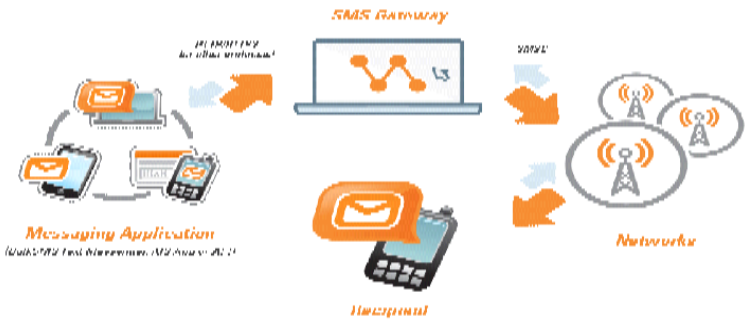
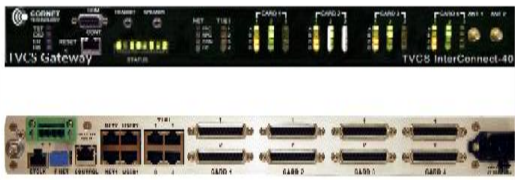
EARLY WARNING DESSIMINATION SYSTEM ODISHA

EWDS Installed & Operationalized under NCRMP in Coastal Districts of Odisha





Special Relief Commissioner
Odisha

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Background:

Under National Cyclone Risk Mitigation Project (NCRMP), the **Early Warning Dissemination System (EWDS)** is functioning in six coastal districts (Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Puri & Ganjam) in the state to address the existing gap of disseminating disaster warning up to the community level. In this project the following equipment have been installed at State Emergency Operation Center (SEOC), 6 coastal District Emergency Operation Centers (DEOC), 22 coastal Block Emergency Operation Centers (BEOC), 14 Fish Landing Centers (FLC) and 113 remote coastal locations.

a. Satellite Based Mobile Data Voice Terminal: - 2 each at SEOC & 6 DEOCs
b. Digital Mobile Radio (DMR): - Installed at 6 DEOCs, 21 BEOCs, 14 FLCs & 113 Alert Siren Locations
   - Fixed Station -168 Nos.
   - Repeater Station -31 Nos.
   - Hand Held Terminal -35 Nos.
c. Mass Messaging System (MMS: GBAS & LBAS) installed at SEOC
d. Alert Siren Tower installed at 122 locations
e. Universal Communication Interface (UCI) installed at SEOC

These communications equipment were widely used during different cyclones like "Fani", "Bulbul", "Amphan"& "Gulab". During cyclone "Fani" about 1.80 crore warning and awareness messages were sent to the vulnerable/ affected people through MMS. Besides, Lightning alert messages are being sent regularly to the people in vulnerable area through SMS. Similarly, through Alert Siren, voice messages relating to different disaster can also be transmitted to the people in coastal areas. SBMDVT plays an important role during cyclone in establishing instant telecommunication, when there is no telephone and internet connectivity due to breakdown of telephone towers. DMR hand held terminal helps in short distance communication during search, rescue & relief operation. UCI makes it possible to communicate through different types of communicating equipment.

Technical features

- **Satellite Based Mobile Data Voice Terminals (SBMDVT)-** 2 sets each to the State (SEOC) and 6 District Emergency Operation Centres (DEOCs)

- **Digital Mobile Radio (DMR)** to SEOC, 6 DEOCs, 22 BEOCs, 14 Fish Landing Centres (FLCs) and 113 Alert Siren locations. DMR Repeater Stations at 6 locations.

- **Mass Messaging Systemat the State EOC**. This will facilitate sending warning messages through SMS to all mobile phone subscribers in a particular locality/ area likely to be affected by a threatening disaster.

- **Alert Siren System** at 122 locations near the coast (within 1.5 km approximately) to cover Tourist Places, Fish Landing Centres and coastal habitations. This system will be helpful for communicating both cyclone and tsunami warnings to the coastal population directly from the State Headquarters.

EWDS Infrastructure

Spun Concrete Tower
15 Mtrs – 14 Nos.
30 Mtrs – 27 Nos.

Angular Tower
15 Mtrs – 33 Nos.
30 Mtrs – 29 Nos.

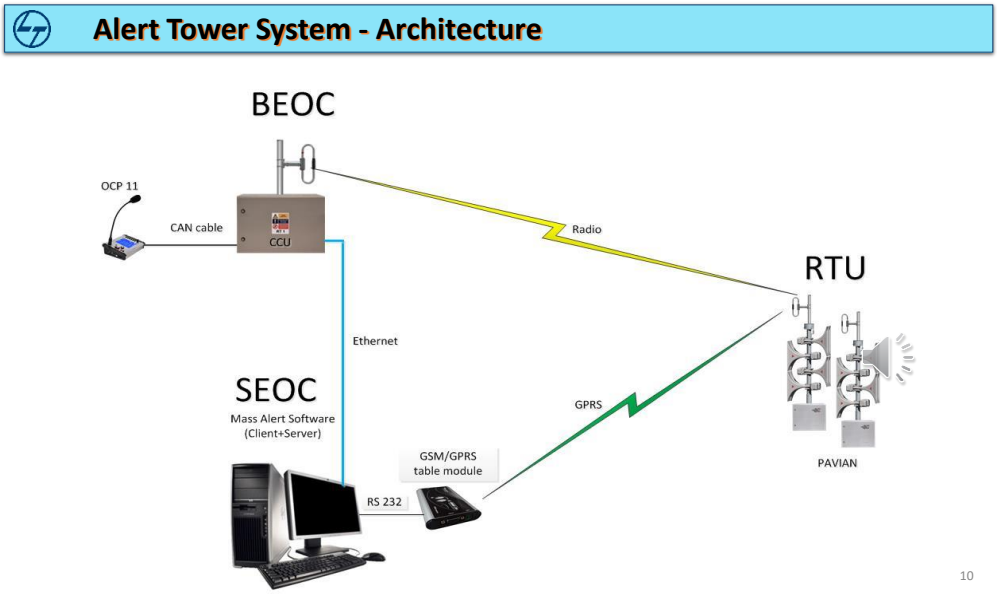
Roof Top Pole
5 Mtrs – 57 Nos.

SOP for ALERT SIREN SYSTEM

1.ALERT SIREN SYSTEM

Alert Siren Can beactivated from

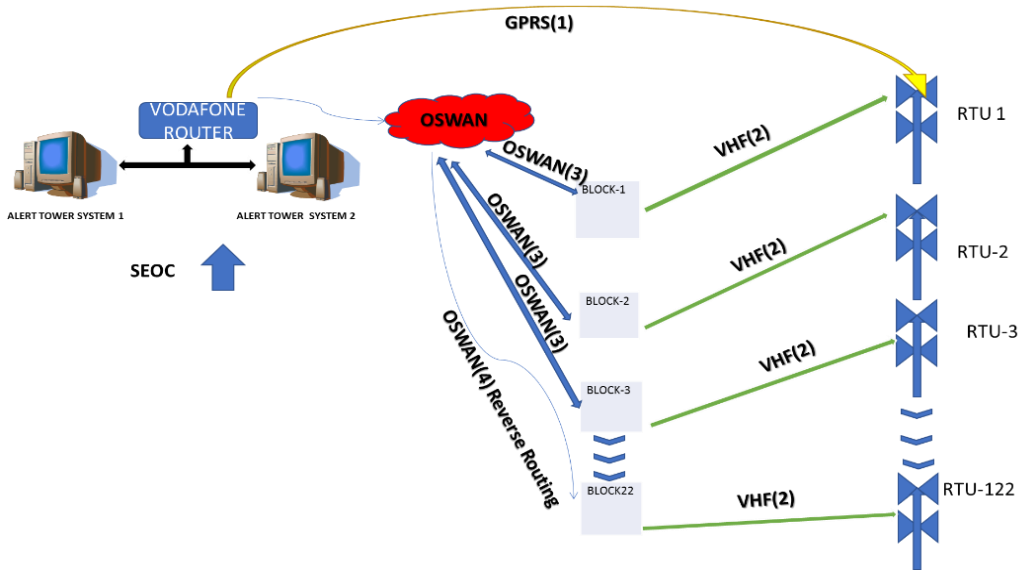
- SEOC (STATE EMERGENCY OPERATION CENTRE) BHUBANESWAR.
- BEOC (BLOCK EMERGENCY OPERATION CENTRE)



1.1. SEOC (STATE EMERGENCY OPERATION CENTRE) BHUBANESWAR.

Using VEKTRA software the following activities can be performed in all 22 blocks of 06 Districts.

- RUN ALARM –PRE RECORDED- THROUGH GPRS
- RUN ALARM- LIVE VOICE ALARM- THROUGH OSWAN+VHF
- STOP ALARM
- CHECK STATUS



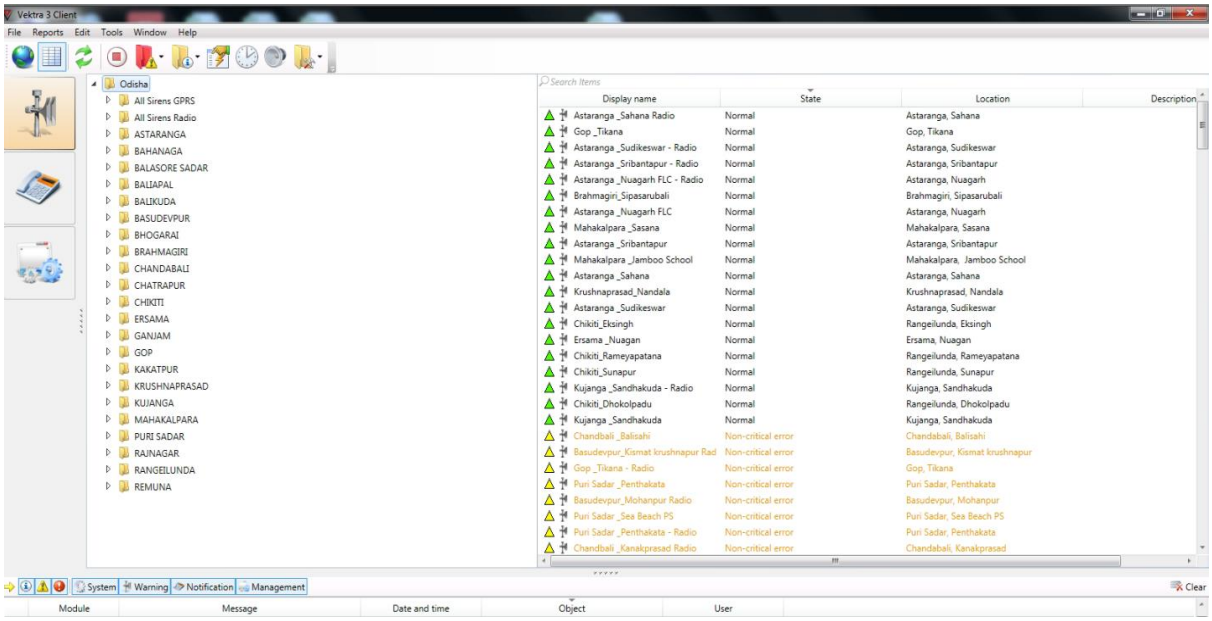
GPRS/VHF at SEOC-

- All 122 sirens can be triggered selecting GPRS in Vectra in one GO.
- Similarly, all 122 sirens can be triggered selecting VHF in Vectra in one go.
    a) We have OSWAN network available in SEOC.
    b) GPRS router is connected to BEOC through OSWAN network.
    c) Command goes through OSWAN network to BEOC router at BEOC.
- From any BEOC all sirens connected to the respective BEOC can be triggered by reverse routing.
    a) Triggering command goes through OSWAN network (Reverse routing) from BEOC to SEOC GPRS router (placed at SEOC)
    b) From SEOC- GPRS router command goes to all sirens through GPRS as GPRS router is connected with OSWAN network and with GPRS network at SEOC.

- Using VHF+OSWAN, **LIVE MESSAGE** can be broadcasted from SEOC.
- Both VECTRA computers are connected to each other. One will be active always and other one is passive/backup system.

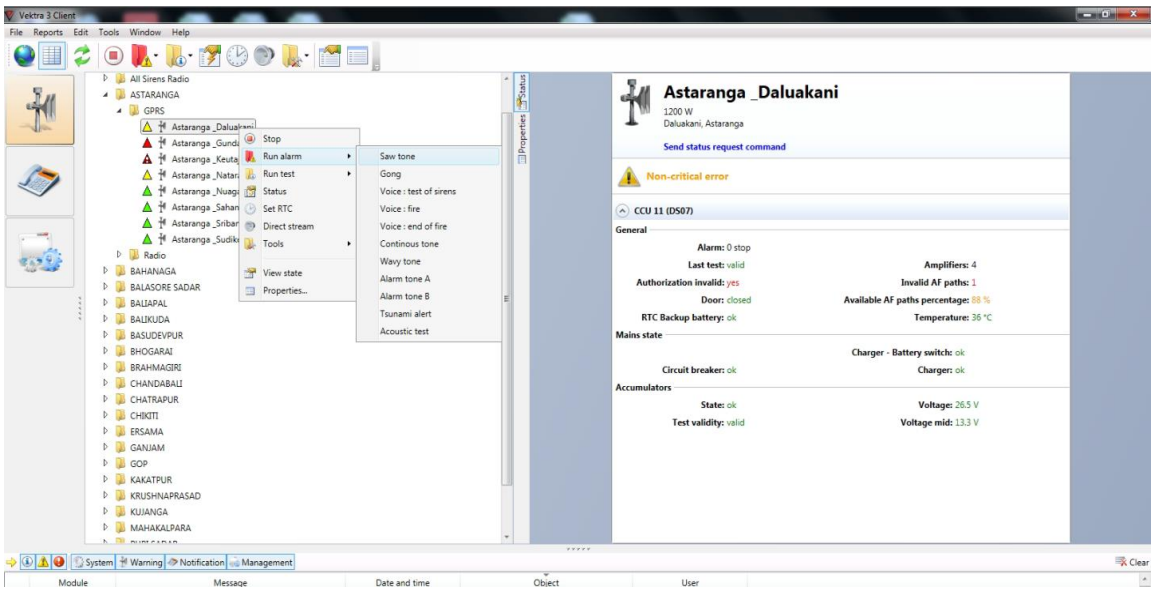
1.2. SEOC- VEKTRA SOFTWARE:-

SHOWING ALL 22 BEOCS UNDER 06 DISTRICTS

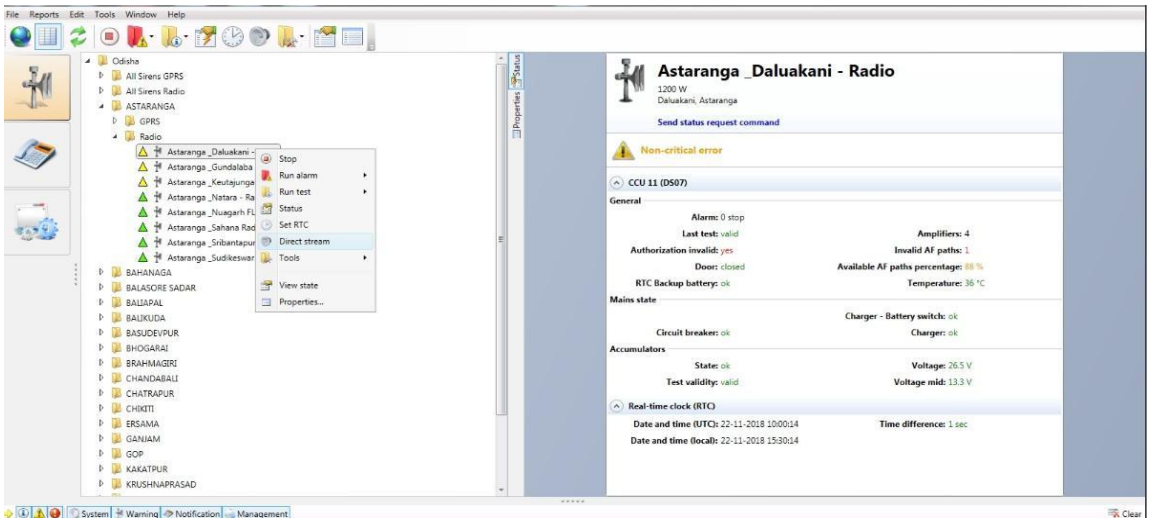


RUN ALARM –PRE RECORDED- THROUGH GPRS

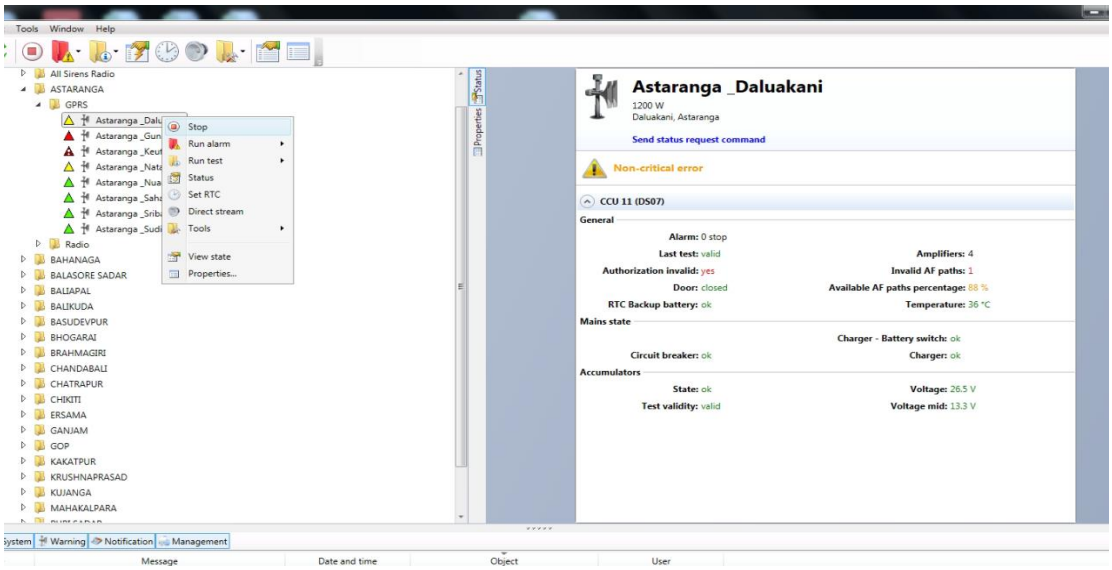
	SEOC	BEOC
PRE RECORDED MESSAGES	GPRS	VHF
SIREN ALARM	GPRS	VHF
LIVE MESSAGE	OSWAN+VHF	VHF
SIREN ALARM		OSWAN+GPRS
PRE RECORDED MESSAGES		OSWAN+GPRS



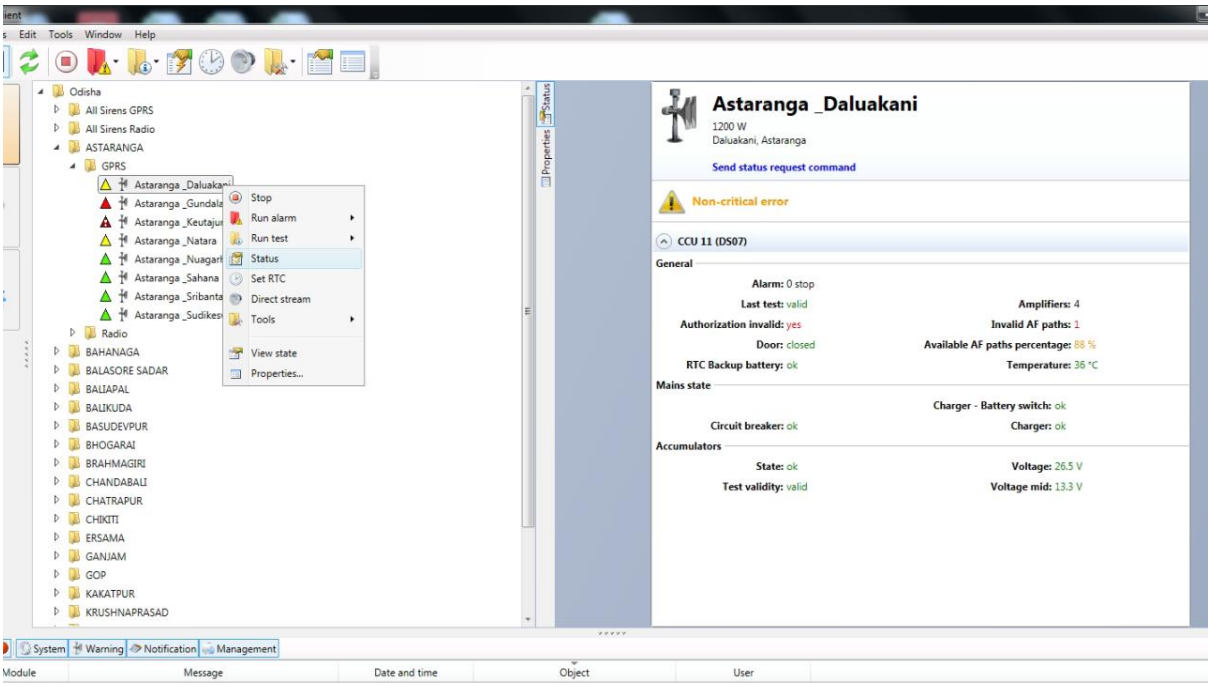
RUN ALARM- LIVE VOICE ALARM- THROUGH OSWAN+VHF



SEOC STOP ALARM



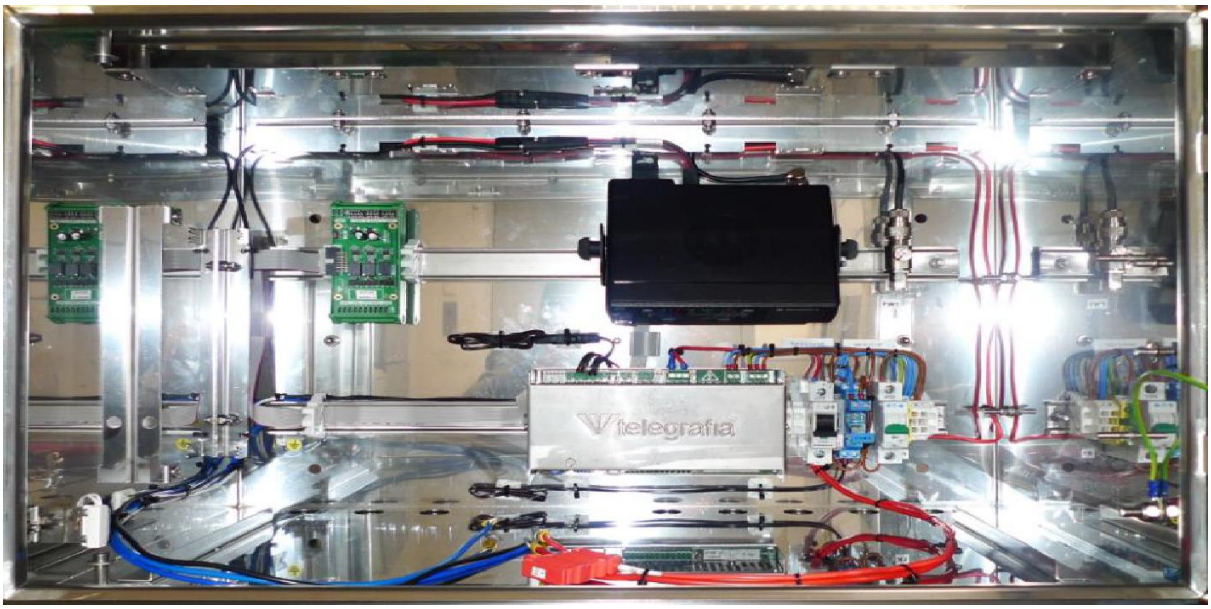
SEOC - CHECK STATUS



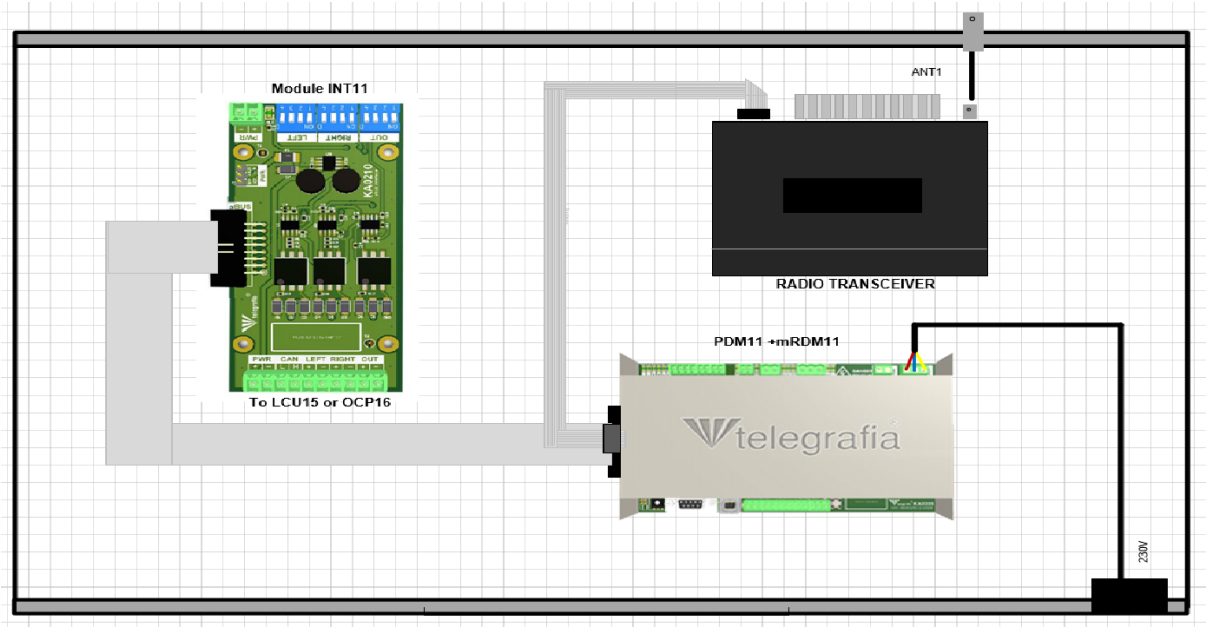
1.3BEOC - CCU

1. All sirens of that particular BEOC can be activated from BEOC using VHF individually or collectively.
2. Live message from BEOC
3. In the absence of VHF, we can activate sirens using OSWAN connectivity between BEOC and SEOC+ GPRS connectivity between SEOC and RTU

1.3.1 CCU-CENTRAL COMMUNICATION UNIT



CCU - Block Diagram



General Description

- The Central Communication Unit is designed to control siren networks.
- All installed sirens are remotely controlled from the central computer with VEKTRA software, or locally from OCP16 – Operators Control Panel.
- The Central Communication Unit communicates with sirens per radio modem.
- The electronics of CCU is housed in a stainless steel box

CCU Modules

- The CCU consists of:
- Module charger PDM11 with submodule mini radio modem mRDM11
- Module interface INT11 for connection a OCP16 control panel
- Transceiver Motorola DM1400 analogue mode
- Module PDM11 supplies power to all modules in the CCU and charges the back-up battery.
- Submodule mRDM11 (mini radio modem) communicates via transceiver Motorola with all sirens.
- Module INT11 slaves for connection of OCP16.
- Human interface called OCP16 is designed for local control of sirens

Default settings:
1. Home
2. Lock
3. Reserved
4. Reserved
5. Brightness

1.3.2 **OPERATOR'S CONTROL PANEL**

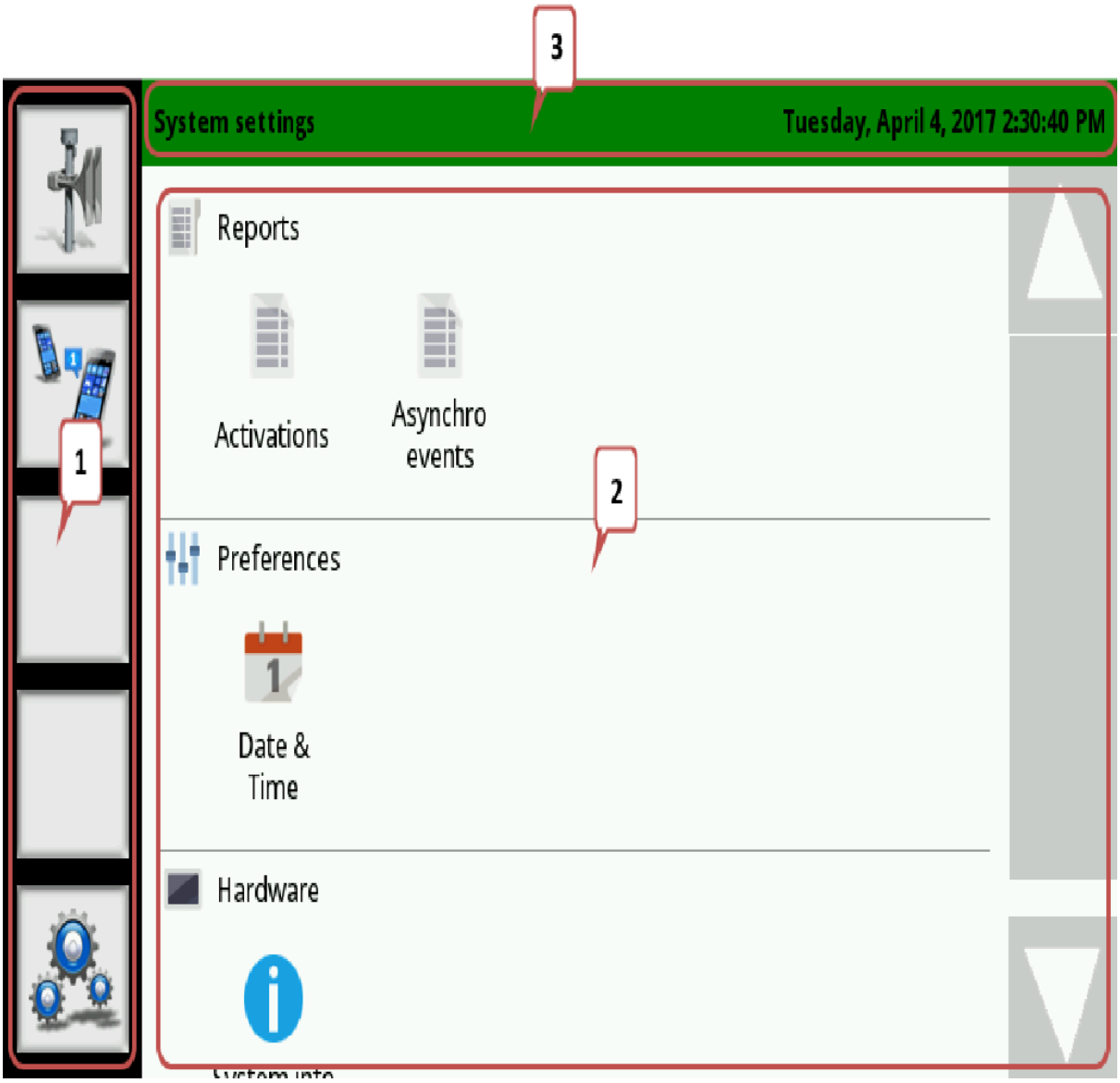
Rotary Push-Button Encoder - serves as audio level control.

- **Set of Push Buttons**
- **Microphone -U**sed to record or convey live voice messages
- **Display Screen -**Touch function allows user to comfortably change active modules, select objects and actions for executed processes, or view available data that is stored in device.

- **LED Indicators**
    1. Green LED – the power supply on
    2. Red LED – the activation of the control panel or the connected local device
    3. Yellow LED – the working status of the control panel or the connected local device

- In order to activate action in warning module, user needs to choose objects upon which this action will be executed. Main area of Warning module shows list of available siren groups and individual sirens. Items are selected by taping on them. Once all required sirens or groups are selected, user can choose action which will be executed.

Display user interface



- **Figure 4 User Interface**

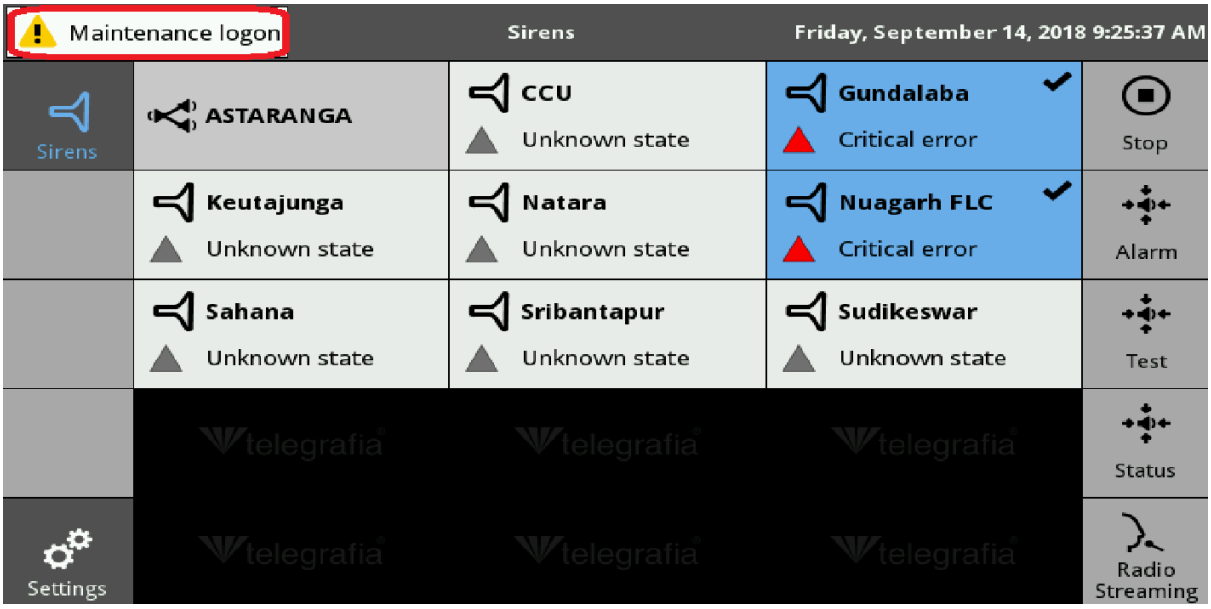
Area 1: contains icons of individual modules. After module icon is taped, selected module will become active.
Area 2: is called main area and shows information from selected module.
Area 3: shows information about selected module, or new messages. Messages shown in this bar can originate in OCP16 system or one of the available modules. Received notification message is shown in Figure 55.

OCP-Siren Activation

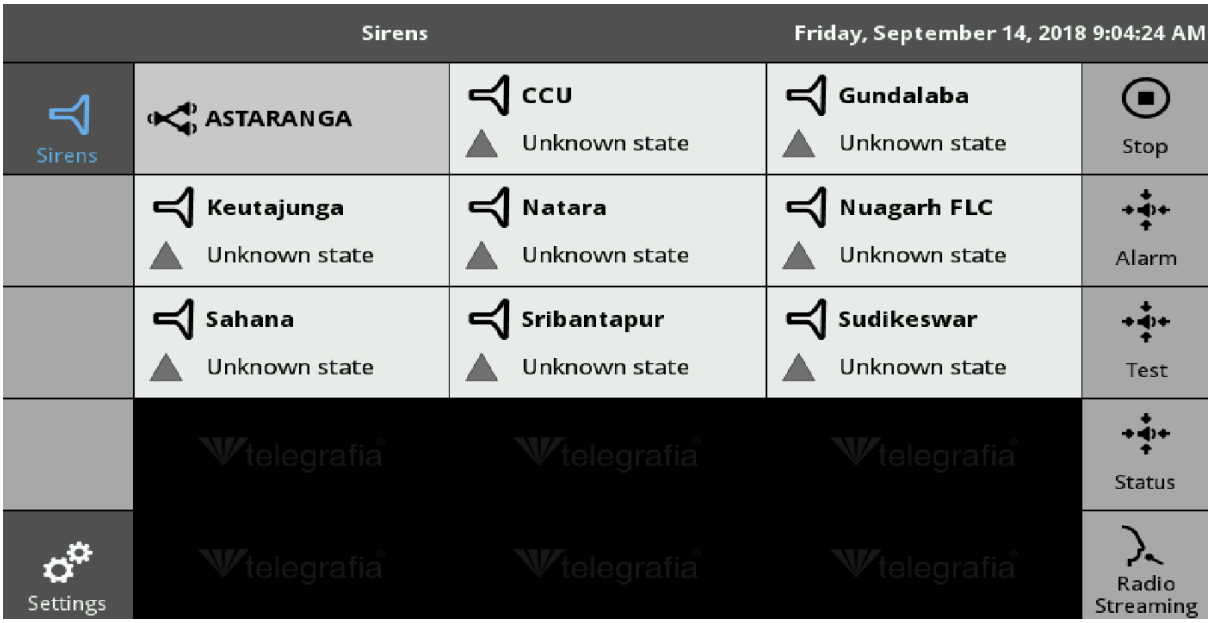
- **PIN Access**
- Access to user interface can be restricted by numerical password (PIN). If more users are required to access OCP16, each user must have unique password.
- **Warning module**
- Warning module is used for control of electronic siren systems.
- It allows users to activate alarms and tests, stop alarm.
- receive status information

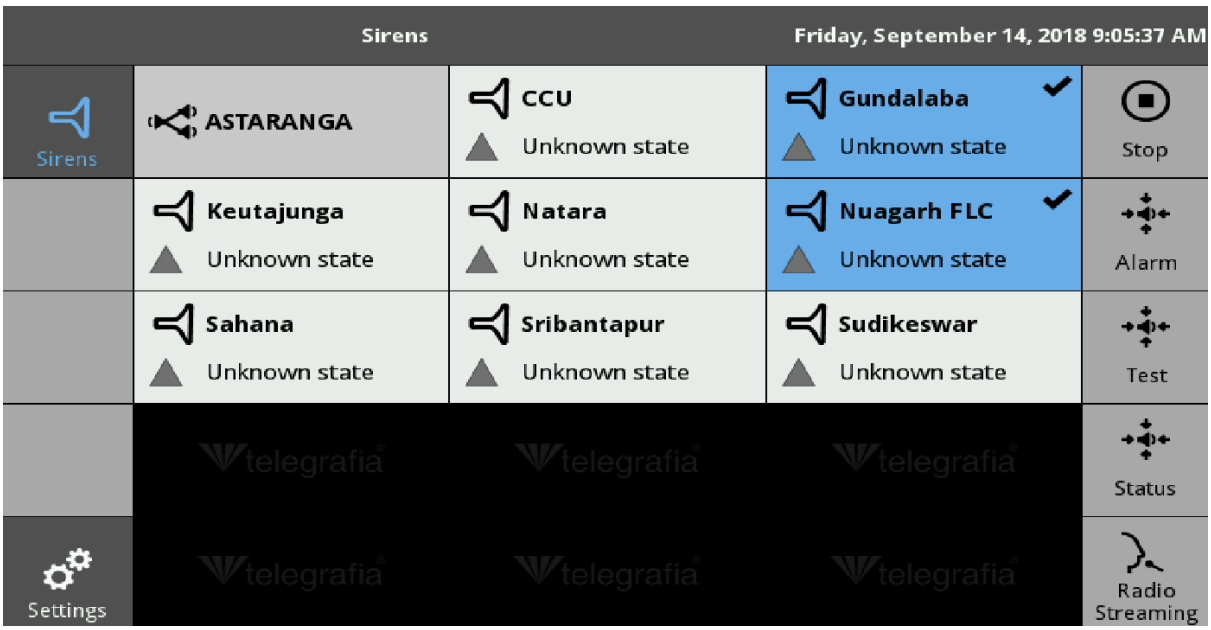
- All actions that are executed on sirens are stored in system with user's name, action type, siren id and actions date and time.
- Selected objects are shown with blue border and check symbol in higher right corner.
- To choose warning action which will be executed, user can choose from 5 options on right panel of actions.
- **Stop action** will stop any ongoing actions on selected devices.
- **Alarm action** will show list of available alarms, from which user needs to select one. Selected alarm will be sent to all selected devices, to start audio alarm on them.

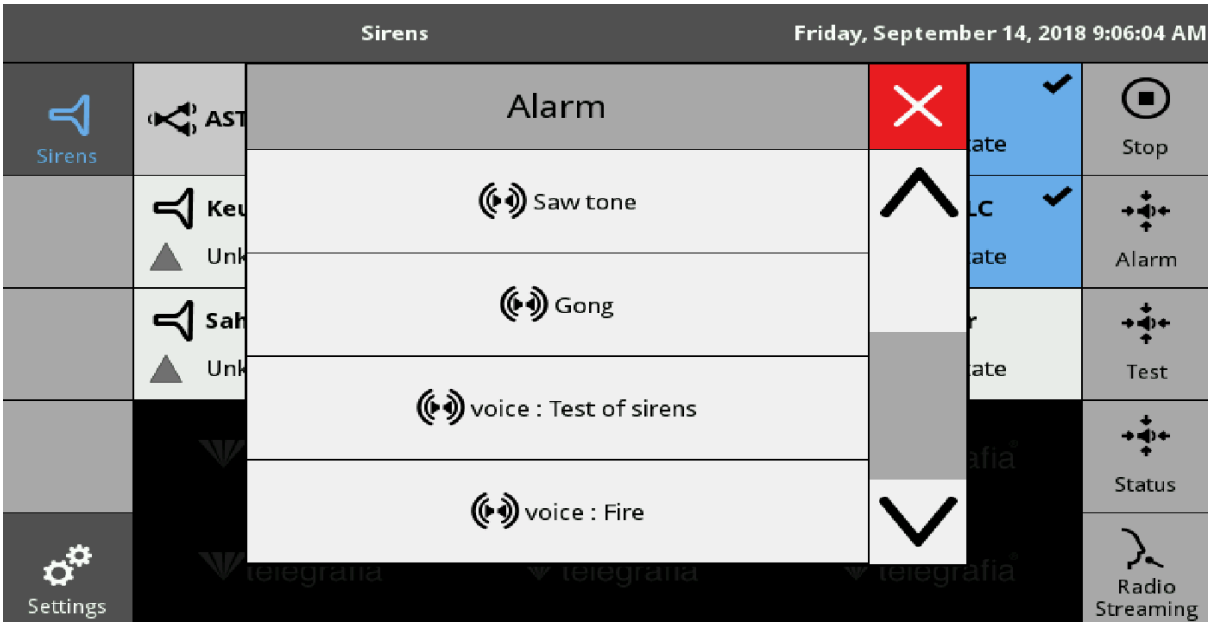
Display user interface

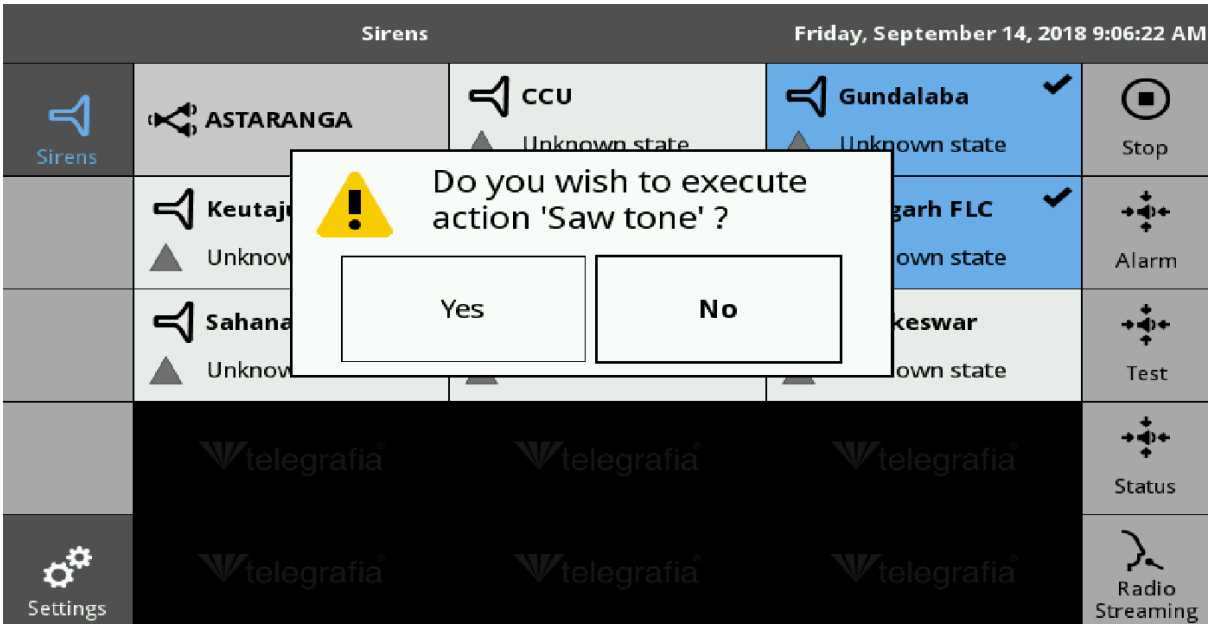


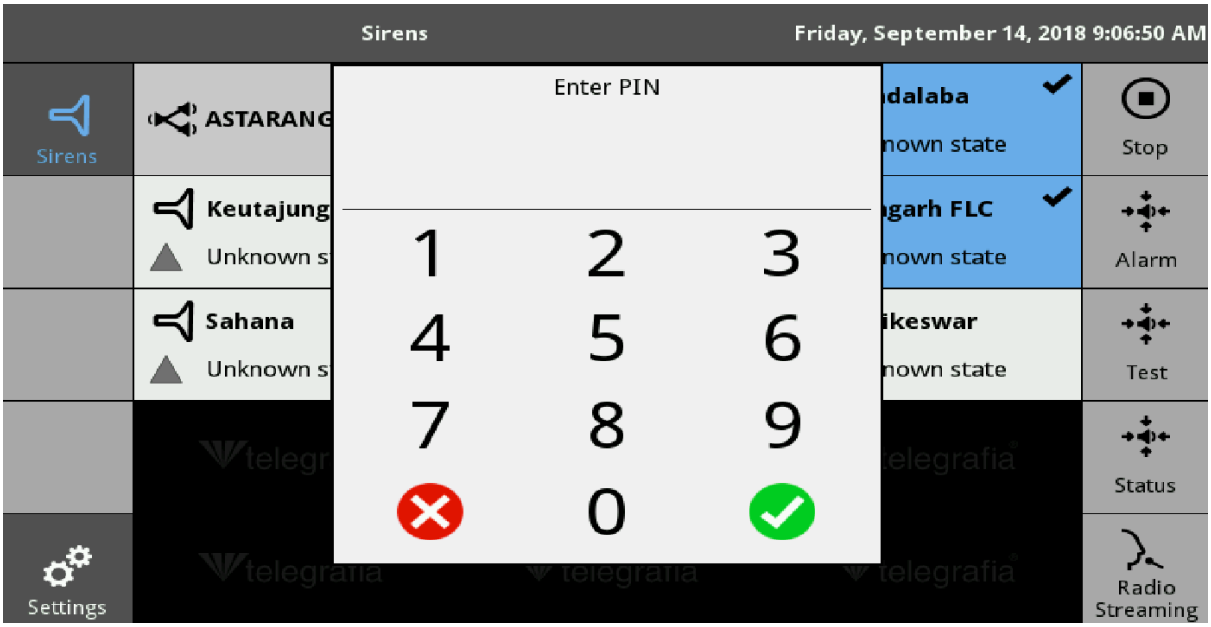
Siren Activation



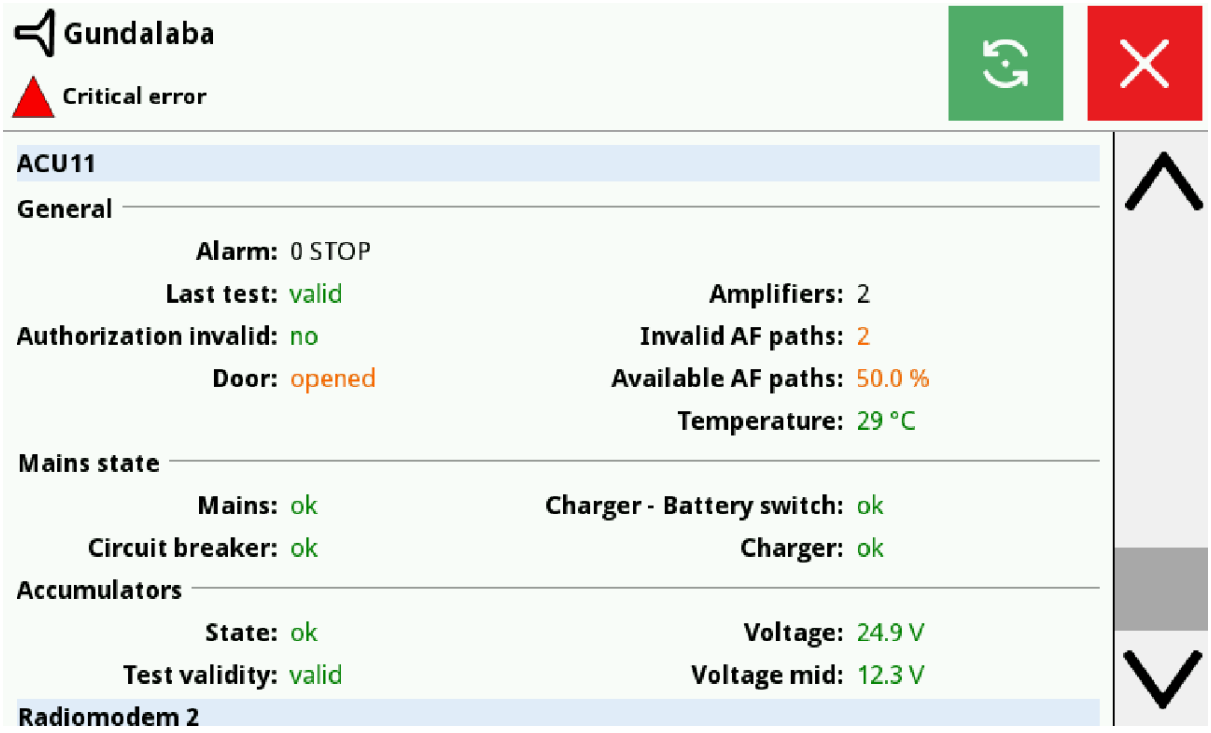

Sirens
Friday, September 14, 2018 9:05:37 AM
Sirens
ASTARANGA
CCU
Unknown state
Gundalaba
Unknown state
Stop
Keutajunga
Unknown state
Natara
Unknown state
Nuagarh FLC
Unknown state
Alarm
Sahana
Unknown state
Sribantapur
Unknown state
Sudikeswar
Unknown state
Test
Status
Settings
Radio Streaming


Sirens
Friday, September 14, 2018 9:06:04 AM
Alarm
Saw tone
Gong
voice : Test of sirens
voice : Fire
Stop
Alarm
Test
Status
Settings
Radio Streaming


Sirens
Friday, September 14, 2018 9:06:22 AM
Sirens
ASTARANGA
CCU
Unknown state
Gundalaba
Unknown state
Stop
Keutaju
Unknow
garh FLC
own state
Alarm
Sahana
Unknow
keswar
own state
Test
Status
Settings
Radio Streaming
Do you wish to execute action 'Saw tone' ?
Yes
No

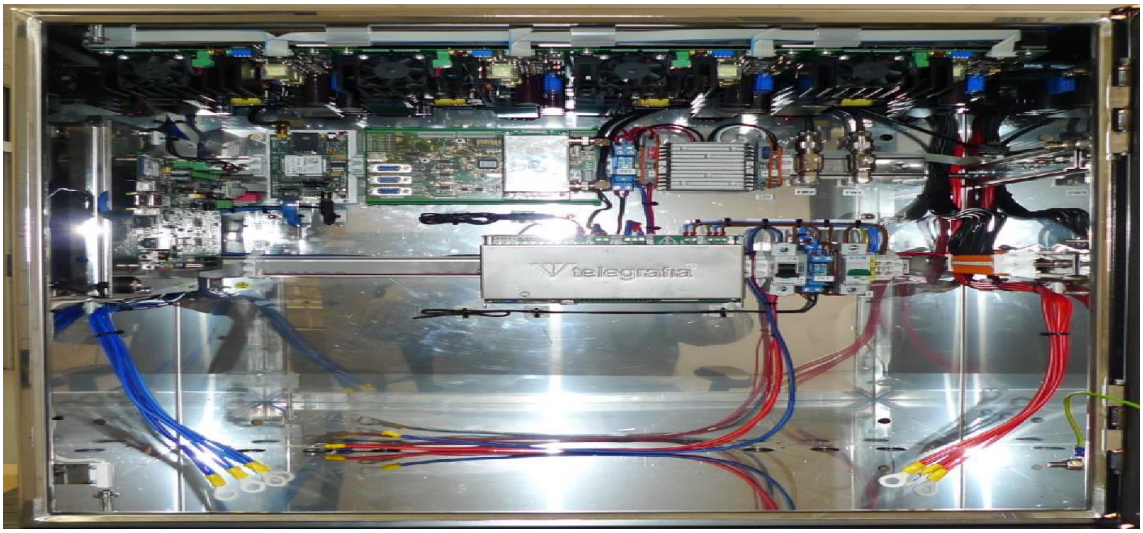

Sirens
Friday, September 14, 2018 9:06:50 AM
Sirens
ASTARANG
dalaba
nown state
Stop
Keutajung
Unknown s
garh FLC
nown state
Alarm
Sahana
Unknown s
ikeswar
nown state
Test
Status
Settings
Radio Streaming
Enter PIN
1 2 3
4 5 6
7 8 9
0


Sirens
Friday, September 14, 2018 9:14:21 AM
Sirens
Saw tone
Activated devices: 2 of 2
Gundalaba
Alarm is running - Saw tone
Nuagarh FLC
Alarm is running - Saw tone
Settings

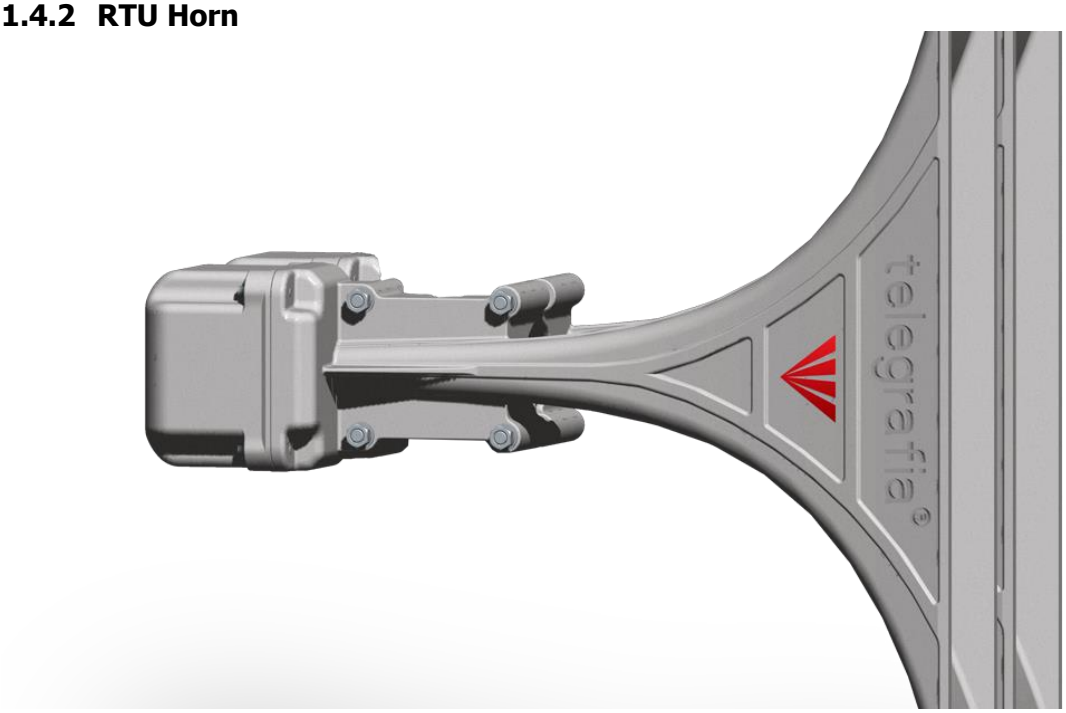

Gundalaba
Critical error
ACU11
General
Alarm: 0 STOP
Last test: valid
Amplifiers: 2
Authorization invalid: no
Invalid AF paths: 2
Door: opened
Available AF paths: 50.0 %
Temperature: 29 °C
Mains state
Mains: ok
Charger - Battery switch: ok
Circuit breaker: ok
Charger: ok
Accumulators
State: ok
Voltage: 24.9 V
Test validity: valid
Voltage mid: 12.3 V
Radiomodem 2

1.4.1 RTU

1. PAVIAN BOX
2. HORNS-8 NOS ON TOWER
3. VHF ANTENNA ON TOWER
4. GPRS ANTENNA ON TOP OF THE BUILDING
5. SOLAR PANEL
6. SOLAR INVERTER



1.4.2 RTU Horn



- **Pavian box is an electronic box having various modules such as**
  - PDM 11- module charger
  - ACU11- Control Module
  - AMP07- Module Amplifier
  - RDM02- Module Radio Modem
  - GPRS15- GSM module

- DM1400- Transceiver Motorola
- DC/DC Converter 24V/12V:10A

RTU consists of following.

- Pavian Box
    a) With 2X 12v 75 Ah batteries inside with a backup of 72 h on standby mode.
- Tower with 08 horns
    a) 8 X 150 W=1200 W
    b) 8 X 9 kg = 72 kg
- VHF antenna on top of tower.
- GPRS antenna on rooftop.

1.4.3 Operation and Maintenance Procedure of Alert siren Tower

The objective of this activity is to conduct preventive maintenance & structural health assessment of towers and identify the further need for conducting corrective maintenance, if required.

Roof Top Tower

Spun Concrete Tower

Metal Angular Tower

Siren installed at tower top

<u>Preventive Maintenance</u>

1. Check and ensure if there are any structural defects to the main tower structure.
2. Check and ensure if there is any crack or damage to the tower foundation member.
3. Check all the accessories like climbing ladder, staging, cage is in good condition.
4. Check and ensure all the cables coming from the tower top is in good condition.
5. Check and ensure all the components installed at the tower top are properly fixed.
6. Check and ensure the earthing of the tower is in good condition.

Breakdown Maintenance

1. If the fault or damage found beyond the capacity of field staff is to be escalated to OEM Representative for resolution.

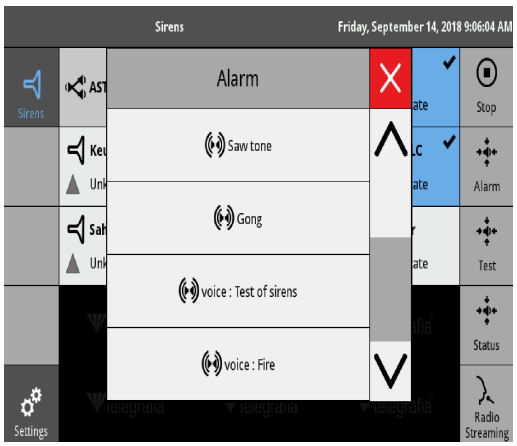
1.4.4 Operation and Maintenance Procedure of Alert Siren System

Remote Terminal Unit

Horns at top of the tower

1.4.5 Operation and Maintenance Procedure At BEOC

Communication Control unit



OCP Screen

Operation Control Panel

Preventive **Maintenance**

1. Ensure the cleanliness of all the components.
2. Check the incoming AC voltage supply to the CCU. Both the Over and Under voltage will led to the burning of CCU components.
3. Check the CCU battery voltage and connections.
4. Check and ensure CCU battery is not overheating.
5. Check if any kind of deformation in battery shape and size.
6. Check all the antenna, Ethernet and power connections are properly fixed to the CCU and OCP.
7. Check the functionality of CCU components.
8. Check and ensure the VHF radio is powered ON.
9. Check the functionality of date Router and Switches.
10. Check the functionality of the OCP.
11. Test the sirens physically by triggering alert tones from SEOC/BEOC.

Breakdown Maintenance

1. Detailed Fault analysis and pin pointing the fault.
2. Replacement of faulty modules/Cards from spare.
3. Sending the cards/modules at OEM/Vendors for repair.

1.4.6 Operation and Maintenance Procedure at Alert Siren locations

Preventive Maintenance

1. Check the locking arrangement of the building and ensure the safety of the components.
2. Ensure the cleanliness of all the components.
3. Check the incoming AC voltage to the RTU. Both the Over and Under voltage will led to the burning of RTU components.
4. Check both the RTU battery voltages.
5. Check and ensure RTU batteries are not overheating.
6. Check if any kind of deformation in battery shape and size.
7. Check all the antenna and power connections are properly fixed to the RTU.
8. Check the functionality of RTU components.
9. Check and ensure VHF radio is powered ON.
10. Test the sirens physically by triggering alert tones from SEOC/BEOC.
11. Close the RTU door properly.
12. Re-ensure the building locking arrangement before leaving the site.

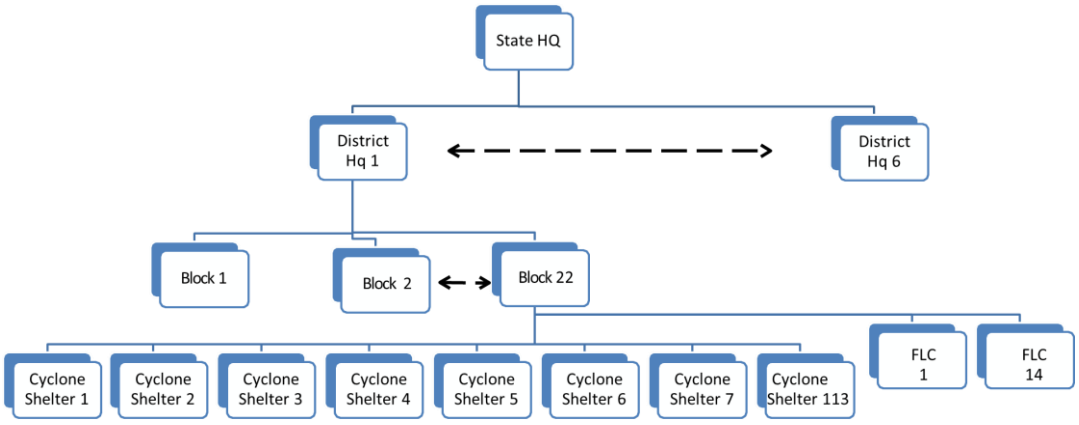
Breakdown Maintenance

1. Detailed Fault analysis and pin pointing the fault.
2. Replacement of faulty modules/Cards from spare.
3. Sending the cards/modules at OEM/Vendors for repair.

DIGITAL MOBILE RADIO

2. DIGITAL MOBILE RADIO

DMR (Digital Mobile Radio) system is installed in this project for the purpose of voice communication between remote coastal sites, BEOC, DEOC and SEOC. An Engineer at SEOC, DEOC and BEOC can initiate the voice call through DMR to communicate with remote sites for any emergency purpose through radio frequency without depending on any other network. In the same way, a user at remote coastal sites can also initiate a voice call to BEOC, DEOC and SEOC.



Apart from voice call, DMR system has a facility to send and receive text messages, call and receive a mobile/landline number. Moreover, we can select the mode of communication also. There are two types of communication.

1. Private Call / Private Messaging
2. Group Call / Group Messaging

2.1 Private Call / Private Messaging

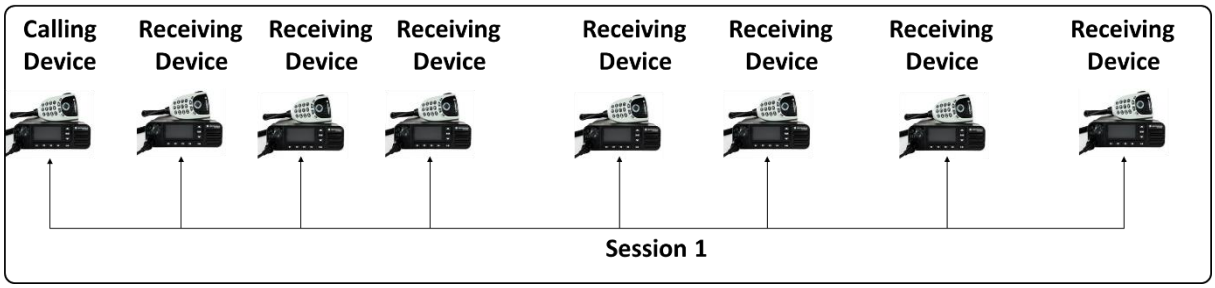
In this mode of communication, the transmitted or received call / message is one to one communication. For initiating a Private call, user shall need a Radio ID of remote site Radio, where call has to be established.

In private call mode user can communicate in one-to-one mode, without involving other radios. In Private Messaging mode a user can send text message to a particular radio. In vice versa a radio can send private message to a particular mobile number

2.2. Group Call / Group Messaging

In this mode of communication, the transmitted or received call / message is in broadcast mode. For initiating a Group call, user shall use 1000 as Group ID in all 6 Districts to communicate with the respective district Radios.

In Group call mode, user can broadcast (one-to-many) the message to all devices, so that all Fixed stations and Hand Held terminals connected on the DMR network within the district can able to receive the message. In group Messaging mode a user shall send text message to a group of radios.



2.3. DMR Components

There are different types of Components are available at DMR system

1. DMR Fixed Station with PTT
2. DMR Repeater
3. GP Antenna with Cable
4. SMPS for DMR Fixed Station
5. DMR Dispatcher
6. Speakers
7. Headphone
8. DMR Server
9. 32" LED Display
10. PSTN Gateway with Landline connection
11. GSM SMS Gateway with Vodafone Sim card

2.3.1 DMR Fixed Station with PTT

DMR FS is installed to Send or receive Voice calls between Radios and also to a Mobile/land line number. It also capable of sending or receiving Text messages.

No.	Item
1	Mic
2	Keypad
3	PTT
4	Power Button
5	Volume Button
6	Network Indicator
7	Private call Button (P3)

FS is physically connected with a MIC, Antenna and SMPS. With the use of MIC user can do DTMF signalling. Antenna is installed to send or receive signals with nearby repeater. SMPS is used to give regulated DC supply to FS.

As shown in Display, we can visually see the strength of signal, which indicates the connectivity of FS and it's nearby Repeater device.

Formats for Voice call/ Text Messages

S No.	Purpose	Type of service	Format	Procedure	Example
1	Calling a Landline number/Mobile number from a fixed station	Private Call	A<mobile number>	Compose a text message from **fixed station** as given format and send it the to**16442850**	A7428840811
2	Calling a fixed station from a Landline number/Mobile number	Private Call	2<Radio ID>	Make a call from **Landline/Mobile Phone** to the **Landline number** present at DEOC. Now, IVRS shall ask for extension number then type extension number as mentioned in format.	2450
3	Calling a fixed station from a Landline number/Mobile number	Group Call	3<Group ID>	Make a call from **Landline/Mobile Phone** to the **Landline number** present at DEOC. Now, IVRS shall ask for extension number then type extension number as mentioned in format.	31000
4	Sending a text message to Fixed station from a Mobile number	Private	:<radio ID><space><msg>	Compose a text message from **Mobile Phone** as given format and send it to **mobile number** which is available at DEOC	:450 Test
5	Sending a text message to Fixed station from a Mobile number	Group	:<Group ID><space><msg>	Compose a text message from **Mobile Phone** as given format and send it to **mobile number** which is available at DEOC	:1000 Test
6	Sending a text message to Mobile number from a Fixed station	Private	:&91<mobile number><space><msg>	Compose a text message from **fixed station** as given format and send it to 16448250	:&917328840811 Test
7	Calling a Fixed station from a Fixed station without Ring	Private Call	<Radio ID>	Double press P3 Button. It shall ask Radio ID. Now type Radio ID. Now press PTT	450
8	Calling a Fixed station from a Fixed station with Ring	Private Call	<Radio ID>	Double press P3 Button. It shall ask Radio ID. Now type Radio ID. Now press OK button	450
9	Calling a Fixed station from a Fixed station without Ring	Group Call		Press PTT	

Details of Landline and Vodafone SIM number

S No.	District	Telephone	SIM No.	Mobile No.
1	Puri	06752-255566	8991753006201773932	7440024201
2	Ganjam	06811-263976	8991753006201385083	9776599090
3	Jagatsinghpur	06724-220369	8991753006201773957	7440024203
4	Kendrapara	06727-233466	8991753006201773940	7440024202
5	Bhadrak	06784-241328	8991753006201773973	7440024204
6	Balasore	06782-262933	8991753006201773965	7440024205

2.3.2 DMR Repeater

DMR Repeater is the device for sending and receiving signals between Radios. DMR RS has an Ethernet port, which connects all RF devices with OSWAN Network devices. This Ethernet port is used to connect multiple repeaters to talk to each other and it also sends the data to DMR Dispatcher which is connected with OSWAN Network.

DMR RS have two Antennas which enables Repeater to send and receive simultaneously with the help of two antennas. It has an Ethernet port, which enables users to connect with OSWAN Network. It has an ACCY Port, which enables user to configure DMR RS device.

In DMR RS front panel, LED indicators are available. With the help of LED Indicators, DMR RS shall give us Transmitting and Receiving indications. It has a status indicator which help us to identify the health status of DMR RS.

2.3.3 GP Antenna with Cable

Ground Plane Antenna (GP Antenna) is installed in all EWDS Sites for DMR Communication. DMR FS and RS are connected with GP Antenna.

This GP Antenna Connected with FS and RS with the help of LMR Cable.

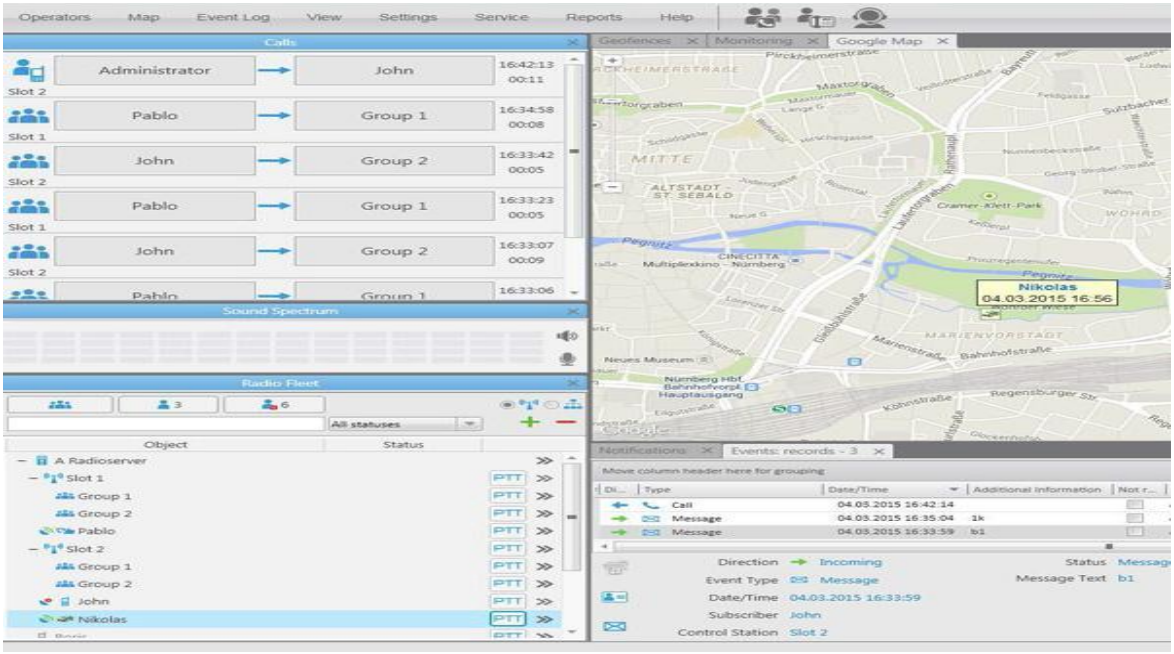
2.3.4 SMPS for DMR Fixed Station

Switch mode power supply is provided in EWDS Project for the purpose of AC – DC converting and it also provides regulated power supply for FS.

SMPS have a LED indicator at its front panel, which indicates the status of SMPS. A power switch is available at front panel, which enables user to switch ON SMPS and Switch OFF SMPS.

2.3.5 DMR DISPATCHER

DMR Dispatcher is a monitoring Software available at all 6 Districts, which enables DEOC to monitor DMR network communications. Dispatcher application logs all the notification, records all the voice calls, registers all the radios.



Dispatcher application displays a list with number of devices connected at its respective district, call details, Map with location details.

A user can send / receive a call or message from Dispatcher application.

2.3.5.1. SPEAKER

Speakers are provided to listen the DMR voice communications in DMR network. It is available at all DEOCs.

Speaker devices are connected with DMR Dispatcher Computers, which enables DMR dispatcher application to playback the earlier voice calls.

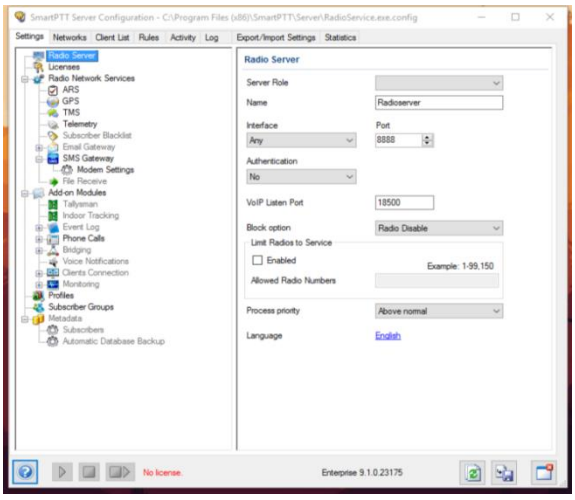
2.3.5.2. HEADPHONE

Headphones are provided to listen the DMR voice communications in DMR network and also enables user to give voice input with the help of mic. It is available at all DEOCs.

Headphone devices are connected with DMR Dispatcher Computers, which enables DMR dispatcher application to playback the earlier voice calls and talk with radios.

2.3.6 DMR Server

DMR server is used to interconnect Telephone network, GSM Network and DMR network. DMR Server Application is directly connected with OSWAN and present at all DEOCs



2.3.7 32" LED DISPLAY

32" display enables user to have a big screen of DMR Dispatcher application. In all 6 DEOCs 2 Nos. of Samsung displays are available.

Samsung displays are directly connected to DMR dispatcher application.

2.3.8 PSTN GATEWAY WITH LANDLINE CONNECTION

Public switched telephone network gateway is used to interconnect DMR network with PSTN network. By this user shall make a call or receive a call from a mobile phone or land line phone.

PSTN Gateway in all 6 DEOCs are connected with a PSTN connection in it's 4th Port and a LAN cable from LAN0th port is connected to DMR server which enables DMR server to create a SIP trunk. PSTN device is mainly used to divert calls from PSTN network to DMR network.

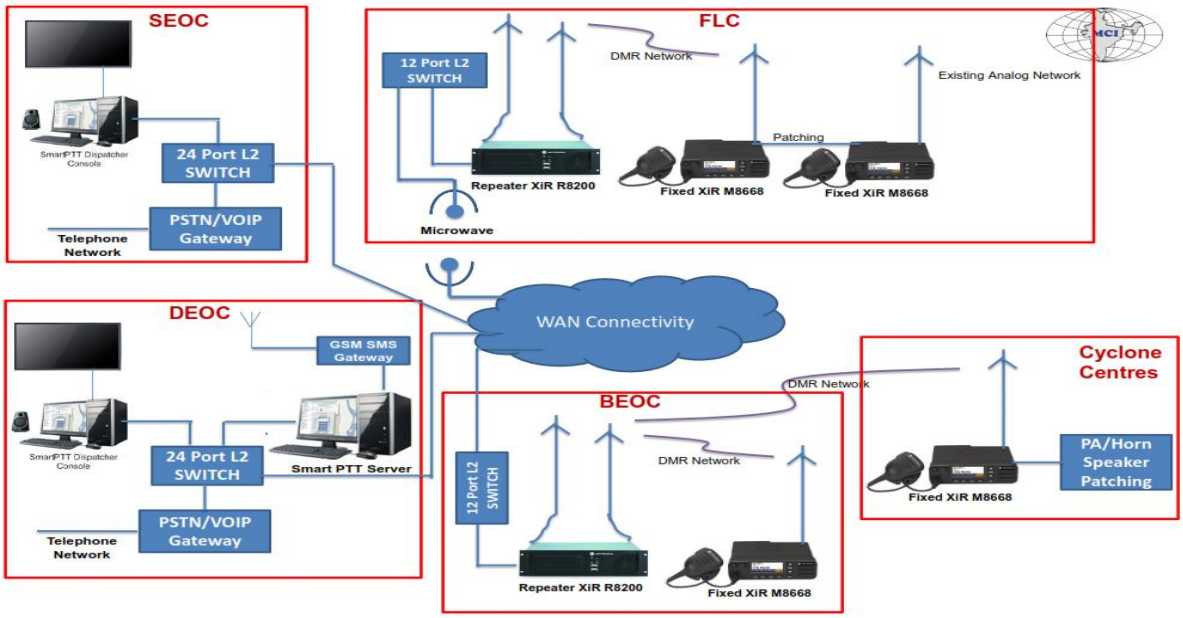
2.3.9 GSM SMS GATEWAY WITH VODAFONE SIM CARD

GSM gateway enables GSM connectivity for DMR network. By this user shall make a send or receive a message from a mobile phone or land line phone to radio

This GSM SMS gateway is available at all 6 DEOCs and it has a vodafone sim card. It has an external antenna which enables to extend the reception of signal coverage.

2.4 DMR STRUCTURE

SEOC, DEOC and BEOC is interconnected with OSWAN. DMR components present at SEOC, DEOC and BEOC are interconnected with OSWAN. At BEOC repeater is connected with OSWAN network and RF Network.



DMR Network is a separate network which helps coastal community to communicate the respective person for any emergencies. They can either communicate Voice or Text Message.

2.4.1 Operation and Maintenance Procedure at DEOC and BEOC

DMR Repeater and Fixed Station

VHF Antenna

Preventive Maintenance

1. Ensure the cleanliness of all the components.
2. Check and ensure DMR Server and Dispatcher system is ON.
3. Check all the additional accessories like Head Phone and Speakers are in working condition.
4. Check and ensure all the antenna connections with the DMR Repeater and Fixed Station are properly connected.
5. Give test call to SEOC/DEOC to check it is functioning properly. Check the voice quality, if noise found try to fix the problem else escalated to the OEM Representative for resolution.

Breakdown Maintenance

1. Detailed Fault analysis and pin pointing the fault.
2. Replacement of faulty modules/ cards from spare.
3. Sending the cards/modules at OEM/Vendors for repair.

2.4.2 Operation and Maintenance Procedure at Alert Siren Location

Preventive Maintenance

1. Ensure the cleanliness of all the components.
2. Check and ensure DMR Radio is always powered ON.
3. Check the antenna connection with the DMR radio is properly connected.
4. Give test call to SEOC/DEOC to check it is functioning properly. Check the voice quality, if noise found try to fix the problem else escalated to the OEM Representative for resolution.

Breakdown Maintenance

1. Detailed Fault analysis and pin pointing the fault.
2. Replacement of faulty modules/Cards from spare.
3. Sending the cards/modules at OEM/Vendors for repair.

FIX STATION DETAILS

No.	Item
1	Mic
2	Keypad
3	PTT
4	Power Button
5	Volume Button
6	Network Indicator
7	Private call Button (P3)

SATELLITE BASED MOBILE DATA VOICE TERMINAL (SBMDVT)

3.Satellite Based Mobile Data Voice Terminal(SBMDVT)

In SEOC and 6 DEOCs, there are two SBMDVT each. SBMDVT (Satellite Based Mobile Data Voice Terminal) is a satellite terminal which connects to the satellite (INMARSAT) and enables us to make phone calls, and data browsing. SBMDVT shall be used when there is no cellular network and we need to communicate a message to an authority, then we can use SBMDVT which works with the help satellite.

SBMDVT is an outdoor device. SBMDVT shall be kept inside SEOC and DEOCs with proper packingand regular charging. When situation comes to use SBMDVT, then it can be unpacked and used at outdoor. SBMDVT cannot connect to satellite when it is kept inside building. SBMDVT has to be placed at ground or rooftop at where it can directly face open sky.

Now turn on SBMDVT by pressing power button. Connectivity between SBMDVT and Satellite shall be indicated by beep sound. Now, in android/ios phone download Explorer Cobham 510 app by using below link

https://m.apkpure.com/explorer-connect/com.explorer710.voipcall

Android phones with Cobham app can access SBMDVT through Wifi. SBMDVT SSID is Explorer 510. Password for the Wifi connection is serial number of the SBMDVT. After successful connection of Cobham app with SBMDVT we shall get 4 features.

1. Satellite Phone
2. Terminal Access
3. Pointing
4. Dashboard

3.1. SATELLITE PHONE

Satellite Phone option enable us to make voice calls by dialling in below format

Format: 0091<mobile number>

3.2. TERMINAL ACCESS

By Terminal access user shall able to connect to internet. User shall do internet voice call, video call through WhatsApp, browse internet.

3.3. POINTING

Pointing feature is used to identify the position of SBMDVT. It gives us the accuracy of focusing satellite.

3.4. DASHBOARD

Dashboard feature shall display the status of SBMDVT. It gives the status of Data connection and call information.

3.5 Operation and Maintenance Procedure of SBMDVT

Preventive Maintenance

1. Ensure the cleanliness of the component.
2. Check and ensure the module's battery is always fully charged.
3. Check and ensure the sufficient balance is always available for the communication.
4. Check its connectivity with the mobile device with the help of Explorer Cobham 510 app already downloaded to the mobile device.
5. Give test call to SEOC/DEOC to check it is functioning properly. Check the voice quality, if noise found try to fix the problem else escalated to the OEM Representative for resolution.

Breakdown Maintenance

1. Detailed Fault analysis and pin pointing the fault.
2. Replacement of faulty modules/Cards from spare.
3. Sending the cards/modules at OEM/Vendors for repair.

MASS MESSAGING SERVICE

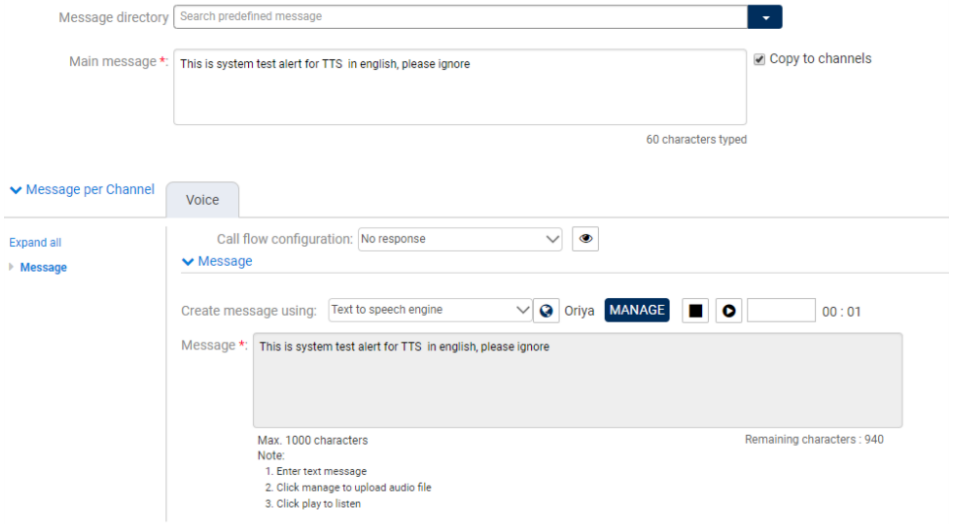
4. MASS MESSAGING SERVICE

MMS software is installed at SEOC to send alert messages to community people. Alert messages can be any form as below mentioned

1. Voice Call
2. Text SMS
3. Email
4. Facebook
5. Twitter

4.1. VOICE CALL

MMS Application will send a **Voice call** to the targeted community people. A person shall receive a call from SEOC and when the call is attended an IVRS shall give the message. Voice call can be delivered in English, Hindi and Odia. If the user is busy or if user didn't attendthe voice call, then application will re-attempt to deliver the message by calling 3 times in periodic time interval. If user didn't understand or if user want to listen the message again, then user can call back the same number again and shall play back the message.



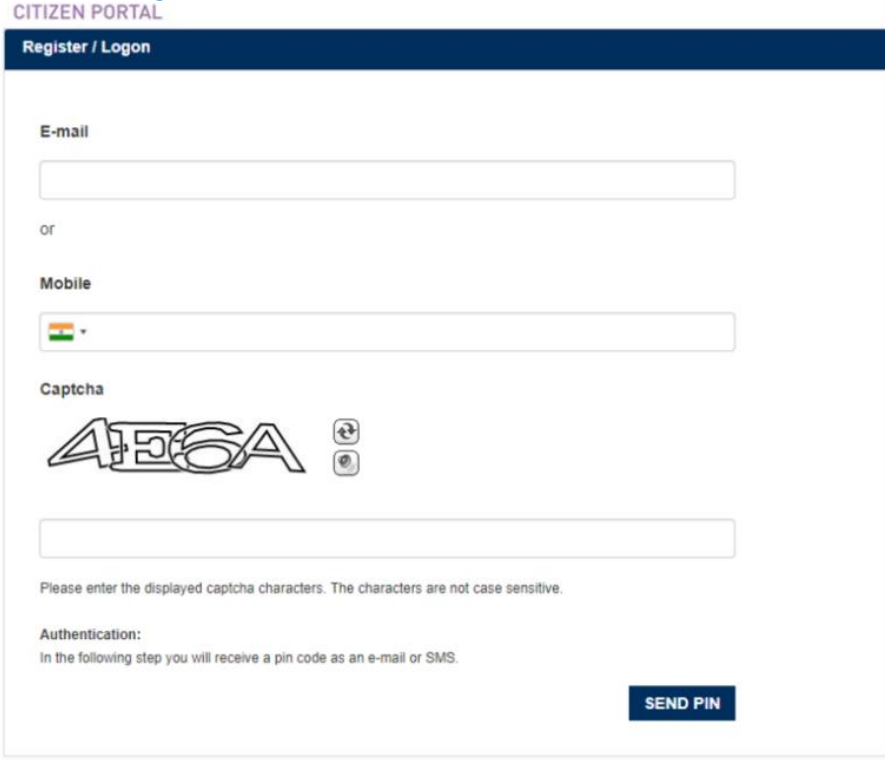
MMS application has pre-recorded Voice Messages in 3 languages. MMS application have capability of converting text into voice facility also. User shall type the message in the text box and by a single click the message content shall be converted into voice and it shall be sent to recipients.

4.2.TEXT SMS

MMS application will send a **Text message** to the targeted community people. A person shall receive a text message from SEOC, regarding the disaster. Text message can be delivered in English, Hindi and Odia. MMS application have capability of storing unlimited recipients. It has capable for maintaining unlimited Groups. Text Messages can be sent to a particular / multiple recipients, it can be sent to a one / multiple groups.

Community people shall register their locations and contact details (mobile number, Email) with MMS application's CDM via below link. So that community people will get timely alert by MMS applications. Community people can register with mobile number to get voice or text message. They can even register their email to get email alerts.

https://ewdsodisha.gov.in/cdm



User shall fill the above form for getting alert messages on time.

MMS application will send an **Email** to the targeted community people. A person shall receive an Email message from SEOC, regarding the disaster. Email message can be delivered in English, Hindi and Odia.

4.3. FACEBOOK AND TWITTER

MMS application will post an alert in **Facebook and Twitter** for the targeted community people. User shall follow SRC's facebook and twitter pages to get posts regarding Disaster alerts. Through MMS Application a post for Facebook and twitter can be posted in SRC's page.

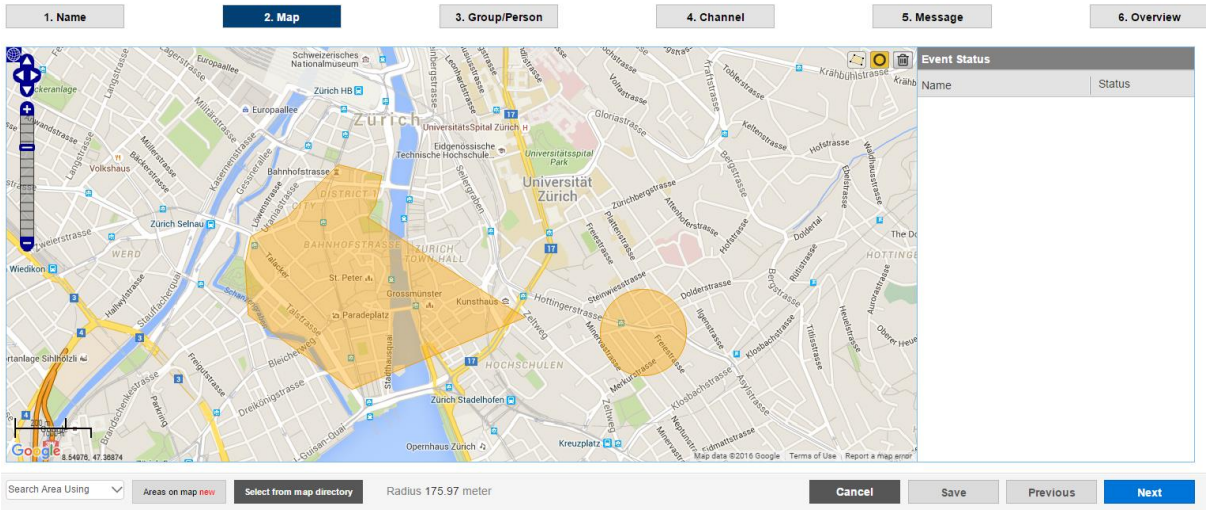
4.4. GROUP BASED ALERT SYSTEM (GBAS)

- Send messages in the form of SMS/Voice messages to pre-determined set of phone numbers simply by sending to a group database.
- SMS and Voice messages will be sent in 3 languages English, Hindi and Odia.
- Messages will go the Media Broadcast Stations to broadcast the said warnings on the AM/FM Radios & TV.
- In addition, a native mobile app will be made available for IOS and Android platform to send Group alerts

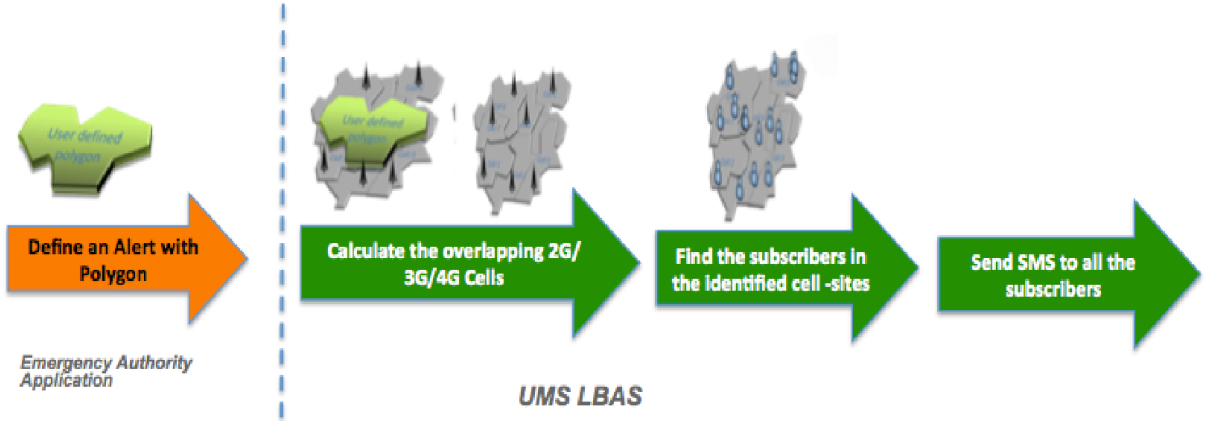
4.5. LOCATION BASED ALERT SYSTEM (LBAS)

- Through LBAS SMS is being sent to all mobile subscribers present in a vulnerable (selected) area to be affected by any disaster.It covers both national subscribers and international roamers who are present in that area.
- In LBAS, the user is able to draw a polygon of a particular area through GIS map and send alerts to all people who are present at the time inside the polygon.
- This can help in saving lives in the event of a natural or man-made disasters / emergencies.
- The system has been designed to ensure effective communication before, during and after an emergency situation.

Step 1: User shall create a polygon or circle in the Google map integrated with MMS application

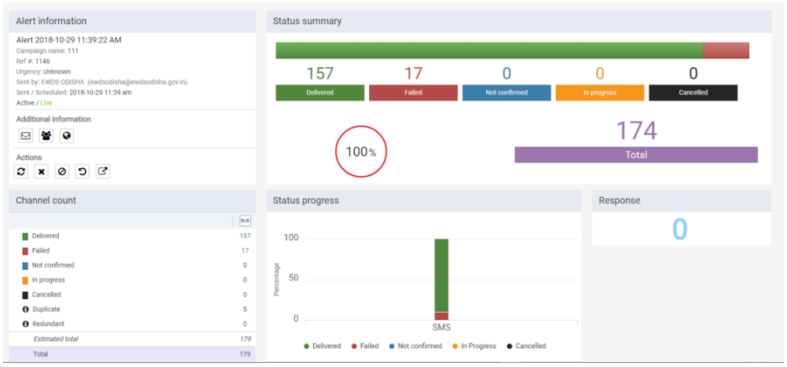


Step 2: Now these polygons in the form of Lat/Long will be sent to 3 telecom providers. Now they will compare the reform the polygon with the help of Lat/long and compare the polygon with their Map.



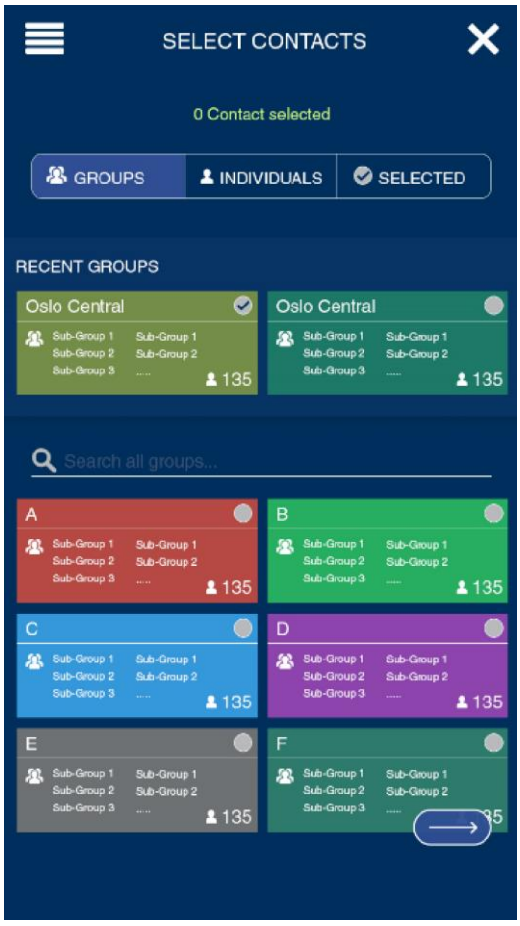
Now they will estimate the number of towers covered under the polygon. And then from towers it can be calculated number of recipients will be covered. And then Alert messages will be sent to the community people. Now MMS application will give a detailed summary of text messages delivery status. User can also send the failed messages.

MMS application has its own onsite back-up at SEOC and also the same backup of the messages will be sent to the Cloud also. In critical stage a user can recover the log messages from cloud storage.



4.6. MOBILE APP

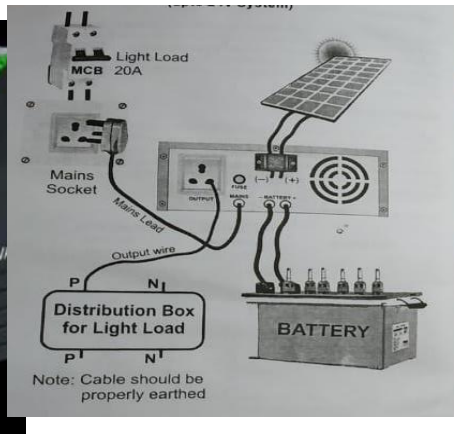
Mobile app is available for both Android and Ios mobiles. Respective authorized people will have access for the Mobile app. Mobile app will have the same features as same as web application.



SOLAR SYSTEM

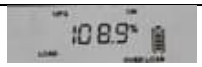
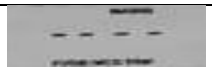
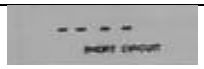
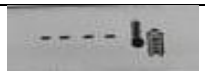
5. SOLAR SYSTEM

There are 122 solar systems are used at Remote siren sites. Solar system needs have two inputs and one output. It needs electric power supply to start the solar system and then it will charge the battery through solar panel. It gives a regulated 230 AC power supply.



- 1500 W
- UPS works on both 230v main power supplied by EB and Solar Panel
- Solar panel supplies 40v power supply
- 12V, 150 Ah batteries 2 Nos
- ADOR inverter supplies uninterrupted power supply to the Pavian box and DMR fixed station

Display Indications

S No.	Indication	Reason
1		Battery Low
2		Overload
3		Fuse/mains MCB Trip
4		Short Circuit
5		Thermal Error
6		PV Reverse

Solar system helps the Siren system to give alert messages to community people, even Mains power supply is disconnected because of disaster situations. It gives uninterrupted power supply to two main components such as DMR fixed station and RTU box. Solar Panel output is connected with an Extension box.

Note: if a solar battery is drained because of misuse by local community people, it cannot perform efficiently during disaster situation.

5.1 Operation and Maintenance Procedure of Solar Hybrid Inverter system

Solar hybrid inverter can simultaneously manage inputs from both solar panels and the building electric supply and charging the batteries and further provides regulated 230 AC power supply to the components.

Solar Inverter & Batteries

Solar PV module

<u>Preventive Maintenance</u>

1. Ensure the cleanliness of the inverter, solar panel and battery bank.
2. Checking all cables and connectors are intact.
3. Ensure the Solar panels are intact at roof top.

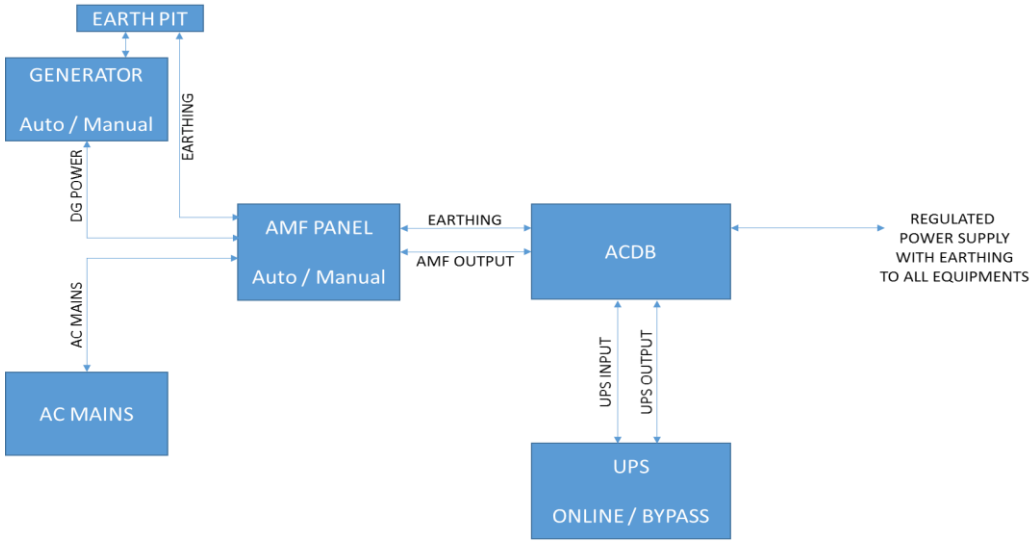
<u>Breakdown Maintenance</u>

1. Any unserviceability is to be reported to Project office for rectification through OEM/Vendor.

UPS, GENERATOR, AMF PANEL AND ACDB

6. UPS, GENERATOR, AMF PANEL AND ACDB

UPS placed in SEOC, DEOC, BEOC and FLCs are installed to give regulated power supply for equipment in case of mains power failure. UPS have its own battery bank which can give backup upto 4 hours. UPS input and output is connected with ACDB Panel. We can disconnect input power supply for UPS and also Output power supply from UPS by ACDB Panel.



AC Mains power supply required to charge UPS batteries. If AC Mains is not available, then AMF panel automatically switched to DG power supply. Then DG shall get turned on automatically and give power supply for UPS for battery charging. In this case, AMF Panel and DG should be in Auto mode. If DG or AMF panel is not in auto mode, then DG has to switch on manually.

UPS output is directly connected to ACDB panel, from where regulated output of UPS is distributed over multiple SPST MCBs. 4 Nos. of Earth pit is available near DG and all 4 Earth pits are interconnected. DG is earthed with this earth pit and also earthing is extended up to AMF Panel. And then from AMF Panel, earthing is extended to ACDB, UPS and all other equipment.

6.1 Operation and Maintenance Procedure of DG & AMF

If AC Mains is not available, then AMF panel automatically switched to DG power supply. Then DG shall get turned on automatically and give power supply for UPS for battery charging. In this case, AMF Panel and DG should be in Auto mode. If DG or AMF panel is not in auto mode, then DG has to switch on manually.

DG Set **AMF panel**

Preventive Maintenance

1. Ensure the cleanliness of the Generator set.
2. Check the voltage of the Battery.
3. Checking all cables and connectors are intact.
4. Check the output voltage of the DG.
5. Run the DG Set for 10 Minutes and check Output Voltage and Lube Oil pressure is within the prescribed limit.
6. Check any abnormal sound from engine or alternator.
7. Quarterly/Half yearly/ Yearly servicing of DG Set as per the OEM servicing manual (Except Consumables)

Breakdown Maintenance

1. Any unserviceability is to be reported to Project office for rectification through OEM/Vendor.

6.2 Operation and Maintenance Procedure of UPS and Battery bank

UPS output is directly connected to a ACDB panel, to provide uninterrupted and regulated output of to all the components through multiple SP MCS's in DEOC, BEOC and FLC's.

5kVA UPS **UPS with Battery Bank**

Preventive Maintenance

1. Ensure the cleanliness of the UPS and Battery banks.
2. Visually inspect equipment for loose connections.
3. Checking all cables and connectors are intact.
4. Visually check for liquid contamination from batteries.
5. Check and ensure batteries are not overheating.
6. Check if any kind of deformation in battery shape and size.
7. Check voltage of all the batteries individually, it should be 12 to 13 volts DC.
8. Check the output voltage of the UPS.
9. Check the endurance of UPS with full load, if it is not running for 20 minutes, report to Project office for rectification

Breakdown Maintenance

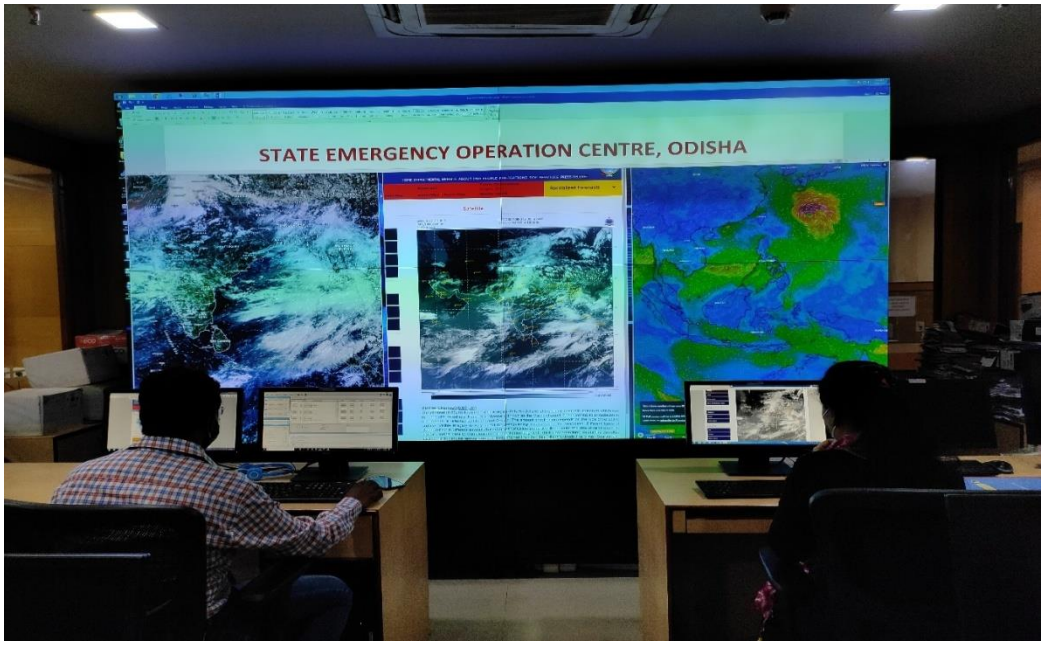
2. Any unserviceability is to be reported to Project office for rectification through OEM/Vendor.

SEOC Server and Control Room Maintenance

7.0. Operation and Maintenance Procedure of SEOC Control Room

Server Rack

UPS & Battery Bank



Video Wall at SEOC

Server and Control Room Maintenance:

Server room consists of one server rack in which EWDS Networking Equipment i.e Servers, Routers, Switches, GPRS Modem, 8nos of PSTN, are installed, 4nos of ACs, 2nos of UPS, 4nos of Battery banks, 1no of ACDB Panel, 1 no of fire Extinguisher (2KG).

The server room is always kept clean and Cool for smooth operation and maintained routine Checklists being carried out at SEOC. Weekly routine servicing of Video-wall Screens and SBMDVT operation to check the Equipment are functioning properly. ACsare switched in alternative manner during daily shifts in order to maintain the temperature of Server room.

SEOC Daily Maintenance:

1	**DMR:**	1. Repeater configuration 2. FS Configuration 3. Dispatcher Configuration 4. Server Configuration 5. PSTN Configuration 6. All other troubleshooting related to DMR
2	**Hardware Support:**	1. Delta UPS support 2. Delta Video-wall Support 3. Dell desktop Support 4. HPE Server hardware support 5. Router and Switch support 6. Firewall support 7. DMR Equipment hardware support 8. All other hardware related support
3	**Report & logs:** 1. Ensuring all reports are properly generated and sent to concern person. 2. Ensuring all logs and backup generate & dumped properly. 3. If not delivered/dumped, then contact concern person & coordinate/ Troubleshoot.	1. Antivirus report – SEPM (2) 2. Firewall logs – FTP 3. Offline and online MMS backup 4. DMR dispatcher backup 5. Automatic Script ping report 6. Weekly report 7. Checklist
4	**Document Maintenance:** (Maintenance includes, updating all new entries and having backup of mentioned details to share whenever required) **Database of complete document:**	1. Roster Preparation and maintaining details of all past roster 2. Maintaining inward and outward equipment and person details along with necessary FSR. 3.Maintaining of WPC details. 4. Maintaining of DLT Details. 5. Credential of all component and software. 6. Maintaining google drive to enable SEOC and FE to access update tech and other content. 7. Uploading all reports to google drive 8. Maintaining complete Escalation matrix 9. Maintaining overall IP Schema. 10.Maintaining available SOP. 11. DMR message format, SBMDVT calling procedure, Set top box details.
5	**Troubleshoot follow-up:**	1.When any report/checklist or log has a component marked as down, follow-up with concern SEOC engineer or FE to make it up 2. If any OSWAN router is down without no proper reason, check with FE engineer (with the help of automatic ping report) 3. Followup with concern SEOC engineer to get update of IOC blocking 4. Followup with Concern SEOC engineer to get update of backup related issues.

8.0 Experienced during Cyclone `FANI'

During Extremely Severe Cyclonic Storm 'FANI' on the May 3rd, 2019 terrestrial tele-communications towers were heavily damaged, the cellular service is completely down. Phone and Internet networks along the entire coast of Odisha were made into uselessness. Odisha State Wide Area Network (OSWAN) was also failed. Communications between satellite phones were limited by a lack of interoperability between users.

SBMDVT: State Emergency Operation Center and 6 coastal districts have 2 nos of each BGAN Explorer (SBMDVT) satellite devises under Early Warning Dissemination System. The satellite terminal provides simultaneous voice and broadband data up to 464 kbps. The service can be accessed through smart phone device via Mobile App (Cobham).

- The mobile App for using the SBMDVT will be loaded at least in 4 mobile devices (Collector, ADM, Emergency officer & DPO) in all six coastal districts and will be trained on its use.
- The terminals shall be kept ready throughout the year.
- In weekly basis the devices will be tested from both SEOC and DEOC by making test call and Internet accessing. Either Emergency officer or District Project Officer will be responsible for making test calls. A register will be maintained at SEOC.
- Besides weekly testing, when there isany emergency update from SEOC, the devices will be tested in a daily basis.
- It is suggested to provide two smart phoneseach to six coastal districts and SEOC for configuring to SBMDVT sets. These smart phones will be kept dedicatedly ready with SBMDVT sets in 24x7 basis.
- The SBMDVT/ Satellite phones should be kept in outdoor location with proper charging during disaster situation like Cyclone, Tsunami & Earthquake, so that interconnectivity between the SBMDVT/ Satellite phones will be possible, when there will be sudden breakdown of (no) telephone/ internet connectivity.Otherwise, it will not come to any use during any disaster situation.

DMR: Communication through Digital Mobile Radio from SEOC to block level and from block to remote sites should be done in a regular basis and should be recorded in a register file. DMR handheld terminal should be kept in usable condition with proper charging with regular test check, so that it can be used in emergency situation.

Alert Siren: Power supply and network connectivity plays very important rolefor operation of the project and these are backbone of the system. Hence, proper power back-up and network connectivity should be ensured for smooth functioning of the project.

Mass Messaging System: All Telecom Service Provider should be integrated with MMS so that disaster warning/ awareness message can be sent to maximum people. Utmost support from all TSPs is essential during any disaster to disseminate the alert messages.

UCI: UCI should be installed at SEOC, DEOC and BEOC for smooth communication between different communicable devices during any disaster**.** It should be tested and operable at regular intervals so that it can be used properly during disaster situation.

9.0 Suggestions:-

1. Shorten resolution time and immediate attention required from Power-division or Electric office for restoring power fluctuations as it is the major reason for damage of sensitive equipment installed at sites.
2. Specified room should be allocated for installation of all EWDs equipment with sealing and ventilation facility in order to keep the system cool and water proof.
3. All equipment/ Battery should be checked regularly and the defective equipment/ batteries needs to be repaired/ replaced in time for smooth functioning of the system. Batteries, UPS, Inverters and Tower Maintenance must be Conducted under supervision of Field Engineers.
4. Almost all the Alert Siren Locations are located at remote locations, hence there is risk of theft of items like battery, copper strip and other items which will hinder the functioning of the equipment. To avoid the theft proper guarding of the equipment is essential with provision of financial assistance for the guarding personnel.
5. Necessary coordination from district and block level authorities is essential for allocation of suitable room/ space for installation of EWDS equipment as well as repair/ replacement of the defective equipment/ batteries. Local police and field officers should be instructed to coordinate with the field engineers for lodging FIR when a theft occurred to claim insurance for early restoring the stolen property at site.
6. Concerned officers/ staffs at State, district, block and siren locations should be trained in regular intervals by executing agency so that they can handle the equipment independently as and when required, especially during disaster situation.

Communication plays an integral role in disaster management. Response and Recovery phase needs more information and communicative means. All conventional methods of communication including land phone, cell phone, radio, television and Internet could be down during and post disaster period. Hence, the SOP must be followed to make use of the devices more efficiently without any fail during any natural disasters.

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