SLS

System Level Solutions

Designing Through Innovation

RESEARCH | DESIGN | DEVELOPMENT | MANUFACTURING

Empowering companies to take a vision & turn it into reality using innovative technologies.

PARESH PATEL (M.S.E.E.)
PRESIDENT & CEO

About SLS

WE ARE A

—— Product and Service Company

INTO

—— Hardware & Software

ESTABLISHED AS

—— Turnkey Solution Provider

Quick Facts

100+
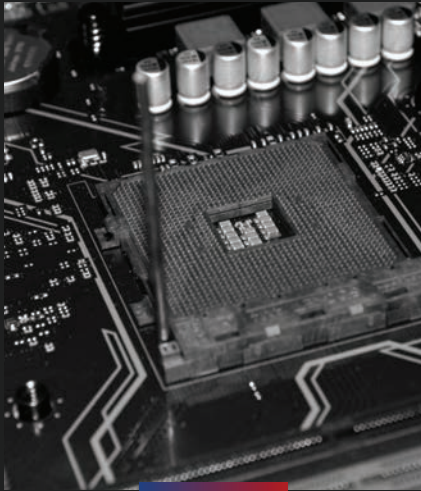active projects across the globe
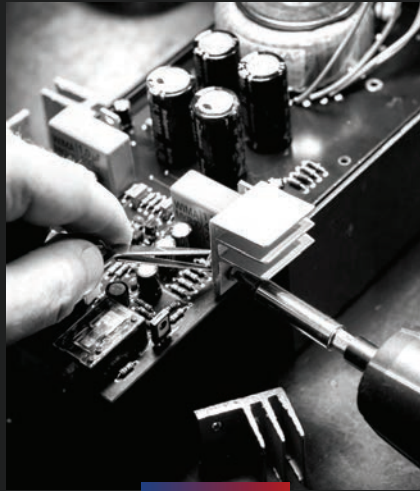
300+
in-house staff

20
years and counting

- No of business verticals : 6+
- Operating Base: India, UK, USA
- No of manufacturing plants : 1
- In-house Design & Manufacturing Capability
- Part of Make-In-India initiative

Our Core

IP Cores & FPGA Design

Hardware Design

Software Development

Client Servicing

FPGA & IP Cores

Ready to go Solution for
IP cores & FPGA Design Services

SLS provides the ready-to-integrate solutions for
FPGA design by offering various interfaces,
communication protocols, memory controllers,
processors, and much more. Along with IP Core,
SLS FPGA team is experienced in working with all
major FPGA key vendors like Intel FPGA, Xilinx,
Microsemi, Lattice.

intel.
partner Titanium

Offerings

- **IP Core Development**
- **FPGA Turnkey Solutions**
- **ASIC to FPGA Solutions**
- **Flexible Business Policy**
- **Serving Customers For 15+ Years**
- **IP Core Customization**
- **Product Customization Solutions**
- **Driver Development**
- **Excellent Customer Support**

Communication

- USB 1.1 Device/Host
- Embedded USB3.1 Gen 1 Device
- **Embedded USB3.1 Gen2 (10Gbps) Device Controller**
- USB 2.0 Device/HUB/Host/OTG
- Ethernet MAC (10/100)

Others

- SD/eMMC Host Controller
- I2C Master/Slave/Controller
- SPI Slave to Avalon Master Bridge
- I2S Controller

FPGA Design Tools

- Intel Quartus Prime
- Microsemi Libero
- Modelsim
- Xilinx Vivado and ISE
- Lattice Diamond, Radiant

OS and HAL Drivers to support IP cores

End-to-end product development of applications
to support IP Core

Software Development

SLS leverages its world-class team of software developers to provide quality turnkey solutions using creative ideas, latest technologies, expertise in domains of embedded solutions, system solutions, web solutions, and application solutions for a wide range target platforms and operating systems including real-time OS.

Web Development
- Cloud Solutions
- Custom Web Application

System Development
- System Porting & Customization
- Driver Development

Enterprise Solutions
- HRM System
- ERP System

Application Development
- Windows Development
- Product Development

Mobile App Development
- Application Development
- System Porting & Customization

Embedded Solutions
- Firmware Development
- Driver Development

Technology Capability

Web Servers: IIS, Apache, NGINX , Jetty,

UI development: Bootstrap, jquery, Javascript, HTML5, CSS3, Angular

Server Side Languages: .NET, C#, PHP, .NET MVC, .NET Core, WPF, JAVA, Python

Databases: PostGreSQL, MySQL, MSSQL, MongoDB, Cassandra, sqlite

Messaging: MQTT, WS, AMQP, Nodejs, RabbitMQ

Frameworks: Joomla, Wordpress, Spring boot, Gradle, Spring, MVC, Hibernate Build

Version management: Jenkins, Docker, Github

OS: Windows, Linux, CentOS

Data Exchange: JSON, AJAX, XML, SOAP

Mobile: Android, Flutter, iOS, React Native

RF & Microwave
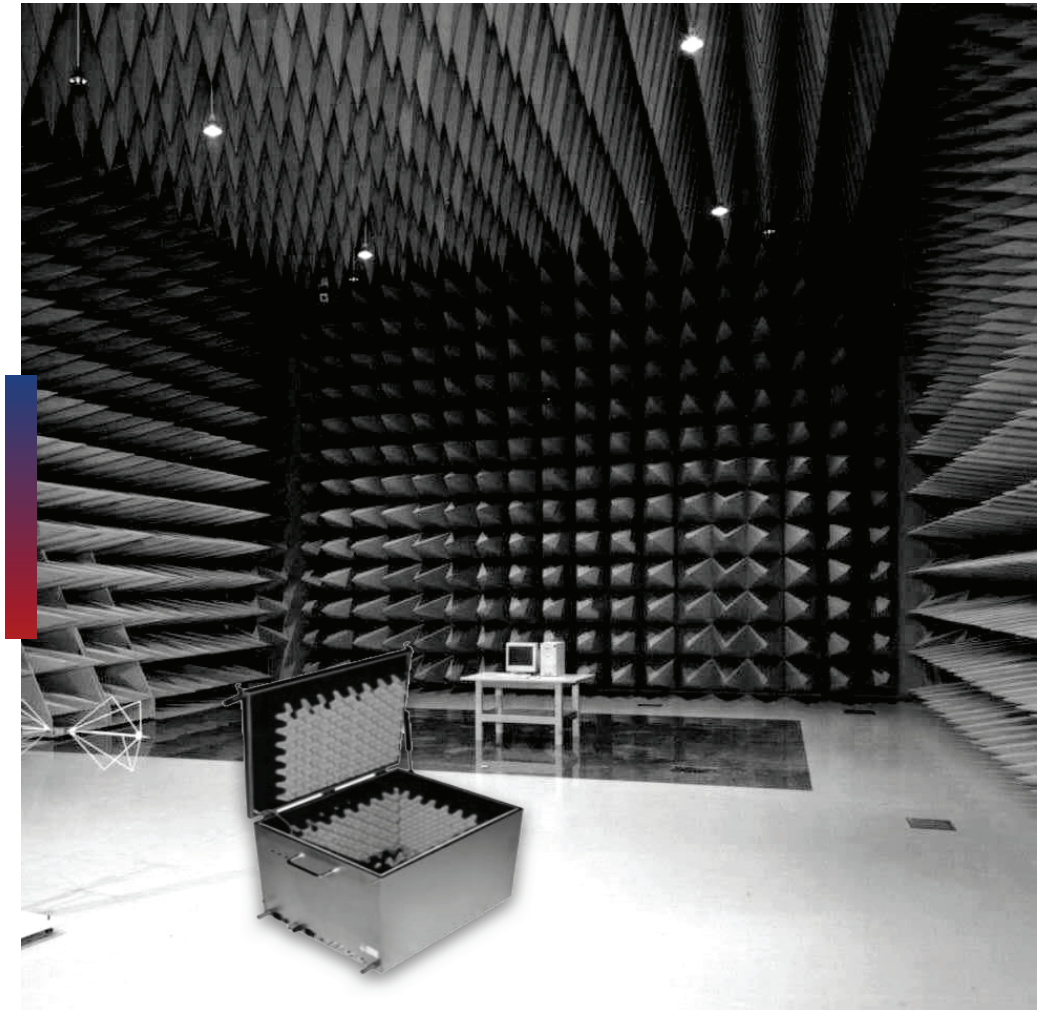## (Measurements Tools & Test Lab)

SLS is equipped with a gamut of RF capabilities which enables it to provide a broad range of Pre-compliance testing facility.
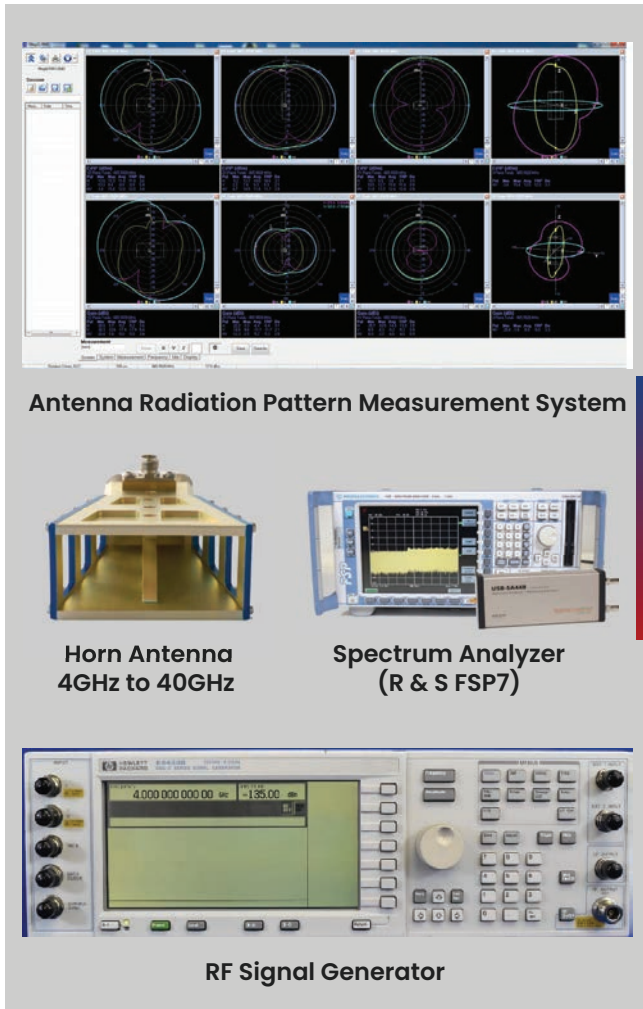
RF Fully Anechoic Chamber

- Semi-Anechoic Chamber (L x W x H) 5 x 4 x 3 meter 3 with 100dB isolation
- Accurate TRP measurement using MegiQ system
- Accurate radiative measurement
- 100dB isolation

Shielding Box

- Conductive sensitivity measurement
- Frequency Range: 700 MHz-4200 MHz
- Dimensions(mm): 550 x 450 x 400 outside

Antenna Radiation Pattern Measurement System

Horn Antenna 4GHz to 40GHz

Spectrum Analyzer (R & S FSP7)

RF Signal Generator

Horn Antenna 4GHz to 40GHz

- Used For radiative spurious measurement
- Frequency Range: 4 GHz–40 GHz
- Maximum Input power: 300W (peak)
- Nominal Impedance: 50 Ohm
- Gain: Up to 17dBi

Spectrum Analyzer (R & S FSP7)

- Frequency Range: 9 kHz to 7 GHz
- Resolution bandwidths: 1 Hz to 10 MHz
- Display Average Noise Level: -155 dBm (1 Hz)
- Frequency Resolution: 0.01 Hz

Antenna Radiation Pattern Measurement System

- Total Radiated Power (TRP) and 3D Radiation Pattern measurement
- Antenna Gain Measurement
- Measurement system adopts the standard method to account for the limited sample data doing only a 3-axis rotation which is done in cooperation with Philips EMC labs

RF SoC Parameter Measurement

- Conductive O/P Power
- Chip Sensitivity
- Chip Reflection (S11)
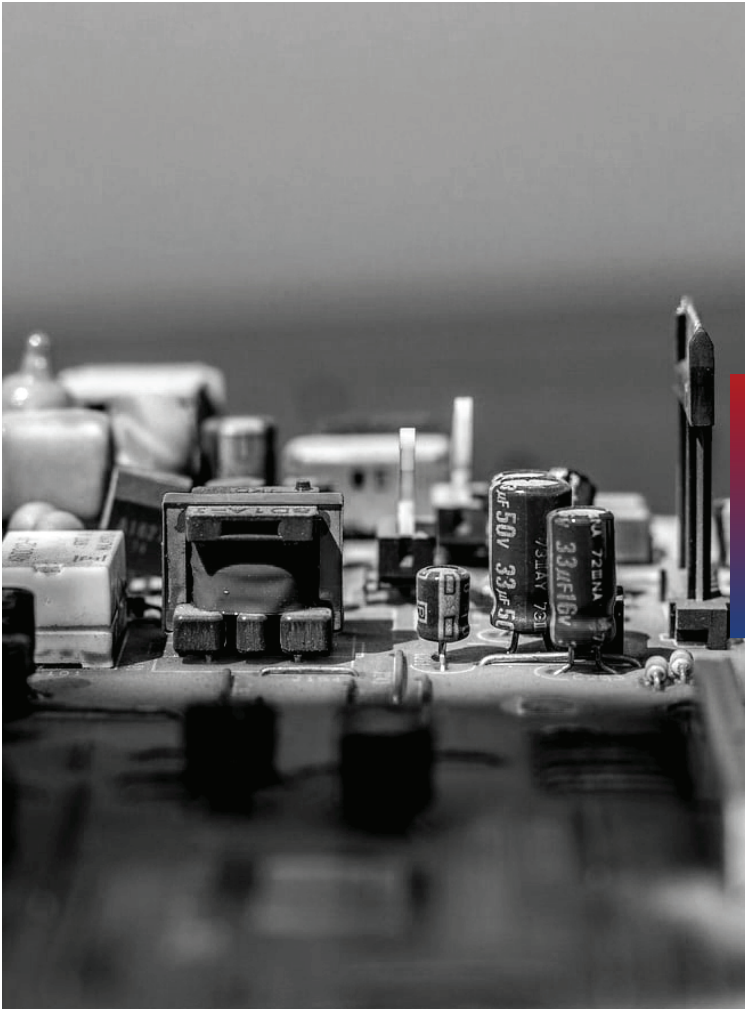- Impedance matching

In-House Products and Radio Pre-Compliance Test Facility

- Out of Band Emission
- Occupied Channel Bandwidth
- Transmitted conductive emission in spurious Domain

*Tested as per EN 300-220/EN 300-328 and FCC15.247 Standard.

RF Signal Generator

- Frequency Range: 250 kHz to 4000MHz
- Output Power Range: -136 dBm to +10 dBm

PCB Design

SLS is a turnkey provider of a wide range of PCB Designs starting right from schematic to final Gerber release. The services include designing high speed board designs, multi-layered, multi-CPU and high performance board designs to suit varying customer manufacturing requirements.

High Speed Digital Design upto 10Gbps (USB3.1 Gen 2)

eUSB 3.1 Gen 2 is designed using the Intel FPGA built-in 10 Gbps transceiver. It is a one-stop solution for all USB requirements ranging from USB 3.1 to USB 2.0

RF Microwave PCB Design

2.4GHz, Sub-GHz Antenna-Radio Chipset Board/Module Design

Add/Snap On Boards

Santa Cruz Add/Snap On Boards (based on Intel FPGA Mother boards) like USB2.0 ULPI Add on, Stackable Stepper Motor Drive Board

Customised Boards

Linux Yocto OSGi based Industrial IoT board with built in web interface and edge computing capability having multi network connection - Dual ethernet/Wi-Fi/GSM, Rs. 485 (Modbus) AIO & DIO features

Development Boards

USB 3.0 5Gbps High Speed Development Board

HSMC Boards

High Speed Mezzanine Cards up USB3.2 Gen2 10Gbps Communication Channel as well as 400MSPS ADC-DAC boards

Manufacturing Infrastructure

Assembly

- Reflow Oven
- Multi-Function Pick and Place
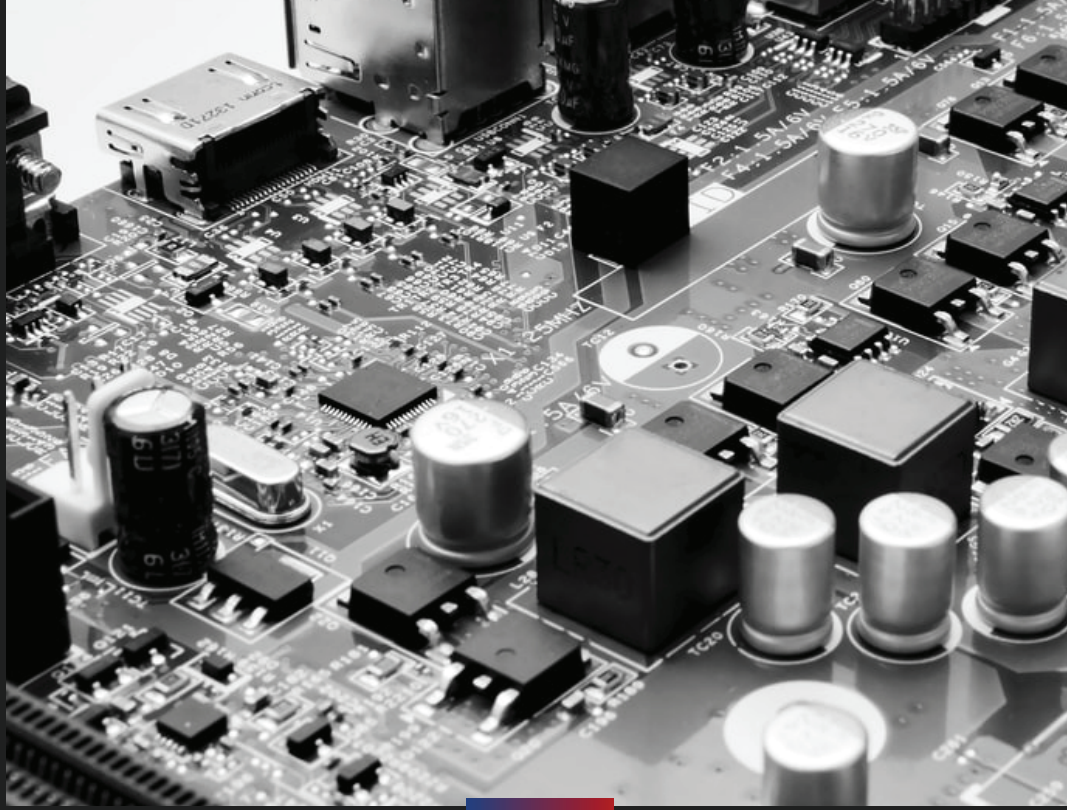- Selective Soldering Machine

Operational Tools

- PCB Prototype Machine
- BGA Rework Station
- CNC Machine
- 3D Printer

Testing and Quality Assurance

- Environment Test Unit
- Dust Resistance Tester
- Thermal Shock Machine

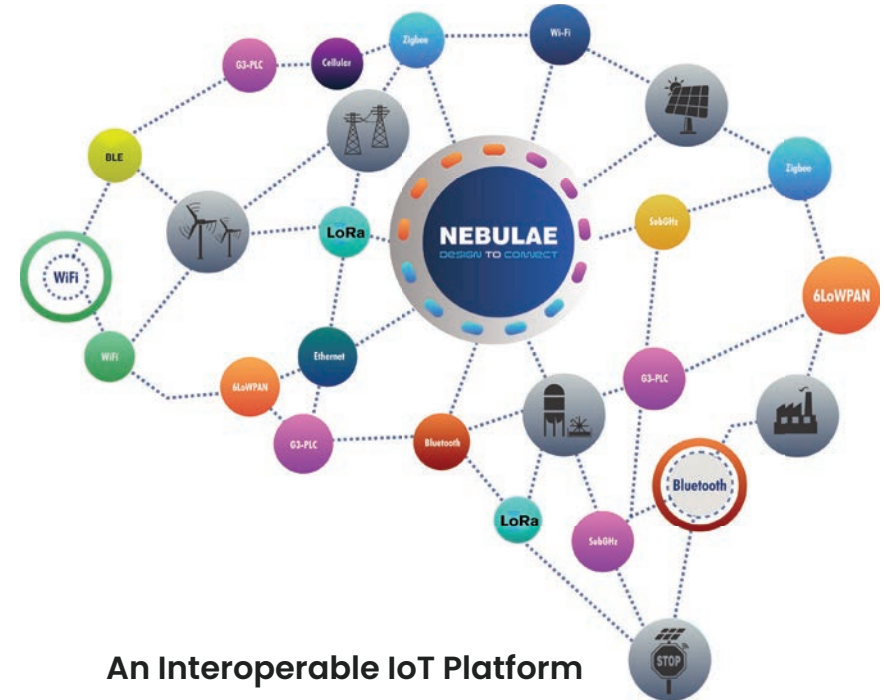# Our Products

NEBULAE®
DESIGN TO CONNECT

An agile and futuristic IoT platform, which integrates all IoT verticals under one common platform. The solution drives interoperability and inter-portability to provide a seamless connection of devices across multi-band networks & mediums.

Offerings

- Feature-rich IoT SDKs for application
- Ready to deploy Hardware for end application
- REST API's for hassle-free application development

Products Portfolio

- **NebuLink Middleware**
- **NebuLink Nodes**
- **NebuLink FOTA**
- **NebuLink Gateways**
- **NebuLink**
- **Nebulae SDKs**

An Interoperable IoT Platform

Applications

🦾 **Smart Manufacturing** | 🏙 **Smart Cities** | 💻 **Smart Agriculture**

Smart Metering

SLS has developed a range of Smart Metering solutions (AMI) which are created by the combination of various technologies over the following functional blocks of HES, WAN, NAN cluster of smart devices and DCU, and HAN network for customer premise appliances.

Products

RF Canopy and NIC - The Smart Metering infrastructure uses the RF technology and Network Interface Card (NIC) to offer powerful network capacity to connected devices. The use of lower bandwidth radio frequencies are less crowded and provide reliable network connectivity to the Smart Metering Infrastructure.

Head-End System (HES) - HES for Smart Metering is a scalable head-end data acquisition solution for Advanced Metering Infrastructure (AMI). The IoT-based solution monitors and controls smart meters and operates as a communication driver between MDM Systems and measurement devices.

DCU - The device is a part of Smart Metering infrastructure and acts as a secured hub to exchange all the data/information between the smart meters/IHD and HES.

UK Smart Metering

Training Simulator Communications Hub

TSCH is a device developed to train Communication Hub (CH) installers with the process of installing CH for on-field experience and training. The device comes in two variants: -

TSCH SKU

TSCH 420

Features

- Meets NSAP Installer Training requirements

- Labelling of CH

- Power Supply using SMETS2 Electricity Meters via ICHIS or easily available batteries

- Android and iOS Mobile App

- Quick Start Guide for LED scenario understanding and troubleshooting

Solar Power Solutions

Sunsights provides in-house manufactured and customized solar solutions. The turnkey solution uses an IoT platform to establish communication within its ecosystem and deliver a smart and optimized solar power set-up.

Next Generation Solar Power Products

- **Micro Inverter**
- **AC Distribution Box**
- **SunSights Live**
- **Data Logger**

Scalable and Sustainable Features

- AC to DC conversion at module level
- Highly secure and efficient system
- Remote troubleshooting and detection of exact-point-of-fault
- Real-time panel-wise monitoring through web dashboard and mobile application
- Yield analysis and control compatible with both, new and existing systems
- Durable solution with longer warranty period

VerdeMobility
CHARGING INTO THE FUTURE

VerdeMobility develops the next generation of innovative EV charging solutions. The EV charging solutions are envisioned to power the future of human mobility with a full-fledged range of custom hardware and software EV charging infrastructure.

Revolutionizing Mobility with

- **EV Chargers**
  AC Charger | DC Charger | Combo Charger
- **OCPP Controller**
- **Charging Management System**

Ours is a turnkey EV charging solution

- OCPP 1.6 compatibility
- CMS for remote monitoring, maintenance, and troubleshooting
- Mobile App for monitoring charging process and billings
- FOTA Support for updates
- Cloud connectivity using Wi-Fi, 3G/4G, RF, PLC, LoRa, SigFox

OPEN CHARGE ALLIANCE

Proud Participant of
Open Charge Alliance

ViaLights
Smart Street Lights

Vialights develops smart street lighting solutions with a comprehensive platform which enables single-point monitoring and control for making smart & secure data-driven decisions.

Bringing New Perspectives to Lights

- **Controller**   • **Gateway**   • **User Dashboard**

Illuminating streets with smarter and energy-efficient lighting solutions

- Retrofit solution for existing infrastructure
- Group and individual control for lights
- Smart Binding feature to control multiple segments of lights
- Sensor control in absence of internet or gateway
- Supports 3G/4G, PLC, LoRa, RF
- Data-driven reports on lighting status, performance, energy consumption, etc.

Smart Traffic Solutions

SLS has developed a Smart Traffic Management System which is an IoT enabled and cloud configurable solution for safer and smarter streets. The product comes with a web dashboard for remote monitoring, control and optimized management of all traffic signages.

Intelligent Traffic Management

- **LED Embedded Warning Signs**
- **Pedestrian Crosswalk Solutions**
- **Wrong Way Detection**
- **School Zone Warning**
- **Dynamic Curve warning**
- **Central Monitoring Software**

Making streets intelligent, safe, & interoperable

- Central Dashboard for remote monitoring and control
- Device status and diagnostics
- Asset management and device scheduling
- Supports 2G/3G/4G, RF, LoRa
- Solar + AC Power Supply

![Konnsys logo] **K·nnsys**
Connecting Sensors With Systems

Konnsys develops a wide range of intelligent sensors for making spaces interactive and smarter. The solutions are delivered by combining a range of hardware, software, and cloud to deliver intelligent, secure, and scalable automation solutions.

A Complete Range of Smart Automation Solutions

- **Smart Bulb**
- **Motion Sensor**
- **Gas Detector**
- **Gang Wall Switch**

- **The Hub**
- **Entry Sensor**
- **Smoke Detector**
- **Multi-Function Button**

- **Temp/Humidity Sensor**
- **Smart Cabinet Lock**
- **Smart Curtain Roller**

Delivering sensors for smart, secure, and interactive spaces

- Remote monitoring & control using mobile app
- Voice control through Alexa, Google Assistant Apple Siri, etc.
- Konnsys smart rule engine for customized automation
- Zigbee 3.0 Compliant
- Long Battery Life

![YALGAAR - A Real-time Messaging Framework]

Yalgaar is a real-time messaging framework that offers highly scalable pub/sub message infrastructure on cloud. The framework allows creation of IoT, mobile, and web applications through its versatile collection of SDKs and secure functionalities.

A scalable and secure messaging framework

- Pub/Sub Messaging
- End-to-end encryption using AES
- Presence and Multiplexing
- Push Notifications and Webhooks
- Offline Messaging
- Control and Monitoring Dashboard
- 2 Factor Authentication and TSL/SSL protocol

Cross-platform messaging communication support for all the major programming languages.

Web

| AngularJS | JavaScript | WebRTC | |

Mobile

| Android | iOS Objective C | iOS Swift | PhoneGap |

Server/Desktop

| Python | Java | .Net | Mono | NodeJS | Ruby |

IoT

| Posix C | Posix C++ | Raspberry Pi | Arduino | Mbed | Yocto Project | ESP32 |

DigitalSyne

Digital Signage Solutions

Dynamic Signage is a comprehensive digital signage solution. The product leverages new-age technologies to control and monitor various kinds of digital display screens.

Redefining Digital Signages with

- **Content Management Director**
- **Media Player**

An extensive platform meeting the modern-day dynamism of digital screens

- Single-point multi-screen control
- Varied screen size compatibility
- End-to-end secure communication
- Supports offline mode operation
- Real time alerts and screen status
- Remote diagnostic & asset management

Solutions for Railways

SLS is an integration specialist providing innovative on-board electronic solutions especially in remote monitoring and train backbone communication for rolling stock.

Remote Monitoring System - Remote monitoring system (RMS) is a GSM and GPS based system connecting various on-field rolling stocks to a centralized train network and management system. Services include providing live location tracking, fuel status, engine fault status, live operational and historical communication, etc.

TCN Gateway - The TCN gateway is like WTB-MVB, WTB-CAN, WTB-ETH, connecting various field signals & sensor inputs to the train communication network & vice-versa. It comes with an in-built WTB-MVB controller, realized on FPGA with in-house developed IP. It is IEC 61375 and UIC Leaflet 556 compliant.

Features

- Modular design for expansion and customization
- Easy addition of Digital Input/Output & Analogue Input/Output modules
- Inbuilt user configurable I/O s and indication LEDs at front
- Compact size with easy mounting

- Temperature Range (operational): -40 ºC to +70 ºC
- Available with 6U, 3U type of rack mounted cards and individual DIN rail modules
- Suited for any type of rolling stock

LOCCARTO
Tracking made easy

Loccarto offers extremely power-efficient, GPS-free location tracking capability without the need of an internet connection. The solution is capable of accessing the environmental changes dynamically without need of site analysis after post-commissioning and provides higher accuracy.

Applications

Logistics Tracking	Workmen Tracking	Asset Tracking	Livestock Tracking

Features

• Independent of RF Protocol

• Advance location solving algorithms based on RSSI and TDoA

• Dynamically assess different environmental changes

• Low cost and extremely power-efficient

• Flexible, scalable and independent of the type of platform or language

Artificial Intelligence & Machine Learning

SLS delivers excellent edge AI solutions by combining break-through technologies like embedded systems with AI. Expertizing in the application of Machine Learning and Deep Learning algorithms in various data forms, SLS has set precedents by innovating newer, more techno-friendly solutions.
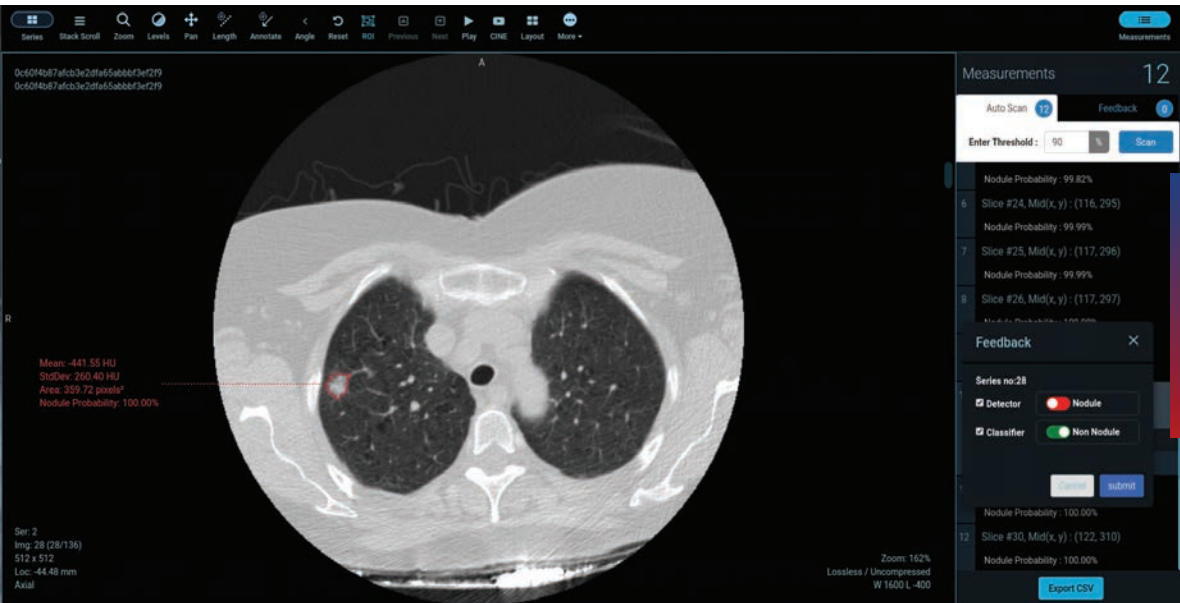

Services

- **Software based AI solutions and Cloud services**
- **AI powered Lung Abnormality Detection**

Advancing healthcare for quicker diagnosis

The AI powered Lung Abnormality Detection system assists Radiologists in performing quicker and timely diagnosis of lung abnormalities to save more lives.

- Localizes and classifies Lung Abnormalities like Lesions/Tumors in CT scans
- Maintain records and track development of abnormalities
- Detects and classifies abnormalities as small as 3 mm in size
- AI-powered report generation
- Self-learns through data utilization

Smart Wireless Targets

Using its state-of-the-art facility, SLS has developed a Smart Targeting System leveraging its targeting technology and training systems. The system uses a smartphone app for interactive gaming and allows users to connect with wireless targets for skill development and advancement in chosen sports.

Products

• **Targets** • **Smart Targeting Software** • **Mobile App**

A Smart Targeting System for Interactive Gaming

• Android and iOS app control

• Cloud and event for multi sports

• Day time LED's for high visibility

• 10 to 15 hour AA battery life

• Advanced self-pairing technology

• Wi-Fi connectivity

Applications

Sports Training and Activities | Gaming | Military Training

Testing and Measurement Tools

SLS develops a wide variety of testing & measurement tools for a wide spectrum of applications & use cases.

Logic Analyzer - The Logic Analyzer is a PCB-based full-featured tool with 36 channels & 100 MHz sampling frequency used for troubleshooting & performance verification of digital circuits.

Logic Analyzer Plug-In - The Logic Analyzer Plug-in is software used in addition to the SLS Logic Analyzer for automatic detection & display of signal errors with reference to used protocols.

Pattern Generator - The Pattern Generators is a PCB-based tool which tests, debugs, and characterizes any digital hardware with the use of a variety of digital signals.

ZTM - ZTM is a bespoke Zigbee certification toolkit that expedites development and testing of Zigbee products by verifying the conformity of nodes as per the Zigbee Alliance Standards.

HAT-HAN Assist Tool - HAN Assist Tool is a Home Area Network Survey tool used for simplifying decision-making related to Smart Meters and de-risking any complex 2.4 & Sub-GHz IoT deployments.

GBCS Test Tool - GBCS Test Tool helps to test GBCS implementation in a wide variety and combination of Smart Metering devices. It helps to build, execute, & reuse real-life business scenarios using GUI-based GBCS commands.
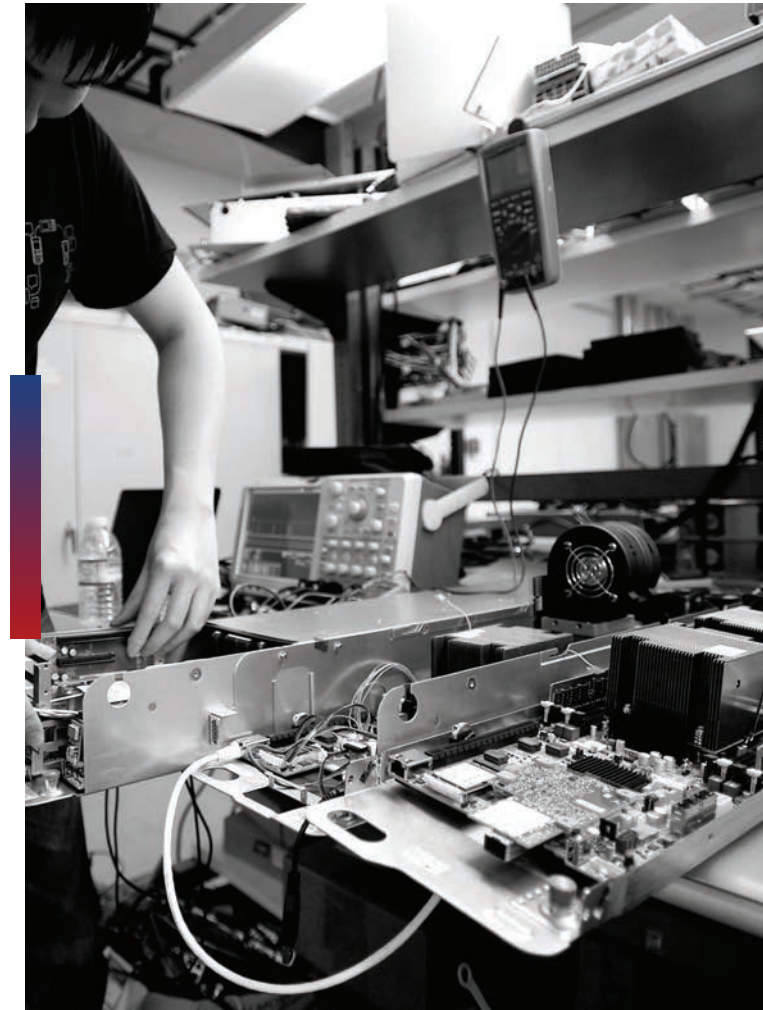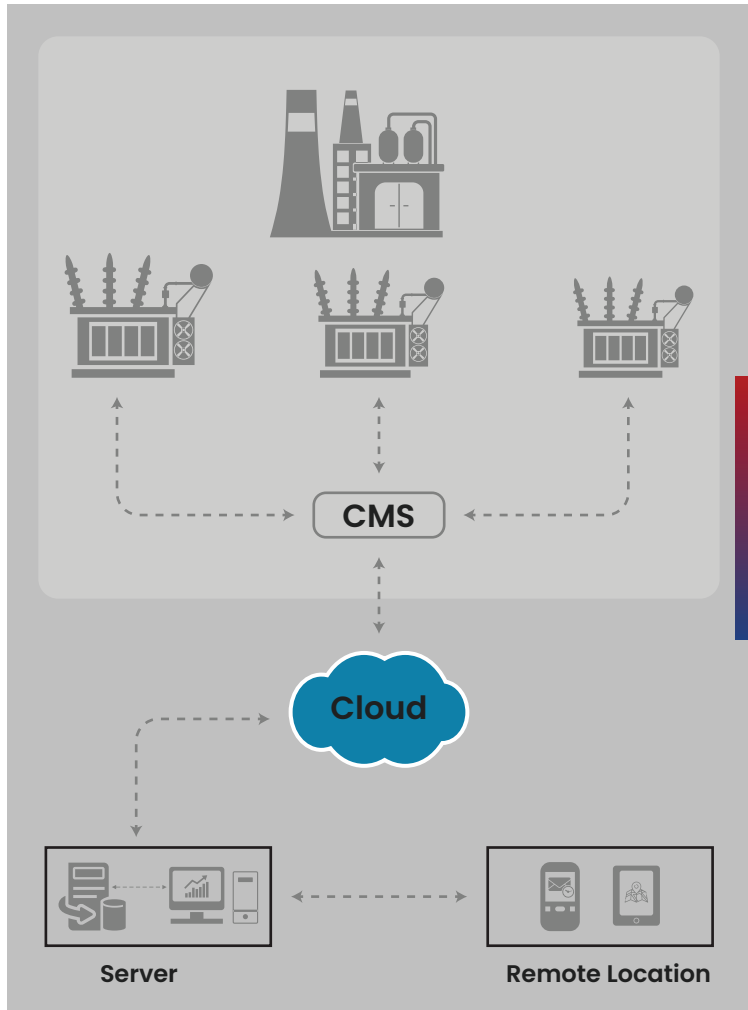
GBCS Validation Tool   **Zigbee Test Manager**   **Packet Inspector**

Intelligent Transformer Monitoring System

SLS has developed an Intelligent Transformer Monitoring System for individual monitoring and control of transformers in power plants, industrial plants and transmission and distribution networks. The system optimizes loading and maximizes asset life through features like data logging, event recording, and dynamic loading analysis, etc.
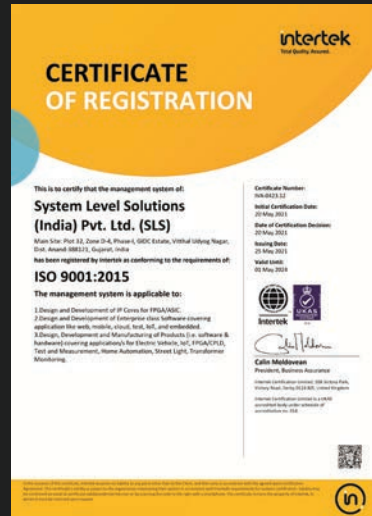
Applications

- **Power Transformer**
- **Distribution transformer**

Features

- Transformer remaining life estimation based on IEC 60076-7
- Logging and analysis of event alarm
- On load TAP monitoring and control
- Fan control and cooling monitoring
- Phase voltage and current and overload capacity measurement

Certifications

ISO 9001:2015

ISO 13485

CMMI Level 4

ISO 27001:2013

Our Clients

We work with Fortune 500+ companies across the globe.

Australia

Austria

Brazil

Canada

China

Finland

Germany

Hongkong

India

Israel

Japan

Singapore

South Africa

Spain

Sweden

Thailand

United Kingdom

United States of America

Partnerships/Association

CSR Activities

Yogiji Circle

Blood Donation Camp

Joy of Giving

Tree Plantation

Thank You

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