



भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत संचार विकास प्रभाग
Power Communication Development Division

Subject: - To explore the possibilities of indigenous development of SCADA software for power system management – Minutes of Meeting.

The minutes of second e-meeting of the team constituted by MoP “to explore the possibilities of indigenous development of SCADA software for power system management” conducted by the Central Electricity Authority via Webex online platform on 26th July, 2021 is enclosed herewith for kind information and necessary action by all concerned.

Encls.: As above.

Signature Not Verified
Digitally signed by UPENDRA
KUMAR
Date: 2021.07.29 18:48:45 IST

Chief Engineer
& Convener

To,
All Members of the Team

Copy for kind information to: -
The Chairman of the Team & Member (Power System), CEA

Meeting of the Team**“To explore the possibilities of indigenous development of SCADA software for power system management”****Minutes of 2nd Meeting**

Meeting Number:	2 nd Meeting
Meeting date & time:	26 th July, 2021 at 11:30 Hrs
Mode:	Online meeting
Team Chair:	Shri Goutam Roy, Member (Power System), CEA
Convener:	Shri Upendra Kumar, Chief Engineer, PCD Division, CEA
Members of the Team:	Enclosed at Annexure – I
List of participants:	Enclosed at Annexure – II

Convener of the Team welcomed Shri Goutam Roy, Member (Power System), CEA & Chairman of the Team to the meeting and extended a cordial welcome to all the participants including representatives from the Indian SCADA industry. The meeting proceeded with introduction of the Indian OEMs engaged in the field of providing SCADA/EMS/DMS solutions for various Sectors including Power Sector.

Then the Convener apprised the participants about the status of actions taken on the decisions of the first meeting of the Team on part of the Members.

Regarding, **identification of the SCADA/EMS/DMS modules** to be developed indigenously in initial stage, he informed the Team that POSOCO has provided a list of SCADA/EMS applications presently in operation at Control Centers, and its proposal for development and deployment of Database Module, Display and UI, and Data Acquisition and Control Module on pilot basis in any Control Center having limited requirements.

Chairman of the Team urged the Members to provide their views on the listed applications. Members confirmed the list and proposed Modules with inclusion of Distribution Management System (DMS) applications.

Regarding, **identification of SCADA Standards and its Communication Protocols**, he informed the Members that CEA has prepared a list of SCADA Standards and its Communication Protocols and shared the draft with the concerned Members for their inputs. He further informed that comments on the draft were received from POSOCO and POWERGRID only and requested other Members to furnish their inputs on draft at the earliest so that the same can be discussed and finalized.

The Chairman emphasized the strict adherence to the timelines decided in the 1st meeting and urged the Members to do the needful.

Convener of the Team informed the Members that as per the decisions of 1st meeting, POSOCO, POWERGRID, Andhra Pradesh, Gujarat and Maharashtra, in coordination with CEA, were entrusted with the task to identify possible Indian developers and have meeting with them to identify feasibility and challenges in development of indigenous SCADA/EMS/DMS software. He informed that eight (8) Indian developers have been identified for SCADA software development and have been called today for making a presentation before the Team on their preparedness, willingness, competency level, feasibility and challenges in line with **QUESTIONNAIRE** shared with them in respect of identified SCADA/EMS/DMS products. He informed the Members that inputs received from some of these identified developers have already been shared with concerned Members for their analysis and comments from their requirement points of view.

After the status update on the decisions of the last meeting, developers were invited to make their presentations before the Team.

The invited developers proceeded with their respective presentations covering their core strengths, preparedness, competency level, feasibility and challenges in development of indigenous SCADA/EMS/DMS system. Their views are abridged below (detail presentations are annexed at Annexure-III):

1. **M/s Chemtrols** stated that they have an experience of 46 years in industry and their operations are segregated into two verticals namely Instrumentation and Automation. They have been involved in Transmission and Distribution automation for last 15 years wherein they provide comprehensive solution involving RTUs, CC equipment and software, and other integrations services. For complete development of the proposed SCADA/EMS/DMS software solutions, there is a need to collaborate with a software company to provide additional pool of software resources and universal software development approach. With this, they assure that indigenous content will be much more than 50%. They also suggested implementation of cloud based SCADA which has benefits like ease of upgradation, easy management of hardware obsolescence, no initial investment for hardware etc. Although, a cloud based solution is not very customizable and therefore will require a standard design and requirement specifications across India. They proposed a timeframe of about 30 months for providing the complete SCADA/EM/DMS solutions for the Power Sector.
2. **M/s Valiant Communications**, established in 1993, stated that they have a huge range of customers worldwide with their products including communication protocol solutions like MODBUS, IEC-101,104, IEEE-C37.118 etc, MPLS routers, PMUs, PDCs, GPS/GNSS synchronization, cyber security solutions, data storage solutions etc. They suggested that a timeframe for development of complete SCADA/EM/DMS solutions can be given after detailed analysis of technical specifications and understanding system requirement through visits to Control Centers.
3. **M/s PRDC** stated that they have a multidisciplinary experience of power sector for over 25 years and they have developed SCADA/EMS modules and other customized software solutions for Generation, Transmission and Distribution sectors. Key modules in their software suite are Load Flow Analysis, Short Circuit Analysis, Transient Stability, Small Signal Analysis, State Estimation etc. Recently they have developed Dynamic Security Assessment solution for RRVPNL. M/s PRDC stated that some of the core modules of SCADA/EMS/DMS software can be developed by them and suggested for a collaboration with Communication Protocol experts, Networking domain experts for SCADA modules

like FEP, ICCP, SIEM, Web Server Applications, NMS etc. They proposed a timeline of about 18-24 months for providing complete solutions.

4. **M/s Kalkitech** stated that they have been in business for over 22 years with a global presence in more than 70 countries with communication products. They have flagship products line for Advanced Metering, Substation Automation, Distribution Automation, software solutions for SLDCs and thermal power plants, Performance Monitoring, scheduling and accounting, SCADA communication protocol tools, Multi-enterprise scale data acquisition system. They have a team of consulting software engineers for providing Automation solutions. M/s Kalkitech stated that they wish to stick to their core competency, which is communication and integration protocols and proposed that they can provide a central platform for merging third party solutions. M/s Kalkitech suggested to follow layered architecture model in which separate services will be running independently and interacting with each other on standard interfaces. For this they suggested a distributed database model. This way enables multiple vendors to come together with pluggable building blocks.
5. **M/s RBH Solutions**, which has been founded in 2004, provides solutions for Smart grid communication/interfaces and Smart grid analytics/SCADA platform. Their products include SCADA systems, MDM/MDAS solutions, EMS systems, Gateway systems and Networking solutions. They have experience of providing SAS in CSPTCL and HPSEB, ADMS system for NER as well as SCADA system for RPADRP Projects. M/s RBH Solutions suggested to allow Indian vendors to participate with pilot projects and get experience/qualification for larger projects. They also suggested that GoI should come up with some kind of assistance, either economic or captive market, so that R&D can be incentivized. They proposed a timeframe of 2 years for indigenous development of SCADA/EMS/DMS software.
6. **M/s Synergy**, which has been founded in 1994, have experience of providing Transmission and Distribution Automation solutions for Railways sector, Power sector, and Oil & Gas sector. Their major products include their homegrown SCADA, RTU, DCU/Gateway, BCU etc. They also stated that they are involved in joint development of ADMS with IIT Kanpur and suggested that a working system can be developed for SCADA/EMS/DMS within a timeframe of 24 months.
7. **CDAC** stated that their Power Electronics Group and Control & Instrumentation group has been involved in development of PMUs, WAMs, AMI etc. They presented that their Control & Instrumentation group is capable of developing indigenous SCADA with security features. The main challenge will be development of EMS/DMS modules. CDAC suggested that a consortium through National Mission on Power Electronics Technology, which has Academic Institutes, CDAC and Industry experts as members, can be used for development of SCADA/EMS/DMS system. They proposed a timeframe of 24 months for basic framework and an extended timeframe for comprehensive module development.
8. **M/s CMS** could not join the meeting.

After each presentation, Chairman of the Team invited the Members to have Q&A with the developers and share their assessment. All Members of the Team have detailed discussion with the developers based on their present requirements, experience and future needs. Most common question was about the experience of developers in providing SCADA/EMS/DMS solutions at Control Centres. To which all the developers have informed that single handedly they have not provided complete solutions so far, however, given the opportunities they can

provide complete range of the SCADA/EMS/DMS products with in the time frame specified by them.

After presentation and Q&A session, the Chairman lauded the enthusiasm and potential of the Indian developers. He expressed his confidence in the technical knowledge pool present in Indian companies. He observed that each of the companies are having their core strengths in some or the other domain like Kalkitech has expertise in protocols for communication integration, PRDC has expertise in EMS/DMS modules and other solutions in the area of generation, transmission and distribution sector, Synergy has expertise in RTU and RT-DAS, Valiant Communications has expertise in communication and networking domain etc. He also observed that some companies have experience of small scale SCADA solutions also, like Chemtrols, RBH Solutions and CDAC. He stated that from the presentations it is evident that most of the companies are not in a position to develop complete SCADA/EMS/DMS system on their own from scratch; however, the requirement of indigenous development can be fulfilled with consortiums among these companies, wherein, each company can develop applications according to its core strengths. He also acknowledged the challenges posed by the developers like imposed conditions of qualification in bidding documents, non-standard specifications among different utilities, small market potential and unguaranteed return of investment, requirement of technical resources for development of advanced applications like EMS and DMS etc. and stated that the Team will try to resolve these issues. He then requested the developers to share their presentations with CEA so that the same can be shared with Members of the Team for their further analysis and recommendations.

The Convener of the Team then presented the status of the draft report and requested the **Members to provide their analysis and recommendations in respect of inputs provided by developers and draft standards and protocols shared earlier.**

The Chairman of the Committee requested the Members to furnish their inputs within a week's time so that the same can be incorporated in the draft report.

CONCLUSIONS

Concluding the deliberations of the meeting, following was decided:

- CEA will share the inputs from developers on questionnaire and their presentations with the Team Members.
- Team Members will furnish their analysis and recommendations on capability, preparedness, feasibility and challenges in indigenous development of SCADA/EMS/DMS software and other required applications within a week's time for incorporation in the draft report.
- Members of Team/subcommittee, whose inputs on list of Standards and Protocols are pending, will furnish their comments within a week's time.

Members List

S. No.	Committee Composition	
1	Shri Goutam Roy, Member (PS),CEA	Chairman
2	Shri Vivek Goel, Chief Engineer (DP&T), CEA	Member
3	Shri Upendra Kumar, Chief Engineer (PCD)	Convener
4	Shri Debashis Bose, Deputy Secretary, MoP	Member
5	Shri A K V Bhaskar, Chief Engineer,APSLDC	Member
6	Shri H M Patel, I/c General Manager (IT),GUVNL	Member
7	Shri Shrikant Sadashiv Rajurkar, ED (Trans),MSETCL	Member
8	Shri. Sunil Agrawal, ED, PGCIL	Member
9	Shri Debasis De, ED,POSOCO	Member
	Shri Devendra Kumar, Chief General Manager ,POSOCO (Alternate Member)	
10	Shri Renji Chacko, Senior Director & Head, Power Electronics Group, C-DAC	Member

List of Participants

S. No.	Organization	Name	Designation	Email
1.	CEA	Shri Goutam Roy	Member (Power System)	goutamroy.cea@nic.in
2.		Shri Vivek Goel	Chief Engineer (DP&T)	cedpt-cea@gov.in
3.		Shri Upendra Kumar	Chief Engineer (PCD)	upendra.cea@nic.in
4.		Shri R P Singh	Director (PCD)	rp_cea@nic.in
5.		Shri Prateek Srivastava	Assistant Director (PCD)	prateek.sri@gov.in
6.		Shri Tanuj	Assistant Director (PCD)	tanuj.cea@gmail.com
7.	POSOCO	Shri Devendra Kumar	Chief General Manager	dkumar@posoco.in
8.	Powergrid	Shri A P Gangadharan	Chief General Manager	apganga@powergrid.in
9.		Dr. Sunita Chohan	Senior General Manager	chohan@powergrid.in
10.	APSLDC	Shri Srinivasan	Deputy Executive Engineer	ade.tc.scada@gmail.com
11.	GUVNL	Shri H M Patel	General Manager (IT)	gmit.guvnl@gebmail.com
12.	UGVCL	Shri Yashodhar Parmar	Superintending Engineer	seemc@ugvcl.com
13.		Shri Gautam Modi	Deputy Engineer	gautam.modi@ugvcl.com
14.		Shri Mayur Pareskh	Junior Engineer	mayur.parekh@ugvcl.com
15.	C-DAC	Shri Renji V Chacko	Group Head, Power Electronics Group	renji@cdac.in
16.		Shri Vinukumar AR	Senior Director	vinu@cdac.in
17.		Shri Titus Chazhoor	Group Head, Control & Instrumentation Group	titus@cdac.in
18.		Ms Anupama P	Joint Director	anupama_p@cdac.in
19.	M/s Chemtrols	Shri Anish Rajgopal	Director	anish.rajgopal@chemtrols.com
20.		Shri Prafull Kulkarni	VP Engineering and Projects	prafull.kulkarni@chemtrols.com
21.	M/s Valiant Communication	Shri Inder Mohan Sood	Managing Director	sood@valiantcom.com
22.		Shri Gaurav Mohan Sood	Director	
23.		Shri Davinder Mohan Sood	Director	

Annexure - II

24.	M/s PRDC	Shri R Nagaraja	Managing Director	
25.		Shri Ganga Prasad GL	Chief Technical Advisor	gonibeed@gmail.com
26.		Shri Manikandan	Business Development Manager	manikandan.m@prdcinfotech.com
27.		Shri Avik Ganguly	Lead Business Development & Software	avik.ganguly@prdcinfotech.com
28.		Shri Santosh Avalamurthy	Program Manager	santosh.avalamurthy@prdcinfotech.com
29.	M/s Kalkitech	Shri Harikumar S	VP Projects	harikumar.sreedharan@kalkitech.com
30.	M/s RBH Solutions	Shri Birinder Singh	CEO	birinder@rbhsolutions.com
31.	M/s Synergy	Shri Krishnan Venkatrama	Vice President	y_krishnan@s3india.com



Development of Power System SCADA/EMS/DMS

Feasibility and Challenges

**Control and Instrumentation Group
&
Power Electronics group**

CDAC, Thiruvananthapuram
July 26,2021

Centre for Development of Advanced Computing (CDAC)



CDAC is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY) , Govt of India, for carrying out R&D in IT, Electronics and associated areas.



Multi-locational, Multi-activity R&D organization with Headquarters at Pune Spread out at 11 locations with 14 laboratories, 3000 employees, involved in the design, development and deployment of electronics and advanced Information Technology products and solutions



One Vision. One Goal... Advanced Computing for Human Advancement...

CDAC, Thiruvananthapuram



Objective

- ❖ Undertake application oriented R&D, in Electronics
- ❖ Promote growth of Electronic industries by working in close co-operation with the industries
- ❖ Design, development and deployment of Electronics and advanced Information Technology

R&D Focus Area

- ❖ **Power Electronics**
- ❖ Broadcast & Communications
- ❖ Hardware Design
- ❖ **Control and Instrumentation**
- ❖ Strategic Electronics
- ❖ Health Informatics & Software Technology
- ❖ Cyber Forensics
- ❖ Education and Training

One Vision. One Goal... Advanced Computing for Human Advancement...



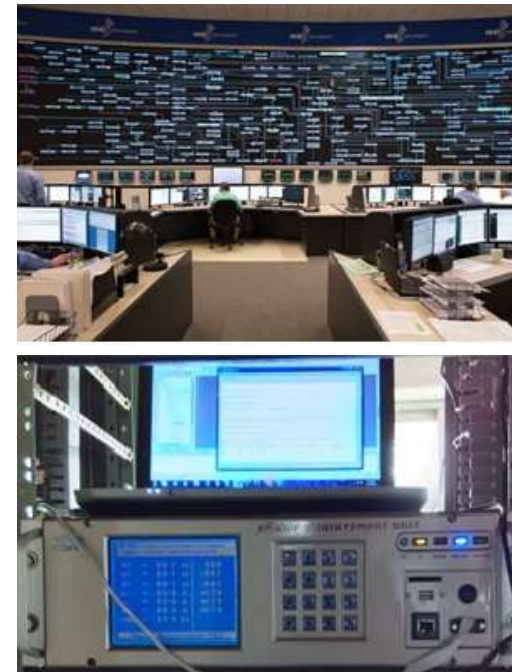
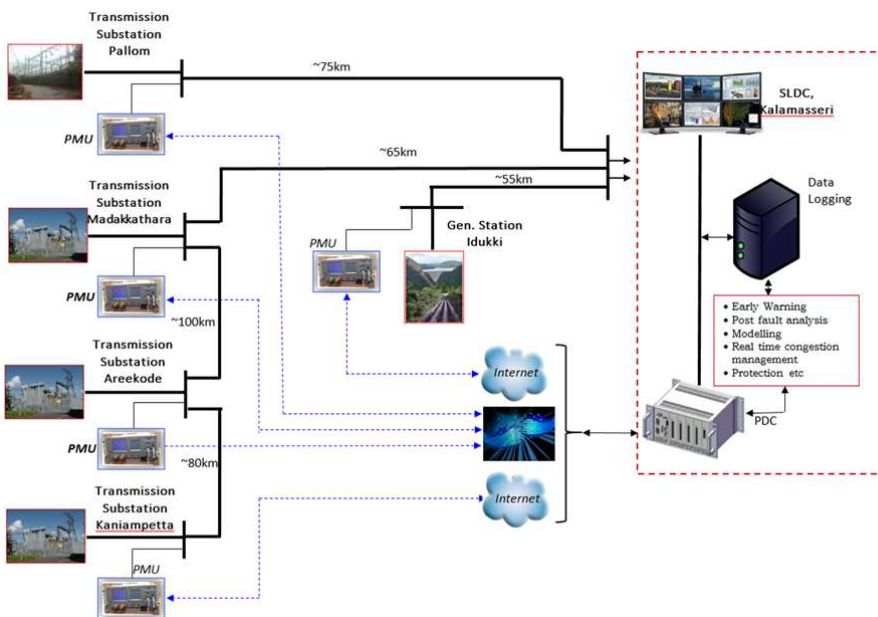
Feasibility - Power Electronics Group Engagements

- **Phasor Measurement Unit (PMU)** development
- **Wide Area Monitoring (WAM)** – Pilot deployment in KSEB network
- **Microgrid EMS** – EMS for interconnected microgrids- Ongoing
- **Digital Substation** – Deployment in KSEB network - Ongoing
- Single Phase and 3 Phase **Smart Energy Meter**
- **Advanced Metering Infrastructure (AMI)** – PoC development and Deployment- Ongoing

Dedicated team of 50+ technical members

Feasibility- Power Electronics Group Engagements

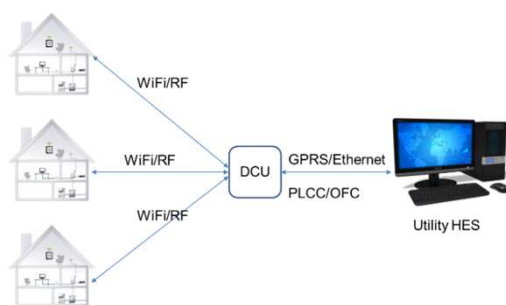
Wide Area Monitoring (WAM) project installed at Kerala State Electricity Board by deployment of Phasor Measurement Units (PMUs) at five sub-stations and Central Monitoring at load dispatch centre.



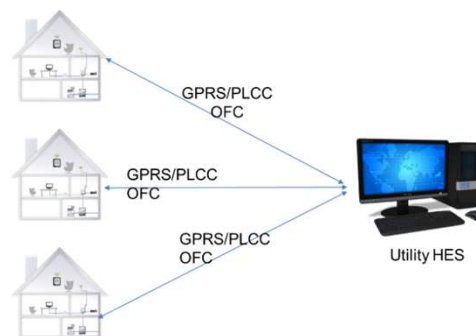
One Vision. One Goal... Advanced Computing for Human Advancement...

Feasibility- Power Electronics Group Engagements

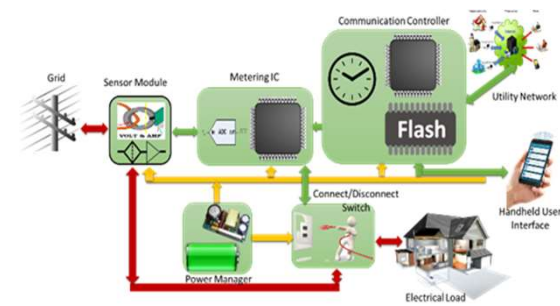
Smart Energy meters based on Indian standards suitable for **Advanced Metering Infrastructure** (AMI), Compatible with Smart Grid Communication Technologies and Distributed Generation (DG) supports.



Neighbourhood Area Network (NAN)
Communication

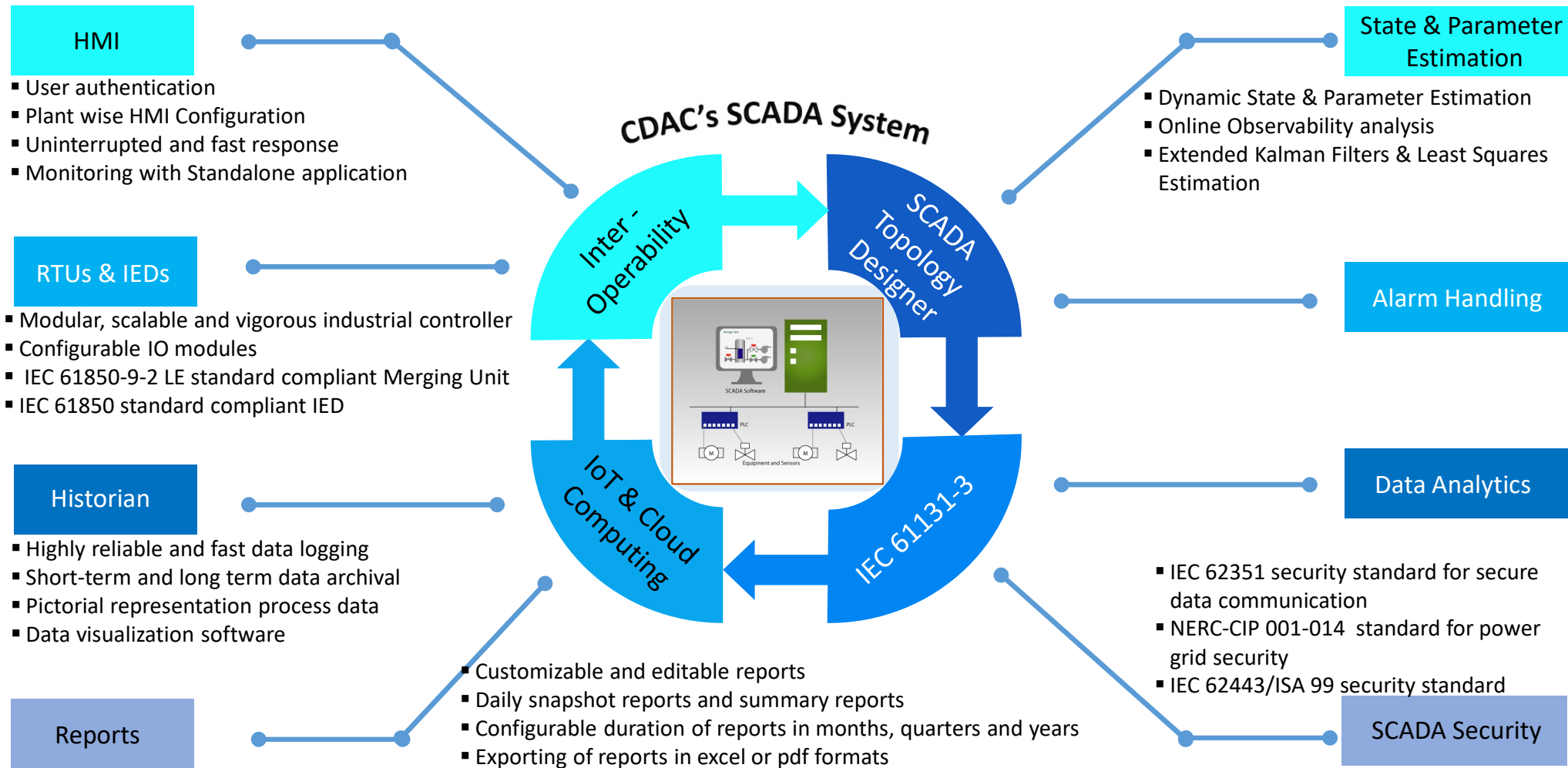


Wide Area Network (WAN)
Communication



SM architecture

Capabilities of Control & Instrumentation Group - SCADA



One Vision. One Goal... Advanced Computing for Human Advancement...

Capabilities of Control & Instrumentation Group - SCADA Security



SCADA Aware Security System

- SCADA Aware Firewall
- Intrusion Detection and Prevention System for SCADA

SCADA Security Standards in Power

- IEC 62351 security standard for secure data communication in energy management systems
- NERC-CIP 001-014 standard for power grid security
- IEC 62443/ISA 99 security standard

SCADA Security Testbed for testing power system security

- Pre-commissioning testing capability
- Power system Signal Generation Hardware
- Power system Modeling Framework
- Security Analysis Tools
- ICS Security Audit of Power control system.





Challenges- EMS/DMS Applications

EMS

- a) State Estimation (Hybrid)
- b) Real Time Contingency Analysis
- c) Real Time Security Enhancement
- d) Voltage and VAR Dispatch
- e) High availability of computing infrastructure

DMS

- a) Network Connectivity Analysis (NCA)
- b) State Estimation (SE)
- c) Load Flow Application (LFA)
- d) Voltage VAR control (VVC)

- **Fault tolerant SCADA & Power System Monitoring Systems**
- **Implementation of required dedicated algorithms**
- **Processing capability of server is a critical requirement**

Technical Consultancy from Academic Institutes

Challenges- Dispatcher Training Simulator



Dispatcher Training Simulator Server:

A dispatcher training simulator (DTS) server is used to train the power system operators who manage the system.

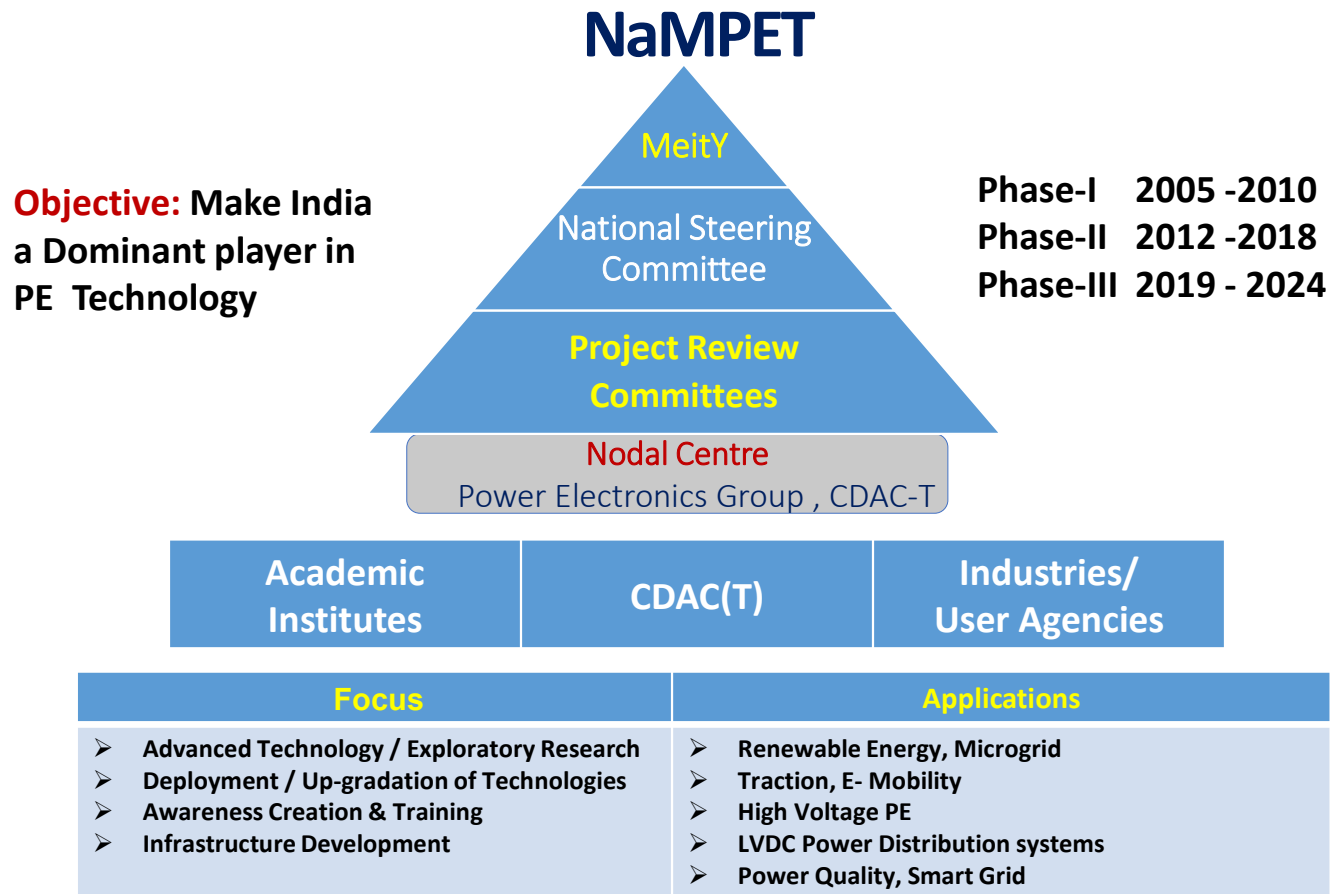
Time frame:

Basic framework of the indigenous SCADA and applications can be done in 24 Months.

The comprehensive level of application modules development/ integration shall be done in an extended time frame.

Long term handholding of the technology is also envisaged and can be carried out.

Consortium Implementation Experience



www.nampet.in

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To Explore The Possibility Of Development Of Indigenous SCADA Software – Vendor Inputs



Submitted To: Central Electricity Authority, CEA on 6/Jul/2021

by

Power Research & Development Consultants Private Limited

www.prdcinfotech.com



PROPOSAL OVERVIEW

Roadmap

- Team Size
 - 20
- Duration
 - 20 - 24 Months

Spec &
Design

6

Development

12

Testing

4

Delivery &
Deployment

2

Capability

- PRDC is fully geared up to develop the SCADA/EMS solutions
- Necessary manpower and infrastructure is available to take up the task

Feasibility

- The proposal is highly feasible
- Indigenous control of the software tools
- Opportunity to export for developing countries, especially in Africa and South East Asia.

Challenges

- With its prior experience, PRDC does not see any challenge in developing the SCADA/EMS modules
- Capacity building and model development will be successful only with the active participation of the LDC engineers.

PRDC OVERVIEW



- PRDC is in business since 1994
- Multi-disciplinary Experience in Power Sector with 300+ years of collective experience, with PhD and Master degree holders
- ISO 9001:2005 QMS certified & CMMi 3 Company
- Deep understanding and experience in energy management & energy efficient systems, models and controls
- PRDC offers best in class services in the areas of:
 - Power System Consulting
 - Power System Studies Software
 - Embedded Systems
 - Power System Training

BUSINESS GROUPS



Power System Consulting



Power System Software

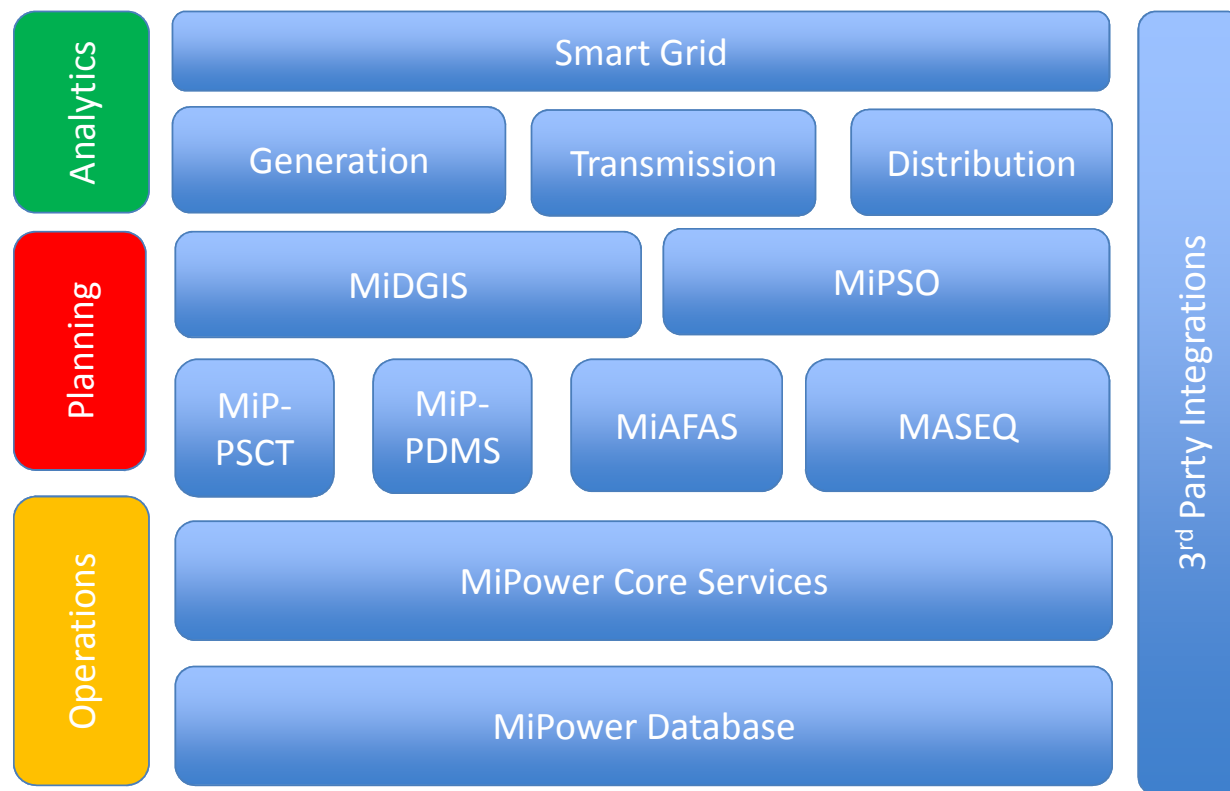


Embedded Systems



R & D

OUR SOFTWARE SOLUTION STACK

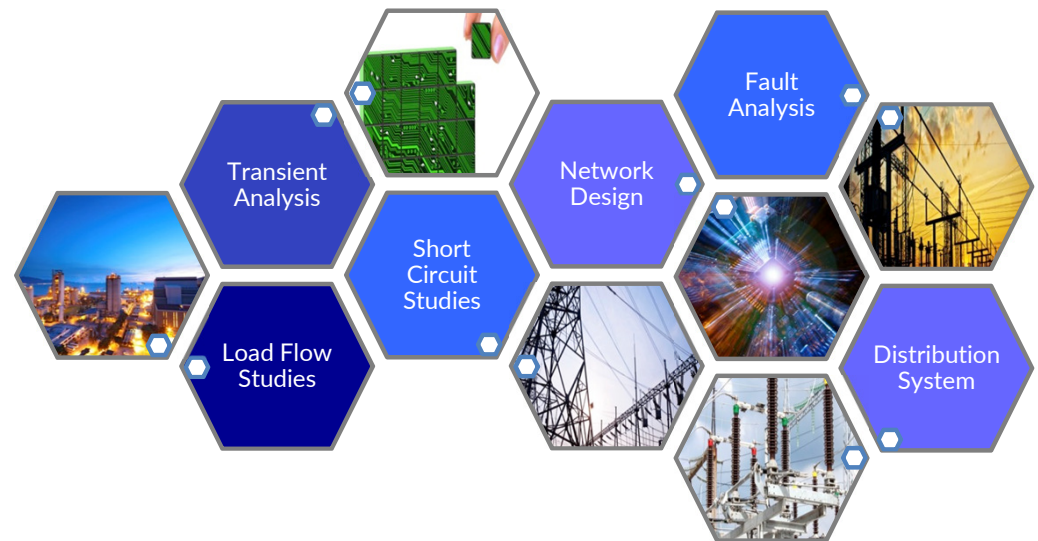


OUR SCADA AND RELATED EXPERIENCE

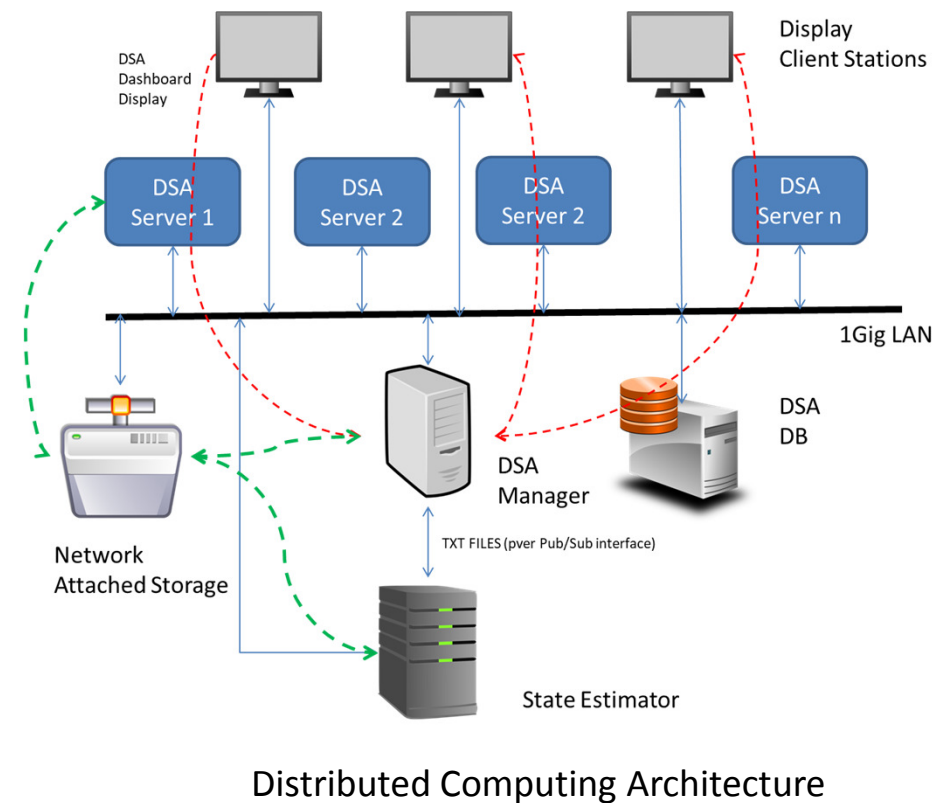
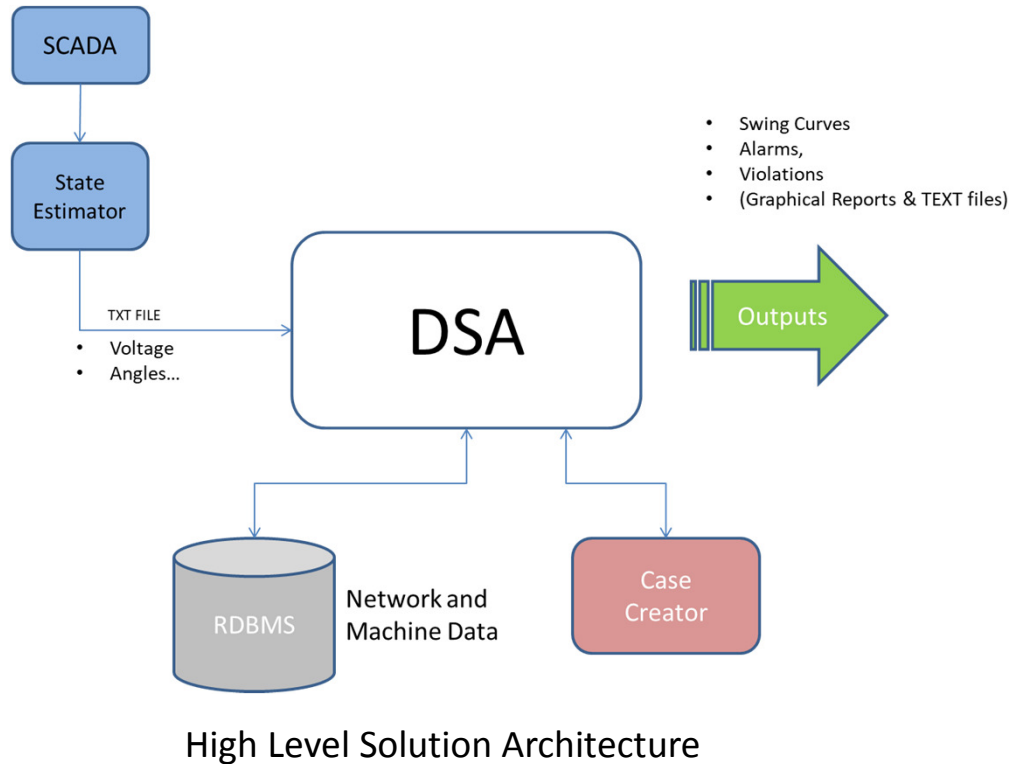
- Indigenously built and deployed SCADA-EMS solution for SRLDC, Bangalore in the year 1994 consisting of
 - Network Topology Processing (NTP)
 - Observability analysis
 - State estimation including bad data detection
 - Operator request load flow
 - Contingency analysis
 - Optimal power flow
 - Short term forecast
 - Voltage instability Analysis
- Provided the consulting services for SCADA Control room application in the same project for
 - Data Acquisition
 - Network Editor
 - Integrated Data Management
 - Man Machine Interface for visualization
 - Reporting
 - Custom Printing

KEY MIPOWER MODULES

- Load flow Analysis
- Short Circuit Studies
- Transient Stability
- Small Signal Analysis
- Voltage Instability Analysis
- Observability Analysis
- State Estimation
- Operator requested load flow
- Economic Despatch
- Optimal Power flow



MIPDSA – DYNAMIC SECURITY ASSESSMENT SOLUTION



KEY SOFTWARE SOLUTIONS



GENERATION

MiPower[®]

MiPSO

MiP-PSCT/PDMS



TRANSMISSION

MiPower[®]

MiAFAS[™]

MiP-PSCT/PDMS



DISTRIBUTION

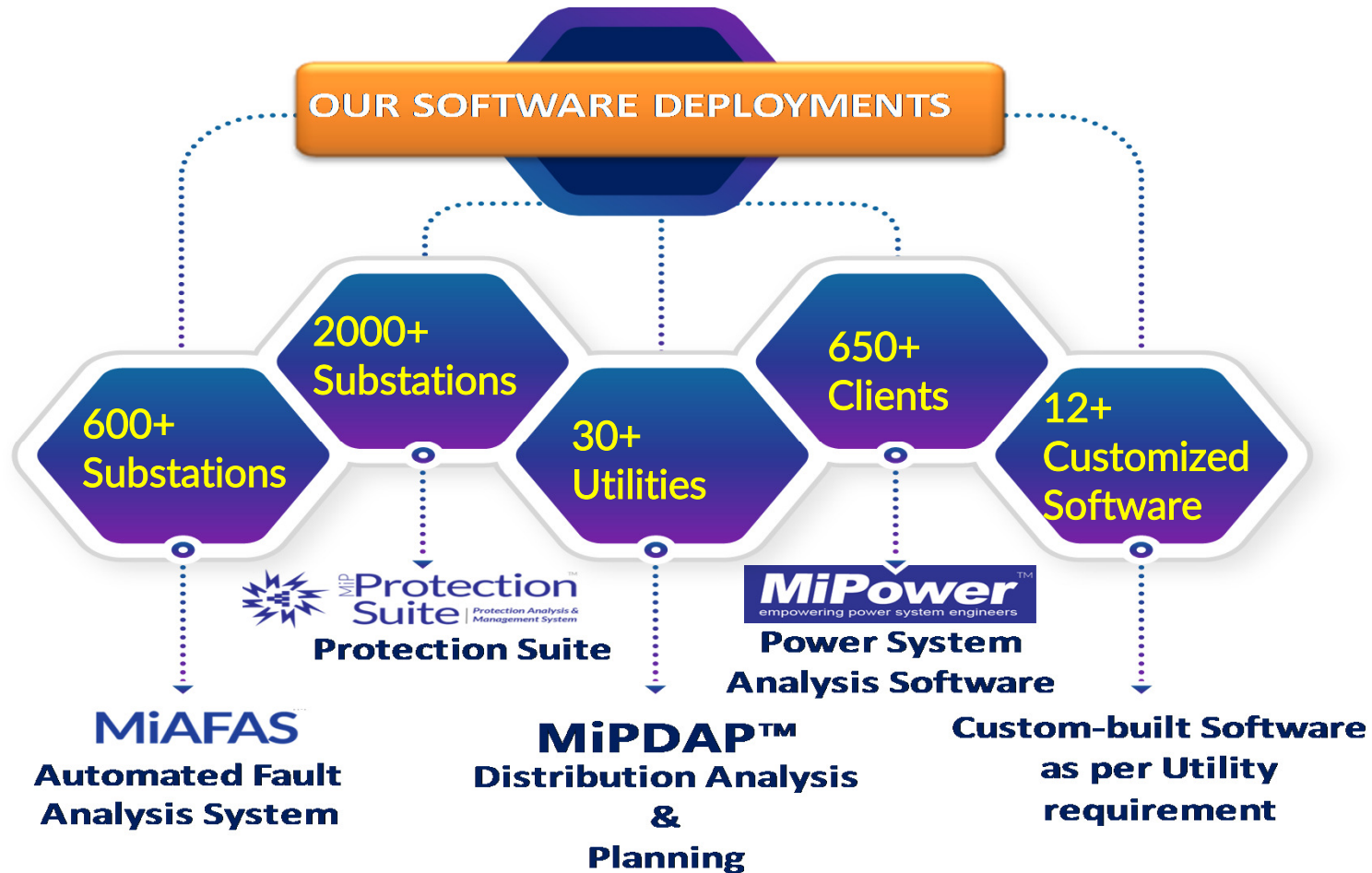
MiPDAP[™]

MiDGIS[™]

MiP-PSCT/PDMS

MiPSO

KEY SOFTWARE PRODUCTS DEPLOYMENTS



OUR READINESS



SI No	Description	Modules by PRDC	Duration	Suggestion
1	SCADA Applications a) FEP for different protocol like, MODBUS, IEC-101 – 104, IEEEc37.118 etc b) Secured ICCP c) CIM exchange d) Full graphics universal User's Interface for all applications e)Replay of Events f) SCADA Topology processor g) Real time data validation tool h) Integration with data historian i) Alarm handling	c),d),e),f),g),h),i) can be built	18-24 months	a) & b) Need to be done by protocol experts
2	CIM based database Development Tools	Yes	6-8 months	

OUR READINESS



Sl No	Description	Modules by PRDC	Duration	Suggestion
3	EMS a) State Estimation (Hybrid) b) Real Time Contingency Analysis c) Real Time Security Enhancement d) Voltage and VAR Despatch e) Optimal Power Flow f) Outage Scheduler g) Transmission Line/Corridor Capability Monitor (TCM) h) Short Circuit Analysis i) Automatic Generation Control (AGC) j) Dynamic Stability Assessment (DSA) etc.	Yes	12-18 months	

OUR READINESS



Sl No	Description	Modules by PRDC	Duration	Suggestion
4	DMS a) Network Connectivity Analysis (NCA) b) State Estimation (SE) c) Load Flow Application (LFA) d) Voltage VAR control (VVC) e) Load Shed Application (LSA) f) Fault Management and System Restoration (FMSR) g) Loss Minimization via Feeder Reconfiguration (LMFR) h) Load Balancing via Feeder Reconfiguration (LBFR) i) Operation Monitor (OM) j) Distribution Load forecasting (DLF) etc.	Yes	12-16 months.	

OUR READINESS



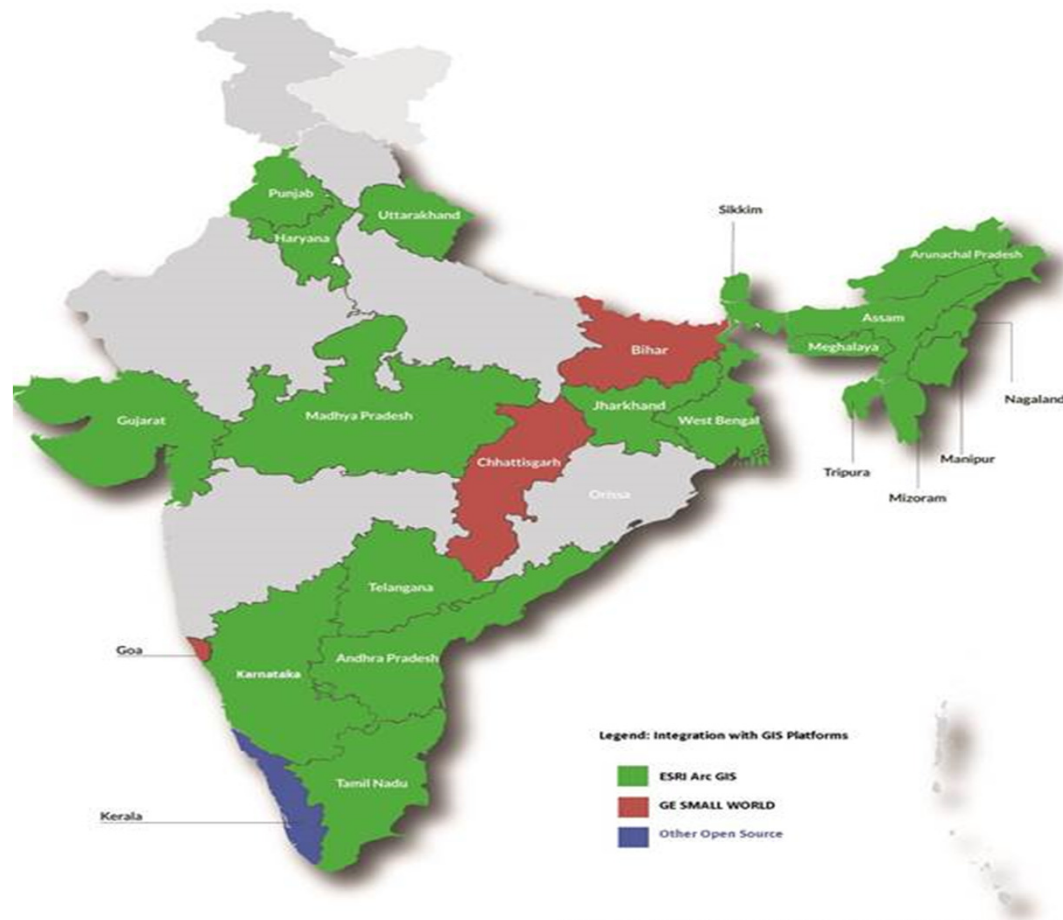
Sl No	Description	Modules by PRDC	Duration	Suggestion
5	Historical databases (Historian or information storage and retrieval) application a) Data Storage Software b) Data Historian Software c) Software for SAN & NAS etc.	Yes	12-16 months	
6	Market Operation applications	Yes.	9-12 months	
7	Web Server Application a) Host based IDS for all machines b) Software for Data Replica server c) E Mail and SMS Application d) Mobile Application App e) Software for Web Server f) Antivirus Server Software etc.	b) To e) can be built	8-12 months	Point (a) It is related to Intrusion Detection System and point (f) is related to Anti Virus
8	Generation/Load Forecasting (RE)	Yes	12-16 months	

OUR READINESS



Sl No	Description	Modules by PRDC	Duration	Suggestion
9	Network Management Server	No		
10	Dispatcher Training Simulator with separate configuration for trainee and Instructor	Yes	12-18 months	
11	SIEM (Security Information and Event management)	No		
12	Application Whitelisting Tool	No		
13	Document Management System	No		
14	Identity Management Software	No		
15	Report Development & Generation Software	No		
16	Server Backup Software	No		
17	Patch Management Software	No		
18	OPC client function in SCADA Server & API	No		

R-APDRP (NETWORK ANALYSIS) SUCCESS STORY



Legend: Integration with GIS Platforms

- ESRI Arc GIS
- GE SMALL WORLD
- Other Open Source

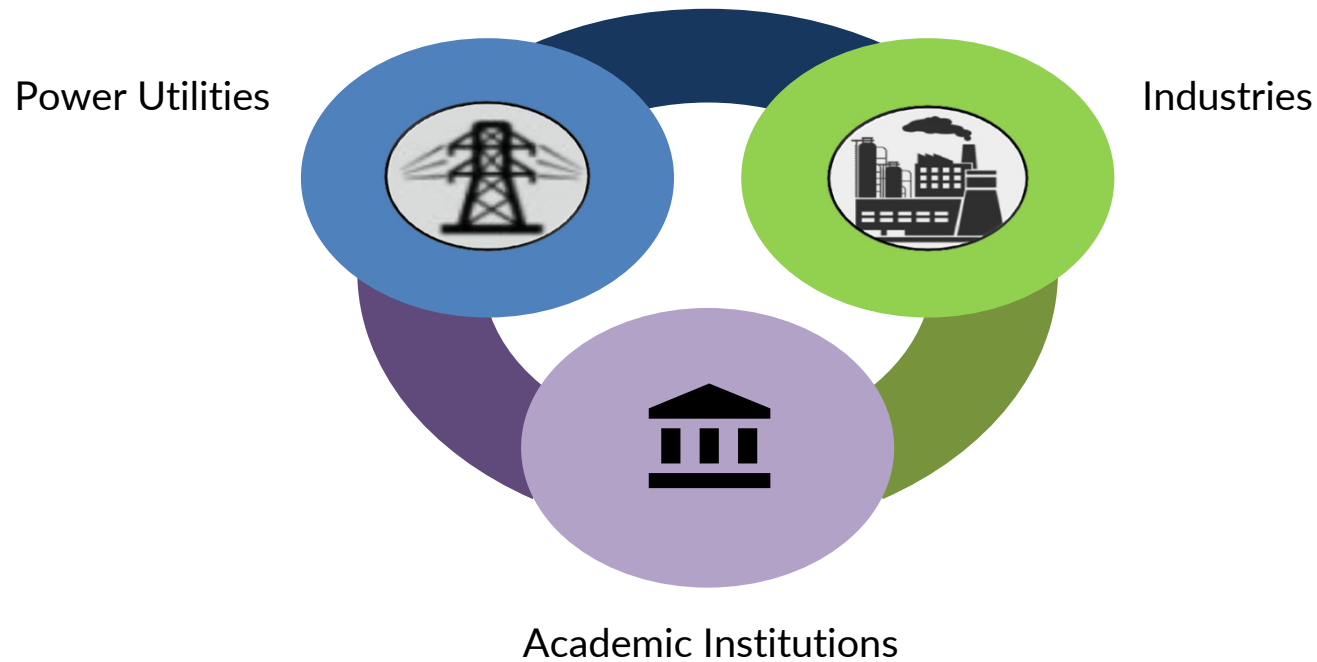
*This map is only for representation purpose to convenience the reader

PRDC's Network Analysis deployments across **21** states.

72% of NA implementation across the nation.

Fully compatible with several GIS platforms and RDBMS.

OUR CLIENTS



We have developed solutions for one of the largest power networks in the world – POWERGRID India.



OUR KEY ACHIEVEMENTS...

LIST OF PROTECTION SOFTWARE SOLUTION EXPERIENCE



S.No	Project Description	Sysetem Integrators	End Client
1	Design, Development and Supply Of Automated Fault Analysis System	GE	PGCIL
2	Design, Development and Supply Of Automated Fault Analysis System	GE	RRVPNL
3	Design, Development and Supply Of Automated Fault Analysis System	Siemens	MSETCL
4	Creation and Maintainance of Web based Protection database and Desktop based protection setting Calculation Tool	PRDC	Eastern Region Power Corporation
5	Creation and Maintainance of Web based Protection database and Desktop based protection setting Calculation Tool	PRDC	North Eastern Region Power Corporation
6	Creation and Maintaining Web based Protection database and Desktop based protection setting Calculation Tool	PRDC	Souther Region Power Corporation

LIST OF CUSTOMIZED SOFTWARE SOLUTION EXPERIENCE



S.No	Project Description	System integrators	Client
1	Development of online web based scheduling software using standard software platform for scheduling of power transactions as per Scheduling and dispatch code of State grid code for Intra State Generating Stations, Distribution utilities, RE Generators, and Open Access consumers on 15 minute time block basis and integration of the same with the billing software at MSLDC, Airoli		Maharashtra State Load Dispatch Centre
2	Design, Development and Supply of Hydro System Model & water inflow forecast Software	Siemens	NRLDC
3	Design Development and Supply of Hydro Thermal Coordination Software	ABB	KPTCL
4	Supply of web based Peak Load Management (PLM) Module along with necessary tools	Alstom T&D	HPSEB
5	Supply of customized web based Peak Load Management (PLM) Module	Wipro	TSEL
6	Supply of Software for Load Research, Collection of Load Research data and Development of Load Profiles		BESCOM, Bengaluru
7	Load managing and loss minimization Software	ABB	PGCIL
8	Design, Development of Software for Energy Accounting Network Mapping by Consumer indexing and DT wise Loss Assessment		Central Electricity Supply Utility - Orissa
9	Design Development Supply and Inegration of Dynamic Security Assesment Software (DSA)	GE	RRVPNL

LIST OF CUSTOMIZED SOFTWARE SOLUTION EXPERIENCE



S.No	Project Description	System integrators	Client
1	Design and Development of Enterprise Portal providing SCADA Data , AFAS & RAS Data	GE	RRVPNL
2	Design & Development of Mobile Application Automated Fault Analysis System	GE	RRVPNL

LIST OF EMBEDDED SOLUTION EXPERIENCE



SI No	Item Purchased	Customer
1	Transmission Line Simulator	Indian Institute of Technology, Guwahati
2	Transmission Line Simulator	Indian Institute of Technology, Banaras (IIT-BHU)
3	Mini Transmission Line Simulator	National Institute of Technology, Trichy
4	Multi Microgrid Emulator and Relay Test Kits	National Institute of Technology, Suratkal
5	Transmission Line Simulator	National Institute of Technology, Auranachal Pradesh
6	Transmission Line Simulator and Relay Test Kits AND Smart LVDC Grid	JNTU College of Engineering Hyderabad
7	Transmission Line Simulator and Relay Test Kits	JNTU College of Engineering Kakinada
8	Relay Test Kit	JNTU College of Engineering, Vizianagaram
9	Relay Test Kit	University College of Engineering, Osmania University
10	Transmission Line Simulator	RVRJC College of Engineering Guntur
11	Campus wide SCADA Monitoring and System	Basaveshwara Engineering College, Bagalkot
12	Transmission Line Simulator	CVR College of Engineering Ibrahimpatnam
13	Relay Test Kits	Chaitanya Bharati Institute of Technology (CBIT) Hyderabad
14	Relay Test Kits	Sree Vidya Nikethan College of Engineering, Tirupathi
15	Relay Test Kits	Sree Venkatesa Perumal College of Technology, Puttur

LIST OF EMBEDDED SOLUTION EXPERIENCE



Sl No	Item Purchased	Customer
16	Relay Test Kits	Narayana Engineering College, Nellore
17	Distribution System with SCADA & Relays	Indian School of Mines Dhanbad
18	Transmission Line Simulator	National Institute of Engineering Mysore
19	Transmission Line Simulator, Relay Test Kits and NRDE	Walchand College of Engineering, Sangli
20	Relay Test Kits	Gyan Ganga Institute of Technology, Bhopal
21	Mini Transmission Line Simulator	OP Jindal Institute of Technology, Raipur
22	Mini Transmission Line Simulator	Chatrapati Shivaji Institute of Technology, Durg
23	Transmission Line Simulator	Government College of Engineering Chandrapur
24	Transmission Line Simulator and Relay Test Kits	Vellore institute of Technology, Chennai
25	Transmission Line Simulator	Assam Engineering College, Assam
26	Relay Test Kits	Kongu Engineering College, Kongu
27	Relay Test Kits	Tezpur University, Assam
28	Mini Transmission Line Simulator	Bhilai Institute of Technology, Bhilai
29	Phase Detector System	Raychem Innovation Center
30	Supply of Power System Laboratory Equipment's - Relays	Khimji Ramdas LLC

OUR SOFTWARE SKILLS



Operating Systems	Databases	Software Languages	Web Server Technologies	Communication	API/ Integration Frameworks	High Availability
Windows	Oracle	C/C++	Tomcat	TCP/IP, UDP	Publish/Subscribe	Database Clustering
Linux	MSSQL	C#, ASP.NET	Apache	MultiCast Communication	REST	Backup/Restore
Android	MySQL	Python	ISS	IEC61850	SOAP	Application Switch Over Configuration
	PostgreSQL	Java/J2EE, Java Script	JBoss	SNMP	RPC	HTTP Load Balancing
	MongoDB	HTML5/CSS			Hibernate	
	MS Access	Ajax, Spring boot			JPA	
		React				
		Android Java				
		Server Side JavaScripting				

THANK YOU



Engineering | Projects | Manufacturing | Technology

Development of SCADA Software for Power System Management



Chemtrols – An Overview

Segments of Operation

Instrumentation

- **Chemtrols** undertakes Instrumentation activities through its Analytics, Metering & Measurement, Steam Engineering Business Units (“BUs”)
- **Chemtrols** undertakes Engineering, Manufacturing, System integration and Service activities under this vertical
- This vertical caters to a number of industries, including Power, Cement, Chemicals & Petrochemicals, Steel, etc. with Oil & Gas being the biggest sector
- Has exclusive partnerships / collaborations with Leading Global Companies for India
- 150 + Service Team across the country
- Goa facility has a number of significant certifications

Automation

- **Chemtrols** undertakes its Automation business for Crude Products & Power through its Terminal Automation and Utility Management System Business Units (“BUs”) respectively, both housed under “Chemtrols Industries Ltd.”
- Chemtrols undertakes Projects, Engineering, Manufacturing, Software, & Service under this vertical
- **Chemtrols** is the only Indian Company qualified to bid for Nation Wide Transmission Network Automation

International Certifications & Accreditations for Global Needs

CERTIFICATE ■ CERTIFICADO ■ CERTIFIKAT ■ 証明書 ■ CERTIFICATE ■ 証明書



The Certification Body of TÜV SÜD South Asia Private Limited certifies that

CERTIFICATE

The Certification Body of TÜV SÜD Management Service GmbH Trading as TÜV SÜD South Asia Private Limited certifies that

Chemtrols Industries Private Limited
141/142, Kundaim Industrial Estate, Kundaim, Goa – 403115, INDIA

has established and applies a Quality Management System for

Design, Manufacture and Supply of Process Analytical and Environment Monitoring Systems, Process Control Instruments, Steam Handling Products, Flow Metering and Automation Systems

An audit was performed, Report No. 4163042856. Proof has been furnished that the requirements according to

ISO 9001:2015

are fulfilled.

The certificate is valid from 2017-12-29 until 2020-12-28.
Certificate Registration No.: 12 190 29927 TMS.

M. A. K. K.
Product Compliance Manager
March, 2017-12-29

IAF DASS



The Certification Body of TÜV SÜD South Asia Private Limited certifies that

Chemtrols Industries Private Limited
141/142, Kundaim Industrial Estate, Kundaim, Goa – 403115, INDIA

has implemented an Environmental Management System in accordance with ISO 14001:2015

For Scope of

Design, Manufacture and Supply of Process Analytical and Environment Monitoring Systems, Process Control Instruments, Steam Handling Products, Flow Metering and Automation Systems

The certificate is valid From 2018-01-25 until 2021-01-24
Subject to successful completion of annual periodic audits
The present status of this Certificate can be obtained on go334r.audg
Further clarifications regarding the scope of this certificate may be obtained by consulting the certification body

Certificate Registration No. 99 104 00541
Date of Initial certification : 2018-01-25

Chemtrols Industries Private Limited
141/142, Kundaim Industrial Estate, Kundaim, Goa – 403115, INDIA

has implemented an Occupational Health and Safety Management System in accordance with OHSAS 18001:2007

For Scope of

Design, Manufacture and Supply of Process Analytical and Environment Monitoring Systems, Process Control Instruments, Steam Handling Products, Flow Metering and Automation Systems

The certificate is valid From 2018-01-25 until 2021-01-24
Subject to successful completion of annual periodic audits
The present status of this Certificate can be obtained on go334r.audg
Further clarifications regarding the scope of this certificate may be obtained by consulting the certification body

Certificate Registration No. 99 116 00291
Date of Initial certification : 2018-01-25
















Manufacturing Facilities



Chemtrols – Segments of Operation

Instrumentation			Automation	
Goa Factory			Taloja / Goa	
Analytics (BU1)*	Measurement & Metering (BU3)*	Steam Engineering (BU4)*	Terminal Automation (BU2)*	Utility Management Systems (BU5)*
Process Analytics	Level Measurement	PRDS	Terminal Automation	Transmission Automation
	Flow Measurement			
Ambient Air Quality Monitoring	Temperature Measurement	Dump PRDS	Truck & Wagon Loading	Distribution Automation
		Control Valves		
Continuous Emission Monitoring	Ball, Butterfly & Plug Valves	Turbine Bypass Valves	Tank Farm Management	Smart Grid
Gas Detection Systems	Metering Skids Custody Transfer	De-Super heaters	Blending & Dosing Systems	RTU/ FRTU

Transmission Automation

- These are SCADA systems for Energy Management that help Transmission Utilities manage their large region-wise power transmission networks from Load Dispatch Control Centres
- Chemtrols provides a comprehensive solution that includes Remote Terminal Units for Substations, Control Centre Equipment & Software, Engineering of the entire solution, Installation & Commissioning and Comprehensive maintenance subsequently
- Chemtrols uses its Goa facility to manufacture RTUs and stage the control centre for Factory Acceptance testing

Distribution Automation

- These are SCADA systems for distribution Management that help Distribution Utilities manage their city distribution networks from centralized control centres
- Chemtrols provides a comprehensive solution that includes Remote Terminal Units for Substations, FRTUs for field installations, Control Centre Equipment & Software, Engineering of the entire solution, Installation & Commissioning and Comprehensive maintenance

Smart Grid

- Smart Grid projects involve installation of entire Advanced Metering Infrastructure that includes Smart meters, Automated meter reading systems, Peak Load Management, & Meter Data Management Systems
- Chemtrols provides a comprehensive solution that includes engineering the entire smart grid solution, supplying equipment & software and integrating the entire system

RTU / FRTU

- Chemtrols manufactures RTUs & FRTUs at its Goa Manufacturing facility
- LDMS (Local Data Monitoring Systems) software which is supplied by Chemtrols is installed along with the RTUs for real time monitoring of sub-stations
- Chemtrols currently supplies an entire range of RTUs for all types of substations & also ones that are IEC 61850 compliant

Development of SCADA Software for Power System Management

Capability, Feasibility, Roadmap, and Challenges

Utility Management Systems (BU5): Systems

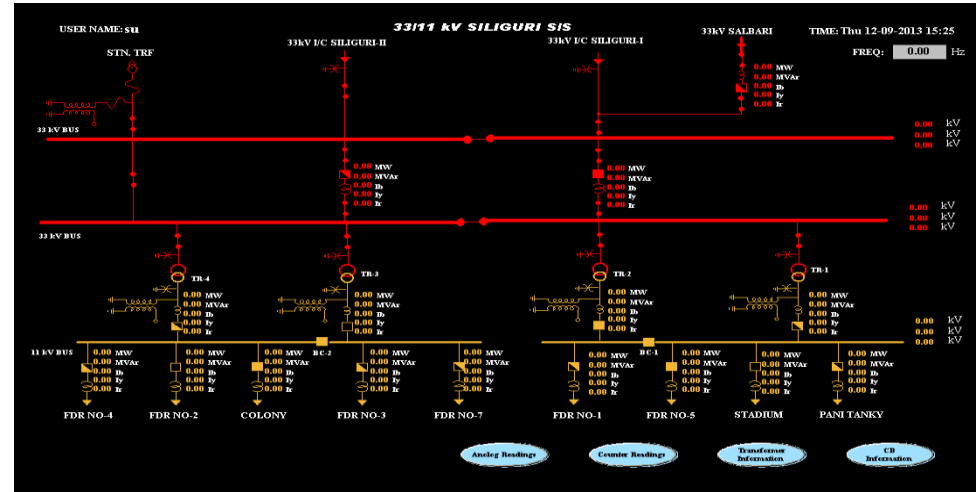
SCADA / EMS / DMS



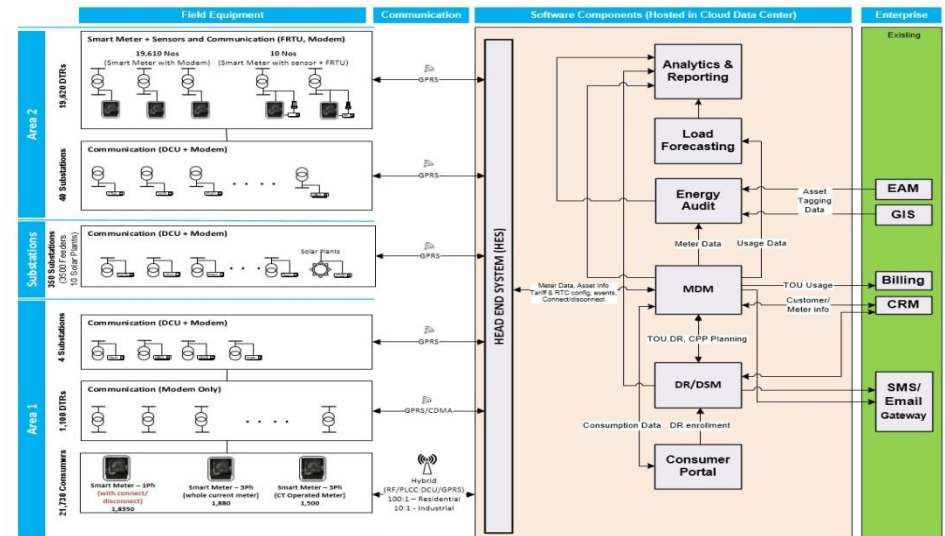
RTU & FRTU



Substation Automation – Sample Display



Smart Grid Architecture



Some Signature Projects and achievements

1. SCADA EMS: Eastern Regional Load Dispatch Centre
2. SCADA EMS: National Load Dispatch Centre
3. Forecasting: REMC Southern Region
4. Forecasting: REMC Northern Region
5. SCADA DMS in West Bengal
6. SCADA DMS in Assam
7. SCADA DMS in Andhra Pradesh
8. SCADA DMS in Telangana
9. SCADA DMS in Gujarat
10. Smart Grid Pilot Project in Siliguri
11. More than 1000 RTUs & FRTUs each supplied across India over the past decade
12. SCADA Software developed in-house and installed in more than 700 Substations across India

- **Chemtrols** has a fully in-house developed SCADA Software which supports industry standard protocols like IEC 61850, IEC101/104, IEC103, Modbus.
- **Chemtrols** has a team of experts with experience in SCADA software development as well as project implementation requiring integration of SCADA, EMS, DMS, RTUs, IEDs, GIS, IT Systems and various type of Communication Systems & Technologies.
- **Chemtrols** has extensive integration experience with Products from multiple OEMs like GE/Alstom, Siemens, OSI, ABB, CG, Schneider, ESRI GIS etc.
- **Chemtrols** has developed add-on customized applications like Database Validation Tools, Report Utilities, RT-DAS, Email/SMS Alerts etc.

Applications	Feasibility	Remarks
SCADA Applications with Alarm Handling	✓	Universal Database and Design
Universal User's Interface	✓	Universal Database and Design
Data Exchange Interface with EMS /DMS /Other Applications	✓	Universal Database and Design
FEP Protocols (IEC101, IEC104, IEC61850, Modbus)	✓	
FEP Protocols (IEEE C37.118)	✓	Advanced SCADA Application
Secured ICCP	✓	
OPC Client	✓	
Data Storage Adaptor	✓	3 rd Party RDBMS
Data Historian Adaptor	✓	3 rd Party Historian
Replay of Events	✓	
Topology Processor	✓	
Data Validation Tool	✓	
CIM Exchange Interface	✓	
CIM based Database Development Tools	✓	

Applications	Feasibility	Remarks
State Estimation (Hybrid)	✓	
Real Time Contingency Analysis	✓	
Real Time Security Enhancement	✓	
Voltage and VAR Despatch	✓	
Optimal Power Flow	✓	
Outage Scheduler	✓	
Transmission Line/Corridor Capability Monitor (TCM)	✓	Advanced EMS Application
Short Circuit Analysis	✓	
Automatic Generation Control (AGC)	✓	Advanced EMS Application
Dynamic Stability Assessment (DSA)	✓	Advanced EMS Application
Dispatcher Training Simulator	✓	Advanced EMS Application
Generation/Load Forecasting (RE)	✗	3 rd Party and External to SCADA/EMS

Applications	Feasibility	Remarks
Network Connectivity Analysis (NCA)	✓	
State Estimation (SE)	✓	
Load Flow Application (LFA)	✓	
Voltage VAR control (VVC)	✓	
Load Shed Application (LSA)	✓	
Fault Management and System Restoration (FMSR)	✓	
Loss Minimization via Feeder Reconfiguration (LMFR)	✓	
Load Balancing via Feeder Reconfiguration (LBFR)	✓	
Operation Monitor (OM)	✓	
Distribution Load forecasting (DLF)	✓	
GIS Data Exchange Interface	✓	

Applications	Feasibility	Remarks
Web Interface	✓	Linked to SCADA
E Mail and SMS Application	✓	Linked to SCADA
Data Replication	✓	Linked to SCADA
Report Development & Generation	✓	Linked to SCADA, RDBMS and Historian
Mobile App	✓	Linked to SCADA
Market Operation Application Interface	✓	3 rd Party /User Applications
Antivirus, HIDS /HIPS	✗	3 rd Party Standard Products
Network Management	✗	3 rd Party and External to SCADA
Software for SAN & NAS	✗	3 rd Party and External to SCADA
SIEM (Security Information and Event Management)	✗	3 rd Party and External to SCADA
Application Whitelisting Tool	✗	3 rd Party and External to SCADA
Document Management System	✗	3 rd Party Standard Products
Identity Management Software	✗	3 rd Party Standard Products
Data Backup	✗	3 rd Party Standard Products

Approach

Chemtrols has team of SCADA/EMS/DMS/RTU Domain Software and Integration experts for Software Design, Engineering, Development, Testing and Deployment in Utilities as well as overall Project Management. Additionally, Chemtrols will utilize a Software Company to provide an additional pool of software resources & universal software development approach. Indigenous content will be much more than 50%.

Development	Time Frame	Remarks
SCADA Applications	Phase-1: 15 months	
DMS Applications	Phase-2: 12 months	Concurrently after 60% of SCADA
EMS Applications	Phase-3: 18 months	Concurrently after 90% of SCADA
Advanced SCADA and EMS Applications	Phase-4: 12 months	

- 1) Cloud based implementation can provide benefits like ease of upgrade, easy management of hardware obsolescence, no initial investment for hardware. Pricing is usually subscription basis (software as a service) and needs to be beneficial contractually to both developers and utilities.
- 2) Cloud based system is usually not highly customizable for each user, and hence will require a standard design & requirement specifications across India to make software development viable. Any modifications or updates will be applicable to ALL Utilities.
- 3) Cyber security as well as Data Security concerns will be required to be addressed. A suitable model for on-site & off-site data servers will be required to be planned.

Technical

- 1) Universal Design: Flexibility, Customization, Open Interface, Capability to cater to Segments other than Power and International Markets
- 2) Standardized Engineering for Database & Interfaces: Specifications and Practices for Indian Context
- 3) EMS/DMS: Experience within India in *software design and programming* of Power Systems Algorithms
- 4) Time Cycle from Design & Implementation to Maturity in the Field
- 5) Required Utilities to support during prototyping and testing

Non-Technical

- 6) Requires Utilities support to ensure critical mass of Business going forward
- 7) Long Term Support with Investment in Development



Engineering | Projects | Manufacturing | Technology

Thank You





Approach to Indigenous SCADA Development



Highlights



1000+

Customers



70+

Countries



20+

Partners

Our Presence



Organization

22+ Years

In business

200+

Employee strength

Investors

World Bank / IFC

Global Env Fund

**Significant Employee
Ownership**

Our Offerings

Applications

Industries



Kalki.io Protocol Expertise



Utilities	Industry 4.0	Smart City	IoT	Renewables
IEC 61850 DNP3 / IEEE1815 IEC60870-5-103/101/104 IEEEC37.118 DLMS-COSEM ICCP /IEC 60870-6 IEC 61400-25 IEEE2030.5	Modbus ANSI Mbus BACnet* Ethernet IP* Lon Talk * ControlNet * OPC UA/ XML	Modbus Mbus Pack bus BACnet* DLMS OPC UA/ XML OCPP MQTT	OPC UA MQTT Web-Socket/JSON AMQP * LWM2M * Amazon AWS Microsoft Azure	Sun-Spec Modbus IEEE2030.5 DLMS-COSEM MQTT OCPP IEC61850 DNP3 / IEEE1815 IEC60870-5-101/104

+ many more

Reference full list of supported protocols on ASE/Kalkitech website:

<https://kalkitech.com/support/sales-support/protocols/>

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Why Indigenous SCADA



- Extensive dependence on Global OEMs
 - Monolithic software.
 - Scrap and build every 7 years
 - High cost for expansion
- Expertise of Local Vendors
 - We have good OEMs ecosystem who are supplying various modules to global OEMs and to global customers
- Develop architecture for next generation SCADA

Proposed Approach of Indigenous SCADA



Layered Architecture

- *Segregate Layers*
- *Data Acquisition*
- *Device Management*
- *Data Storage*
- *Data Transformation*
- *OT application*
- *IT Applications*
- *Visualization*

Cyber Security Modules to be added

- *IEC 62351*
- *ISO 27000*
- *Identity and Access Management*
- *Device Management*
 - .

Distributed Data Base

New approach Needed to

- *SQL*
- *No-SQL*
- *Time series*
- *Graph*
- *Files*

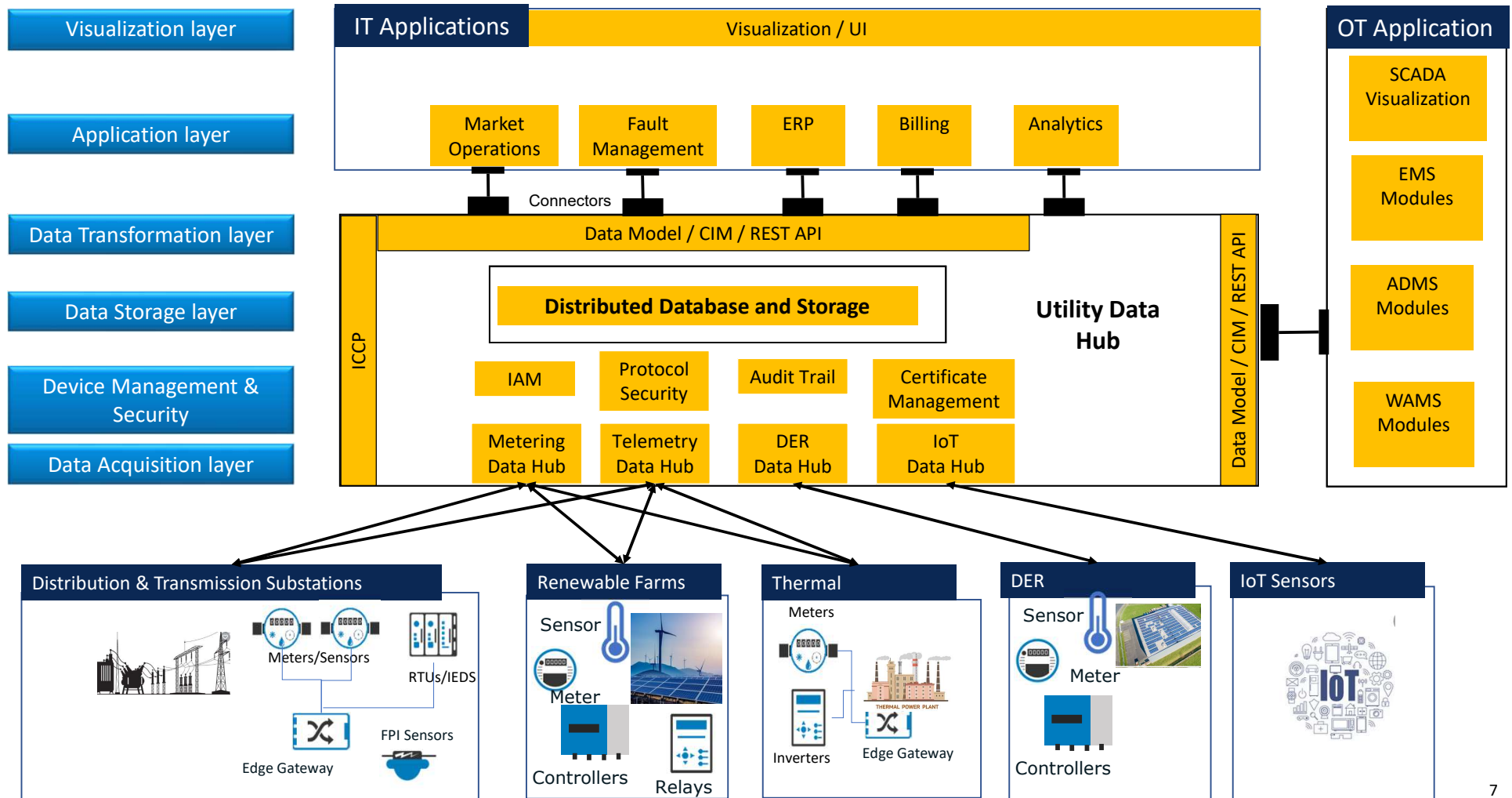
Modular Approach

- *Architecture must allow multiple vendors – move away from monolithic*
- *Enable multiple Vendors to come together with pluggable building blocks*

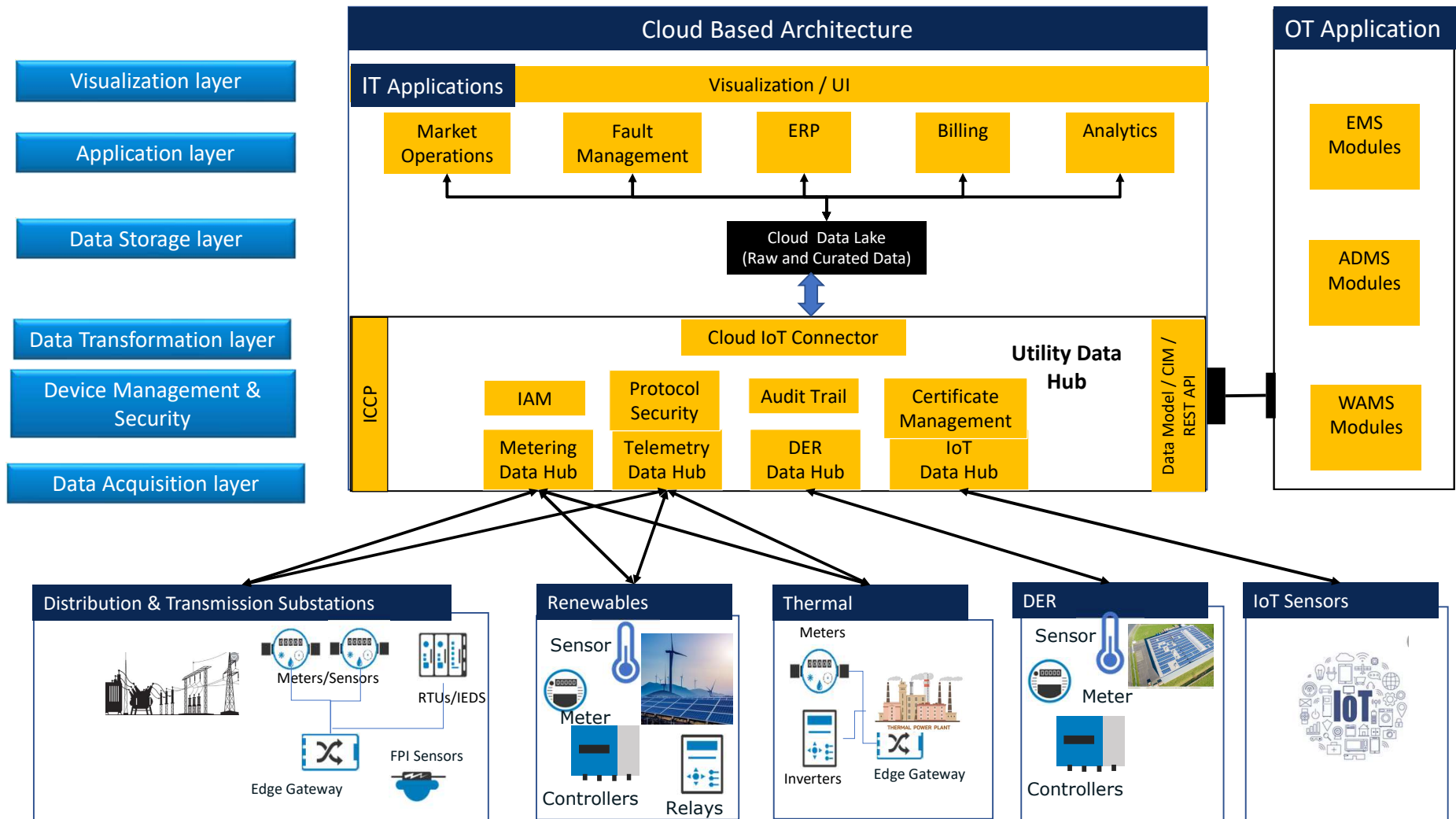
Timeline & Funding Support

- *Timelines for product development of 18-24 months must be factored in*
- *CEA /Beneficiaries must evaluate provide funding for development or captive market*

Proposed DATA CENTRE Architecture



Proposed Cloud Architecture



Our Products



SCADA



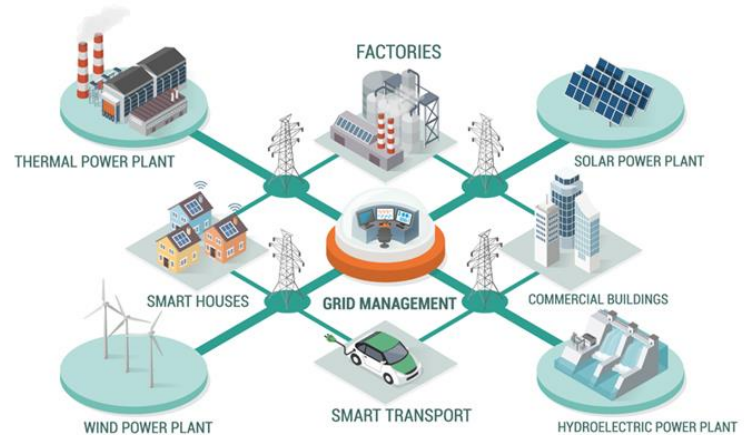
Gateway



Protocol
Simulator



Source
Code Libraries



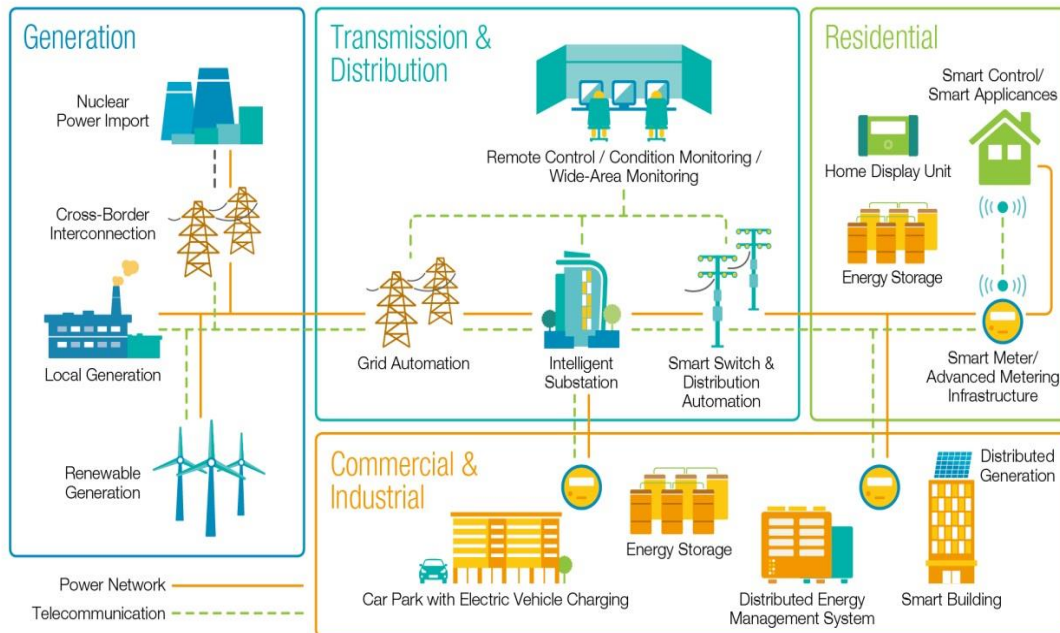
RBH SOLUTIONS PRIVATE LIMITED

Smart Grid Experts



RBH Introduction

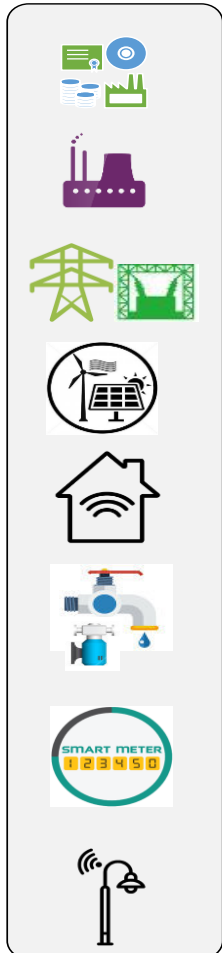
- Provides solutions for SMART Grid Communication / Interfaces and Smart Grid Analytics / SCADA Platform
- 5 Indigenously developed different products to cover all Grid's End to End Requirements (1 – 6: Generation to Consumption)



- Started in 2004
- ISO 9001:2015
- ISO 27001:2013
- CMMI Lvl 3 Appraised
- All products / solutions are 100% owned and Made in INDIA

Products

Sensors / Devices Plant Fields



Communication Middleware RBH ICx Gateway (USP)



*Windows / Linux
Platforms*



ICxRTU



Raspberry Pi



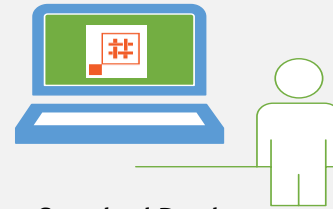
Arduino



*IoT
Gateway*

**Any Type of Sensor /
Vendor / Technology
Supports 90% of
industrial communication
standards**

Digital Dashboards/ Displays RBH RsS SCADA



**Industry Standard Products
Dashboard / Reports / Interactive Plant
Operations / Monitoring / Control
System Alerts / Simulations**

- Automation Platform
- Energy Management System
- Building Management System
- Substation Automation System
- Demand Management System
- Load Shedding Analytics

**RsS RCDC
Cloud based SCADA System**



Control Center

Cloud Servers

**M2M VPN Frontend Server
ICx Gateway M2M Frontend Servers**



RBH Products

SCADA Systems

- Substation Automation
- Centralized Monitoring System
- Automatic Demand Management System
- Historian UMaC Store: Time Series : NO SQL DB

Metering Systems

- MDM / MDAS Solutions
- EMS Systems
- Metering Headend / Data Concentrators

Gateway Systems

- Gateway / Data Concentrator
- M2M / Remote Devices Connectivity over VPN
- IEC / MODBUS / DLMS / OPC / ICCP / DNP3 / MQTT

Networking Solutions

- Serial / Ethernet / Fiber Convertors
- Ethernet / Fiber Switches
- MODEMs

RBH Solutions

- Product based offering for
 - Power Plant Automation & Integration
 - Electrical Distribution Infrastructure Automation
 - Automatic Metering Infrastructure / Energy Management System
 - Central Monitoring System: Web based Central Monitoring System
 - Substation Automation
 - References upto 765kV Substation
 - Automatic Demand Management
 - Substation SCADA and Metering
 - Electrical Installation / Integration / Automation for Balance of Plant
 - LDC Data Exchange / Interface
 - Remote HMI Option
 - Web addon Cloud Enabled Solutions for Remote Monitoring & control of Plant / Assets with Analytics Platform

Key Customers



ALSTOM

SIEMENS

Schneider
Electric



ABB



Honeywell

A
AREVA



SEL

Atos




EMERSON



SATURN PYRO SDN. BHD.

Rockwell
Automation

RBH SCADA Experience

- SCADA System for Distribution Utility
 - Scope
 - 400 kV / 220 kV / 33 kV / 11KV Substations
 - Deployment of SCADA and Metering application
 - Supply of RsS SCADA Software for monitoring and Control of 12 Substation
 - Supply of ICx Gateway for interfacing with RTUs / IEDs over IEC 60870-5-101/104, IEC 61850, Modbus Serial & TCP.
 - Interface with 65 Wireless RTUs & Meters installed at RMUs over GPRS / M2M Network.
- FRTU for RMUs for RAPDRP Project
 - Scope
 - Supply of ICxRTU based solution as FRTU for RMUs under RAPDRP SCADA / DMS Projects
 - More than 650 FRTUs supplied under this project.

RBH SCADA Experience

- Wind Turbines Remote Control Center: RsS RCDC SCADA Solution
 - Scope
 - Implementation of Metering and Control Solution over GRPS Cloud using RCDC Platform
 - Supply of GPRS Modems
 - Deployment of ICxM2M and RsS RCDC Platform over Cloud Server
 - Remote Monitoring and control of Wind Turbines including Metering over GPRS Modems
- VPN based SLDC Integration of Solar plants with SLDC at Punjab / Himachal & Rajasthan
 - Scope
 - Implementation of ICxM2M based VPNL Platform at State LDCs
 - Supply of GPRS Modems and RTUs at Solar Plant site for SLDC Integration

RBH SCADA System: Utility Experience

- SCADA System at CSPTCL
 - 220 kV / 132kV / 33kV Substation SCADA
 - Interface over IEC 61850, IEC 60870-5-101/104, MODBUS / DLMS
 - Complete SCADA Solution for Substation Automation and Control
- SCADA System at HPSEB
 - 33kV / 11kV Substation SCADA
 - Interface over IEC 61850, IEC 60870-5-101/104/103, MODBUS / DLMS
 - Operation, Monitoring and Control of Auto Reclosers / Sectionalizers.
- SCADA System at NRLDC Substation
- SCADA System for RPADRP Projects
 - RBH SCADA System as LDMS System for RAPDRP Projects

RBH SCADA System: ADMS Experience

- ADMS System for 7 North East States
 - Assam
 - Meghalaya
 - Mizoram
 - Manipur
 - Nagaland
 - Tripura
 - Arunachal Pradesh
- Scope of Supply
 - ADMS Application
 - VPN Server
 - SLDC Integration over ICCP
 - RTUs at Substations
 - 4G Modems
 - VPN Connectivity

Electric Infra: Products & Solutions

- Substation Automation & Integration (ADMS)
 - Central SCADA Platform
 - IEC 61850 based Substation Automation Platform with support for IEC 60870-5-104 /101 and IEC 61850-9-2 Protocols
 - Interface with any BCU / IEDs / Metering Platform
 - Interface with Remote Substations over GPRS / Broadband / FO Networks
 - SCADA Solution with Energy Management and Load Shedding
 - Interfacing with SLDC / LDC over IEC 61850-9-2 / IEC Protocols
 - M2M Gateways for interfacing with Remote RTUs over GPRS using Secure VPN Technology.
 - Substation Solution
 - RTUs
 - For Local IO management
 - Local LDMS Communication
 - Remote Communication with Network / or through Modems over VPN
 - LDMS: Local Display Management System (Small SCADA)

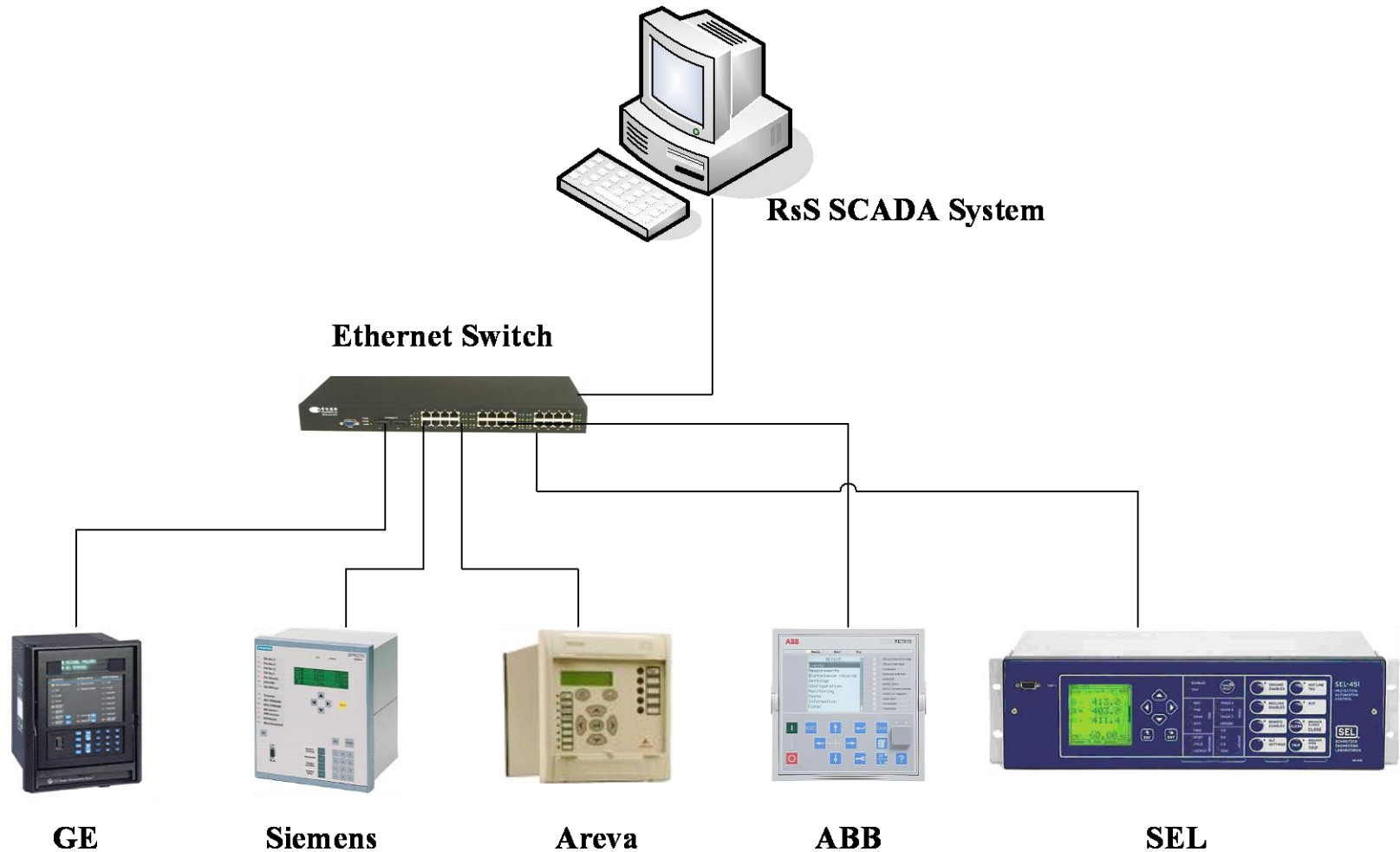
Solutions for Distribution Utility

- Substation Automation
 - Local SCADA and Centralized SCADA System
 - Support for IEC, MODBUS, DLMS, OPC Protocols
 - Gateway / RTU / FRTU Based
 - M2M / Secure VPN based Central Communication Platform
- RT-DAS – IPDS Projects
 - Control Center Infrastructure
 - Substation RTUs / FRTUs
 - SAIDI / SAIFI Calculations
- Meter Data Management Solution
 - VPN Enabled Secure / M2M enabled Headend System
 - Multi vendor / multi protocol (MODBUS / DLMS) support
 - DCU / Gateway based
- Automatic Demand Management System
 - Load Shedding
 - Outage Management System
 - FRTU / Gateway based

Solutions for Distribution Utility

- DT Transformer Monitoring Unit
 - Installation of DT Monitoring Unit
 - Centralized monitoring and remote tripping of DTs
 - Preventive Maintenance
- MDAS / Energy Management System
 - Metering data and billing solution
 - Utility Grade Billing and Management
 - Customer Portal and comprehensive accounts management solution
 - Data analysis and energy management
- FRTUs / DCU / Substation Gateways
 - Substation / RMU FRTUs
 - Metering Data Concentrators (DCUs)
 - Substation Alerts (SMS & Email) Solution
 - GPRS / 3G / 4G Modems and Routers

RBH Products: Vendor Independent

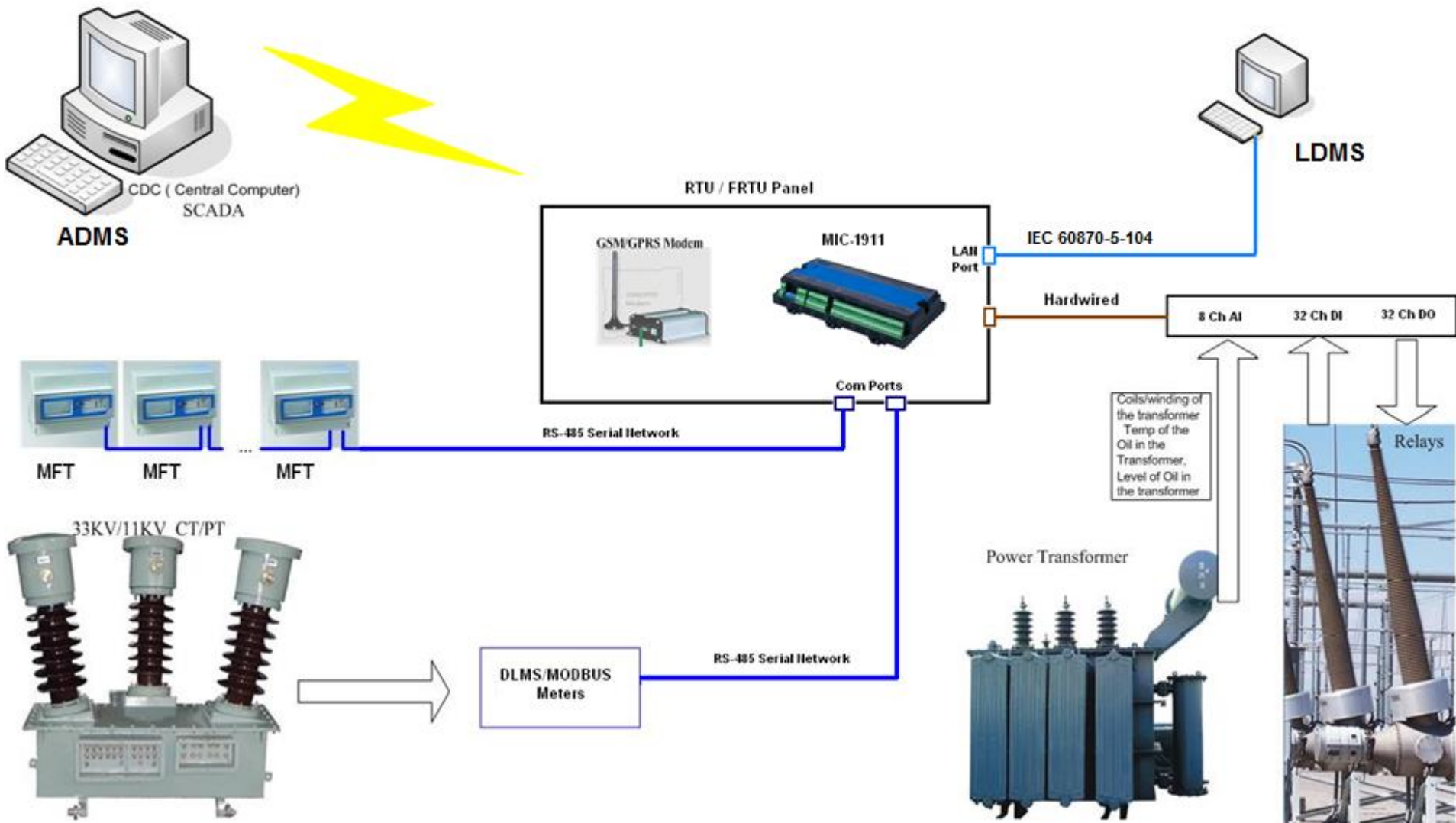


ALL IEDs / BCUs over IEC 61850 Protocol

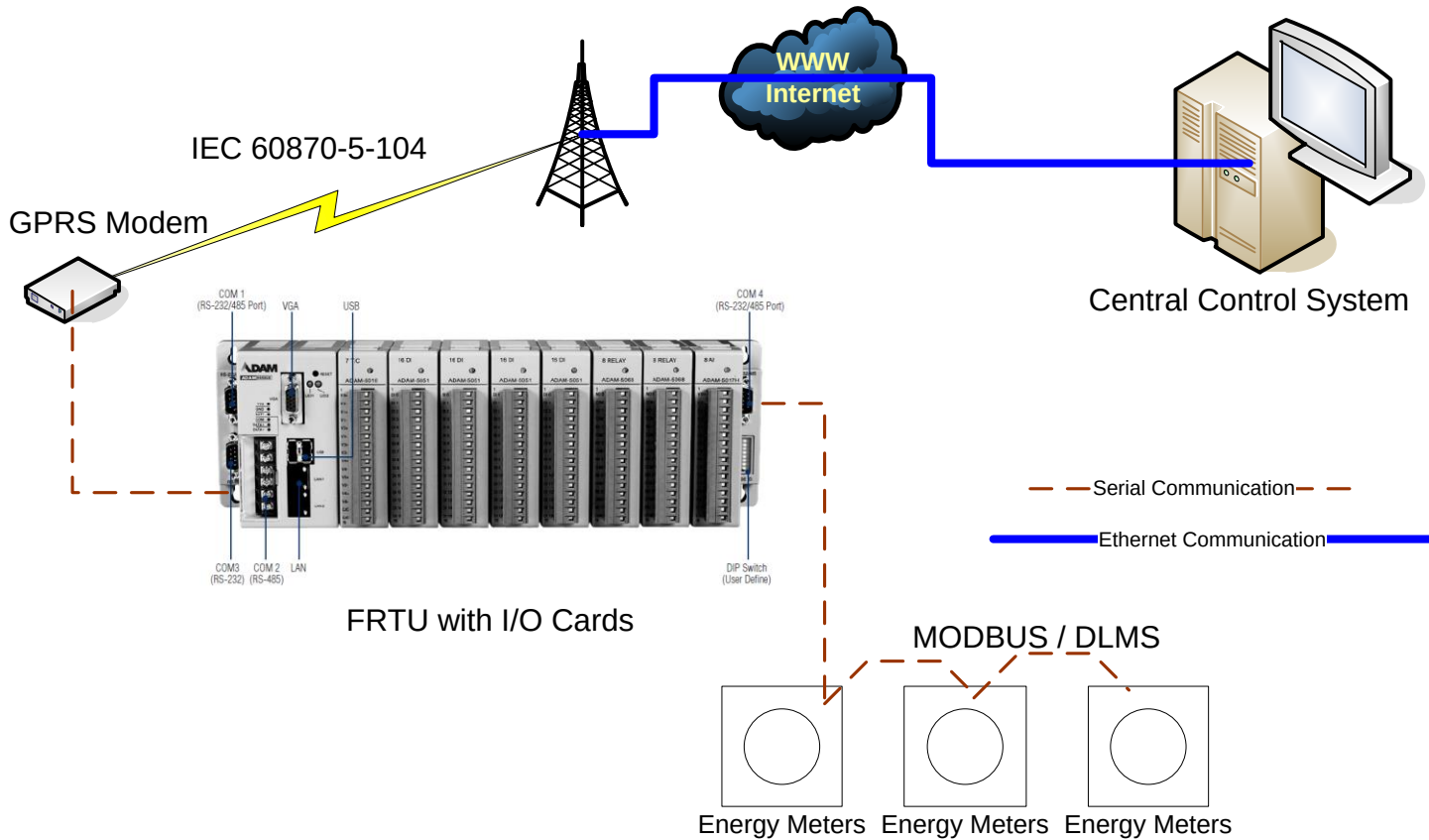
Substation RTU: Key Deployment

- RTU Based
 - RTU based solution is suitable where IO information is not available through communication channels
 - Digital Inputs for Status Monitoring
 - Digital Output for Control
 - Analog Inputs for Sensors data (OTI / WTI)
 - Communication interfaces for Metering and Protection Relays tripping information
 - Capture of Input Information through Relays and Meters over communication channels
- Common Features
 - Optional SMS / Email Alert System
 - Communication with Control Center over IEC 60870-5-104 /101
 - Interface over Fiber / PLCC / Modems through VPN / M2M Interfaces

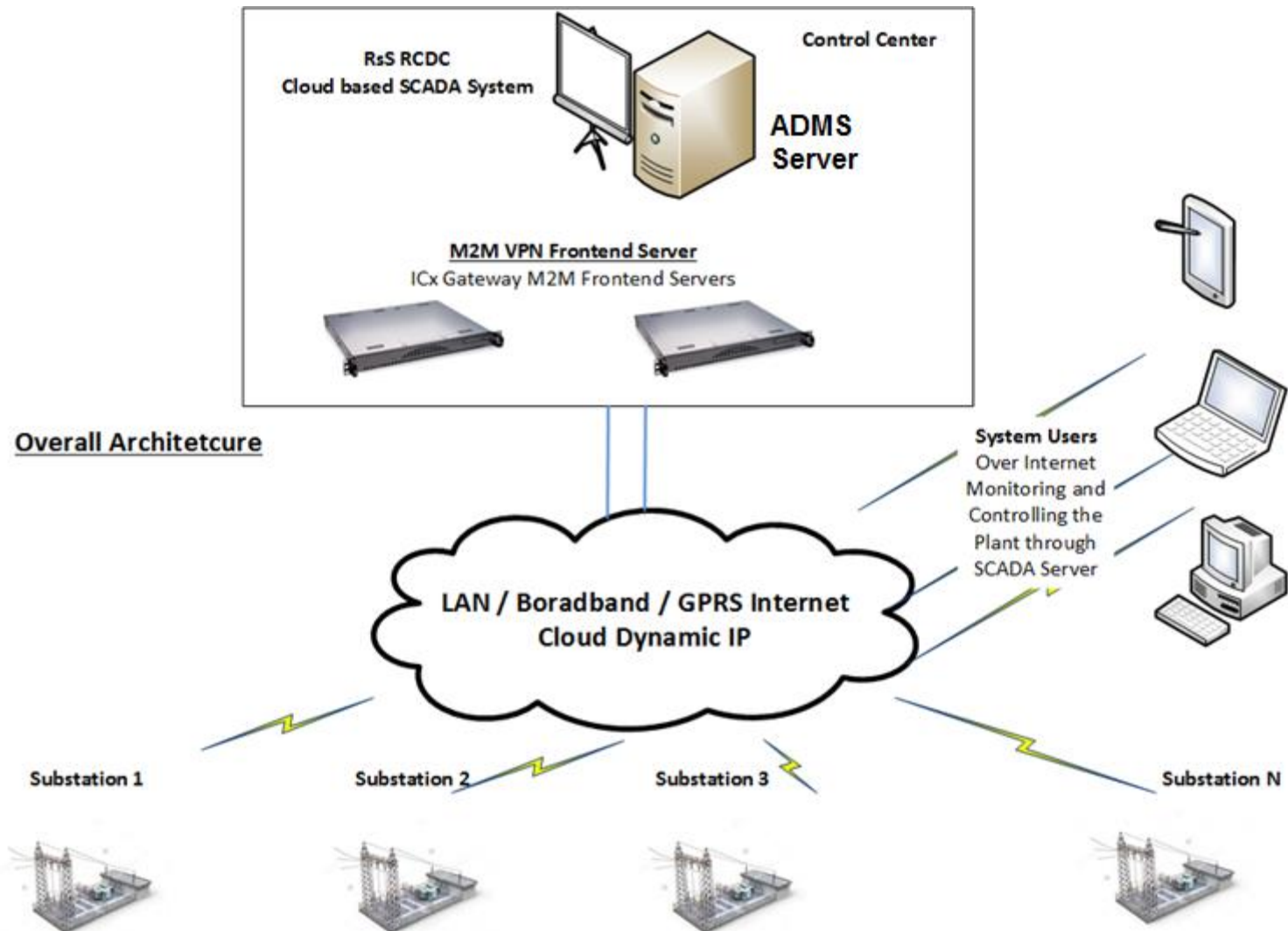
LOCAL SUBSTATION: RTU System Architecture



Remote Plant Management: Complete Solution



Central Monitoring System: Architecture



ADMS System Architecture

Assam-ADMS

Welcome! Administrator

22/02/2021 13:59:57

Project Views

Dashboard

SLDC Report

Overview1

Overview2

Tripping Report

Events

Alarms

Status

History

Load Shedding

ADMS Control Centre Network Architecture Diagram

The diagram illustrates the network architecture of the ADMS Control Centre. It features two ADMS servers (ADMS Server 1 and ADMS Server 2) connected to two switches (Switch 1 and Switch 2). These switches are connected to two routers (Router cum Firewall 1 and Router cum Firewall 2). Both routers are connected to an ISP Router, which is connected to the Internet Cloud. The Internet Cloud is connected to various substations via GPRS LINKS. The substations are: KACHULI, CHINNAKORA, NALAGAN, GALIAPUR, and GOSSAIGAON. The diagram also shows an Existing SLDC System with two firewalls (Firewall 1 and Firewall 2) and two switches (Switch 1 and Switch 2). The ADMS servers are connected to the Existing SLDC System via the routers and firewalls.

Total Load (MW)

26.86

Load Shedding

S.No.	Name	Status	Rank
1	ASSAM LOGIC	Disabled	0
2	APDCL TESTING	Disabled	0

SLDC Parameters

ASSAM DRAWAL	-74.76 MW
ASSAM SCHEDULE	77.00 MW
ASSAM DEVIATION	3.24 MW
SARUSAJAI BUS FREQUENCY	50.03 Hz
BALIPARA PG BUS FREQUENCY	49.97 Hz
MORAN BUS VOLTAGE	137.64 kV
MARIANI BUS VOLTAGE	224.03 kV
BOKAJAN BUS VOLTAGE	131.41 kV
ROWTA BUS VOLTAGE	132.48 kV
GOSSAIGAON BUS VOLTAGE	0.00 kV
GAURIPUR BUS VOLTAGE	0.00 kV
DHALIGAON BUS VOLTAGE	134.76 kV
KHALOIGAON BUS VOLTAGE	0.00 kV
LANKA VOLTAGE	129.92 kV
% Deviation	0.48 MW

Settings

Welcome!

ADMS System: Design Considerations

- SLDC Integration
 - ICCP
 - OPC
 - IEC 60870-5-104
- RTU Interfacing
 - IEC 60870-5-104 / DNP / IEC 61850
 - Over Fiber / Direct LAN Connections
 - Over VPN Enables Secure 4G / GPRS Interfacing
- At Control Center
 - RSS RCDC as SCADA and ADMS Application
 - ICxM2M as Front – End System for RTU Interfacing and VPN Handling
 - ICCP and OPC Interfacing

RsS RCDC Central ADMS System

- Cloud based Web enabled Centralized Automation Solution as Automatic Distribution SCADA
- Key Features
 - User Management / Secure Access
 - Dashboards
 - Alarms / Events
 - Control Operations
 - Colour Coded Electrical Flow Diagrams
 - Metering
 - Reporting
 - Operator Logs
 - Load Shedding Application
 - ABT Metering / Open Access Metering

RsS RCDC: Applications

- Dashboards / SLDs / Detail Views /Network Views /
- Load Shedding System
 - Define load shedding schedule
 - Define Time based / Alarms / Event triggers
 - Define Round robin / Critical / Non Critical Priorities
- Alarms / Events over SMS / Email
- Reporting
 - Load Shedding
 - Operator Logs
- Work Permit Management
 - Issue work Permits
 - Auto locking / Graphic symbols on Feeders where work permits / shedding algorithms are in progress
 - Reporting / Logging / Operator Communications

RsS RCDC Frontends: ICxM2M

- Front End Gateways based on ICx Gateway Platform
 - VPN Enabled: PPTP / L2TP / IPSec
 - Connect with upto 200,000 Remote Devices
 - Protocols Supported
 - IEC 60870-5-101/104
 - IEC 61850
 - DNP 3
 - MODBUS
 - DLMS
 - OPC
 - ICCP for LDC integration
 - HTTP / SOAP / WebSockets / FTP
 - MQTT / Thrift
 - Security:
 - Encryption
 - RSA
 - 3DES
 - Inbuilt Firewall

Sample Views: ADMS

Project Views

SLD

Report

Events

Alarms

Load Shedding

MEGHALAYA

33-11KV KENCH TRACE

19/03/2020 15:57:04

33-11KV KENCH TRACE SLD

L/R STATUS
LOCAL

BAY 1
FROM 33 kV MAWLAI

BAY 2
33/11 kV TR-1

BAY 3
33/11 kV TR-2

BAY 4
TO 33 kV NONGTHYMAI

33kV BB

33/0.11kV

LIS

CB

CT-400/5A

BIS

33/11 kV TR-1

BIS

CB

CT-200/1A

LIS

TR 33/11 kV TR-1

5 MVA

33/11 kV TR-2

BIS

CB

CT-200/1A

LIS

TR 33/11 kV TR-2

5 MVA

33/11 kV TR-1

BIS

CB

CT-400/5A

BIS

33/11 kV TR-2

BIS

CB

CT-400/5A

BIS

11kV BB1

11/0.11kV

CB

CT-300/5A

11KV LAWSOHTUN
BAY 1

11KV LABAN
BAY 2

11KV I/C-1
BAY 3

11KV I/C-2
BAY 4

11KV KENCH'S TRACE
BAY 6

11KV MES
BAY 7

11kV BB2

11/0.11kV

CB

CT-300/5A

CT-300/5A

CT-300/5A

CT-300/5A

CT-300/5A

CT-300/5A

CT-300/5A

CT-300/5A

BUS COUPLER
BAY 4

MW

2.07

MVAR

1.08

MW

1.62

MVAR

0.21

MW

1.88

MVAR

-0.53

MW

0.92

MVAR

0.16

MW

1.42

MVAR

0.17

?

Feeder Load

0.00

0.50

1.00

1.50

2.00

2.50

3.00

00:00

05:00

10:00

11KV INCOMER-1 (MW)

11KV INCOMER-2 (MW)

11KV KENCH'S TRACE (MW)

11KV LAWSOHTUN (MW)

11KV MADAN LABAN (MW)

11KV MES (MW)

11KV SPARE-1 (MW)

11KV SPARE-2 (MW)

SLDC Parameters

ME NEHU Freq

49.99

Hz

ME NEHU Vol

128.44

kV

ME Mawph Freq

49.97

Hz

ME Mawph Vol

129.53

kV

PG Badarpur Freq

49.90

Hz

PG Balipara Freq

49.97

Hz

Deviation

XXX

MW

Schedule

164.03

MW

PG Line Interchange

155.757

MW

RsS - MEGHALAYA

Mail - Birinder Kumar - Outlook

get help with file explorer in -

Not secure

192.168.2.49:4000/project/1017/MEGHALAYA/33-11KV%20KENCH%20TRACE?view=P8

19/03/2020 15:57:04

3:57 PM

3/19/2020

Sample Scenarios: ADMS

The screenshot displays the MEGHALAYA ADMS web interface. The browser address bar shows the URL: 192.168.2.49:4000/project/1017/MEGHALAYA/33-11KV%20METER%20FACTORY?view=LS. The interface includes a top navigation bar with the MEGHALAYA logo, a user profile for 'Administrator', and a timestamp of 19/03/2020 16:02:40. A left sidebar contains 'Project Views' with 'Load Shedding' selected. The main content area is titled 'Load Shedding' and features a table with columns: S.No., Name, Status, Rank, Enabled, and action icons. The table lists three load shedding conditions (L1, L2, L3), all with a status of 'Disabled' and a rank of 0. Below the table, a detailed view for 'L1' shows its status as 'Disabled' and rank as 0. A 'Load Shedding Condition' dialog box is open, displaying a logical expression: $\text{Sum (OR)} \left[\left(\text{And} \rightarrow \text{NEHU Freq}(50.05) < 49.8 \right) \text{ And } \left(\text{PG Line Interchange}(152.96) - \text{PG Line Schedule}(164.49) > 1 \right) \right] \text{ Sum (OR)}$. The Windows taskbar at the bottom shows the system time as 4:02 PM on 3/19/2020.

S.No.	Name	Status	Rank	Enabled	
1	L1	Disabled	0		
2	L2	Disabled	0		
3	L3	Disabled	0		

L1

Status : Disabled Rank : 0

Load Shedding Condition

Sum (OR)

(And) $\rightarrow \text{NEHU Freq}(50.05) < 49.8$

(And) $\rightarrow \text{PG Line Interchange}(152.96) - \text{PG Line Schedule}(164.49) > 1$

Sum (OR)

Sample Scenarios: ADMS

- Frequency Based
 - If Grid frequency is less than 49.8 Hz and is sustained for a predefined period, trip signal will be generated
 - The trip command is to be issued to the next feeder in the order of precedence till the required relief is achieved in the grid.
- Voltage Based
 - When voltage falls below defined levels and sustains for 15 minutes and reactive power flow is towards start grid
 - Load shedding is to be given at the preassigned substation near the low voltage node.
- Operator Initiated
 - Trip signal to be initiated by the operator at SLDC may be given region wise (selectable) on round robin basis.
 - The operator shall be able to enter the load that is to be curtailed and ADMS system shall trip feeders accordingly.

Sample ADMS Views

RSS Web Scada

PRP Preparation | Platelet R

192.168.12.99/SCADA_LogiC1.aspx

RSS SCADA

SLD | EVENTS | ALARMS | LOGIC

SERVER TIME : 10:34:24 AM

Logic 1

Logic 2

(LOGIC-1)

Ranking for Load Shedding (0 to not shed, same rank to shed together)

Time Setting

Repeat Sheding Timer (Min.)

10

Max Sheding Timer (Min.)

20

Testing

Frequency (Hz)

45.5

Over Draw Value

158

Update

Reset

Feeder Setting

Feeder Name

1. 5MVA TRFO-1

2. 11KV INCOMER-1

3. 5MVA TRFO-2

4. 11KV INCOMER-2

5. 11KV O/G FEEDER-1

6. 11KV O/G FEEDER-2

7. 11KV O/G FEEDER-3

8. 11KV O/G FEEDER-4

9. 11KV O/G FEEDER-5

10. 11KV O/G FEEDER-6

11. 11KV O/G FEEDER-7

12. 11KV O/G FEEDER-8

13. 11KV O/G FEEDER-9

14. 11KV O/G FEEDER-10

15. 11KV O/G FEEDER-11

16. 11KV O/G FEEDER-12

Update Settings

Rank

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

RSS Web Scada

PRP Preparation | Platelet R

192.168.12.99/SCADA_LogiC2.aspx

RSS SCADA

SLD | EVENTS | ALARMS | LOGIC

SERVER TIME : 10:35:33 AM

Logic 1

Logic 2

(LOGIC-2)

Ranking for Load Shedding (0 to not shed, same rank to shed together)

Time Setting

Repeat Sheding Timer (Min.)

1

Max Sheding Timer (Min.)

20

Testing

Voltage Value

160

Update

Reset

Feeder Setting

Feeder Name

1. 5MVA TRFO-1

2. 11KV INCOMER-1

3. 5MVA TRFO-2

4. 11KV INCOMER-2

5. 11KV O/G FEEDER-1

6. 11KV O/G FEEDER-2

7. 11KV O/G FEEDER-3

8. 11KV O/G FEEDER-4

9. 11KV O/G FEEDER-5

10. 11KV O/G FEEDER-6

11. 11KV O/G FEEDER-7

12. 11KV O/G FEEDER-8

13. 11KV O/G FEEDER-9

14. 11KV O/G FEEDER-10

15. 11KV O/G FEEDER-11

16. 11KV O/G FEEDER-12

Update Settings

Rank

1

2

3

4

5

6

7

8

9

10

11

12

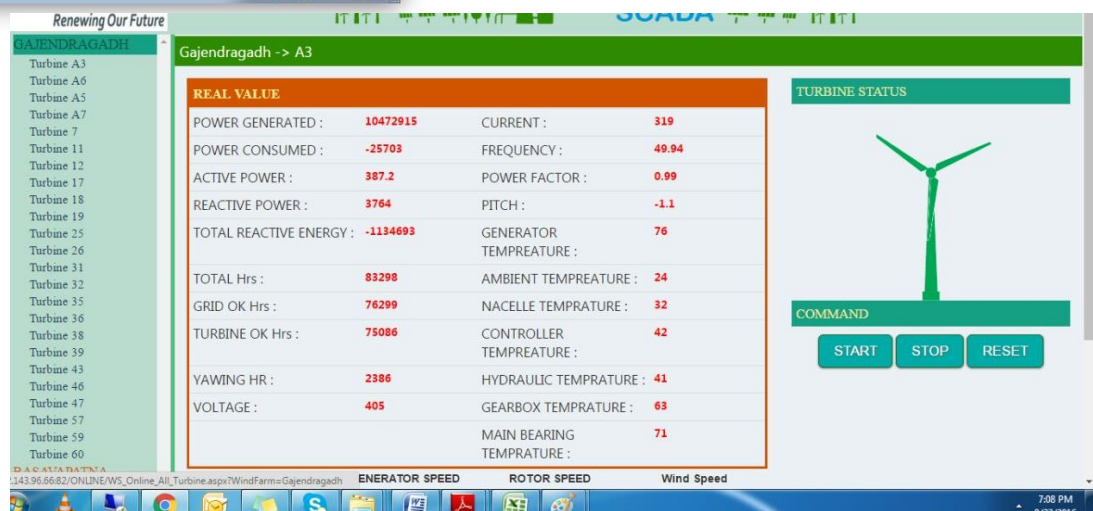
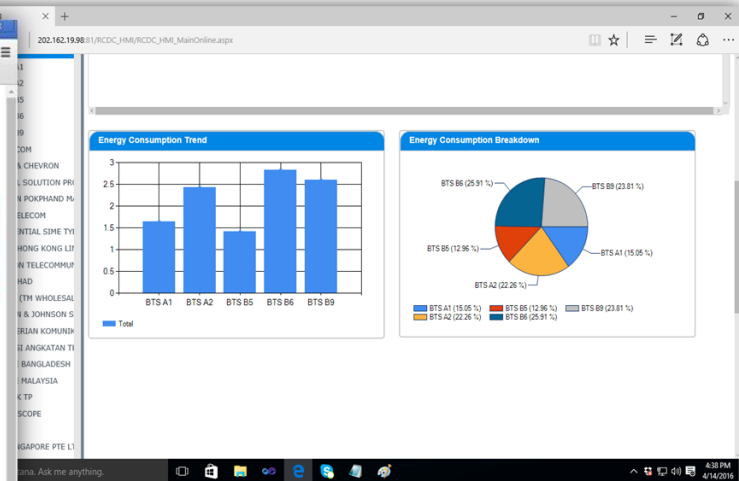
13

14

15

16

Sample WEB Views



SCADA Applications

Module	Can you develop the complete module indigenously while meeting the laid down specifications?	If yes, timeframe for indigenous development
SCADA Applications a) FEP for different protocol like, MODBUS, IEC-101 – 104, IEEEc37.118 etc b) Secured ICCP c) CIM exchange d) Full graphics universal User's Interface for all applications e) Replay of events f) SCADA topology processor g) Real time data validation tool h) Integration with data historian i) Alarm handling	Yes	a) Available b) Available c) Under Development d) Available e) Available f) Available g) Available h) Available i) Available

CIM Based Database

CIM based database Development Tools	Yes	Database modelling tool available but not CIM based
--------------------------------------	-----	---

EMS

EMS	Yes	
a) State Estimation (Hybrid)		a. Available
b) Real Time Contingency Analysis		b. 6 Months
c) Real Time Security Enhancement		c. 12 Months
d) Voltage and VAR Despatch		d. Available. 1 Month for full features
e) Optimal Power Flow		e. 3 months
f) Outage Scheduler		f. Available
g) Transmission Line/Corridor Capability Monitor (TCM)		g. 6 Months for full features
h) Short Circuit Analysis		h. 6 Months for full features
i) Automatic Generation Control (AGC)		i. Available
j) Dynamic Stability Assessment (DSA) etc.		j. 6 Months for full features

CIM Based Database

CIM based database Development Tools	Yes	Database modelling tool available but not CIM based
--------------------------------------	-----	---

EMS

EMS	Yes	
a) State Estimation (Hybrid)		a. Available
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g) Transmission Line/Corridor Capability Monitor (TCM)		g. 6 Months for full features
h) Short Circuit Analysis		h. 6 Months for full features
i) Automatic Generation Control (AGC)		i. Available
j) Dynamic Stability Assessment (DSA) etc.		j. 6 Months for full features

DMS

DMS	Yes	a. 6 Months
a) Network Connectivity Analysis (NCA)		b. Available
b) State Estimation (SE)		c. 1 Months
c) Load Flow Application (LFA)		d. Available. 1 Month for full features
d) Voltage VAR control (VVC)		e. Available
e) Load Shed Application (LSA)		f. Available
f) Fault Management and System Restoration (FMSR)		g. 1 Months for full features
g) Loss Minimization via Feeder Reconfiguration (LMFR)		h. 1 Months for full features
h) Load Balancing via Feeder Reconfiguration (LBFR)		i. Available
i) Operation Monitor (OM)		j. 6 Months for full features
j) Distribution Load forecasting (DLF) etc.		k. Integration with Google MAP and Bing APIs
k) Asset Mapping Geo Tagging		

Historian

Historical databases (Historian or information storage and retrieval) application	YES	a. Available
a) Data Storage Software		b. Available
b) Data Historian Software		c. 1 month for full features
c) Software for SAN & NAS etc.		

Marketing Operation

Market Operation applications		1 month for full features
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Web Applications

Web Server Application		a. 3 rd party application
a) Host based IDS for all machines		b. Available
b) Software for Data Replica server		c. Available
c) E Mail and SMS Application		d. Available
d) Mobile Application App		e. Available
e) Software for Web Server		f. 3 rd party application
f) Antivirus Server Software etc.		

Generation/Load Forecasting (RE)

Generation/Load Forecasting (RE)		1 year development
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Other Applications

Network Management Server		3 rd party application Base features supported
Dispatcher Training Simulator with separate configuration for trainee and Instructor		Available 1 year for full feature development
SIEM (Security Information and Event management)		3 rd party application
Application Whitelisting Tool		3 rd party application

Challenges & Support

Use case	Allow Indian vendors to participate with pilot projects and get qualified for larger projects	
Cost & Funds	Funding from Development & Pilot Projects	
RBH Expertise	RBH has required domain and software IT expertise.	Within 2 Years time frame required EMS and DMS can be developed in house.

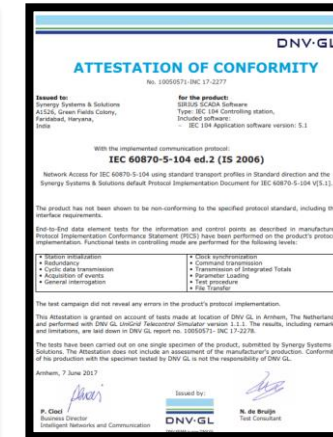
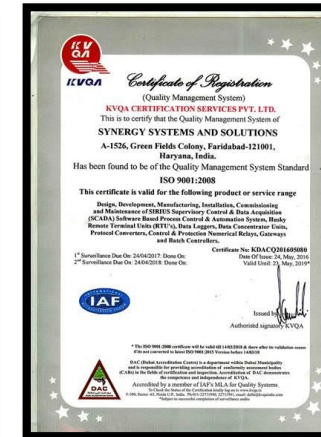
SYNERGY SYSTEMS & SOLUTIONS

CEA PRESENTATION 26.07.2021

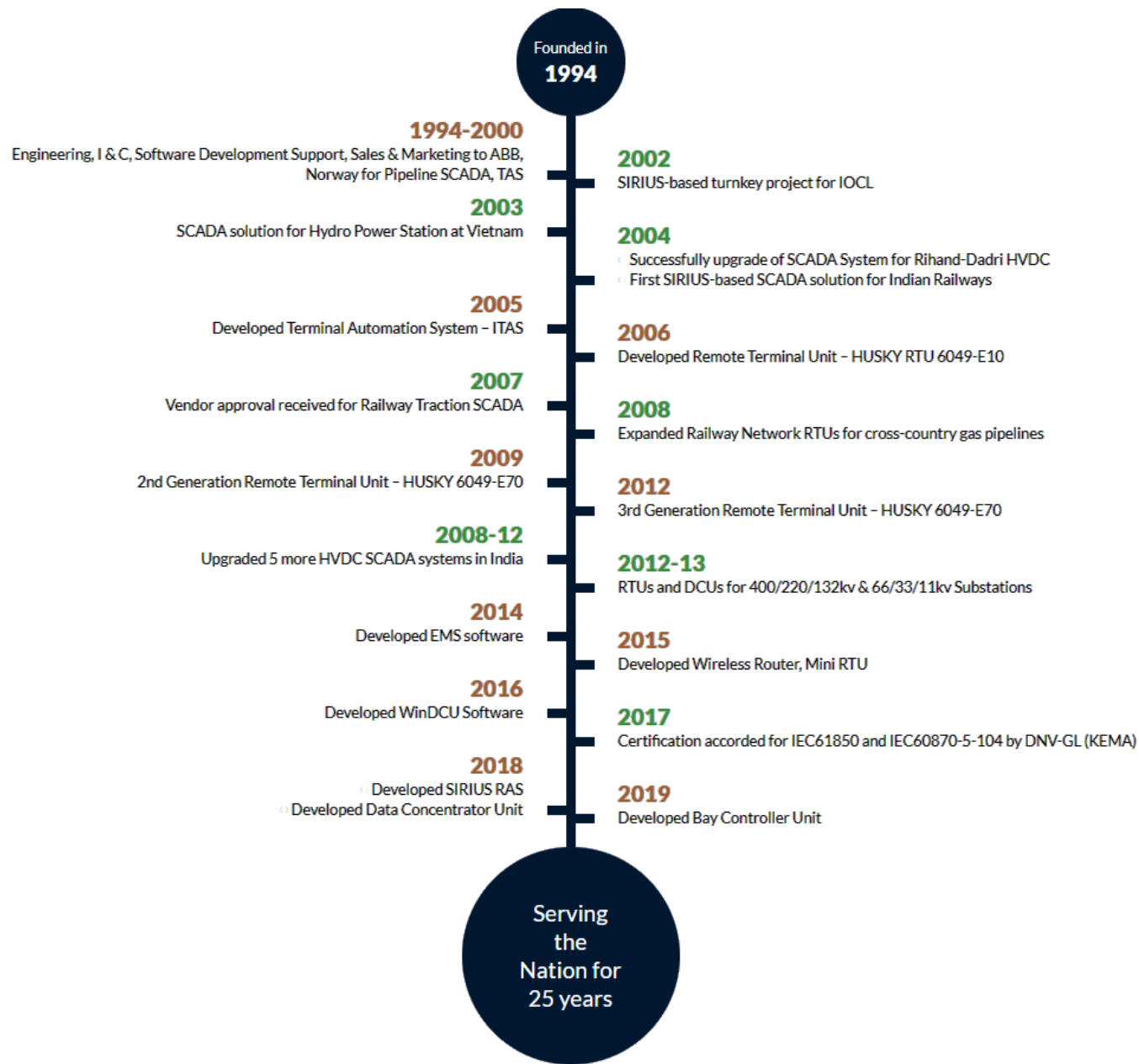


FACT SHEET

- Founded in 1994 in New Delhi, India
- Employees: 200+
- HQ Location: Faridabad, India
- ISO 9001:2008, 14001:2015 Certified
- Indigenous development of SIRIUS SCADA Software & HUSKY Remote Terminal Unit
- Single largest RDSO approved vendor to Railways for Traction & Non-Traction SCADA
- DNVGL (KEMA) Certified Protocol Implementations
- RTU and SCADA approvals and proven track record for O&G, Power Utilities and Railways
- RTU installation base from 11kV to 400kV substations
- Retrofit of legacy systems – HVDC, Railway Traction, Terminal Automation, Substations



TIMELINE



MAJOR PRODUCTS

- **SIRIUS** – SCADA/HMI
 - Add-ons: MDAS (Metering Data Acquisition System),
 - RAS (Remote Accessibility System),
 - ADMS (Advanced DMS) *under development*
- **HUSKY** – Remote Terminal Unit (RTU)
 - Integrated Ethernet Switch (with fiber ports), LTE modules
- **ITAS** – Terminal Automation
- **DCU-E70** – Data Concentrator Unit / Gateway
 - Metering DCU
 - RAS Gateway
 - M2M Gateway with TLS VPN
- **Bay Controller Unit (BCU)**



BUSINESS SEGMENTS

Transmission & Distribution Automation Solutions

■ Railways

- Traction SCADA
- Non-Traction SCADA
- Metro

■ Power T&D

- HVDC
- 400kV, 220kV, 132kV
- 66kV, 33kV, 11kV

■ Oil & Gas T&D

- Pipelines
- Terminals
- City Gas Distribution

■ Power Generation

- Hydro
- Wind
- Solar

TECHNICAL EXPERTISE

- Custom Software Development
- Embedded Hardware / Software Development
- Protocols – Profibus, CAN, IEC61850, IEC 870-5, DNP, OPC, DLMS
- Deciphering, Development of Legacy Protocols
- Interface to Third-party Systems
- Cyber Security
- Machine-learning based analytics
- Third-party Systems' Maintenance Support
- Integration of legacy (proprietary) and standardized protocols with various OEMs – ABB, Siemens, GE, OSI, ETAP, Schneider, etc.

DOMAIN KNOWLEDGE

- Traction SCADA for Railways
- Non-traction/Auxiliary SCADA for Railways
- Power demand forecasting using Machine Learning
- Open Access power purchase
 - Load forecasting
 - Scheduling
 - DSM calculations
- ADMS for Power Distribution networks
- Substation Automation
- Automatic Metering Infrastructure
- Remote Access System for T&D Utilities
- HVDC SCADA
- Distribution Network Monitoring & Control
- Special Protection Schemes for T&D networks
- Telecom SCADA for Metro Railway
- Cross country Gas pipelines
- Oil Distribution Terminals

EXPERIENCE

- Indian Railways – Traction & Non-Traction Application
 - Serving since 2003
 - SCADA Control Centers ~70
 - RTUs Supplied – 3000+
 - Total Network Covered ~ 18000 TKM!
 - SCADA for monitoring and control of entire Western Dedicated Freight Corridor

EXPERIENCE

■ Power T&D

- 1000+ RTUs for Substations to PGCIL, UPPTCL, UJVNL, BHEL, APTRANSCO, KPTCL, BPSTCL, JUSNL, MPPGCL
- Local Data Monitoring Systems (LDMS) for EHV Substations
- RTU/Data Concentrator/Protocol Converter for Distribution Grid Substations for Tata Power, Reliance, Noida Power, Torrent, MS&EDCL, CSP&DCL, PSP&DCL, UP&DCL
- Substation Gateway for IEC61850 devices
- RT-DAS for Haryana State (*in progress*)
- Special Protection Scheme (SPS) for Transmission Lines, Transformers
- SCADA System for Smart City Pilot for IIT Kanpur
- Intelligent load-shedding schemes and Self-healing Grid (proof-of-concept implementations)

■ HVDC SCADA

- Upgraded HVDC SCADA at 6 locations (Dadri-Rihand HVDC SCADA operating for more than 15 years now)
- Each of different generation and architecture

EXPERIENCE

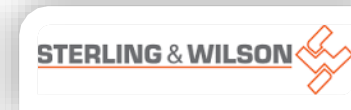
■ Oil & Gas Terminals

- Deployed terminal automation software solution at 25 locations across the country with different oil companies

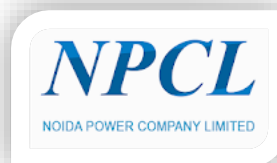
■ Oil & Gas Pipelines

- RTUs for gas pipeline Transportation & Distribution
 - 400+ RTU/Mini-RTUs installed
- PLC-based SCADA Systems for 3 short-run pipelines
- Supply, Integration of Process Instrumentation

CUSTOMERS



Mumbai Mono Rail



JOINT DEVELOPMENT OF ADVANCED DISTRIBUTION MANAGEMENT SYSTEM (ADMS) WITH IIT KANPUR (*IN PROGRESS*)

- CIM based data model for ADMS and CIM enabled export and import
- Network Modeling
- Topology Analyzer
- State Estimator
- Distribution Power Flow
- Fault Location, Isolation Service Restoration
- Volt/VAR Optimization
- Switch Order Management
- Loss minimization via feeder reconfiguration
- Load balancing via feeder reconfiguration
- Short term load and renewable energy resource forecasting and profiling
- Monitoring and control of micro-grids including storages
- GIS integration
- Playback / Training Simulator
- ESB Adapter

All functions will be validated against test-bed/pilot projects being installed as part of the overall work

INDIGENOUS DEVELOPMENT OF SCADA/EMS/DMS

SCADA APPLICATIONS

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
a) FEP for different protocol like, MODBUS, IEC-101 – 104, IEEEc37.118 etc b) Secured ICCP c) CIM exchange d) Full graphics universal User's Interface for all applications e) Replay of events f) SCADA topology processor g) Real time data validation tool h) Integration with data historian i) Alarm handling	a) Yes, we already have the solution for Modbus, IEC 101/104, DNP3, IEC61850 b) Yes, available c) Yes, we have some facilities in place for DMS application d) Yes, many features are readily available, and further requirements can be developed e) Yes, we have a playback function already available in our SCADA f) Yes, we have this functionality available g) Yes h) Yes, we also have a data historian available in our SCADA, which can be extended further i) Yes, standard alarm handling functionality is available in SCADA

CIM BASED DATABASE DEVELOPMENT TOOLS

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
CIM based database Development Tools	Yes, we have some basic facilities in place for DMS application Remarks: Standardization and adoption of CIM profiles similar to ENTSO-E to be done before proceeding on development

EMS

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
a) State Estimation (Hybrid) b) Real Time Contingency Analysis c) Real Time Security Enhancement d) Voltage and VAR Despatch e) Optimal Power Flow f) Outage Scheduler g) Transmission Line/Corridor Capability Monitor (TCM) h) Short Circuit Analysis i) Automatic Generation Control (AGC) j) Dynamic Stability Assessment (DSA) etc.	Yes Remarks: Module-specific and region /utility-specific needs to be identified and elaborated

DMS

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
a) Network Connectivity Analysis (NCA) b) State Estimation (SE) c) Load Flow Application (LFA) d) Voltage VAR control (VVC) e) Load Shed Application (LSA) f) Fault Management and System Restoration (FMSR) g) Loss Minimization via Feeder Reconfiguration (LMFR) h) Load Balancing via Feeder Reconfiguration (LBFR) i) Operation Monitor (OM) j) Distribution Load forecasting (DLF) etc.	Yes, certain functions are available for DMS and some are being developed. Other requirements can be developed as per requirements.

HISTORIAN

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
Historical databases (Historian or information storage and retrieval) application a) Data Storage Software b) Data Historian Software c) Software for SAN & NAS etc.	Yes. Basic functionality of Historian for time-series data is already available as part of our SIRIUS SCADA. Further enhancements can be taken up.

GENERATION/LOAD FORECASTING (RE), REPORT DEVELOPMENT & GENERATION SOFTWARE, OPC CLIENT FUNCTION IN SCADA SERVER & API

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
a) Generation/Load Forecasting (RE) b) Report Development & Generation c) OPC Client Function	a) Yes, Load forecasting using ML is available in our software, which can further be enhanced based on specific requirements b) Yes, functionality already available in our SCADA c) Yes, OPC UA server is supported in our SCADA

MARKET APPLICATIONS, WEB SERVER, NMS, SIEM, DOCUMENT MANAGEMENT SYSTEM, SERVER BACKUP, PATCH MANAGEMENT

Module	Can you develop the complete module indigenously while meeting the laid down specifications?
Market Operation applications Web Server Application a) Host based IDS for all machines b) Software for Data Replica server c) E Mail and SMS Application d) Mobile Application App e) Software for Web Server f) Antivirus Server Software etc.	This is more of an IT-domain application, rather than OT. Basic NMS, E-mail/SMS applications available.

DEVELOPMENT TIMELINE

- 18-24 months for development of EMS/DMS modules and associated applications

PRODUCT & TECHNOLOGY SUMMARY

CEA Presentation

ABOUT VALIANT COMMUNICATIONS



Introduction

- Established in 1993.
- An ISO 9001:2015, ISO 10001: 2007, ISO 14001: 2015, ISO 18001:2007 and ISO/IEC 27001:2018 certified equipment manufacturer of Communication, Transmission, Protection, Synchronization and Cyber Security solutions.
- Provides a powerful blend of “innovation, quality and economics”.
- Successful installations in over 110 countries, worldwide.
- Global footprint with offices in USA, UK, Canada and India.
- Regional Distributor offices in 25 countries.



PRESTIGIOUS REFERENCE CUSTOMERS

End-users, using VCL equipment



ABB

SIEMENS

Siemens

Schneider
Electric

Schneider Electric



पावरग्रिड

Power Grid (PGCIL)



TEİAŞ

Turkish Electricity
Company



Larsen & Toubro limited



PLN

Perusahaan Listrik Negara



EVN

Vietnam Electricity



Litgrid

Litgrid



Transelectrica

swissgrid

Swiss Grid

azpo

AXPO



DELHI TRANSCO LIMITED

Delhi Transco



WBSETCL

WBSETCL



KPTCL

KSEB

KSEB

MAHA TRANSCO

Mahatransco



APTRANSCO



United States Government

Raytheon

Raytheon



Airports Authority
of India

GENERAL
DYNAMICS

General Dynamics

Canada

Government of Canada

Honeywell

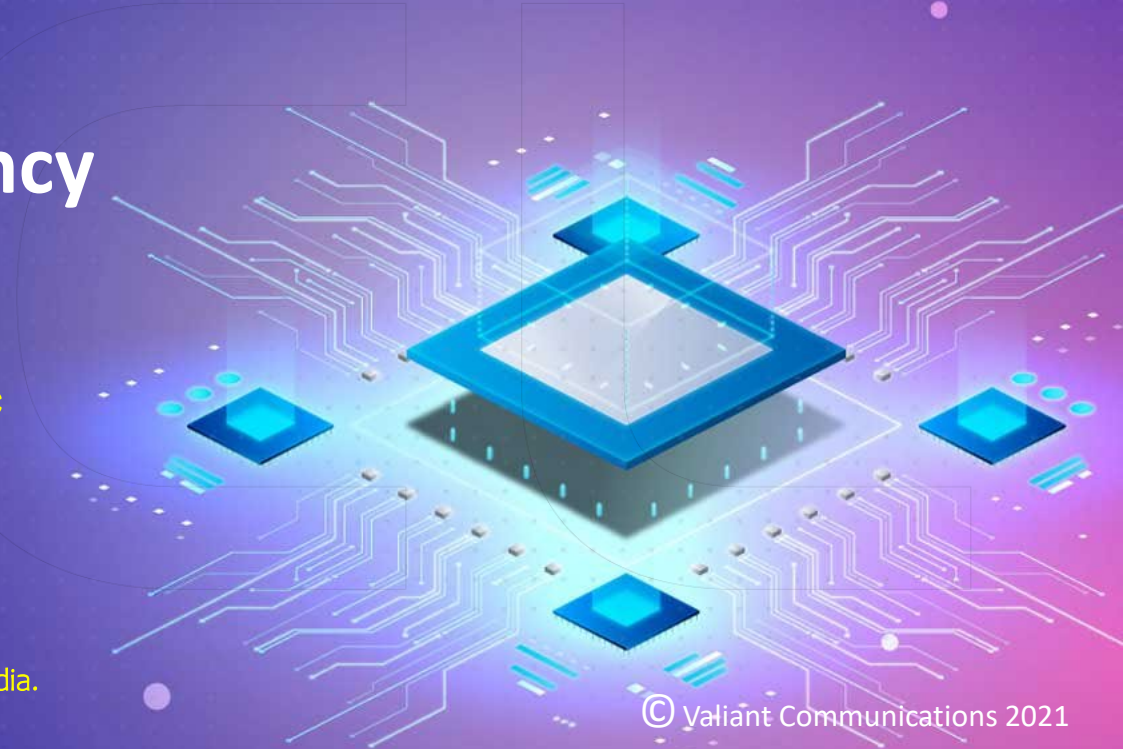
Honeywell

CURRENT PRODUCT PORTFOLIO

BEING MANUFACTURED INCLUDES

- MODBUS, IEC-101 IEC-104, IEEE C37.118, IEC-61850, IEEE C37.94 based products
- MPLS Routers
- Equipment and Network Redundancy Systems.
- Phasor Measurement Unit (PMU)*
- Phasor Data Concentrator (PDC)

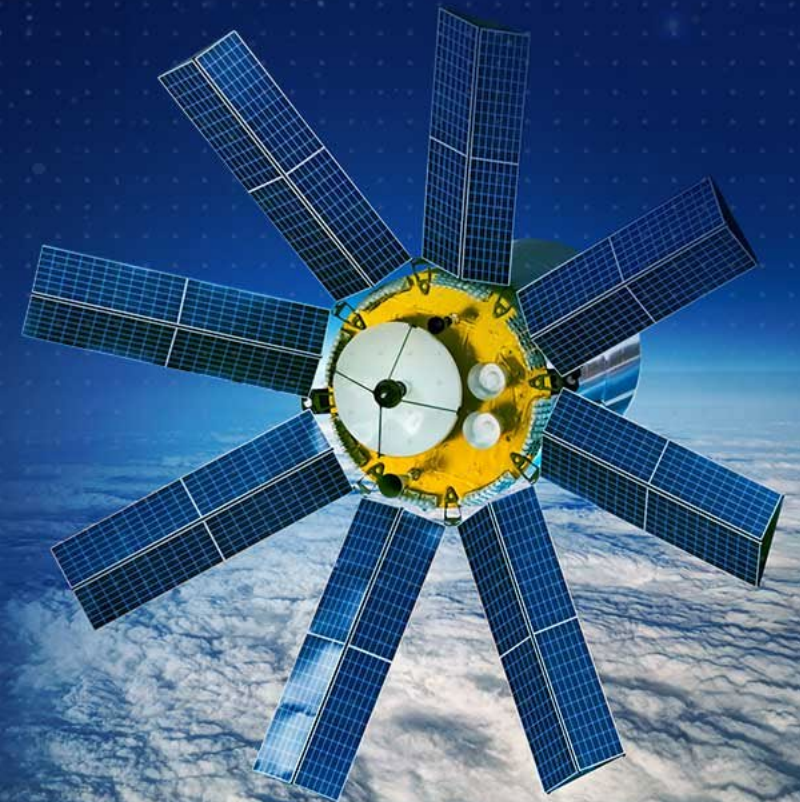
*Approved by CSIR-National Physical Laboratory, Ministry of Science & Technology, Government of India.



GPS/GNSS

SYNCHRONIZATION

- GPS/GNSS Primary Reference Clocks and Synchronization equipment,
 - NTP Time Servers,
 - PTP 1588v2 Grandmaster,
 - PTP Slaves, PTP Switches.



GPS/GNSS

CYBER SECURITY SOLUTIONS



- 👁️ **Next Generation Firewall with comprehensive Cyber Security Suite**
- 👁️ **IDS and Alarm Systems**
- 👁️ **Data Encryption Systems for WAN and LAN networks.**

STORAGE, SAN, NAS, UNMS

- Data Storage solutions
- Data Historian solutions
- SAN and NAS solutions
- Unified Network Management System (UNMS).



REQUIRED ASSISTANCE

- **Draft Technical Specifications**
- **Site Visit**
 - SLDC
 - RLDC
 - NLDC

VEL

Contact Us

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