



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 fourth meeting of the team constituted by MoP “to explore the possibilities of indigenous development of SCADA software for power system management” with the identified developers of SCADA/EMS/DMS system, conducted by the Central Electricity Authority via online platform on 18th August, 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: 2021.08.23 12:28:53 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 Meeting**

Meeting Number:	4 th Meeting
Meeting date & time:	18 th August, 2021 at 11:00 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 Members and participants, including representatives from identified Indian developers.

Then the Convener apprised the participants that as per the decisions of the last meeting, CEA had shared modified draft report, considering received comments and discussions held in the last meeting, requesting Team Members to furnish their inputs on the same. So far, inputs have been received from POSOCO. The issues and apprehensions raised by Members were forwarded to identified developers, inviting them for deliberations with the Team in the meeting today.

The Chairman of the Team suggested to start the discussion with comments received from POSOCO (enclosed at Annexure-III) on modified draft report. The Convener stated that POSOCO's comments are on: (i) issues and challenges shared by the users of SCADA under categories “Contractual Issues”, “Higher Cost”, “Customization Issues” and “Miscellaneous Issues”; (ii) Conclusion part of the draft report. After deliberation, it was decided that issues and challenges raised by the users of SCADA system need to be highlighted in the report for information, so that these could be suitably resolved at proper stage of design, development, implementation, bidding, O&M phases.

After discussions on POSOCO's comments, the Chairman suggested to start with meeting's agenda about responses of developers with regard to apprehensions and issues raised by Members in the last meeting. The Convener invited the developers one by one to share their responses.

Synergy:

Regarding requirement of documentary evidence of past experience, Synergy presented the documents.

Regarding providing the complete SCADA/EMS/DMS solution, they proposed two options of either developing the modules in-house or through consortiums depending upon the viability/timeline and are open to both routes.

POSOCO pointed out that Synergy have not implemented SCADA in large scale/wide area systems and asked for more clarification about ICCP implementation, CIM profile and Historian. Further, they require a roadmap for this project. POWERGRID, APSLDC and MSETCL also emphasized on deciding upon a proper roadmap for development and implementation of SCADA/EMS systems from substation level to control center.

Regarding wide area systems, Synergy clarified that they did not get the opportunity to do that so far due to not meeting the experience criteria in bidding process. He further clarified that ICCP module and Historian are available as their in-house developed products, with flexibility to integrate with Historian of third party. Synergy shared the implementation philosophy and tentative timeline of SCADA/EMS/DMS software development with the Team which is given in their presentation (Annexure – IV). Regarding further detailed development roadmap, they stated that further details other than what they have presented in terms of development, pilot and testing stage, is not feasible to decide at this stage.

Chemtrols:

The response to the apprehension and issues raised by the members in the last meeting are presented by the Chemtrols which are attached herewith (Annexure – V).

Chemtrols informed that they can develop complete SCADA system along with EMS including Pilot project would take about 42 months whereas timeframe for development of SCADA with DMS would be about 34 months. However, for expeditious development and implementation of complete SCADA/EMS/DMS system a consortium may be envisaged, and for the same one of the company from the consortium may take a lead role.

Further, in respect of proposed development of SCADA/EMS/DMS and other applications along with pilot project, Chemtrols has suggested a roadmap indicating module wise time frame for complete development of SCADA/EMS including pilot phase which is given in their presentation.

POSOCO sought a clarification whether Chemtrols would be providing OSI SCADA software which they currently deliver in collaboration with OSI. Chemtrols clarified that they would provide indigenously developed SCADA software, in case opportunity is provided, whereas Historian will be third party.

POWERGRID enquired about whether Chemtrols has provided SCADA application to any utility without OSI collaboration. Chemtrols confirmed that control center SCADA application are provided in collaboration with OSI due stringent qualification criteria whereas substation level applications are developed indigenously.

In response to the APSLDC observation about Chemtrols being an EPC contractor using outside products rather than in-house, Chemtrols has clarified that products like RTU, LDMS, Protocol drivers and simulator are indigenously developed. They are also implementing RT-DAS in state of Telangana without OSI collaboration.

PRDC:

PRDC stated that they do not have experience in core SCADA application, but they have established EMS/DMS and Simulator solutions. Most of the solutions that PRDC proposes to develop are in final form and need small modifications. PRDC suggested that Ministry may explore the provision of one SPV to identify right organizations, with excellent R&D ability for indigenous development of complete SCADA software and bring them together. They also suggested to start thinking about cyber security from the beginning like security in design feature and to involve organizations with expertise in cyber security from the start of development phase itself. Users should also be involved in consortium so that product can be developed according to their needs. This way product developed will be directly usable by users. The SPV can decide the architecture, design, integration plan and deployment plan etc. and MoP can fund the SPV, which in turn can fund the consortium partners. Another approach can be utilities seeking support from PSDF for utilization in SPV.

They further added that PRDC can integrate its modules with other consortium partners' modules and proposed that entire solution through a consortium can be developed within the given timeframe.

The presentation given by PRDC is enclosed at Annexure – VI.

POSOCO stated that core SCADA application should come from consortium lead entity. POSOCO also enquired how PRDC proposes to ensure cyber security in their solution. PRDC proposed that cyber security solution can be provided by C-DAC who have strong credentials in cyber security domain.

POWERGRID sought clarification about whether PRDC have collaborated with other vendors in the past for SCADA solution and what were the experiences and challenges. To which PRDC informed that they have recently integrated their solutions with GE SCADA system for a project in Rajasthan. They have integrated with other vendors like Siemens as well. They further added that they have REST based APIs for interfaces and have experience of integration with other vendors' solutions.

APSLDC and MSETCL agreed with the model proposed by PRDC.

PRDC stated that issue of IPR needs to be addressed.

The Convener suggested that IPR issue can be mutually decided among the consortium partners as and when development begins.

RBH Solutions:

Regarding documentary evidence for past project, RBH responded that this criteria needs to be selected carefully as most of the Indian developers do not have their SCADA solutions deployed at control centers.

Regarding integration with other vendors' modules, RBH responded that integration is possible with suitably adopting the standards and protocols. RBH is ready for taking the challenge of SCADA development and is willing to enter into a consortium for providing the integrated solution.

Regarding qualification criteria, RBH responded that financial criteria and prior experience criteria need to be relaxed for Indian developers so that they can participate in the bidding process for SCADA systems.

The response given by RBH is enclosed at Annexure – VII.

None of the Members commented on the response of RBH Solutions.

Valiant Communications:

Valiant Communications stated that while drafting specifications and qualifying criteria, care may be taken to promote Indian vendors considering their efforts in developing SCADA/EMS/DMS software. They agreed with other developers regarding formation of a consortium. They further added that they have a complete cyber security solution available with them. They proposed that in addition to cyber security, data encryption should also be incorporated in the model and they have already in house developed solutions for the same. They suggested that draft specifications of different modules with detailed requirement may be made available so that developers can develop the product as per the expectations. They stated that they have started communicating with other vendors to explore formation of a consortium.

None of the Members commented on the response of Valiant Communications. However, GUVNL informed that they are in receipt of draft SBD for Distribution SCADA system prepared by PFC for furnishing their views.

C-DAC:

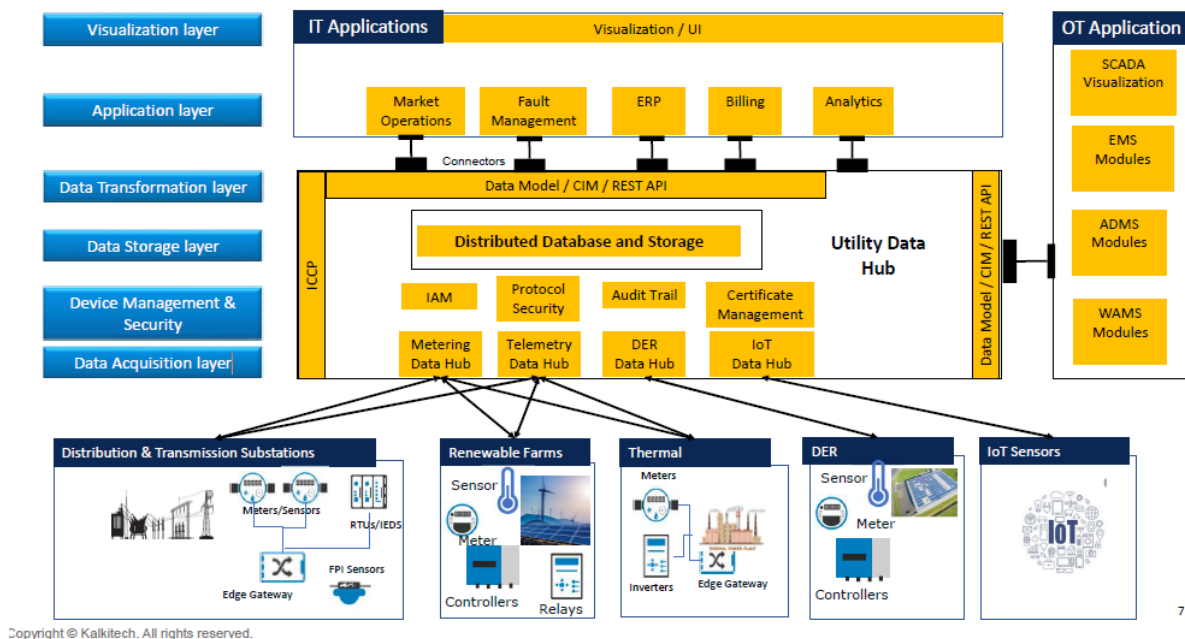
C-DAC stated that from their side main challenge will be development of EMS application which requires in depth domain knowledge of power system modelling. For this, they proposed that support can be taken from research institutions like CPRI, IIT Bombay and IIT Madras through their NamPET program.

They agreed to the proposal of formation of SPV and stated that funding will be required to carry out this project. They proposed to plan the indigenous development for Distribution level, Substation level, SLDC, RLDC and NLDC level.

Kalkitech:

They proposed segregation of application layer from data acquisition layer. They stated that they have expertise in data acquisition and have an established global product, which is cyber security compliant. They proposed that multiple applications can be integrated on their solution. They proposed that layered architecture, as proposed by them in earlier meeting (and reproduced below for ready reference), should be followed instead of a monolithic solution. This will enable user to have a choice among different vendors' products. They agreed to the proposal of formation of SPV.

Proposed DATA CENTRE Architecture



After the responses from identified developers, Chairman of the Team requested the Members to summarize their views on meeting's discussions.

POSOCO:

At present, each developer has its core strength in some or other area of SCADA/EMS/DMS system like C-DAC and Valiant Communications are good in cyber forensic etc. But we are looking for a SCADA/EMS solution which is complete in all respect and is delivered with quality standards envisaged for the system.

The present SCADA/EMS system at the control centers has already been designed using layered architecture approach, as suggested by the Kalkitech and for implementing this system, there is always a lead entity. The lead entity has to gather building blocks of all applications of SCADA/EMS system together either through tie ups or collaborations. It is the responsibility of the lead entity to deliver the complete solution.

SCADA is the basic and foremost layer of the SCADA/EMS system and there is no clarity on that from developers' side. So, an entity who is aspiring to become a lead entity should suggest a clear roadmap on basic building blocks of the SCADA/EMS applications and how to arrange these blocks i.e. whether through tie ups or through collaborations.

POWERGRID:

From the responses of developers and discussion it appears that complete solutions of SCADA/EMS/DMS system may be provided by a consortium. But in that case how competitive price from the consortium vis-a-vis numbers of individual vendors could be ensured.

Chairman of the team highlighted that first we have to provide opportunity to the Indian developers. In that case more developers would come forward and subsequently price competitiveness could be ensured.

APSLDC:

APSLDC agreed with the SPV model suggested by PRDC and stated that standardized specifications are necessary for achieving indigenous development of SCADA software.

MSETCL:

MSETCL agreed with the view that consortium may be a possible route to complete the project in a shorter timeline.

CE (DP&T Division), CEA:

CE (DP&T Division), CEA agreed with the draft report. He also stated that Distribution SCADA system is different from SCADA system for transmission system and control centers. While some of the vendors have capability in Distribution SCADA, but there is a need to focus more on development of SCADA system for transmission system. He suggested formation of consortium with C-DAC, being a government organization, as lead entity.

Chairman's Conclusion:

Given the proposition that none of the company has core strength to develop and provide complete SCADA/EMS solution, therefore, they may have to come together, in the form of SPV/consortium, and develop the complete solution. Lead entity in consortium need not necessarily be a government organization and can be left for consortium partners to decide. Another point that came out in the discussion is ensuring cyber security from the starting phase of development. We will try to collate all the views suitably and incorporate in the draft report.

Keeping in view the time line for report submission i.e. 31.08.2021, all Members are requested to go through the draft and convey their comments/consent within 2-3 days to the Convener of the Team.

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	Ms Gitanjali Sharma	Deputy General Manager	gitanjali.sharma@powergrid.in
9.	APSLDC	Shri Srinivasan	Deputy Executive Engineer	ade.tc.scada@gmail.com
10.	MSETCL	Shri Shashank Jewalikar	Chief Engineer	ceaci@mahatransco.in
11.	GUVNL	Shri H M Patel	General Manager (IT)	gmit.guvnl@gebmail.com
12.	C-DAC	Shri Renji V Chacko	Group Head, Power Electronics Group	renji@cdac.in
13.		Shri Vinukumar AR & Others	Senior Director	vinu@cdac.in
14.	M/s Chemtrols	Shri Anish Rajgopal	Director	anish.rajgopal@chemtrols.com
15.		Shri Prafull Kulkarni	VP Engineering and Projects	prafull.kulkarni@chemtrols.com
	M/s Valiant Communication	Shri Davinder Mohan Sood	Director	sood@valiantcom.com
16.	M/s PRDC	Shri Ganga Prasad GL & Others	Chief Technical Advisor	gonibeed@gmail.com
17.	M/s Kalkitech	Shri Giri Pb & Others		
18.	M/s RBH Solutions	Ms Satinder	Manager - Sales	
19.	M/s Synergy	Shri Krishnan Venkatrama	Vice President	v_krishnan@s3india.com

Comments from POSOCO**1.0 General Observations:**

The contractual issues as mentioned under para 3.1.6 is not relevant to the intent of the report as it not linked to indigenous SCADA/EMS application development. Further, some issues mentioned, are as per bid document of the contracting and have other financial implications.

Issues mentioned under the para 3.1.7 leading to high cost is also not relevant as the mandate for development of indigenous SCADA/EMS system is already there and report considers the same. The cost has been decided through a competitive bidding process and is the lowest one considering the given design and the available system Integrator. It is also true that the cost of indigenous SCADA with similar capabilities and facilities is yet to be known.

The availability of source code does not guarantee that the customization (para 3.2.8) is possible by the users as generally the users are not expert in understanding the huge SCADA/EMS code and implement the changes. Users are not expected to be developers specially for State of the Art Application packages like SCADA/EMS/DMS. The users are not envisaged to do the application customization and it is felt the customisation will be done by the future indigenous SCADA/EMS system Integrators only and not the users.

The miscellaneous issues mentioned under para 3.1.9 are mainly the implementation issues at specific control centre and not generalised deficiencies of the present SCADA/EMS system implemented across India. It may be avoided, as not generalised and not the basic intent of the report.

Under chapter – 4, sl. No. 5 it is mentioned that developers have shown interest to form a consortium. In continuation, we may include “However, the integration issues of various applications need to be confirmed by those developers before approval of the formation of the consortiums”.

It was deliberated during the previous meeting that pilot project may be carried out in distribution sector under smart grid scheme which may be mentioned along with the EHV scheme of Andhra Pradesh.

2.0 Para-wise observations:

Clause	Description	Remarks
3.1.1	Recent SCADA system deployment is based on Geographical Information System (GIS), which is a proprietary solution of OEMs and create challenge during integration as per interoperability standards.	Recent SCADA system deployment in distribution sector is based on Geographical Information System (GIS), which is a proprietary solution of OEMs and create challenge during integration as per interoperability standards.
3.1.2	OEMs prefer to host Distribution related data on public or private cloud, which is not considered secure for SCADA data.	May be deleted. It is as per system design by the users and not by OEMs
3.1.3	No standardization exists in colour configurations used in various SCADA system and deployment challenges exist on account of customization.	May be deleted as guidelines for colour configurations are already available and all concerned needs to be configure as per guidelines. A BIS standard on Display guidelines is also in advance stage of finalization. It is just configuration issues

3.1.3	Status of switching devices also needs uniformity. Isolator status should be single point status and CB status should be double point status.	May be deleted. Present SCADA system support both single and double point status which was not available in earlier database configuration. It is a configuration issue and not an issue of SCADA.
3.1.3	Power flow convention for the data points (ICTs, Generators, Reactors and Line Flows) does not follow IEEE standards across control centers. This is an implementation issue which is being faced due to non-availability access to the CT/CVT connections for all utilities.	May be deleted. It is mandatory to follow IEEE standards on power flow conventions and in case it is not implemented in some of the LDCs, it is an implementation issue. Further, non-availability of CT/CVT points is an implementation issue at field and not an issue of SCADA.
3.1.4	For graphical and tabular representation of real time and historical data, third party software has been used in current SCADA system.	May be deleted. In Technical specifications it was mentioned that third party software shall be supplied.
3.1.7	The license to use SCADA system by the OEM is issued usually on tag basis. The cost of licenses and subsequent Maintenance and Service (M&S) cost are considerably high. The utility does not have any option but to enter in to an M&S contract with the OEMs to get required support and software upgradation.	May be deleted. SCADA tags or system sizing is per Technical specification prepared by utility. Multiple SI compete commercially with a given sizing requirement and the contract is awarded to L1 bidder. Hence, basis of costing is not leading to high cost as the L1 bidder is selected for implementation.
3.1.8	Customisation issues	The availability of source code does not guarantee that the customization is possible by the users as generally the users are not expert in understanding the huge SCADA/EMS code and implement the changes. Users are not expected to be developers specially for state of the Art Application packages like SCADA/EMS/DMS.

Annexure - IV

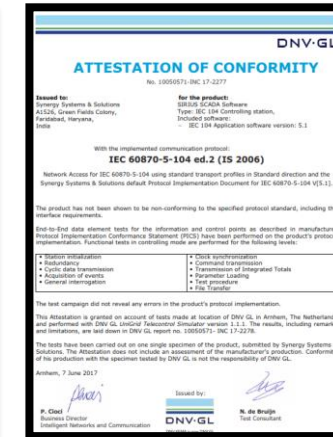
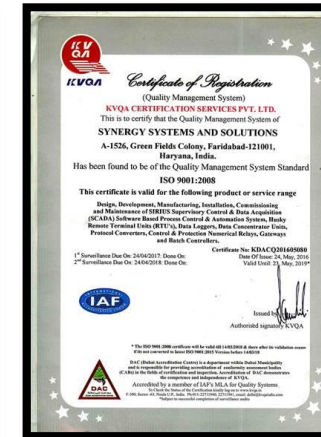
SYNERGY SYSTEMS & SOLUTIONS

CREDENTIALS



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



SCADA REFERENCE PROJECTS

TRACTION POWER SCADA FOR INDIAN RAILWAYS

■ SCADA Functions

- SCADA system for real-time **monitoring and control** of traction power network
- Real-time communications with RTUs over a geographically wide-area
- IEC 60870-5-104 / 101 protocol for RTU communications
- Sequence of Events Acquisition
- Historian for data archival
- Reports and Trends
- Automatic Disturbance Record Acquisition from protection IEDs

■ DMS Functions

- Network topology driven network colouring
- Automatic fault location and isolation based on network topology search
- Energy data management for energy auditing
- Demand forecasting based on historical data
- Scheduling of power purchase under Open Access based on forecasted data

■ NMS Functions

- SNMP based network monitoring of RTU communication network

SCADA Control Centres: 70+
RTUs Integrated: 3000+

Avg. I/O handled per SCADA: ~4000

Project References: Page 18 to 22

AUXILIARY POWER SCADA FOR INDIAN RAILWAYS

■ SCADA Functions

- SCADA system for real-time **monitoring and control** of 11kV auxiliary power network
- IEC 60870-5-104 / 101 protocol for RTU communications
- Sequence of Events Acquisition
- Historian for data archival
- Reports and Trends

■ DMS Functions

- Network topology driven network colouring

SCADA Control Centres: 5
RTUs Integrated: ~100

Avg. I/O handled per SCADA: ~3000

Project References: Page 23 to 24

SCADA FOR IIT-KANPUR CAMPUS (SMART CITY PILOT)

- SCADA Functions
 - SCADA system for real-time **monitoring and control** of campus power distribution network
 - Real-time communications with RTUs across the campus
 - IEC 60870-5-104 protocol for RTU communications
 - Sequence of Events Acquisition
- DMS Functions
 - Network topology driven network colouring

33/11/.415kV Network
Feeders Monitored: ~250

I/O handled by SCADA: ~15000

Project References: Page 25

SCADA FOR HVDC TERMINALS

■ SCADA Functions

- SCADA system for real-time **monitoring and control** of HVDC station
- Real-time communications with local control units
- Integration of proprietary protocols in SCADA
- Sequence of Events Acquisition
- Automatic Disturbance Record Acquisition
- IEC 60870-5-101 interface towards SRLDC

■ Projects

- Dadri-Rihand HVDC Link (~20 years in service)
- Chandrapur-Padghe HVDC Link (~10 years in service)
- Vindhyachal BTB Station (~10 years in service)
- Bhadrawati BTB Station (~12 years in service)
- Vizag BTB Station (~10 years in service)
- Sasaram BTB Station (~6 years in service)

HVDC BTB Stations
HVDC Transmission Lines

Avg. I/O handled by SCADA: ~5000

Project References: Page 26 to 28

COMMUNICATION FRONT-END SOLUTION

- Functions
 - Comms. Front-End to ETAP SCADA
 - Monitoring and Control functions
 - Real-time communications with RTU/FRTU
 - IEC 60870-5-101/104, DNP3 Protocols
 - Sequence of Events Acquisition

NPCL SCADA/DMS Project

I/O handled by CFE: ~70000

Project References: Page 29

MAJOR WORKS IN PROGRESS

RT-DAS FOR HARYANA STATE

- SCADA for monitoring of 33/11kV feeders of entire state
 - Real-time communications with RTUs over a geographically wide-area
 - IEC 60870-5-104 protocol for RTU communications
 - Secured VPN over 4G networks
 - Sequence of Events Acquisition
 - Historian for data archival
 - Reports and Trends
 - SAIFI / SAIDI computation

33/11kV Network RTUs: ~1200 Feeders: ~12000	I/O handled by SCADA: ~250000

SCADA FOR TRACTION NETWORK OF WDFC

- Single SCADA for Western Dedicated Freight Corridor covering over ~1300km
 - Real-time communications with RTUs over a geographically wide-area
 - IEC 60870-5-104 / 101 protocol for RTU communications
 - Sequence of Events Acquisition
 - Historian for data archival
 - Reports and Trends
 - Automatic Disturbance Record Acquisition from protection IEDs
- DMS Functions
 - Network topology driven network colouring
 - Automatic fault location and isolation based on network topology search
 - Energy data management for energy auditing
- NMS Functions
 - SNMP based network monitoring of RTU communication network

132kV/56kV Network

I/O handled by SCADA: ~10000

JOINT DEVELOPMENT OF ADMS WITH IIT KANPUR

- 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

33/11kV Network
Integration with existing
SCADA

Field trials to be conducted on test-beds

IMPLEMENTATION PHILOSOPHY

SOLUTION DELIVERABILITY

■ SCADA Modules

- Majority of modules are already available in-house and proven in the field
- Additional requirements can be developed in-house

■ CIM database development tools

- CIM editor and RDF/XML import tools available
- Need to expand functionality as per additional CIM profiles required

■ Historian

- Our SCADA solution has in-built historian
- Specific requirements can be added to the historian

■ EMS / DMS

- We are already jointly working with IITK on developing many of the modules for DMS
- Same can be adopted/extended to transmission networks

■ Load Forecasting

- Machine-learning based solution is already available
- Additional algorithms can also be implemented

■ Report Development & Generation

- Our SCADA has this feature in-built

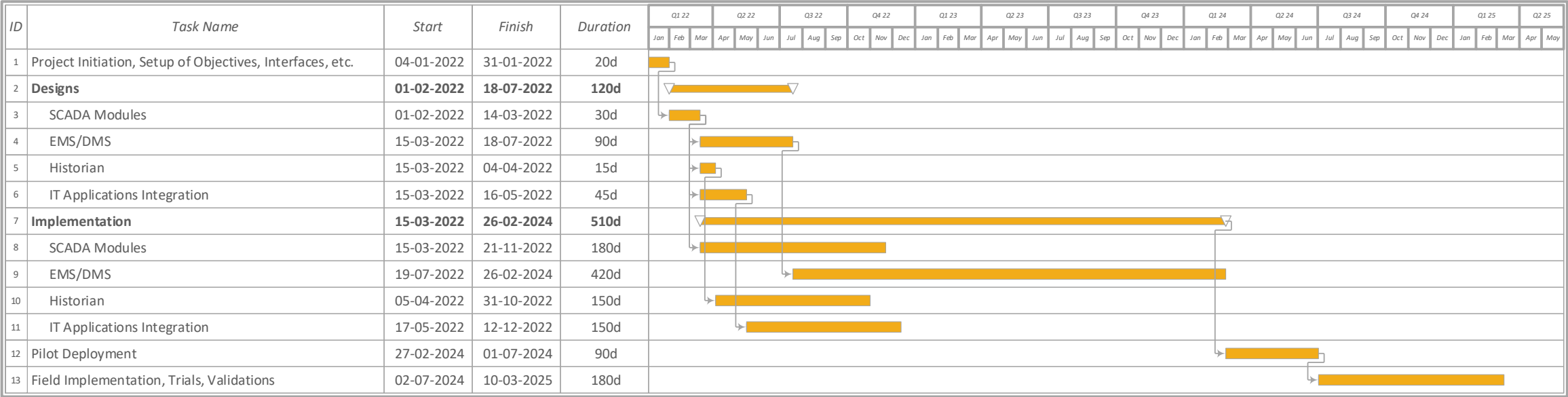
■ OPC Client, Web Server

- Our SCADA has this feature in-built

SOLUTION DELIVERABILITY

- Market Applications (Open Access, etc.)
 - We can develop this solution
 - Or, interface with already available applications from Indian OEMs
- NMS, SIEM, Document management System, Server Backup, Patch management
 - We can interface with already available solutions from Indian OEMs
- In summary, we can provide an integrated solution for all the requirements utilizing in-house products and expertise and with off-the-shelf solutions for IT applications from Indian OEMs

APPROX. DEVELOPMENT TIMELINE



CERTIFICATES / ORDER COPIES



No-TRD/KUR/Tender/2020/2167

Dt: 29.09.2020

PERFORMANCE CERTIFICATE

This is to certify that M/s Synergy Systems and Solution, A-D1526, Green Field Colony, Faridabad, Haryana execute the work "Replacement of out dated SCADA system of Khurda Road(KUR) Division(PSA-BHC & BRAG-TLHR Sections including KUR-PURI, SQQ-MZY & CTC-PRDP Sections) by latest SCADA system with Annual maintenance contract for 4 years as per latest RDSO specification" and the status is as stated below.

1.	Name of the work	:	Replacement of out dated SCADA system of Khurda Road(KUR) Division(PSA-BHC & BRAG-TLHR Sections including KUR-PURI, SQQ-MZY & CTC-PRDP Sections) by latest SCADA system with Annual maintenance contract for 4 years as per latest RDSO specification.
2.	Name of the contractor with Address	:	M/s Synergy Systems and Solution, A-D1526, Green Field Colony, Faridabad, Haryana.
3.	LOA No:	:	TRD/KUR/NEW SCADA AMC/2018; Dt.28.03.2018.
4.	Contract Agt No & Date	:	W/TRD/KUR/Replacement SCADA/2018; Dt.02.07.2018
5.	Original Agreement value	:	₹.9,65,12,991/-
6.	Revised Agreement value	:	₹.9,64,52,900/-
7.	Original Period of contract	:	Sch-A: The supply, erection, testing and commissioning of latest SCADA work shall be completed within one year i.e. from 28.03.2018 to 27.03.2019 & extended upto 27.09.2019 and subsequently extended upto 26.11.2019. The warranty period from the date of commissioning of SCADA shall be 3 years i.e from 26.11.2019 to 25.11.2022. Sch-B: Annual maintenance contract of SCADA system for 04 years will be commence from expiry of warranty period i.e from 26.11.2022 to 25.11.2026.
8.	Date of commencement of Sch-A	:	26.06.2018
9.	Date of commissioning and handing over of Sch-A (without warranty & AMC)	:	26.11.2019
10.	Total Payment received for Sch-A for execution upto 26.11.2019.(Without Sch-B, AMC part)	:	₹.8,67,29,730/-
11.	Number of RTU's installed	:	TSS - RTU's - 11 nos. SP - RTU's - 14 nos. FP - RTU's- 1 no. SSP - RTU's- 33 nos.

12.	System Details	:	Design, Supply, Erection, Testing & Commissioning of SCADA System at RCC consisting of 2 nos. Dual hot standby SCADA + Historian servers, 2 nos. Dual EMS servers, 2 nos. Web servers, 8 nos. Man Machine Interface for SCADA, 2nos. MMI for EMS along with 2X5KVA UPS, batteries and furniture etc. 59 nos. RTUs installed at various TSS,SP & SSP in the section.	
13.	Make/ Model of SCADA System		SIRIUS, Make: Synergy System & Solutions, Version- 5.1	
14.	Make/ Model of RTU		Husky RTU 6049-E70, Firmware Version- 5.1	
			Redundant CPU	yes
			Redundant Power Supply	Yes
15.	Devices Integrated		Protection Relays(IEC 60870-5-103), Energy Meters(MODBUS)	
16.	Protocols Implemented		IEC 60870-5-104 Slave in RTU,IEC 60870-5-104 Master in SCADA System, IEC 60870-5-103 Master in RTU, MODBUS master in RTU	
17.	Type of communication channel with Master		Fiber optic based Ethernet	
			Redundant communication	Yes
18.	Functions Implemented		SNMP based network monitoring in SCADA of all network devices. Disturbance Record Retrieval. SOE recording. IEC-104 slave in SCADA for reporting to higher level SCADA. Network connectivity analysis. Remote RTU diagnostics & configuration. Automatic fault localization algorithm.	

Note: 1. The system has been commissioned on 26.11.2019 & working satisfactorily till now without any major problem.

2.The above certificate has been issued as per the request of the contractor vide their Lr no. SSS/P-18/00009/20200923/001;Dt:23.09.2020.


(A.Pandu Ranga Rao)

Sr.Divl.Elect.Engineer(TRD)
East Coast Railway, Khurda Road
व. प्रबल बिबुत इंजीनियर (कार्पणवितरण)
Sr. Divl. Elect. Engineer(TRD)
पूर्व तट रेलवे, खोर्दरा रोड
E.Co.Rly., Khurda Road

File No.CEA-PS-17-13/7/2020-PCD Division
Office of the Deputy Chief Electrical Engineer
Railway Electrification, Guntur
 DRM office compound, TPC Building 2nd Floor
 Guntur – 522006
 Email.dyceeregnt@gmail.com



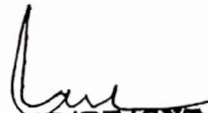
TO WHOM IT MAY CONCERN

Dt: 22-05-2019

Ref: REGNT/EL/Gr.177/SCADA

Subject: M/s Synergy Systems & Solutions have installed and successfully commissioned their SIRIUS SCADA system and HUSKY RTU 6049-E70 at various substations of Nallapadu(Excl)- Diguva metta (Incl) Section(Gr.177) under Secunderabad RE project. Details of the same are as mentioned below. The system has been working satisfactorily since its commissioning.

Name of Work	Design, Supply, Erection, Testing and Commissioning of (Supervisory Control and Data Acquisition) SCADA system along with comprehensive maintenance contract of SCADA system for 04 years after warrantee period in Nallapadu(Excl)- Diguva metta (Incl) Section(Gr.177) of South Central Railway in the state of Andhra Pradesh under jurisdiction of Secunderabad project Railway Electrification. - reg	
PO Number & Date	ELCORE/T/SRC/ Gr.177/848 Dated. 18.08.2017	
Total Order Value	INR 46,552,694.53	
Total revised order Value	INR 39,168,295.53	
Total payment released so far	INR 35,538,004.93	
Number of RTU's Installed	TSS RTU's - 5 No's SP RTU's - 5 No's SSP RTU's - 14 No's	
Date of Commissioning & handing over	25/02/2019	
Defect Liability Period	36 Months	
System Details	Design, Supply, Erection, Testing & Commissioning of SCADA system at RCC consisting of Dual hot standby SCADA + Historian servers & dual EMS servers, 1 no of Web server, 4 no's of Man Machine Interface for SCADA & 2 no's for EMS MMI complete along with 2 x 5 KVA UPS, batteries and furniture etc. 24 no's of RTU's installed at various TSS, SP & SSP in the section	
Make/Model of SCADA System	SIRIUS, Make : Synergy Systems & Solutions, Version - 5.1	
Make/Model of RTU	HUSKY RTU 6049-E70, Firmware Version – 5.1	
	<i>Redundant CPU</i>	Yes
	<i>Redundant Power Supply</i>	Yes
Devices Integrated	Protection Relays (IEC 60870-5-103), Energy Meters (MODBUS)	
Protocols Implemented	IEC 60870-5-104 Slave in RTU, IEC 60870-5-104 Master in SCADA System, IEC 60870-5-103 Master in RTU, MODBUS master in RTU	
Type of Communication Channel with Master	Fiber Optic based Ethernet	
	<i>Redundant Communications</i>	Yes
Functions Implemented	SNMP based network monitoring in SCADA of all network devices. Disturbance Record Retrieval. SoE recording. IEC - 104 slave in SCADA for reporting to higher level SCADA. Network connectivity analysis. Remote RTU diagnostics & configuration. Automatic fault localization algorithm.	


Dy. CEE/RE/GNT
Dy. Chief Electrical Engineer
 रेल विद्युतीकरण, गुंटूर
 Railway Electrification, Guntur



Office of the Chief Project Director Railway Electrification

4th floor, Rail Nirman Nifayam
Secunderabad – 500 071.
Telefax : 040-27823142
www.core.indianrailways.gov.in

COMPLETION CERTIFICATE

Date: 26.02.2020

M/s Synergy Systems & Solutions have installed and successfully commissioned their SIRIUS SCADA system and HUSKY RTU 6049-E70 at various Traction Substations/Switching Stations of Diguva Metta (Excl) – Guntakal (Excl) including Pendekallu – Gooty (Excl) Section (Gr.178) under Railway Electrification Project, Secunderabad (CORE). The system has been working satisfactorily since its commissioning. Details are as follows:

Name of Work	Design, supply, erection, testing & commissioning of SCADA (Supervisory Remote Control and Data Acquisition) system along with comprehensive maintenance contract of SCADA system for 04 years after warrantee period for Diguva Metta (Excl) – Guntakal (Excl) including Pendekallu – Gooty (Excl) Section (Gr.178), Guntakal Division, South Central Railway, in the state of Andhra Pradesh under Railway Electrification Project, Secunderabad (CORE) jurisdiction, as per RDSO Spec no. TI/SPC/RCC/SCADA/0130/ (Rev-2) with amendments.	
PO Number & Date	ELCORE/T/SRC/Gr.178 (Mod)/842 , Dated 17.02.2017	
Total Order Value	INR 3,40,95,168.64 /-	
Total revised order Value	INR 2,63,28,807.83 /-	
Number of RTU's Installed	TSS RTU's – 2 No's SP RTU's – 5 No's, SSP RTU's – 6 No's	
Date of Commissioning & handing over	23.11.2019	
Defect Liability Period	36 Months	
System Details	Design, Supply, Erection, Testing & Commissioning of SCADA system at RCC consisting of Dual hot standby SCADA + Historian servers & dual EMS servers, 1 no of Web server, 3 no's of Man Machine Interface for SCADA & 1 no's for EMS MMI complete along with 2 x 5 KVA UPS, batteries and furniture etc.	
Make/Model of SCADA System	SIRIUS, Make : Synergy Systems & Solutions, Version – 5.1	
Make/Model of RTU	HUSKY RTU 6049-E70, Firmware Version – 5.1	
	Redundant CPU	Yes
Devices Integrated	Redundant Power Supply	Yes
	Protection Relays (IEC 60870-5-103), Energy Meters (MODBUS)	
Protocols Implemented	IEC 60870-5-104 Slave in RTU, IEC 60870-5-104 Master in SCADA System, IEC 60870-5-103 Master in RTU, MODBUS master in RTU	
Type of Communication Channel with Master	Fiber Optic based Ethernet	
	Redundant Communications	Yes
Functions Implemented	Energy Management System (EMS) as per RDSO Specs. TI/SPC/RCC/SCADA/0130 (Rev.2). SNMP based network monitoring in SCADA of all network devices. Disturbance Record Retrieval. SOE recording. IEC – 104 slave in SCADA for reporting to higher level SCADA. Network connectivity analysis. Remote RTU diagnostics & configuration. Automatic fault localization algorithm.	

26.02.2020
NAGARAJU DOLA

IRSEE
Dy. Chief Electrical Engineer
रेल विद्युतीकरण/Railway Electrification

cm/vk

WEST CENTRAL RAILWAY

Divisional Office
Elect. (TRD), Kota
Dated 18.10.2018

No. EL/TRD/93/3/3(SCADA-AMC)

TO WHOM IT MAY CONCERN

Sub: Performance of SCADA equipments provided by M/s Synergy Systems & Solutions against the work of "Design, Supply, erection, Testing & Commissioning of Supervisory Remote Control & Data Acquisition (SCADA) equipment along with comprehensive maintenance contact of SCADA system for 04 years after warranty period on (i) Kota-Ruthiyai section and ii) Mathura - Gangapur city, Gangapur city- Kota & Kota -Nagda section (Gr. 134) under Kota Project.

Ref.: (i) LOA No: EL/TRD/50/06 (2017-18) Dated 30.01.2018.

(ii) LOA No: - EL/TRD/93/3/3(SCADA-AMC) Dated 23.12.2013 which are continuation of Contract No. ELCORE/T/SRC/Gr.134/539 Dated 14/05/2009 of RE Kota.

(iii) M/s SSS letter no. SSS/WCR/Kota/181008/001 dated 08/10/2018.

(iv) SSE/RC/Kota's letter no. SSE (RC) SCADA dated 16.10.2018.

Following SCADA equipments have been provided by M/s Synergy Systems & Solutions, A-1526, Green Fields, Faridabad-121010 against the above work:-

Sr. No.	Name of Section	Date of Commissioning	Control Room Equipment	No. of RTU
SCADA System for Nagda- Mathura Section				
1	Kota–Nagda	12-01-2011	Synergy SCADA Software, Dual Servers, Dual Front Ends, 5 Nos. PCs as operator Workstations, UPS Batteries.	19
2	Kota -Gangapur City	08-12-2011		13
3	Gangapur City- Mathura	08-12-2011		16
	Total No. RTUs			48
SCADA Systems for Kota-Ruthiyai Section				
4	Kota- Ruthiyai	24-11-2010 & 25-10-2011	Synergy SCADA Software, Dual Servers, Dual Front Ends, 5 Nos. PCs as operator Workstations, UPS Batteries .	15
	Total No. RTUs			15

1. Out of the above:

(a) In NAD-Kota-MTJ section no. of RTU working are- at 132KV/25 KV TSS – 10 Nos. & at 25 KV switching posts - 38 Nos.

(b) In Kota-RTA section no. of RTU working are- at 132KV/25KV TSS-03 Nos. & at 25KV switching posts- 12 Nos.

2. The said SCADA system is primarily installed for monitoring of digital/Analog data related to Traction Power System of respective sections and for control output to CBs/BMs/Tap changers etc.

The above SCADA System is working satisfactory and no major defects have been observed till date since commissioning.

This certificate is issued as per their own request.


Sr. DEE/TRD/Kota वि.)
व. म. रं. कोटा
Sr. D. E. E./TRD
W. C. Rly KOTA

प्रगति की ओर अग्रसर
Urge to stay Ahead



इरकॉन इन्टरनेशनल लिमिटेड
सिविल, मेकैनिक्ल, इलेक्ट्रिकल, कम्यूनिकेशन्स और टर्नकी कंन्ट्रैक्टर्स
(भारत सरकार का उपक्रम)



IRCON INTERNATIONAL LIMITED

Civil, Mechanical, Electrical, Communications and Turnkey Contractors.
(A Govt. of India Undertaking)

RAIL COACH FACTORY PROJECT

House No. 517, Type-V, Rail Coach Factory Raebareli Township, P.O. Lalganj,
Distt. Rae Bareli - 229 206 (U.P.)
Phone : 0535-2704382, 0535-2704383 Telefax : 0535-2704380
E-mail : irconrcf_rbl@yahoo.co.in

CIN-U45203DL1976GOI008171

IRCON/ELECT/1029/RCF-RBL/SCADA/52 / 8078

Date-23/09/2015

COMPLETION CERTIFICATE

Name Of Work	Design, Supply, Installation, Testing, Commissioning & AMC of SCADA System for Display & Controls of Power Supplies and Distribution Network at New Rail Coach factory, Raebareli (UP)
LOA No.	IRCON/ELECT/1029/RCF-RBL/SCADA/52 dated 12/11/2013
Client	Rail Coach Factory Under Ministry of Railways, India, Rae Bareli (UP).
Name Of the Contractor	M/s SYNERGY SYSTEMS & SOLUTIONS, FARIDABAD-121001
Date of award	12/11/2013
Original Value of Contract	Rs. 1,98,53,109/-
Revised Value of Contract	Rs.2,03,43,529/-
Final amount of work done	Final Bill is in process
Schedule date of completion	04 months from date of award of LOA i.e. up to 11/03/2014
EOT granted up to	EOT was granted till 31/10/2015 without LD
Final date of completion	12/09/2015
Defect Liability period	12 months
DLP start date	12/09/2015
DLP Completion date	12 /09/2016
Warranty Period	12months from the date of certified date of completion. (ref cl. 5.0 of SCC). Warranty and /Guaranty shall be 01 year from the date of operational acceptance of equipments/system as per SCC cl. 23.0.

The certificate of completion issued for above work in pursuance to sub clause 65.0 of GCC shall not absolve M/s.Synergy Systems & Solutions from their liability to make good defects, imperfections and shrinkages or faults, which may appear during the defect liability period effective for 12 months, i.e. up to 12.09.2016.

(Anand Swaroop)
General Manager





भारतीय रेल (रेल मंत्रालय)
डीजल रेल इंजन कारखाना
वाराणसी - 221004 भारत
INDIAN RAILWAYS (MINISTRY OF RAILWAYS)
DIESEL LOCOMOTIVE WORKS
VARANASI - 221004, INDIA



Date: 06.10.2018

COMPLETION CERTIFICATE

M/s Synergy Systems & Solutions have installed and successfully commissioned their SIRIUS SCADA system and HUSKY RTU 6049-E70 at various substations of DLW. Details of the same are as mentioned below.

Name of Work	SCADA system, metering systems and other misc. work.																
LOA Number & Date	EL/145/W-1042/1.7 Date: 30.01.2015																
Original value of the contract	INR 1,67,28,694.00																
Final value of the contract	INR 2,50,91,337.90																
Original date of completion	29.09.2015																
Final date of completion	30.12.2016																
Defect Liability Period	36 Months																
SCADA System Details	Control Room: Dual hot-standby servers, 2 Nos Man Machine Interface MRS: 1 No. remote MMI Kanchanpur S/Stn: 1 No. remote MMI Date of Commissioning: 05.02.2016																
Make/Model of SCADA System	Synergy Systems & Solutions SIRIUS SCADA System																
RTU Details	<table border="1"> <thead> <tr> <th>S.No.</th><th>Site Name</th><th>Qty of RTUs</th><th>Date of Commissioning</th></tr> </thead> <tbody> <tr> <td>1.</td><td>132KV Kanchanpur S/Stns</td><td>2</td><td>05.02.2016</td></tr> <tr> <td>2.</td><td>33 KV Workshop S/Stn</td><td>1</td><td>05.02.2016</td></tr> <tr> <td>3.</td><td>11 KV S/Stns</td><td>26</td><td>05.02.2016</td></tr> </tbody> </table>	S.No.	Site Name	Qty of RTUs	Date of Commissioning	1.	132KV Kanchanpur S/Stns	2	05.02.2016	2.	33 KV Workshop S/Stn	1	05.02.2016	3.	11 KV S/Stns	26	05.02.2016
S.No.	Site Name	Qty of RTUs	Date of Commissioning														
1.	132KV Kanchanpur S/Stns	2	05.02.2016														
2.	33 KV Workshop S/Stn	1	05.02.2016														
3.	11 KV S/Stns	26	05.02.2016														
Make/Model of RTU	HUSKY RTU 6049-E70																
	Redundant CPU Yes																
	Redundant Power Supply Yes																
Devices Integrated	Energy Meters (MODBUS)																
Protocols Implemented	IEC 60870-5-104 Slave in RTU, IEC 60870-5-104 Master in SCADA System, MODBUS master in RTU																
Type of Communication Channel with Master	Fiber Optic based Ethernet																
	Redundant Communications No																
Special Functions	1. Energy Management System (EMS) as per RDSO Spec TI/SPC/RCC/SCADA/0130 2. Street Light Control 3. Pump Monitoring 4. SMS on critical alarms																

The installed system has been working satisfactorily since the date of commissioning.

गोपनीय
06/10/18

Dy Chief Electrical Engineer/M

उप मुख्य विद्युत अभियन्ता/म
Dy. Chief Elect. Engineer/M

डि. ई. ६०/११२/१८
DLW, Varanasi



Saikat Chakrabarti
Professor
Department of Electrical Engineering
Indian Institute of Technology Kanpur
Uttar Pradesh, Kanpur 208016, India

Office: 105 ACES
Email: saikatc@iitk.ac.in
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Phone: +91-512-2596598
Fax: +91-512-2590063 / 2590260
Homepage: <http://home.iitk.ac.in/~saikatc/>

PERFORMANCE CERTIFICATE

Date: 21 December 2020

M/S Synergy Systems & Solutions have installed and successfully commissioned their SIRIUS SCADA system and HUSKY RTU 6049-E70 at various substations of IIT Kanpur under Smart City Project under Ministry of Power, Government of India.

Details of the same are as mentioned below –

Name of Work	Supply, Installation, Testing and Commissioning of SCADA and Energy Management System for Smart City Pilot Project at Substations of IIT Kanpur			
LOA Number & Date	P/EE/RD/2018-2019/82/867 Dated 07.02.2019			
Original Value of the contract	INR 1,34,91,090.00			
Final Value of the Contract	INR 1,75,51,002.11			
SCADA System Details	Control Room (Master Station): Dual hot-standby servers, 10 Nos Man Machine Interface Date of Commissioning: 10.06.2019			
Make/Model of SCADA System	Synergy Systems & Solutions SIRIUS SCADA System Ver. 5.1			
RTU Details	S. No.	Site Name	Qty. of RTUs	Date of Commissioning
	1.	33/11 substation	01	12.04.2019
	2.	11KV/415V substation	11	12.04.2019
Make/Model of RTU	HUSKY RTU 6049-E70 V 5.1			
	Redundant CPU		No	
	Redundant Power Supply		No	
Devices Integrated	Energy Meters (MODBUS)			
Protocols Implemented	IEC 60870-5-104 Slave in RTU, IEC 60870-5-104 Master in SCADA System, MODBUS master in RTU			
Type of Communication Channel with Master	Fibre Optic based Ethernet			
	Redundant Communications		No	
System Features	- Real-time monitoring and control of 11kV feeders, 11kV/415V transformers, LV feeders - Event recording with 1ms resolution - Network topology processing 3-phase monitoring of 11kV, 415V feeders through MFMs (approx. 250nos.) - Total I/O integrated in SCADA: approx. 15,000 points			

The installed system has been working satisfactorily since the date of commissioning.

Saikat Chakrabarti

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)



POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

रिहन्द - दिल्ली एचवीडीसीटी पारेषण प्रणाली, दादरी टर्मिनल, विद्युत नगर, गाजियाबाद-201008 (उप्र)
टेलीफैक्स : 2671297, 2672423 दूरभाष : 2672422, 2717797 एक्स : 5815 ई-मेल : एचवीडीसीटीएडी@वीएसएनएल.कॉम
Rihand - Delhi HVDC Transmission system, Dadri Terminal Vidyut Nagar, Ghaziabad-201008 (U.P.)
Telefax : 2671297, 2672423 Tel. : 2672422, 2717797 Ext. : 5815 E-mail : hvdcddad@vsnl.com

Date:29-08-05

CERTIFICATE

This is to certify that M/s Synergy Systems & Solutions (SSS) have carried out upgrading of SCADA system at PGCIL's 1500 MW, 500KV Rihand-Dadri HVDC (High Voltage DC) transmission line successfully. Contract of SCADA system upgrading was awarded to SSS for a total value of approximately INR 30,00,000/- (Indian Rupees Thirty Lacs only).

SSS's scope of work included design, engineering, supply, installation and commissioning of the SIRIUS SCADA software, and PLCs at Dadri and Rihand terminals. The SIRIUS SCADA system is configured for dual hot-standby SCADA Servers cum Operator stations, Dual hot-standby communication front ends, an extra Operator station, Engineering station, and Dual LAN. This upgrading also required deciphering and programming of four numbers of existing protocols. With a total I/O count of approximately 3500 inputs and outputs, the system was designed for fast response which is critical for acquisition of approximately 2500 alarms time stamped at 1 millisecond resolution.

The installed SIRIUS SCADA system is working satisfactorily.

Yours faithfully,

(D.B.Tripathi)
DGM(HVDC)

To
Synergy Systems & Solutions
D-985, 2nd Floor, New Friends Colony,
New Delhi.

**Minutes of Meeting
Between
POWERGRID VIZAG
&
Synergy Systems & Solutions**

Date: 21/05/2010

Place: POWERGRID Vizag, Control Room

Project: Supply, Installation & commissioning of Upgrading of SCADA System for HVDC Vizag Pole-1

- Engineers of M/s Synergy Systems & Solutions visited site from 20th Nov, 2009 to 06th Dec, 2009 to decipher the protocols being used at Vizag HVDC station. During this visit, following protocols were deciphered, which are detailed as below:
 - Protocol for BIO
 - Protocol for HVDC Controller
 - Protocol for MIMIC
 - Protocol for HVAC ABB 232 RTU
 - Protocol for Inductive Disturbance Recorders
 - Protocol for Siprotec Disturbance Recorders
 - Protocol for Energy Meters
- Engineers of M/s Synergy Systems & Solutions again visited site from 01st Jan, 2010 to 04th March, 2010 in which following works were carried out.
 - Supply of all hardware items as per the BOQ.
 - Installation of all the equipment and laying of cables as per the scheme.
 - Testing of following devices with their respective protocols:
 - BIO on DNP3.0
 - HVDC Controller on DNP 3.0
 - MIMIC on MT700
 - PG RTU on MT700
 - HVAC ABB 232 RTU on RP570
 - Energy Meters on IEC 1107
 - Syprotech Relays on IEC870-5-103
 - Inductive DR on Inductive
 - ABB REL Relays on SPA
 - Pole-2 gateway on IEC870-5-101
 - Valve Cooling System (Alspa) of Pole-1
- Commissioning team further visited site from 21st March, 2010 to 20th May, 2010 to carry out the commissioning works and putting the New SCADA in service. During the above period, following works were completed which includes integration of 03 Stations of HVDC Pole-1, HVAC and HVDC Pole-2
 - Commissioning of MIMIC over MT700 protocol.
 - Commissioning of PGRTU over MT700 protocol.
 - Commissioning of HVDC Controller over DNP3.0 protocol.
 - Commissioning of 04-Nos of BIOs over DNP 3.0 protocol.
 - Commissioning of ALSPA (Valve Cooling) over SNP protocol.
 - Commissioning of ABB 232 RTU over RP570 protocol.
 - Commissioning of 03-Nos. of Siemens Siprotech Relays over IEC 870-5-103 protocol.
 - Commissioning of Hathaway Event Recorders SER4100 & 7000 over ASCII protocol.
 - Commissioning of ABB Relays over SPA protocol.
 - Commissioning of ABB Inductive 3 nos. 65C/650 disturbance recorders over Inductive protocol.
 - Commissioning of 17 nos. L&T make ER300P Energy Meters over IEC 1107 protocol.
 - Commissioning of Pole2 Data over IEC870-5-101 protocol.

[Signature]

[Signature]

[Signature]

- Demonstration of IEC 61850 protocol against simulator server due to absence of any device. It was also agreed by M/s Synergy that technical support will be provided in future.
 - Demonstration of IEC 870-5-104 protocol against slave simulator due to absence of any device. It was also agreed by M/s Synergy that technical support will be provided in future.
 - Integration of IEC 870-5-101 communication gateway interface to provide data to SRLDC and configuration for ERLDC. Since the data was being transmitted to SRLDC, the same were tested point-wise in association with representative at SRLDC.
 - Time Synchronization of SCADA system with GPS.
 - Commissioning of quad redundant communication links with BIOs, MIMIC and HVDC controller. Commissioning of dual redundant communication channels for IEC870-5-101 gateway, ABB 232 RTU and Event recorders.
 - Commissioning of dual redundant SCADA servers, dual redundant communication Front Ends, two nos. of OWS and one no. of EWS.
- SAT Checks were carried out from 26th April, 2010 to 01st May, 2010 in which verification related to approved SAT procedures were carried out and has been recorded in SAT document.
- Ten Days training programme were carried out regarding Operation and Maintenance of SCADA system, addition of new RTU's, configuration of events/alarms, report generation, creation of new trends, configuration of hardware, etc.
- System availability test was carried out for 15 days from 03rd May, 2010 to 18th May, 2010.
- Backup of complete system along with documentation, CD's necessary for configuration for entire SCADA system has been handed over to POWERGRID in soft and hard form.

Considering above, the SCADA system stands fully commissioned and taken over by POWERGRID with effect from 21st May, 2010 and there is no pending work on part of M/s Synergy Systems and Solutions.

(SAGAR REDDY).

POWERGRID Vizag


(RABI ROSHAN)
Manager


Synergy Systems & Solutions

रवि रोशन डी.डी / RABI ROSHAN D.D.
प्रबंधक / Manager
पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
POWER GRID CORPORATION OF INDIA LTD.
विशाखपट्टणम / VISAKHAPATNAM - 530 032

Section	Draft Report Paragraph	Comment from Members	Feedback from Chemtrols
Ch. 4 Para 3 Pt. 2	Considering the knowledge pool, preparedness and potential present among Indian developers, complete development of SCADA/ EMS/ DMS software is possible.	POWERGRID: Ok. However, documentary evidence for the Projects executed by them in past are to be examined to conclude about the capabilities of indigenous suppliers.	Yes, concurred. Documentary evidence has to be provided by all the interested parties showing proof of projects executed / being executed.
Ch. 4 Para 3 Pt. 4	Most of the identified developers have expressed willingness to provide complete SCADA/EMS/DMS software individually, while others are willing to provide only some modules as per their core strengths and business needs.	POWERGRID: Ok. However, documentary evidence in support of their claims is to be given. Detailed reports w.r.t modules mentioned in questionnaire and system size handled for all the applications is required to access the capability of indigenous vendors to handle large and complex Indian grid.	Handling a large & complex grid through an indigenous software is not a constraint if proper designing is carried out. It is possible for Powergrid / POSOCO to assess the performance capabilities during development stage. A proper Quality Assurance Plan to assess performance will have to be defined.
Ch.4 Para 3 Pt. 3	Presently, the individual developers have their core strengths in different domains of SCADA/EMS/DMS system and none of them is in a position to provide complete SCADA/EMS/DMS software individually. It was observed that if modules already available with individual developers are viewed collectively, major portion of the complete software is readily available and only some modules remain to be developed.	POSOCO: Though all the modules are individually available, the integration of these modules are required on real time basis with single database. The design of different modules may not be compatible and needs to be ascertained before recommending the same. Hence, recommending the availability of complete module should be avoided. This can only be done once they are tested through a pilot project for their integrated functionality. POWERGRID: Although developers have confirmed the availability of some modules but still more developmental work is required at their end to meet the current specification fully. It may be recommended that indigenous vendors should first develop their system in line with technical specification of SCADA/EMS Control centres and then the developed system can be deployed as a part of pilot project to test the system as per details of Technical specification. APTRANSCO: v. The main challenge is allocating pilot projects and providing funding to the vendors for development of indigenous SCADA.	We note and appreciate the valid concern regarding integration. This has to be mitigated through service oriented architecture by design with proper software engineering specifications for module integrations.

Section	Draft Report Paragraph	Comment from Members	Feedback from Chemtrols
Ch. 4 Para 3 Pt. 5	In case complete solution is to be provided by individual identified developers, it may take up to 36 months	POSOCO: Time frame may be taken as 48 months including testing, verification of compliance and operational reliability through a pilot vis-à-vis applications already deployed at LDCs.	We believe the Development phase can be completed in phases in a period of 36 months. The pilot testing will also be done phase wise and we expect deployment to happen by the 43 rd month. (See chart below)
Ch. 4 Para 3 Pt. 6	However, as highlighted in point 3 above, complete solution may be expedited if individual developers come together to form a consortium as per their core strength.	POWERGRID: In case of consortium of individual developers, proper integration of various modules is to be ensured to achieve desired performance for the software in integrated manner. POSOCO: Coordination may be a challenge in delivery, installation, commissioning and operation of OT system through consortiums. Hence this point may be removed.	Yes a consortium could potentially work. However a lead member should be appointed who will take responsibility of overall execution & project management.
Ch. 4 Para 4	For indigenous development of SCADA software for Power System Management, it is pertinent to address the following challenges raised by developers: 1. Unguaranteed return on investment. 2. Qualification criteria in bidding process prohibits Indian developers from participating. 3. Investment for carrying out research & development activities.	POWERGRID: The statement on Qualification criterion in bidding process prohibits Indian developers from participating is not correct. Despite the claims made about their experience, actual experience is not meeting the requirement of Standard Technical specification in terms of size and complexity of Indian grid.	We recommend to start qualifying and promoting Indian Vendors meeting design requirements of a large SCADA/EMS/DMS System for Substation Automation Software to begin with. This will also help to develop vendors with field testing as well as design & performance assessments by Powergrid / POSOCO. Presently the SAS Software applications are dominated by Protection Relay manufacturers since the entire system is provided as a package.
Ch. 4 Para 5 Pt. 1	SCADA standards and its communication protocols identified in section 3.3.2 should be universally adopted to ensure interoperability.	POWERGRID: Some of the standards suggested by POWERGRID are not incorporated. (Which???)	These are mainly the third party IT Systems in DISCOMs that are implemented before the SCADA projects.

Section	Draft Report Paragraph	Comment from Members	Feedback from Chemtrols
Ch. 4 Para 5 Pt. 3	To ensure participation of Indian developers of SCADA/EMS/DMS/SAS in the bids for SCADA/EMS/DMS systems and Substation Automation Systems, the provisions of Public Procurement (Preference to Make in India) (PPP-MII) need to be complied. Qualification criteria in bid document need to be relaxed for Indian developers till the desired maturity level is achieved.	POWERGRID: Ok. However, the relaxation in Qualification criterion may be such that the technical requirements are not compromised as SCADA /EMS /DMS /SAS are critical applications of Power systems and relaxing technical requirements may result in performance and security related issues. POSOCO: Reliability and Performance Criteria cannot be relaxed. Specific restrictive clause prohibiting Indian Developers may be mentioned.	Kindly refer feedback to Chapter 4, Para 4 for promoting Indian Vendors.
Ch. 4 Para 7 Pt. 4	Consortiums of Indian developers should be allowed to participate in bidding process.	POWERGRID: Ok but integration related issues to be addressed.	Kindly refer feedback to Chapter 4, Para 3, Pt. 6 for mitigating challenge of coordination.

Proposed Development & Pilot Testing Schedule - Chemtrols

Module/Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
SCADA														
DMS														
EMS														
Other Applications														
Pilot Testing														
Development														

Process for awarding the development contract

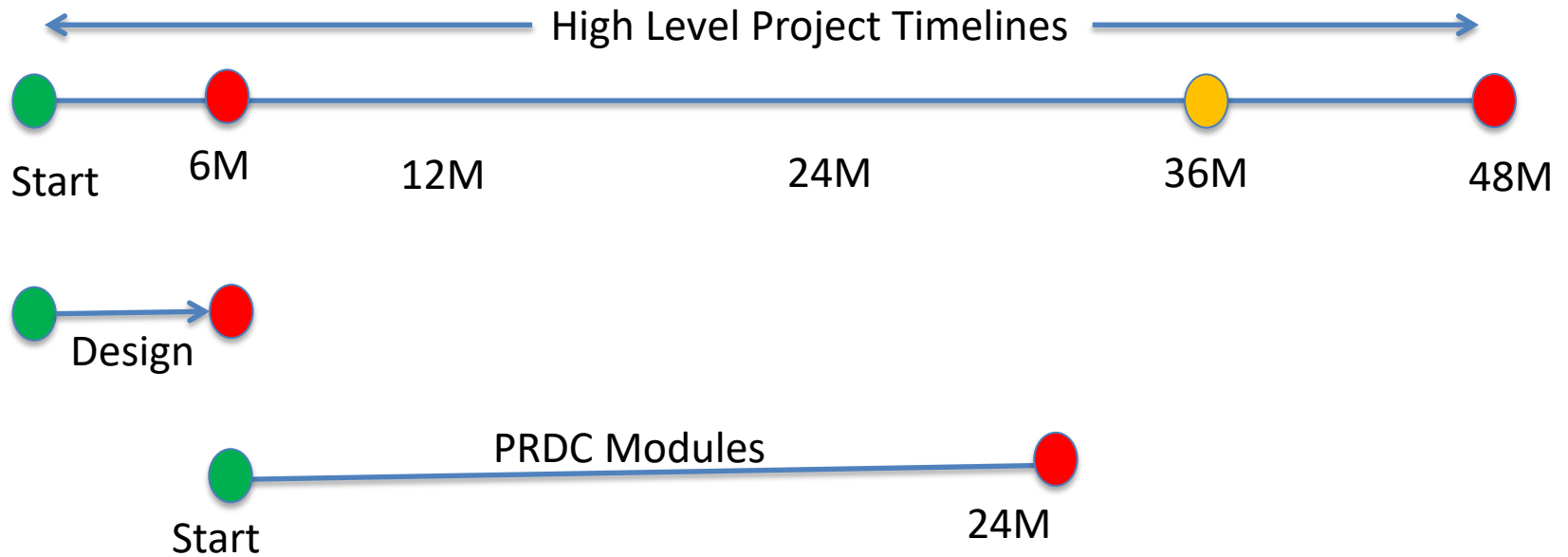
GoI should ideally not adopt a tender route for the award of the development of such a package. Instead it should nominate a consortium of Indian Companies (Maximum 3) to develop the software. If need be a Swiss Challenge Method can be adopted.

The funding should be done by GoI for this project in phases / upfront as per need, as funding for such a large scale project where there is no guarantee of end user acceptance will be difficult to raise for the Companies concerned.

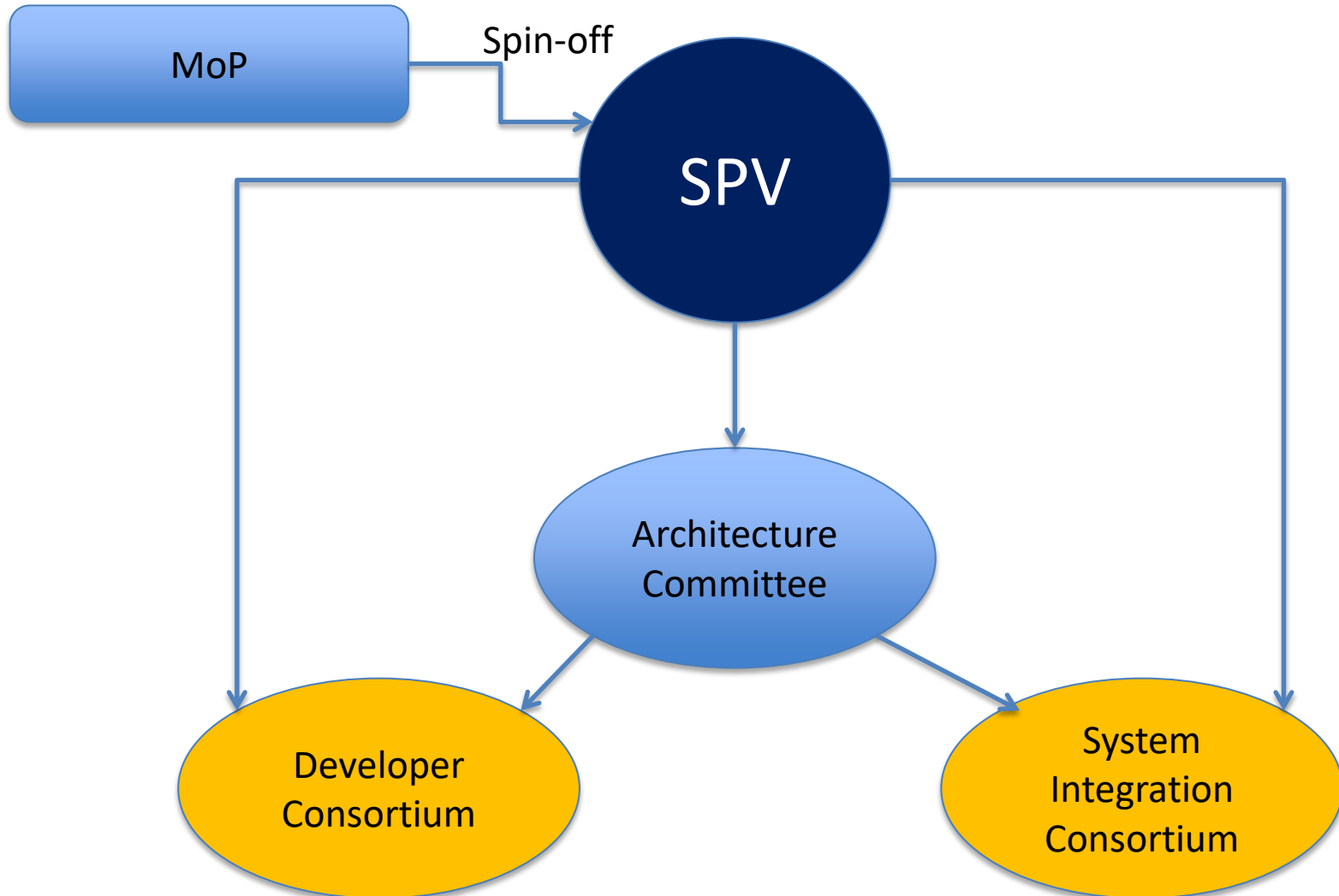
Indigenous Development of SCADA Solution

Our Recommendation

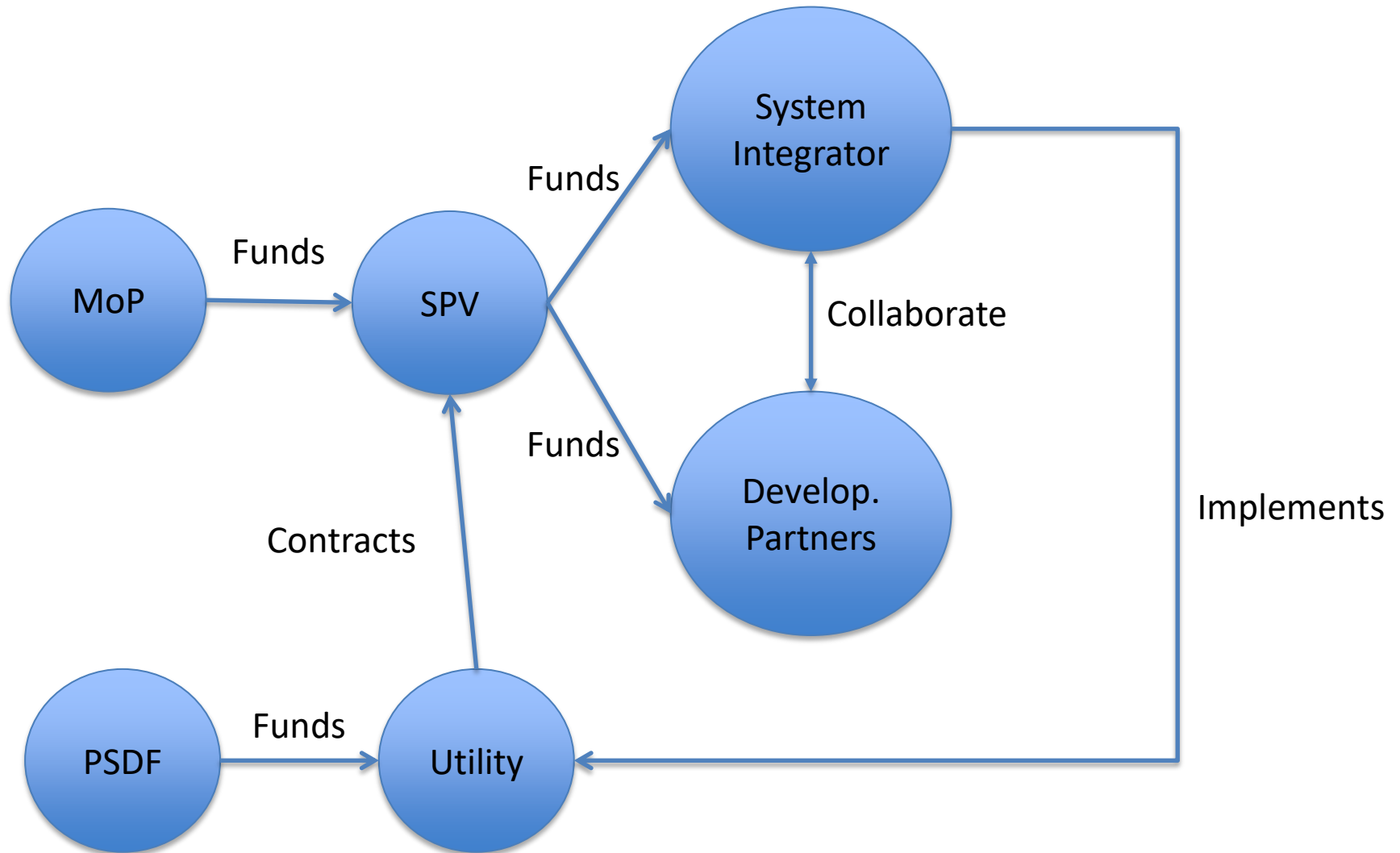
Timelines



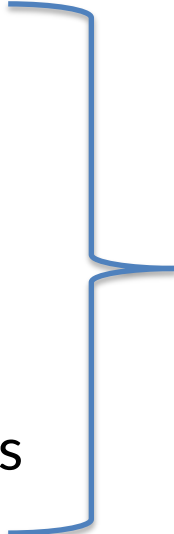
Our Recommendation



Funding



PRDC's Role Play

- Design and Development of
 - EMS
 - DMS
 - Power System Simulator
 - Integration with 3rd party applications
- 
- A large blue bracket is positioned between the two columns of bullet points, grouping the design and development tasks with the integration task.
- 25+ Years in the Power Industry
 - Expertise in Power System Simulation
 - Best-in-class software engineering team

RBH Reply

Section	Draft Report Paragraph	Comment from Members
Ch. 4 Para 3 Pt. 2	Considering the knowledge pool, preparedness and potential present among Indian developers, complete development of SCADA/ EMS/ DMS software is possible.	POWERGRID: Ok. However, documentary evidence for the Projects executed by them in past are to be examined to conclude about the capabilities of indigenous suppliers.
		RBH: For Pilot project this criteria need to be carefully set, as many modules shall be newly developed and experience may not be applicable.

Section	Draft Report Paragraph	Comment from Members
Ch. 4 Para 3 Pt. 4	Most of the identified developers have expressed willingness to provide complete SCADA/EMS/DMS software individually, while others are willing to provide only some modules as per their core strengths and business needs	POWERGRID: Ok. However, documentary evidence in support of their claims is to be given. Detailed reports w.r.t modules mentioned in questionnaire and system size handled for all the applications is required to access the capability of indigenous vendors to handle large and complex Indian grid.
	RBH: For Pilot project this criteria need to be carefully set, as many modules shall be newly developed and experience may not be applicable. All companies have 15 years + in terms of large and complex project handling.	

Ch. 4 Para 3 Pt. 3: Presently, the individual developers have their core strengths in different domains of SCADA/EMS/DMS system and none of them is in a position to provide complete SCADA/EMS/DMS software individually. It was observed that if modules already available with individual developers are viewed collectively, major portion of the complete software is readily available and only some modules remain to be developed.

POSOCO: Though all the modules are individually available, the integration of these modules are required on real time basis with single database. The design of different modules may not be compatible and needs to be ascertained before recommending the same. Hence, recommending the availability of complete module should be avoided. This can only be done once they are tested through

POWERGRID: Although developers have confirmed the availability of some modules but still more developmental work is required at their end to meet the current specification fully.

It may be recommended that indigenous vendors should first develop their system in line with technical specification of SCADA/EMS Control centres and then the developed system can be deployed as a part of

a **pilot** project for their integrated functionality.

pilot project to test the system as per details of Technical specification.

RBH: Development of EMS system without consideration / ascertaining the Pilot project, the cost and risk is very huge for MSME / Indian vendors.
All companies have 15 years + in terms of large and complex project handling.

APTRANSCO

v. The main challenge is allocating pilot projects and providing funding to the vendors for development of indigenous SCADA.

Section	Draft Report Paragraph	Comment from Members
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Ch. 4 Para 3 Pt. 5	In case complete solution is to be provided by individual identified developers, it may take up to 36 months	POSOCO: Timeframe may be taken as 48 months including testing, verification of compliance and operational reliability through a pilot vis-à-vis applications already deployed at LDCs.
Ch. 4 Para 3 Pt. 6	However, as highlighted in point 3 above, complete solution may be expedited if individual developers come together to form a consortium as per their core strength.	POWERGRID: In case of consortium of individual developers, proper integration of various modules is to be ensured to achieve desired performance for the software in integrated manner. POSOCO: Coordination may be a challenge in delivery, installation, commissioning and operation of OT system through consortiums. Hence this point may be removed.

	RBH: We can ascertain the integration of different vendors, as RBH is already supporting various OEMs for their integration requirements since 15 years. We are willing to take up the challenge with full responsibility of integration of modules with other consortium partners
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Section	Draft Report Paragraph	Comment from Members
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Ch. 4 Para 4	For indigenous development of SCADA software for Power System Management, it is pertinent to address the following challenges raised by developers: 1. Unguaranteed return on investment. 2. Qualification criteria in bidding process prohibits Indian developers from participating. 3. Investment for carrying out research & development activities.	POWERGRID: The statement on Qualification criterion in bidding process prohibits Indian developers from participating is not correct. Despite the claims made about their experience, actual experience is not meeting the requirement of Standard Technical specification in terms of size and complexity of Indian grid.
	RBH: • Funds for the development of such large and complex system required • Pilot projects with relaxed qualification criteria to be considered	

Ch. 4 Para 5 Pt. 1	SCADA standards and its communication protocols identified in section 3.3.2 should be universally adopted to ensure interoperability.	POWERGRID: Some of the standards suggested by POWERGRID are not incorporated. (Which???)
	RBH: • We support all the industry Standard Communication protocols	

Section	Draft Report Paragraph	Comment from Members
Ch. 4 Para 5 Pt. 3	To ensure participation of Indian developers of SCADA/EMS/DMS/SAS in the bids for SCADA/EMS/DMS systems and Substation Automation Systems, the provisions of Public Procurement (Preference to Make in India) (PPP-MII) need to be complied. Qualification criteria in bid document need to be relaxed for Indian developers till the desired maturity level is achieved.	POWERGRID: Ok. However, the relaxation in Qualification criterion may be such that the technical requirements are not compromised as SCADA /EMS /DMS /SAS are critical applications of Power systems and relaxing technical requirements may result in performance and security related issues. POSOCO: Reliability and Performance Criteria cannot be relaxed. Specific restrictive clause prohibiting Indian Developers may be mentioned.
	RBH: Following requirements are prohibiting RBH for participating in projects • Financial Qualification Criteria • Similar work experience and size of similar work experience required	

Ch. 4 Para 7 Pt. 4	Consortiums of Indian developers should be allowed to participate in bidding process.	POWERGRID: Ok but integration related issues to be addressed.
	RBH: We are willing to take up the challenge with full responsibility of integration of modules with other consortium partners	

THANK YOU