STS designs, manufactures, and tests equipment for the lighting metrology industry.

Our attention to turn-around time and solutions has established our footprint in the aerospace, automotive, and naval lighting industries.

Our calibrations lab was first to attain Optical Radiation Accreditation by N.I.S.T.

SAE membership

- SAE members for 27 years
- Chair of Test Methods and Procedures
- Chair of Lighting Standard Practicies
- Sponsors of
  - J594 and J2041 - Reflex Reflectors
  - J1300 – Photometric Accuracy Guidelines
  - J3100 – Camera-based Photometry

GTB membership

- U.S. Delegates at global meetings
- Also represented by a prior GRE Chairman and Senior Regulatory Developer of Transport Canada
- Active member of GTB Photometry workgroup

STS provides to the Industry

- TDA Series - Test Data Acquisition Systems
- FFP (Far-field Photometer) – Forward / Signal Light Pattern Analyzing Systems (Patent Pending)
- AP-80, AP-60, AP-48, and AP-24 Goniophotometers (CE marked)
- VTM-100 Vibration/Shock tester (CE marked)
- VOA Series – Camera-based ADB (Advanced Driving Beam) Testing
- Integrating Spheres
- Photometric and Environmental testing
- Equipment installation and repairs (for most manufacturers measurement equipment)
- Calibrations
- Training
- *Automated Test Equipment for any type of quality control and product life testing including data acquisition and extremely long-life cycle testing*

TDA-100 Fully Automated Test Data Acquisition

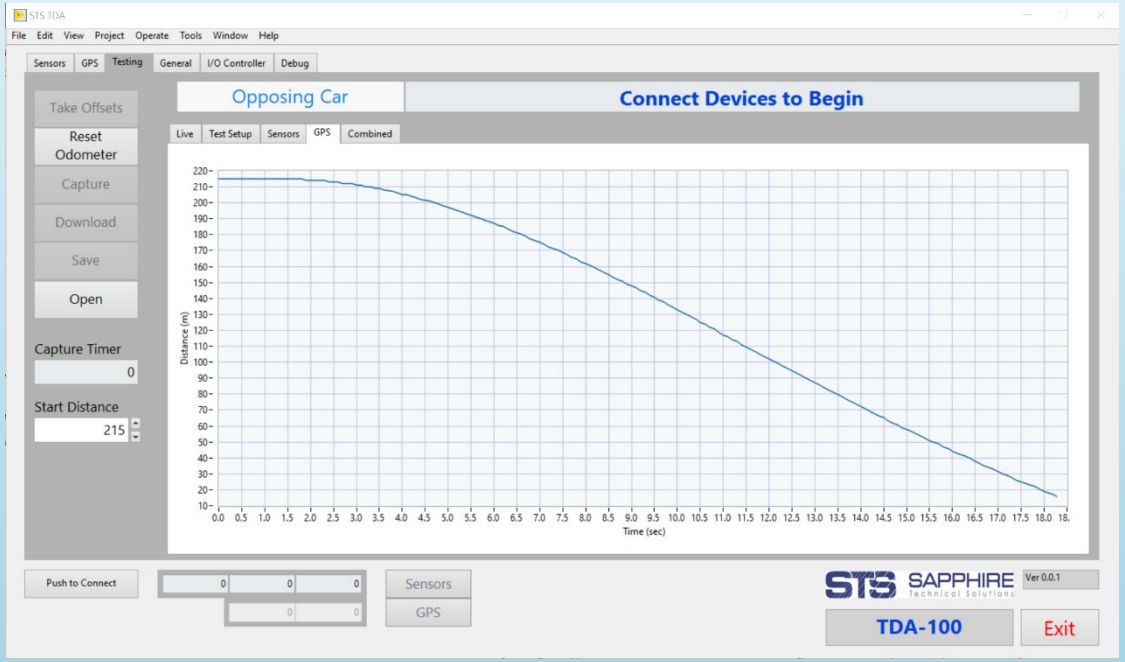
Testing for SAE J3069 Adaptive Driving Beam

- 18 test drives
- Opposing Vehicle Fixture – car, truck, motorcycle
- Preceding Vehicle Fixture – car, truck, motorcycle
- Some tests with fixture lamps on during whole run
- Some tests with fixture lamps suddenly exposed
- Record illuminance (lux) levels vs distance between ADB vehicle and test fixture

TDA-100 (Test Data Acquisition)

TDA-100 – J3069 Software

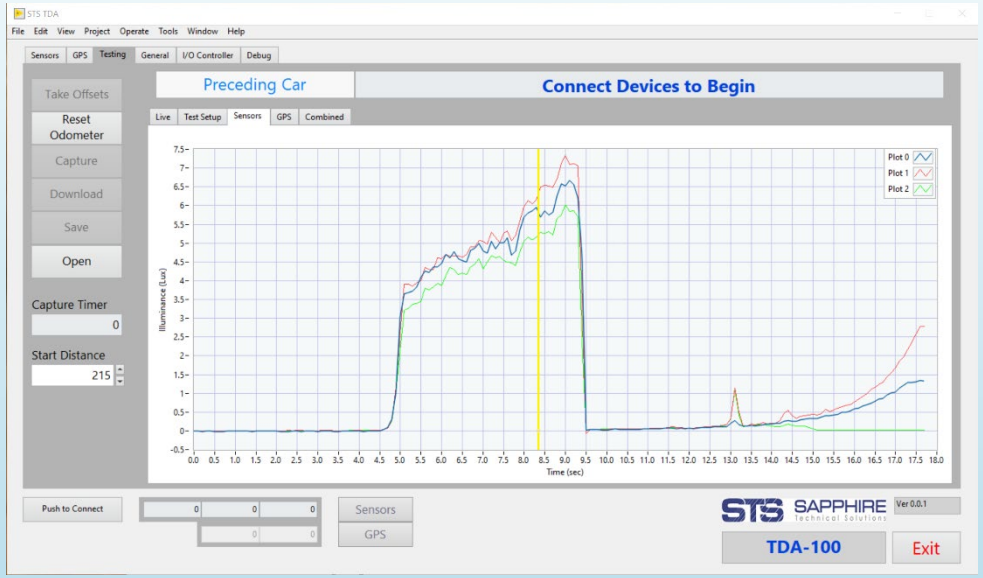
- Runs on a standard laptop
- Automatically coordinates and stores all data from photometers and GPS of test vehicle
- Automatically prompts operator for test setup based on J3069 vehicles (car, truck, motorcycle with opposing vs preceding setups)
- Compiles reports of vehicle runs for export to PDF or email.

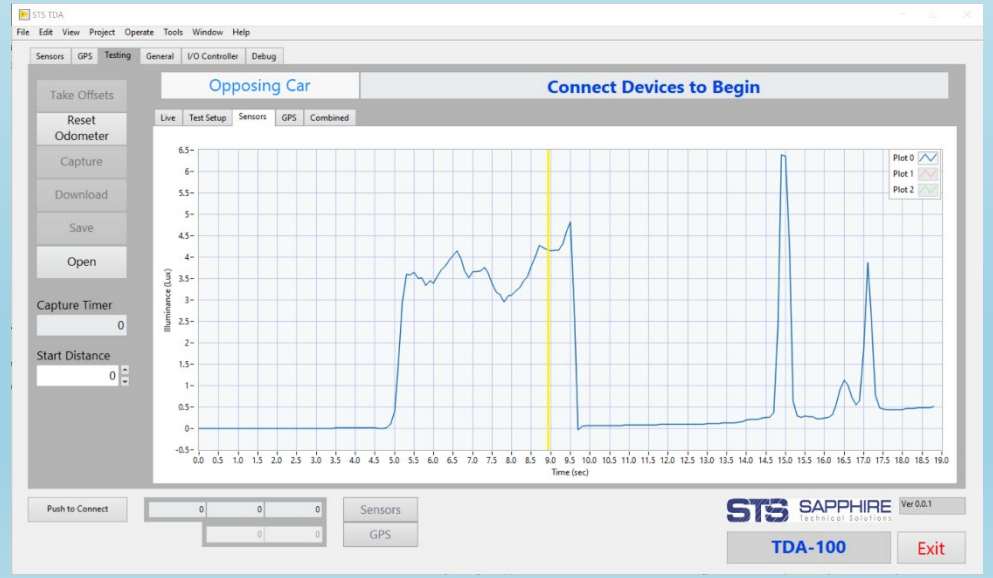


TDA-100 (Test Data Acquisition)

TDA-100 – Reports

- Distance vs Time-Opposing Car (LB Only)
- Illuminance vs Time-Opposing Car (LB Only)
- Illuminance vs Distance-Opposing Car (LB Only)
- Distance vs Time-Opposing Car
- Illuminance vs Time-Opposing Car
- Illuminance vs Distance-Opposing Car
- Illuminance vs Distance-Opposing Car (LB Only Baseline)
- Distance vs Time-Preceding Car
- Illuminance vs Time-Preceding Car
- Illuminance vs Distance-Preceding Car





TDA-100 (Test Data Acquisition)

TDA-100 – Fully Automated Test Data Acquisition

- Self-contained unit runs off 12V rechargeable battery (6-8 hours run time)
- Combines GPS Test vehicle distance with up to 5 “live” photometer lux readings during test runs.
- Simple Ethernet connection to photometers and laptop for use with TDA reporting software.
- Used for J3069 Adaptive Driving Beam

TDA-100 (Test Data Acquisition)

TDA-100 – ADB Vehicle Remote

- Runs off 12V of test vehicle or separate battery
- Remote start of data acquisition
- Remote on/off of “static” and “suddenly exposed” lights.
- GPS unit measures and stores distance to test trailer/test base.
- Data coordinated and automatically evaluated with TDA-100 Software.
- Can be used with: Customer manual set-up or RITT trailer set-up/weatherproof.

TDA-100 (Test Data Acquisition)

LS-300 – Remote Controlled Light Sources

- Un-spillable rechargeable 12V battery
- Remote turn on/off up to 300m
- Operate from within the ADB vehicle
- Digital trigger on Light Controller for data acquisition interface

LS-300 for TDA-100 (Test Data Acquisition)

LS-300 – Remote Controlled Light Sources – Head Lamp

- Self-regulated internal power supply
- Uniform 300cd +/- 5% over conical 15 degree angle
- Remote turn on/off up to 300m
- Long-life incandescent white source
- Future LED with PWM add-on

LS-300 for TDA-100 (Test Data Acquisition)

LS-300 – Remote Controlled Light Sources – Tail Lights

- Self-regulated internal power supply
- Uniform <7cd over conical 25 degree angle
- Remote turn on/off up to 300m
- Long-life incandescent white source with red filter
- Future LED with PWM add-on

LS-300 for TDA-100 (Test Data Acquisition)

Photo-150 High Accuracy Photometer

- Cosine-Corrected Optic
- Up to 200 readings/sec
- Extreme low-light accuracy
- Built-in “Ambient Light” offset.
- Auto-ranging for 9 decades of Illuminance (lux) levels (0.0001 – 100,000 lux)
- Single Cord - POE powered by Ethernet

Photo-150 for TDA-100/200 (Test Data Acquisition)

Light Rider Series - RITT

RITT - Road Illumination Testing Trailer ©STS - 2020

TDA-200 Fully Automated Test Data Acquisition

Testing for NHTSA NPRM Adaptive Driving Beam

- Easily modified to meet final ruling
- 13 test scenarios/drives
- Individual GPS units in test vehicle and stimulus vehicle automatically calculates distance between vehicles
- Photo-150 Photometers can be mounted inside/outside of front windshield, back windshield, or on motorcycle surfaces of stimulus vehicle
- Full system fits in a back-pack and is fully portable.

TDA-200 (Test Data Acquisition)

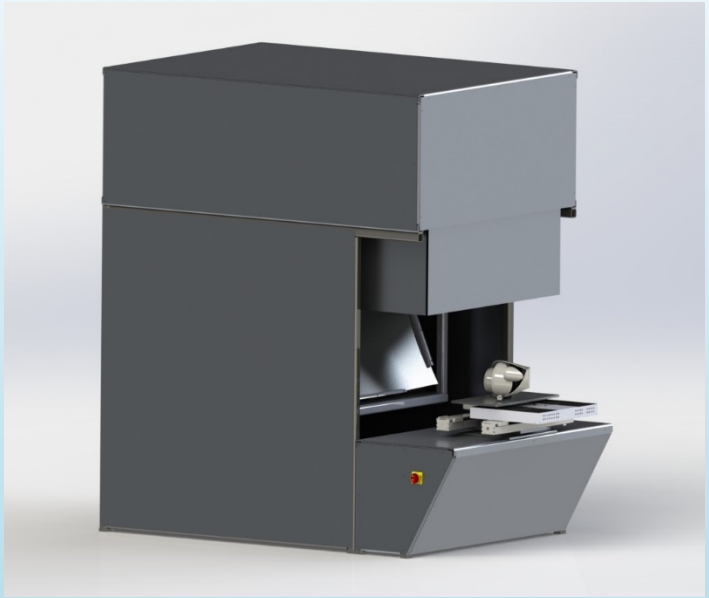
FFP-400 – Far-Field Photometer (Patent Pending)

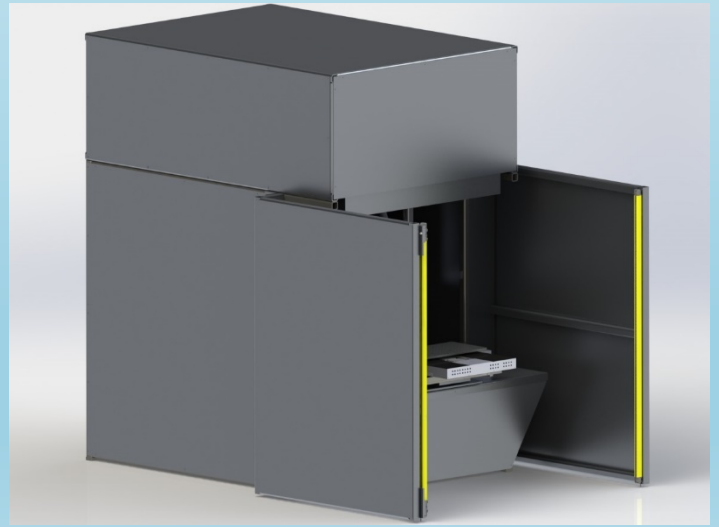
- Measures FMVSS test points truncated to +/- 10 degrees L/R and U/D field of view in static system. +/- 180 degrees L/R in system equipped with rotary stage

- Configurations include on-vehicle testing, lamp assembly line testing, combination goniometer/FFP laboratory testing, audit station / car dealership / repair shop aiming

- Full beam distributions of +/- 45 L/R, +/- 10 U/D in 0.01 degree resolution in under 45 seconds

- “True” optical path measures forward lighting and signal lighting in same system without use of imaging lenses





FFP-Series (Far-Field Photometer) (Patent Pending)

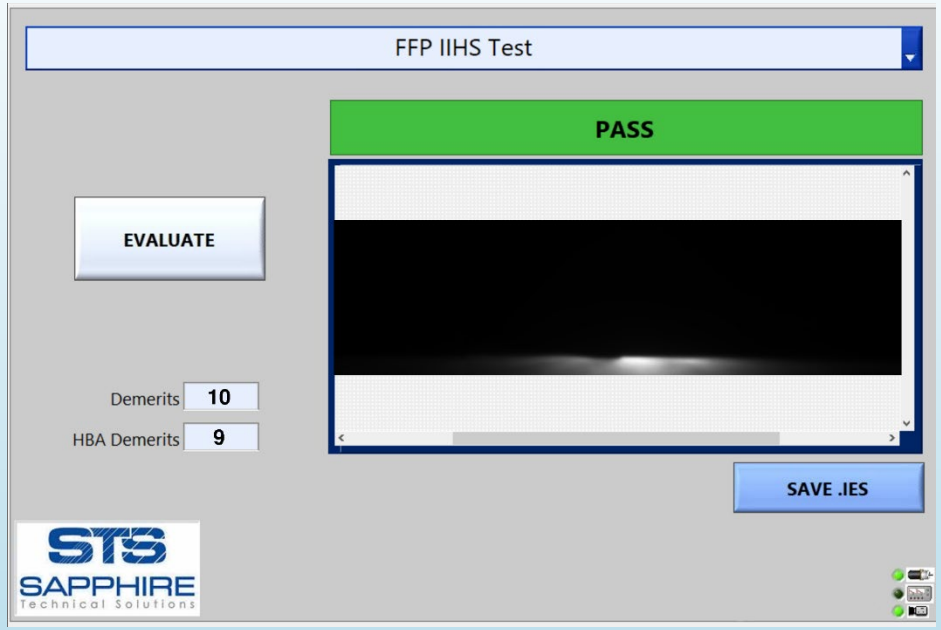
FFP-400 – Far-Field Photometer

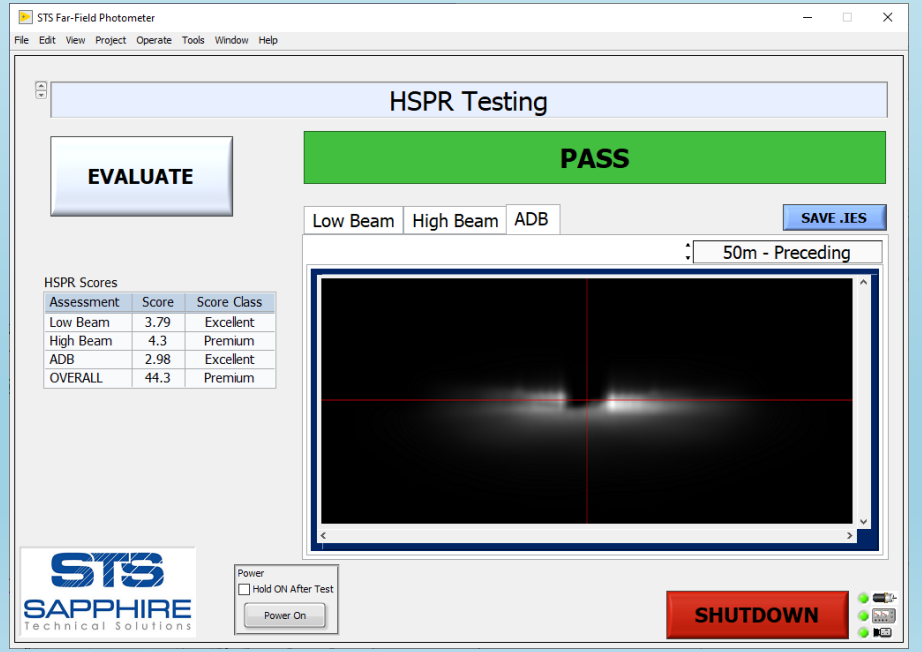
- Automated acquisition and storage of the forward-lighting pattern for analysis and comparison. Single process records and stores aiming and intensity information for improved efficiency and time savings

- Provides beam distributions, pass/fail for FMVSS108/SAE/ECE test results, IIHS protocols, UN-ECE HSPR (Headlamp Safety Performance Rating) measurement and calculation.

- Software capable of assisting operator with onscreen aiming for VOR, VOL, UN-ECE with gradient values, angular position, and inclination

- Quantitative evaluation of the “gradient/cutoff” line, along with actual total lumens of the area of the light pattern captured

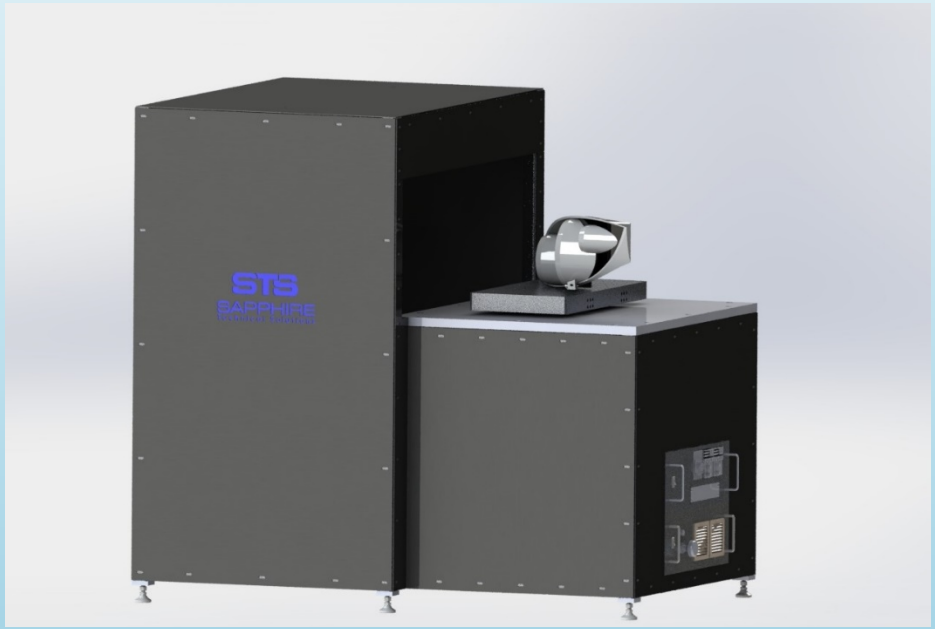




FFP-Series (Far-Field Photometer) (Patent Pending)

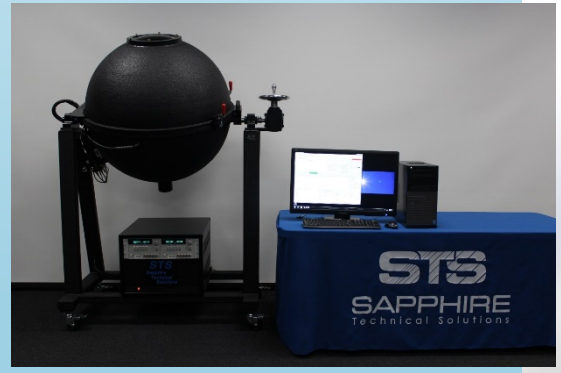
FFP-400 – Far-Field Photometer

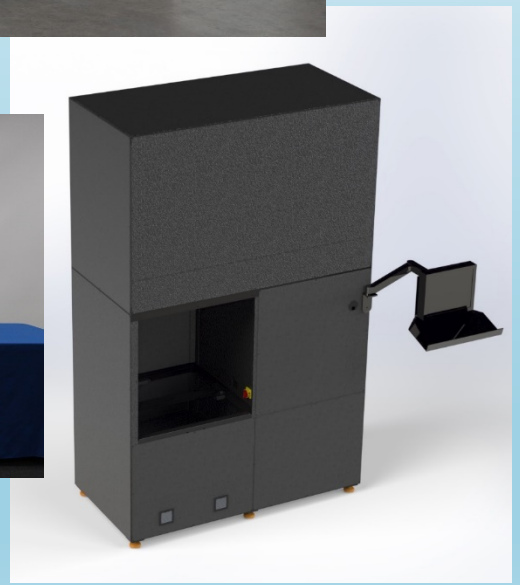
- +/- 10% (or less) correlation to goniophotometer data.
- Measures points, lines, zones of both forward lighting and signal lighting
- Virtual Test Distances: Infinity (100ft, 25m, 10m, and other requested distances available)
- Entrance mounting height is 42 inches off the floor for adding your fixture/lamp in front of the unit
- Rotary table option for expanding the L/R axis field of view to full 360 degrees
- Bar Code reader



FFP-Series (Far-Field Photometer) (Patent Pending)

Additional Products





- Goniophotometers
- Visual Optical Aiming (VOA) System
- Integrating Sphere
- Photometers and Light Sources
- VTM-100 Vibration Test Machine
- VP-100 Vertical Photometer
- Spectroradiometer
- TDA-100/200 – Fully-Automated Vehicle Test Data Acquisition System

Visual Optical Aim Photometer

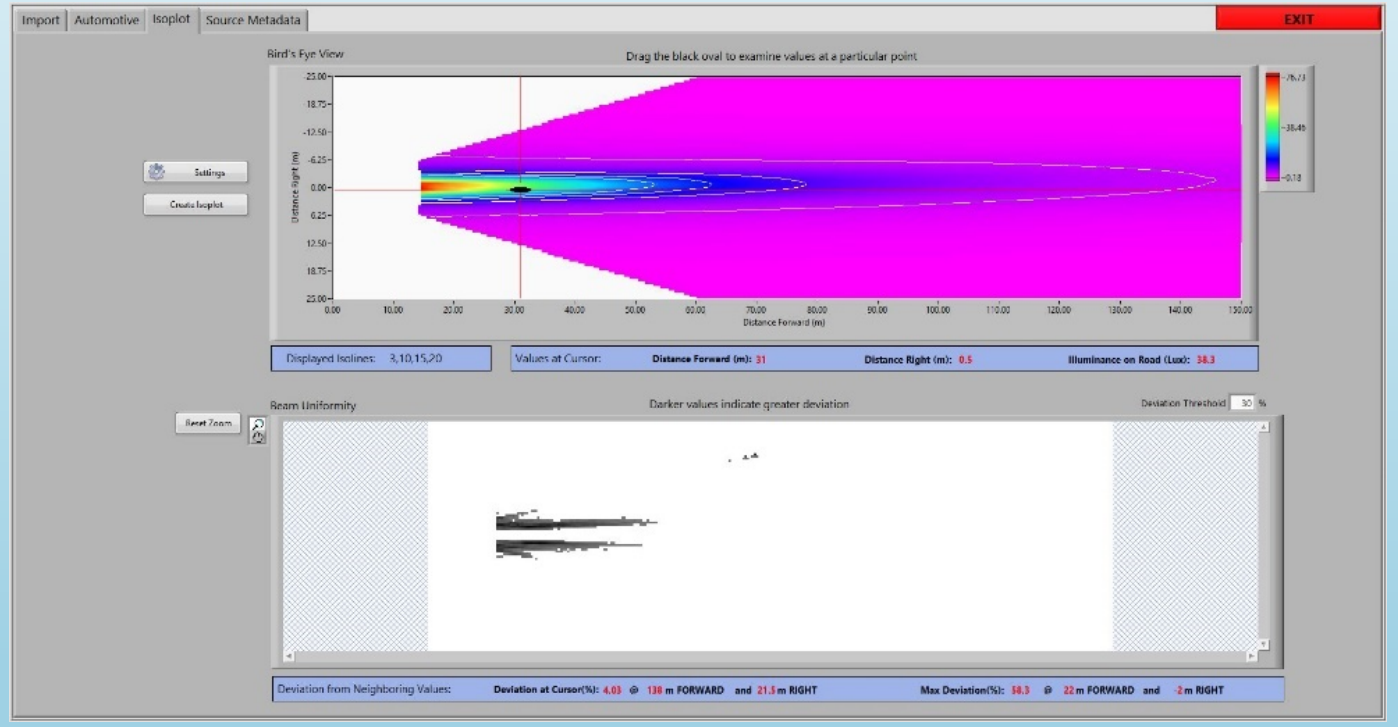
- Precision charge coupled device (CCD) camera based photometer
- Provides comparable photometric values to a goniophotometer with a high degree of repeatability and long-term accuracy
- Able to aim headlamps, measure and record gradient value, cut off position, total lumens of lamp (in projected area) and more

VOA-100

- Software which analyzes lighting data files (standard IES files)
- Simulate and calculate the amount of light that will strike pre-defined target areas with single or multiple lamps illuminated

- Calculates IIHS rating for vehicle and lux values for Consumer Reports posts
- Future protocols – NHSTA and NCAP
- Analyzes light data file

STAND ALONE SOFTWARE PACKAGE



Beam Scale HF (Human Factors)

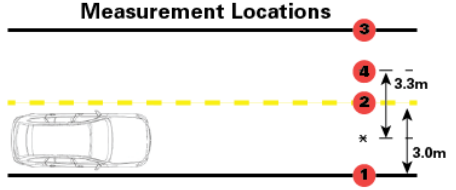
IIHS Rating Protocol

Measurements | Post Gradients | Isoplot | IIHS | 2016 My Make My Model (DVN Demo) | SAVE REPORT | CLOSE

Predicted Rating

Total Demerits	45	POOR
Total Demerits with High Beam Assist	43	POOR

Measurement Locations



1 2 3 Visibility illuminance measurements, 25cm from ground
4 Glare illuminance measurement, 110cm from ground
x Origin of coordinate measurement system

IIHS Visibility Calculations

5 Lux Distances (in meters)

	Low Beams	High Beams
Straightaway Sensor 1	96.18	140.68
Straightaway Sensor 3	56.05	108.11
R250 RIGHT Sensor 1	53.55	62.75
R250 RIGHT Sensor 2	58.96	70.1
R250 LEFT Sensor 1	56.31	67.73
R250 LEFT Sensor 2	50.86	60.73
R150 RIGHT Sensor 1	46.98	51.92
R150 RIGHT Sensor 2	52.28	59.29
R150 LEFT Sensor 1	50.6	57.5
R150 LEFT Sensor 2	46.08	51.21

Low Beam Measurements

Approach	Min	Critical	Actual	Visibility Demerits	Demerits with HBA	Exceeds Critical?
Straightaway right edge	100	70	96.18	1.15	0.76	OK
Straightaway left edge	60	40	56.05	1.78	1.19	OK
250m radius RIGHT curve -- right or left edge (min)	70	50	53.55	2.47	2.01	OK
250m radius LEFT curve -- right or left edge (min)	70	50	50.86	2.87	2.38	OK
150m radius RIGHT curve -- right or left edge (min)	60	40	46.98	1.95	1.71	OK
150m radius LEFT curve -- right or left edge (min)	60	40	46.08	2.09	1.83	OK

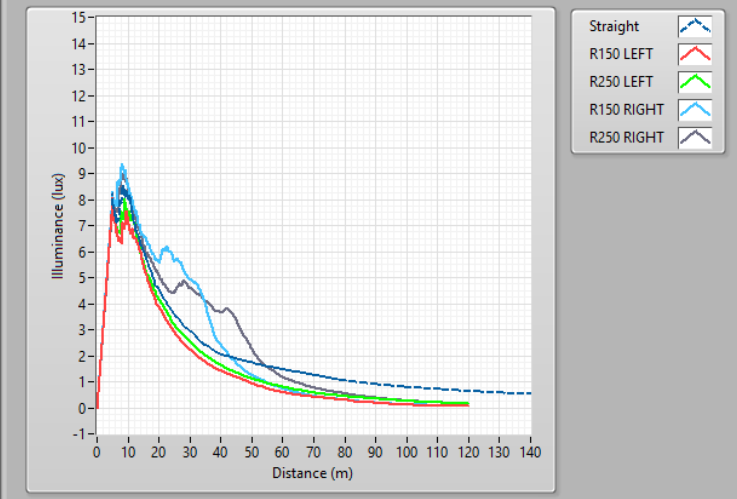
Glare Msmts

Glare Exceeded?	% Over Limit	Glare Multiplier	Glare Demerits
NG	54.15	36	19.49
NG	37.85	6	2.27
NG	40.47	6	2.43
OK	0.00	6	0.00
OK	0.00	6	0.00

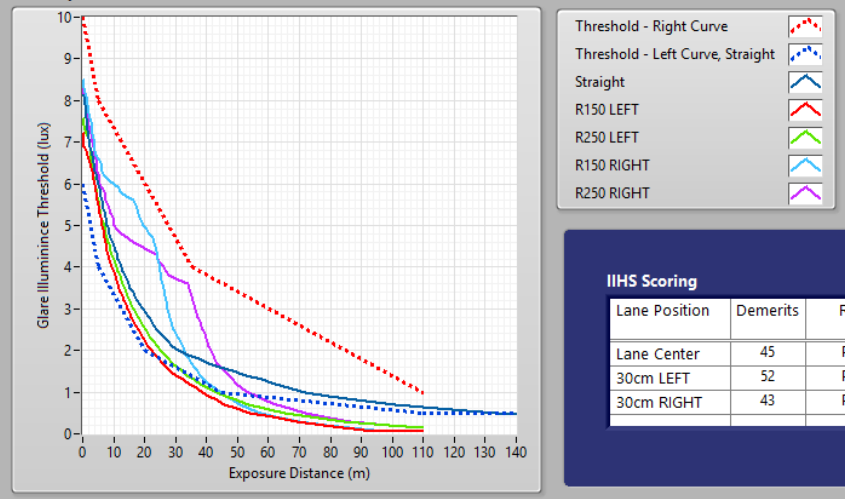
High Beam Measurements

Straightaway right edge	150	120	140.68	0.93	OK
Straightaway left edge	150	120	108.11	4.19	NG
250m radius RIGHT curve -- right or left edge (min)	80	60	62.75	0.86	OK
250m radius LEFT curve -- right or left edge (min)	80	60	60.73	0.96	OK
150m radius RIGHT curve -- right or left edge (min)	70	50	51.92	0.90	OK
150m radius LEFT curve -- right or left edge (min)	70	50	51.21	0.94	OK

Glare Illuminance Measurements



Glare Exposure (Distances Greater Than 10 meters)



IIHS Scoring

Lane Position	Demerits	Rating	Demerits w/AHB	Rating w/AHB
Lane Center	45	POOR	43	POOR
30cm LEFT	52	POOR	49	POOR
30cm RIGHT	43	POOR	40	POOR

Beam Scale HF (Human Factors)

Reflex Color Transmission Tester

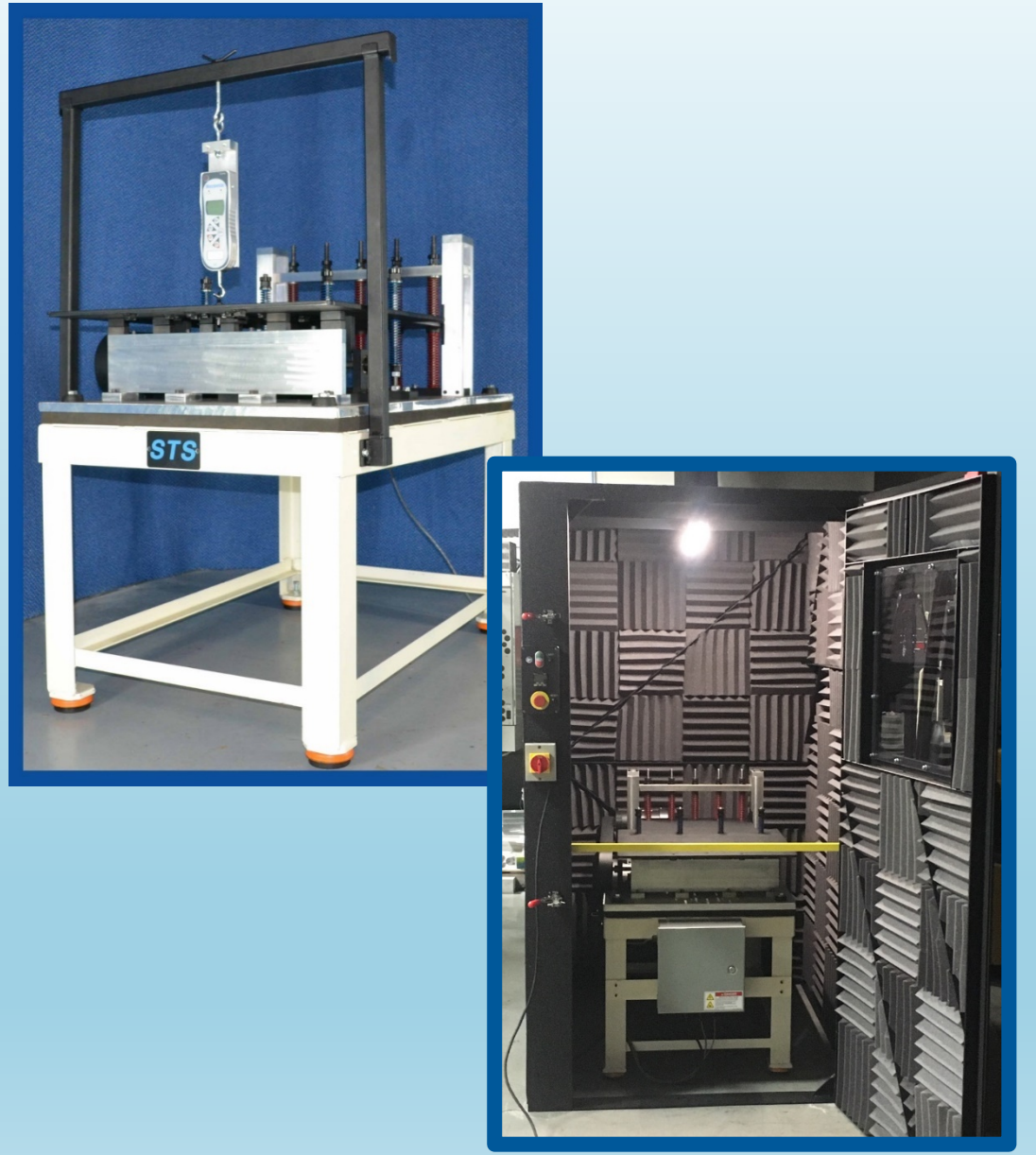
- Fast, accurate reflector color measuring tool
- Utilizes same recommended 2856K light source as a goniophotometer
- NIST traceable calibration
- Fully portable with small laptop or netbook
- Software driven with custom chromaticity color specifications

Spectro-101

Vibration Test Machine

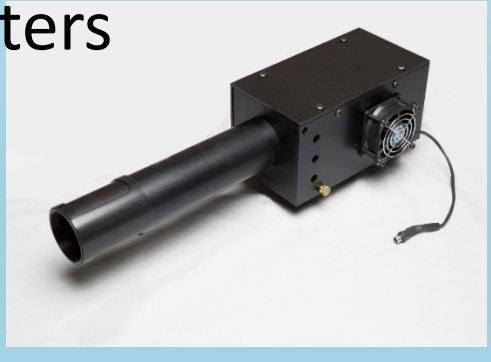
- Heavy duty vibration test machine
- Has precise, simple adjustments to allow for the testing of many different components for possible mechanical failure
- Complies with FMVSS108, SAE J575 and SAE J577
- Safety Device Enclosure option for CE compliance

VTM-100



Projector Light Source

- High performance, uniform projecting light sources for use in retro-reflex testing
- May be incorporated in a large variety of test measurement systems including:
  - Goniophotometers
  - Vertical Photometers
  - Comparators



High Accuracy Photometers

- Extreme low light accuracy
- May be incorporated in a large variety of test measurement systems including:
  - Goniophotometers
  - Vertical Photometers
  - Comparators
  - Integrating Spheres, Illuminance / Luminance meters and LED Testing

LS-100 and Photo-100

- Calibration
- Testing
- Training
- Installation / System set up
- Lab design
- Repair and diagnostics of most manufacturer photometric equipment

Services

- Luminous Intensity Standards
- Illuminance Meters
- Total Radiant Flux / Intensity
- Integrating Spheres
- Angular Positioning
- AC/DC Power Supplies
- Spectroradiometers
- Night Vision / NVIS

Laboratory Services – ISO/IEC 17025 Accredited

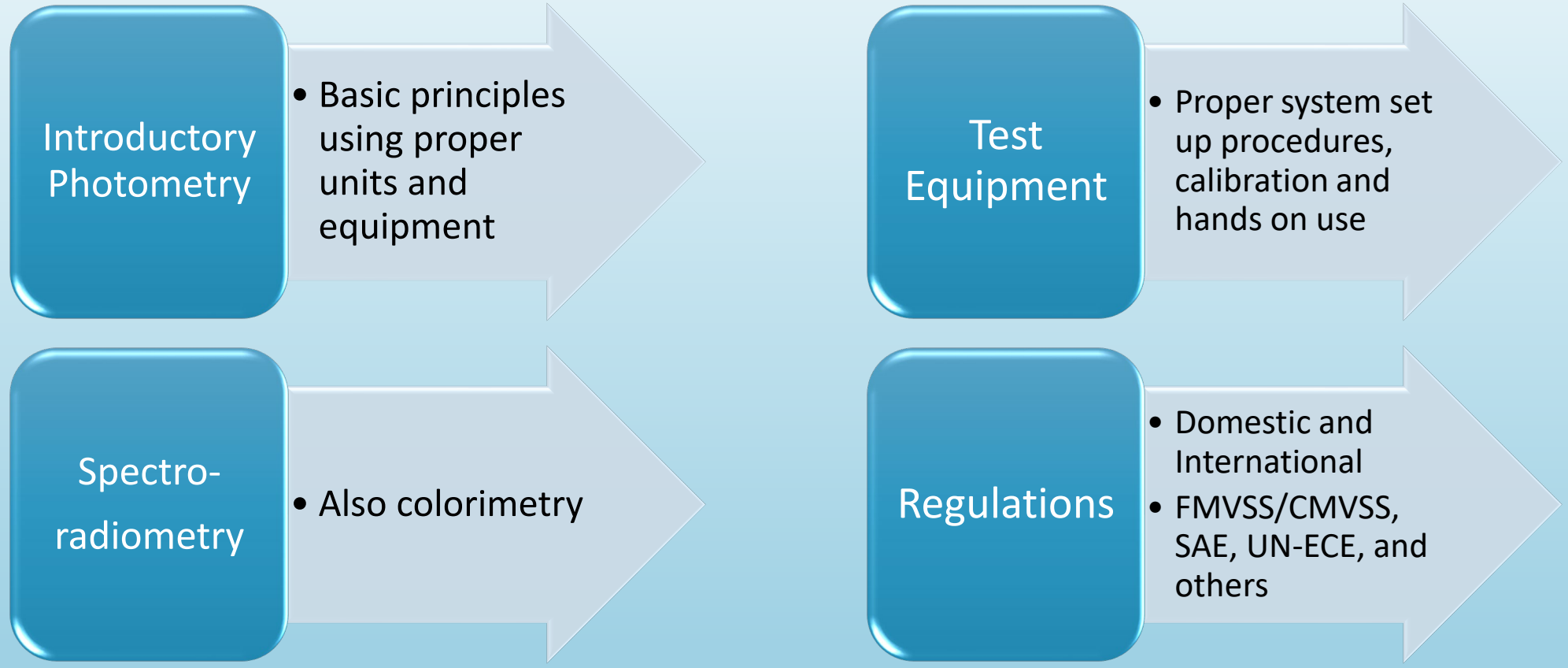
Photometric Testing

- ISO/IEC 17025
- SAE, UN-ECE, JIS, FMVSS108, TSD108 (Canada) and other exterior lighting regulations
- Two 100-foot long testing tunnels
- 1.5 Meter Integrating Sphere
- 10-foot Precision Photometric Bench
- Performance-based Forward Lighting Testing

Laboratory Services

Environmental Testing - SAE / FMVSS108

Photometric & Goniophotometer Training



STS provides comprehensive customer training to utilize their testing personnel and equipment to their fullest potential.

CONTACT sales@sapphirests.com for more details