seconds) is shown in table form and color coded for ease of interpretation on any desktop computer, tablet, or mobile device by logging in from anywhere in the world. Historical web based graphs can be displayed "on demand" for any time interval to examine trends for any monitored parameter.

VPT Combiner REFL(W) Inputs



## VSWR Sentinel – Protect the Entire System

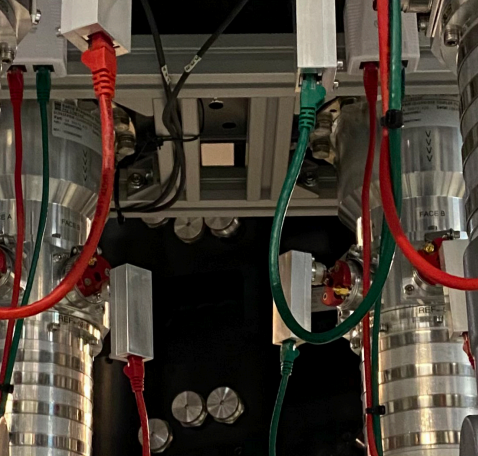
In recent years modern transmitters have incorporated updated VSWR foldback systems designed to keep a transmitter on the air at the highest power under a VSWR condition. These systems have done a good job ensuring the sensitive RF transistors inside the transmitter are protected while keeping the station broadcasting, however they can leave the rest of the RF system unprotected from costly damage as a result of prolonged operation at reduced power into a problematic antenna system.

Shulins Solutions employs artificial intelligence (AI) in our exclusive VSWR Sentinel software to rapidly monitor hundreds of data points continuously to catch even the most transient VSWR condition and promptly protect your system by opening interlocks to extinguish any arc and protect the antenna and RF system from costly damage.

Stellar Eclipse provides needed control and monitoring of all system interlocks including motorized wave-guide and coaxial RF switches, as well as dummy loads, patch panels, and phase shifters. This is extremely important because if RF energy is applied at the wrong time to any of these components, costly damage will occur.

## Monitor and Control Beyond the Transmitter

Stellar Eclipse provides complete site-wide management ideal for common antenna sites with many shared points of infrastructure that are often get overlooked on any one station's remote control. We can monitor common combiner outputs, reject loads and RF switches, backup power sources, UPS, tower lights, ambient temperature, line pressurization, nitrogen generators, door alarms, motion sensors, and even HD video cameras to provide you with a complete view of what is happening at your site.



Stellar Eclipse uses precision RF probes for superior accuracy and standard CAT5 RJ-45 connections for simple installation.

## Complete System Monitoring For Dual Feed Antennas

Recent implementation of dual polarization antenna systems for digital TV and variable phase technology (VPT) have led to an increase in dual feed antenna systems employing multiple transmission lines. We know that these antenna systems with dual transmission lines create a unique challenge for system monitoring and protection.

Traditional systems designed for single lines look only at each line in isolation. Stellar Eclipse has been designed from the ground up to provide a systems level approach that brings exclusive AI capabilities to evaluate the entire systems and provide instantaneous and balanced protection to multi feed line systems. Stations in major markets rely on Stellar Eclipse every day to provide RF system protection and peace of mind.



Each Stellar Eclipse includes a straight forward simple to use touchscreen on site to view system status and control. Cloud based connectivity provides for universal remote access.

## Modular Approach Means Simple Installation

We have been in your shoes and know that each transmission site is unique. Realizing early on that a “one size fits all” product is a compromise, Stellar Eclipse was designed from the ground up using a flexible modular approach that can be tailored to the simplest single station in a small market and scale up to a complex multi station combined site and anything in between. This flexibility allows you to start small and grow your system on your time frame and budget and also makes installation a snap. Stellar Eclipse uses standard off the shelf CAT-5 cabling for the interconnect between various probes, no complex wiring or remembering color codes. We take the guess work out of installations.

## A Great Tool Is Only Useful If You Know How To Use It

Paul Shulins has always been committed to helping broadcasters learn about new technology, and Stellar Eclipse is no exception. Each Stellar Eclipse systems includes free on-site system set up and hands on training to ensure you get the maximum benefit from your investment. Paul will help you tailor the system to your specific needs and be armed with an in depth understanding of how it works so you have a powerful tool to use every day to protect your facility.



Protecting your RF system includes monitoring beyond simply RF, Stellar Eclipse covers the entire system including line pressurization. Capturing a broad set of data allows our exclusive predictive algorithms to provide early visibility for potential issues before they happen.

## Protect Your Broadcast Infrastructure Investment

Broadcast transmission systems are expensive, complex, exposed to the elements, and difficult to access when certain components are located thousands of feet in the air. Repairs are always expensive both from a parts and labor standpoint and possible lost air time. Because you already have a significant investment in your transmission system, it makes good sense to use cutting edge technology to help minimize problems and maximize the life of your asset. To ensure your viewers and listeners receive a reliable crisp immersive experience that they can count on when they need you the most, put the power of Stellar Eclipse to work for you today and enjoy an ROI you can take to the bank. Your signal is worth protecting and we have both the experience and the technology to help!

**Contact Shulins' Solutions today and we will help you determine the most efficient solution to meet your needs.**

## CONTACT US TODAY!

Contact Shulins' Solutions today for broadcaster-centric solutions for your transmission site protection and monitoring, sUAS drone-based tower inspections and a full range of consulting services based on years of practical experience on the ground building and operating broadcast facilities. Let our team of experts help you craft the right solutions to solve your broadcast challenges.

### **Contact Information:**

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