SAFE GOA 24X 7 EMERGENCY MONITORING SYSTEMS

(A) OVERVIEW:

The mission of the Directorate of Fire and Emergency Services is to save the lives and property of Citizens from the ravages of Fire, besides responding to other Emergencies. The Fire & Emergency Services intends to move towards being more proactive than reactive. This translates to a greater focus on preventive activities rather than dealing with incidents after they have occurred. The Directorate of Fire & Emergency Services has innovated a 24X7 Direct Alarm System that uses IoT platform to monitor the Fire Protection System (Fire Detection, Fire Alarm, Gas Detection & Fire Fighting System) in real time for ensuring the continuous functional fitness of the Fire Protection System 24X7 and not just when seeking No Objection Certificate at the Initial stage or Renewal stage. However, monitoring whether the measure remains operative and functional is a multi-stake holder responsibility. Hence with this IoT based technology, it is proposed to integrate the Fire Protection Measures in every occupancy i.e. (Hotels, Hospitals, Banks, Industry &High-Rise Buildings) having independent Fire Protection System with Safe Goa 24X7 EMS to reduce & Minimize loss of life & loss of Physical Assets thereby aiming at making Goa the Safer State in India.

(B) AIM:

To provide an Effective Response plan by Monitoring & Preventing Fire so as to Reduce & Minimize Loss of Life & Loss of Physical Assets. The System is developed as an initiative for incorporating Technological Advancements integrating IT application & Digitization.

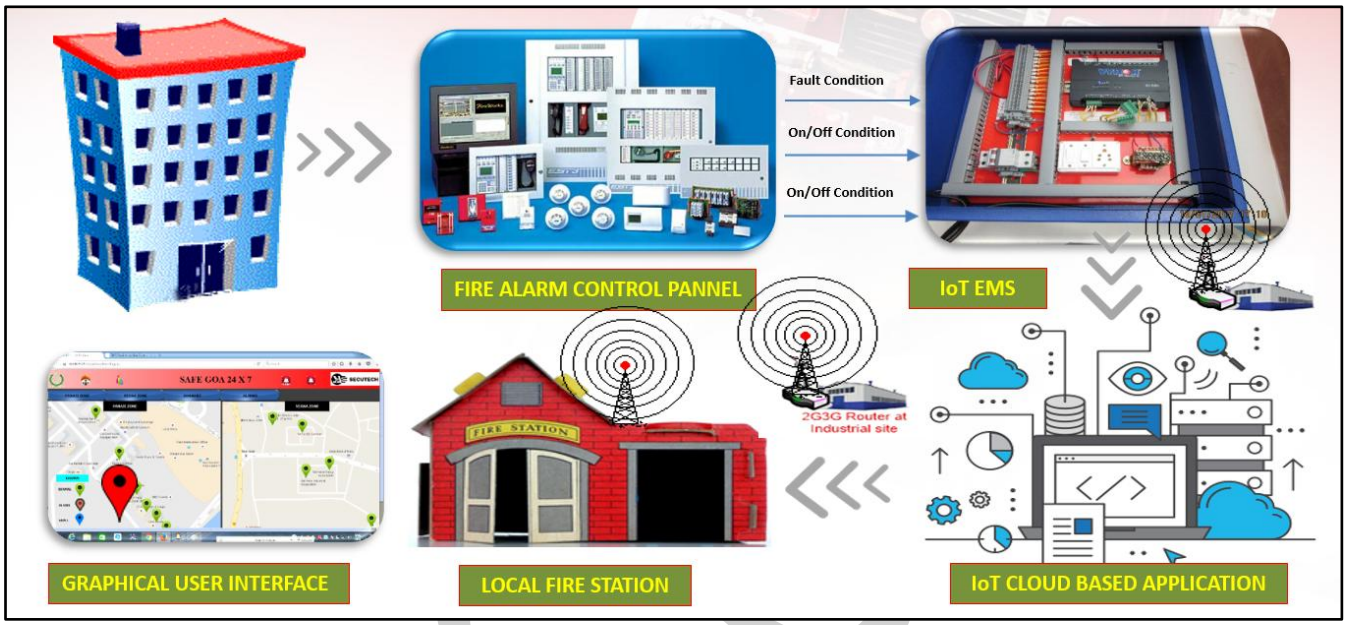
(C) OBJECTIVES:

1. All Facilities/Occupancy i.e. (Industries, Hotels, Banks, Hospitals, Govt. Buildings &High Rise Buildings) having independent Fire Protection Systems will connect with Safe Goa 24x7 Emergency Monitoring System (EMS).
2. Monitor 24X7 the Health of the Fire Protection System i.e. (Fire Detectors, Fire Alarm System, Gas Detectors and Fire Fighting System) in real time and facilitate immediate dispatch of resources.
3. Ensuring all Facilities/Occupancy in Goa have a functional Fire Protection System on 24x7 Basis and not just when seeking NOC at Initial stage or Renewal stage.
4. Optimize the use of Manpower needed for periodical Fire Safety Audit.
5. Minimize loss due to Business / Activity disruption due to Fire incident through Automated Compliance through the Emergency Monitoring System.
6. Integration of GPS with the EMS to facilitate optimum utilization of fleet of Fire Fighting Appliance.

(D) SYSTEM BRIEF:

All vulnerable establishments namely Industries, Hotels, Banks, Hospitals, Govt. Buildings &High-Rise Buildings will remain connected 24X7 with theHeadquarters Command Centre Control Room, Zonal Control Room and Local Fire Station Control Room. The system enables 3 stage alerts;

1. System On/Off, 2) System Fault, 3) System Alert.



1. In the First Stage there is no action to be taken by the Department.

2. In the Second Stage the Headquarters Command Centre Control Room, Zonal Control Room and Local Fire Station Control Room will initiate remedial steps. An automatic response reminding the stake holders that their Fire Protection System is showing sign of System Off/ Fault and direct them to rectify immediately. Such cases are followed up closely till settled. Such monitoring reduces the possibility of neglect to rectify defects and thereby ensures sound functioning of the Fire Protection system.

3. In the Stage of Alert the Headquarters Command Centre Control Room, Zonal Control Room and Local Fire Station Control Room are simultaneously alerted that there is an incident where response is warranted. This enables the Local Fire Station to respond promptly and co-ordinate with the primary stake holder to ascertain the nature of the incident and plan an effective response.

   This response is also integrated with the Automatic Vehicle Tracking system (AVTS) and can be seen and monitored by all the Control Room and the incident response system is activated based on the gravity of the situation. Such a comprehensive approach achieves the following;

   a) Reduces the response time by reducing the communication time & expedite response.

   b) Ensure 100% compliance of the functional effect of all Fire Protection Measures.

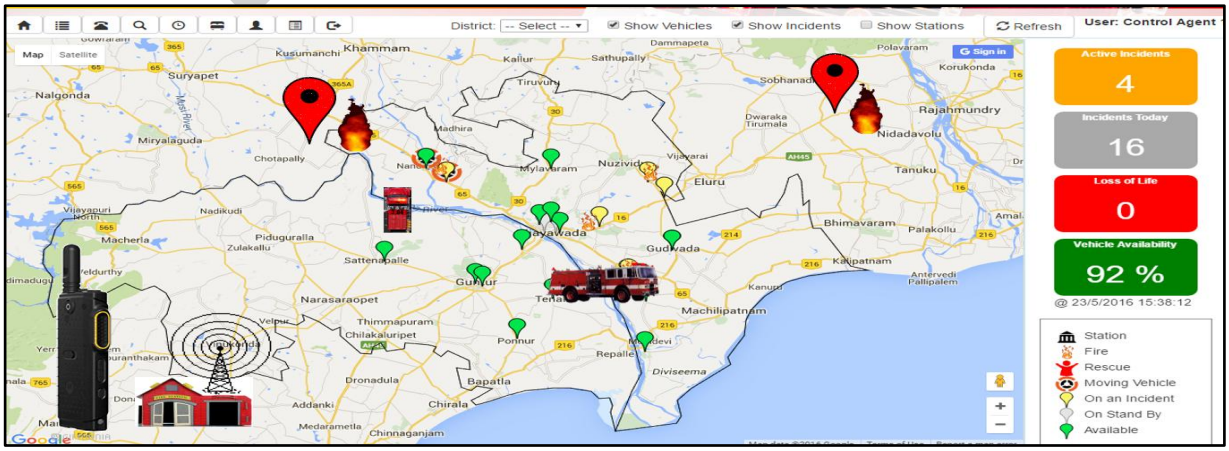
   c) Optimize the use of available fleet of Fire Fighting Appliances for response.

d) It does away with the need for physical inspection during renewal of NOC as safety audit is done on continuous basis i.e. 24X7.

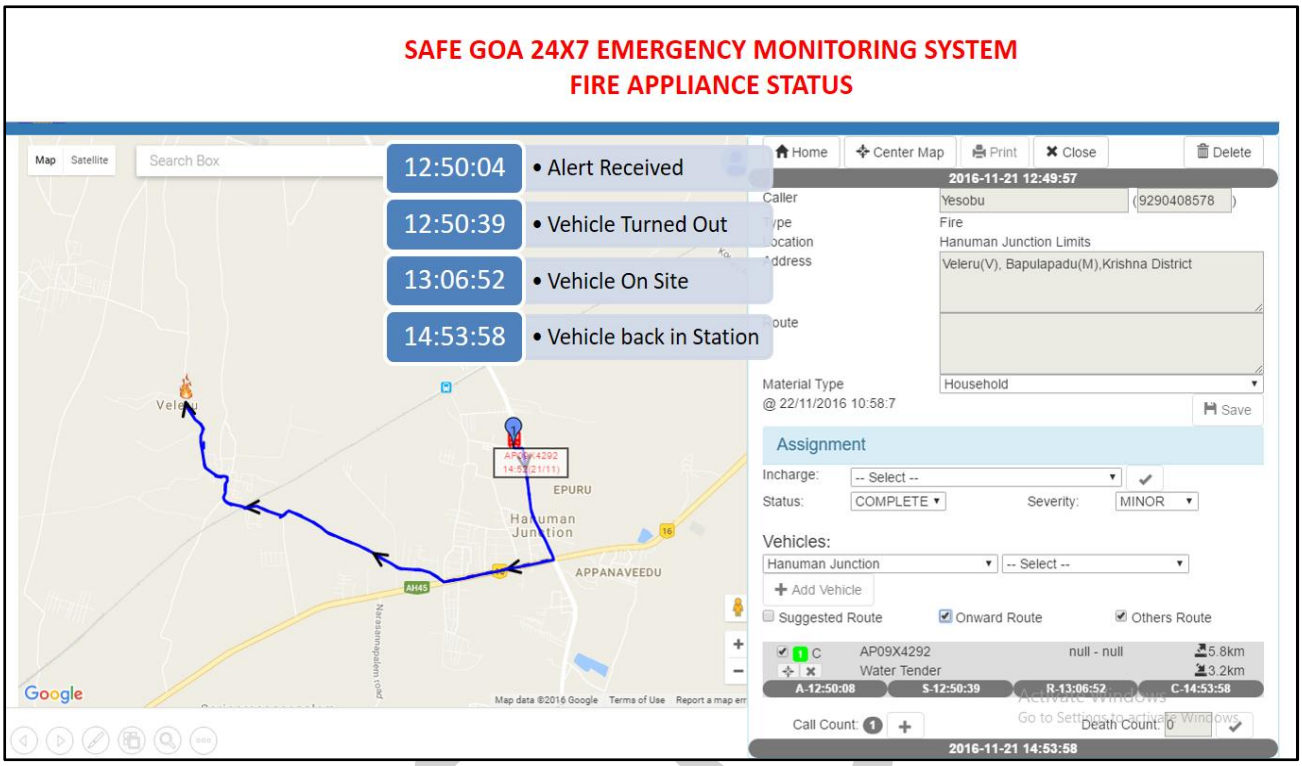
(E) SYSTEM IN ACTION:

1. In the event of any fire incident a critical alarm signal is relayed in the Fire Alarm Control Panel this signal is relayed to the IoT Emergency Monitoring System (EMS) via potential free contacts (PFC). IoT Emergency Monitoring System (EMS) is a mini Intelligent system uses mobile network to communicate with the IoT Application hosted on Cloud. The IoT Application is the User Interface to visualise all site data. The Display Unit installed in the Headquarters Control Room and Local Fire Station Watch Room are coupled with individual operating workstations which displays the alert signal via Goa Broad Band Network (GBBN).

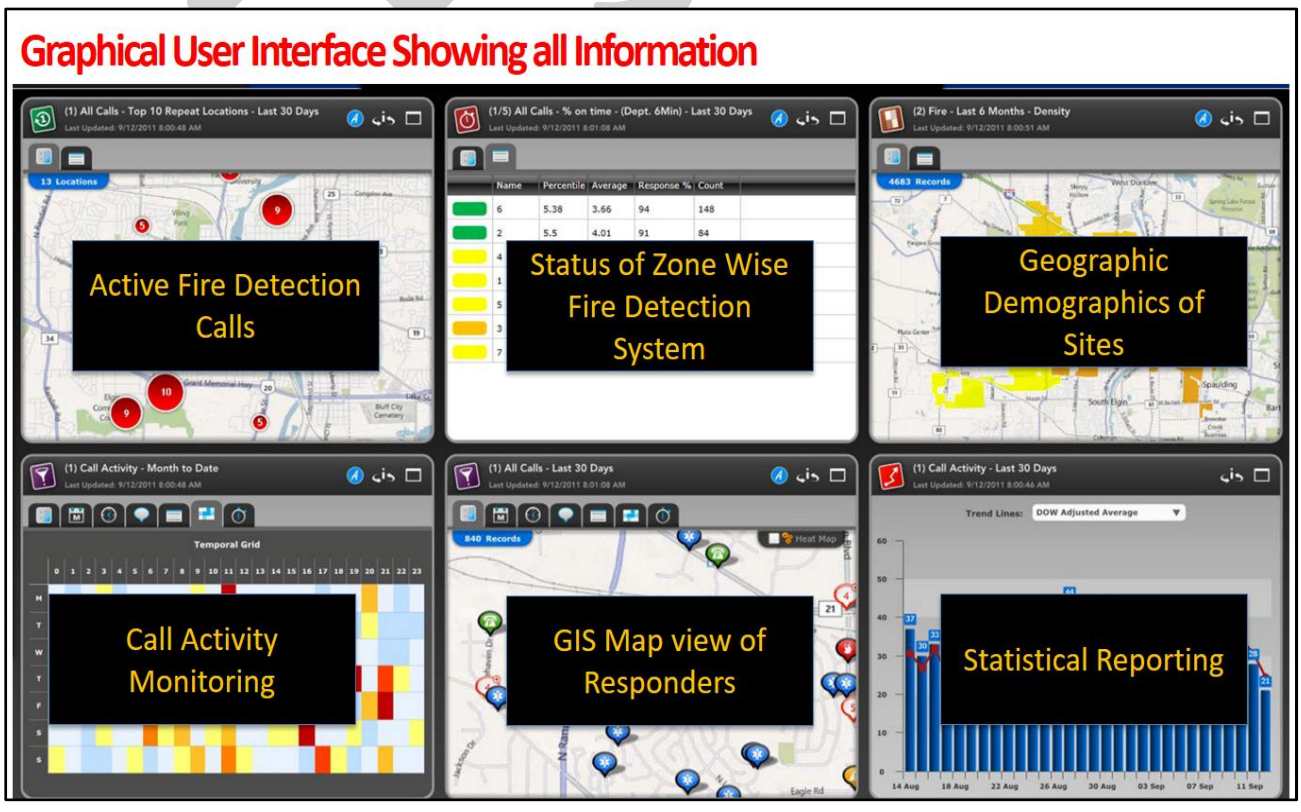
2. The Local Fire Station acknowledges the Alarm Signal in the GUI (Graphical User Interface); Headquarters Control Room can also monitor the dispatch of Fire Appliances through the Global Positioning System (GPS) connectivity. The Watchroom Operator manning the Control Room will respond appropriately by dispatching the Fire Fighting Appliances & Equipment's.



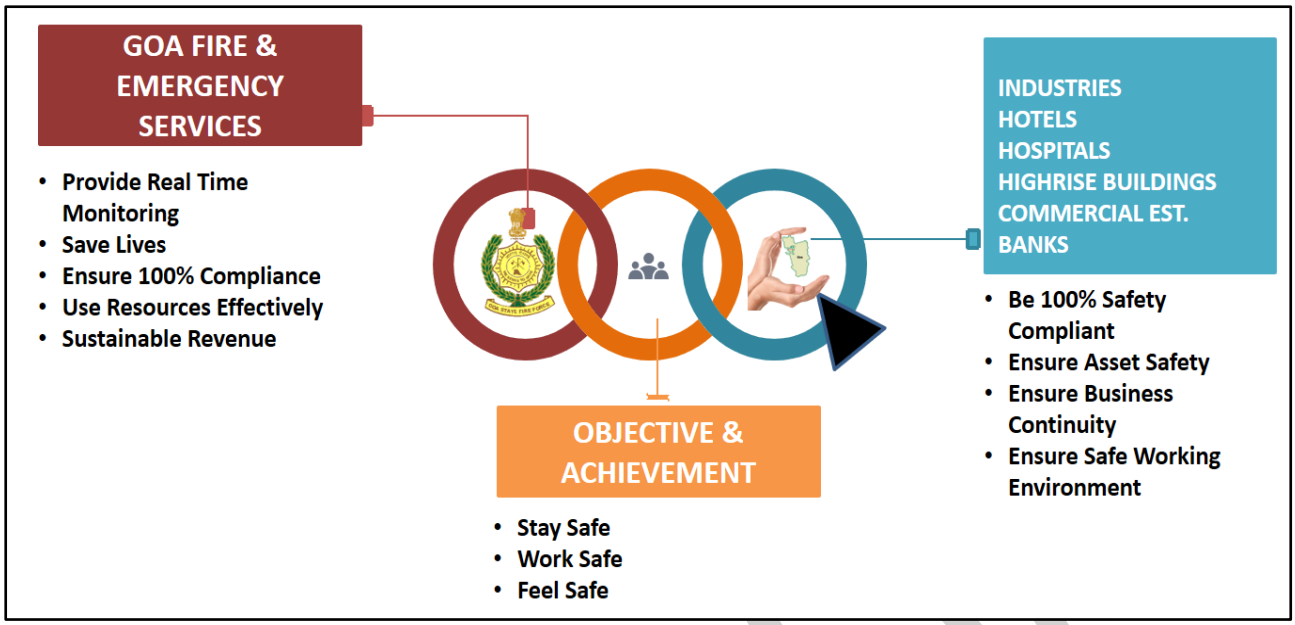
3. This response is also integrated with the Automatic Vehicle Tracking system (AVTS) and can be seen and monitored by all the Control Rooms and the incident response system is activated based on the gravity of the situation.



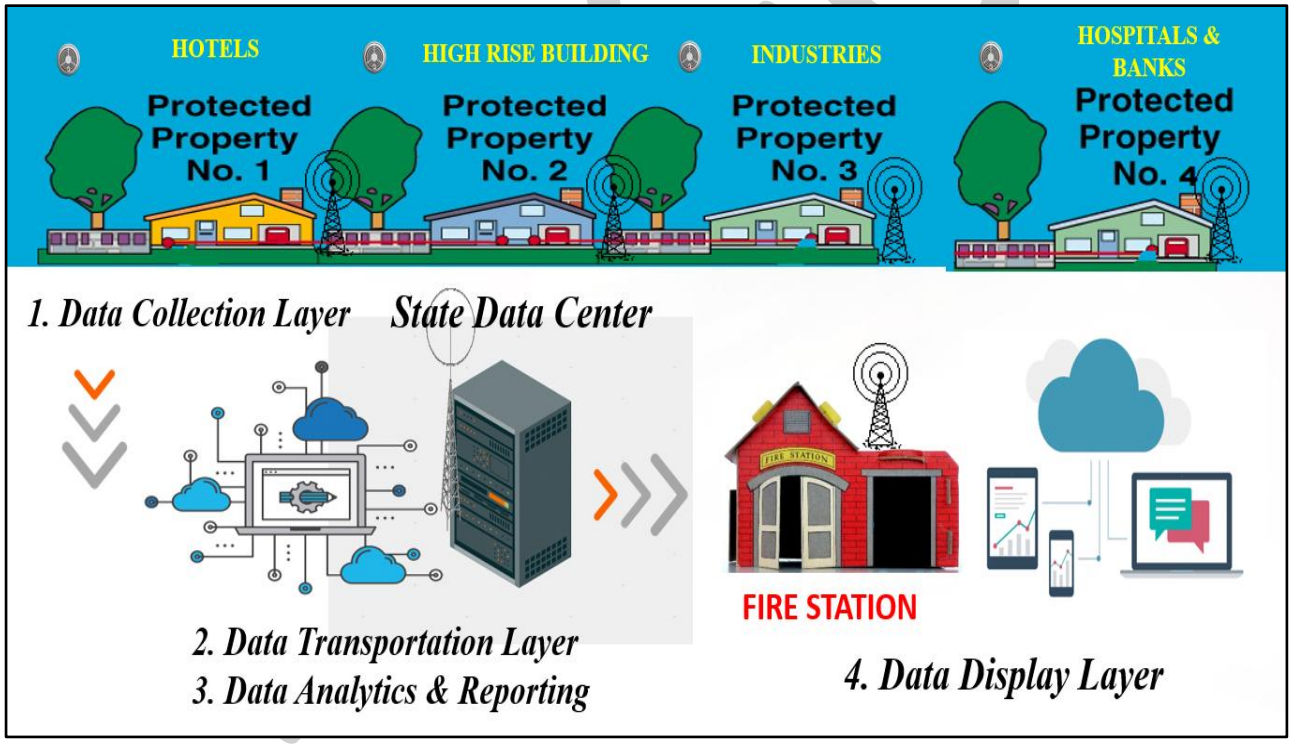
4. Application User interface displays various information on the video wall mount pertaining to Live Monitoring of Systems, History, Geographic Information Systems, Statistical Reporting (Alerts, Faults, Non-compliance),Appliances on route, Traffic updates etc.



(E) Project Deliverance:



(F) IoT Functional Reference Block of Safe Goa 24x7 Emergency Monitoring System:



a) **Data Collection Layer** – This is the Layer that is installed on the IoT Gateway for enabling Data Collection.

b) **Data Transportation Layer** – This is on the IoT Gateway at the Cloud (DoIT) enabling Seamless Transfer of Data from & to the Sites.

c) **Data Display Layer** – This is at the Control Rooms for Visualization.

d) **Data Analytics & Reporting** – This is hosted at Department of Information Technology State Data Centre Servers but accessible on any Device for Immediate Proactive Analytics & Reporting.

The System's open architecture allows for easy and seamless integration with all the field devices to be connected based on a common communication protocol, while maintaining Unified operations console.

The functionality is easy to configure and modify according to varying operational needs and concept of operation.

The System supports redundant multi-site deployments. The system supports deployment and scalability to multi-sites. The software system has the capability to migrate/upgrade to a full Disaster Recovery Mode of operation, in which the redundant sets of servers are placed and operational at a geographically different location.

The system supports multi-hierarchy feature levels i.e. support of certain defined features in the system to Watchroom operators/ Leading Firemen, some more to Sub Officers, some more to Station Fire Officers and all features to Administrators. This also includes the decision making/taking process in the incident work flow management.

The system supports large number of user work stations. The system has a capability for multiple users to be logged on to the system simultaneously.

The System has a capability to map all incident alerts received fromIoT Gateway with the map location of the incident automatically or if needed manually.

The map provides a common operational picture that enables information sharing between different control rooms.

The System architecture supports a multi-tier deployment. In case of major incidents/emergencies, the system shall be capable of deploying resources from multiple fire stations and managing those including notifications, SMS alerts and co-ordination with other emergency services such as Police, NDRF and Civil defense etc.

(G) IoTEMS Electronic HardwareTechnical Specification

The occupancies shall install the IoT Emergency Monitoring System (EMS) having the capability to monitor the following Fire Protection Systems.

1. Automatic Detection & Fire Alarm System: Status (ON/OFF, FAULT, ALERT).
2. Fire Pumps: Status (ON/OFF, FAULT, ALERT).
3. Gas Leak Detection System: Status (ON/OFF, FAULT, ALERT).
4. Common Alarm from Specialized Fire System

The IoT EMS Electronic Hardware interfaced with the Fire Protection System have the following minimum generic specifications: -

1. The IoT EMS is an intelligent Computing platform of industrial grade capable of running 24x7 having Central Processing Unit (CPU) of Intel Atom or Quad Cortex or Intel Xenon having

Random Access Memory (RAM) 1 GB or More, Clock Speed of 1.1Ghz or More, Storage of 32 GB Flash or more.It has a inbuilt battery backup for 4 Hours.

2. The EMS has a 1 x RS485 port for Modbus or Bacnet Integration and 1 x RS232 port for Third Party Soft Integration.

3. The EMS has a Cellular Modem connectivity for 3G/4G/LTE. The General-Purpose Input/Output (GPIO) shall be 12xDI/DO interchangeable to any combination for 4-10ma, 0-20V or NO/NC Combination

4. Operating System for the EMS shall be Linux / Ubuntu / Windows. The EMS has a e-SMS Operation 24x7.

5. The EMS is IP54 Compliant with Dual Ventilation FAN.

6. The IoT EMS is capable of Distributed Intelligence and Taking Decisions without having a need to communicate to the Central Command Station. It acts as a Web Server and Stores all Graphics on its Internal Memory and is accessible onboard.

7. The EMS is capable of storing Historical data & Reports for 1 year within its Internal Memory for Report Generation

8. EMS is integrated with the Intelligent Cloud based Monitoring Application using open Protocols as below:

   - Modbus Transmission Control Protocol (TCP),
   - Modbus Remote Terminal Unit (RTU),
   - Bacnet Internet Protocol (IP),
   - Bacnet Multiple Spanning Trees Protocol (MSTP) &
   - Simple Network Management Protocol (SNMP) Driver inbuilt for 1000 Points.

9. The IoT EMS is integrated with Geolocation Services to identify its accurate location and also includes an inbuilt Watchdog for health monitoring of the System.

(H)Safe Goa 24x7 Emergency Monitoring IoT Application Features

The IoT Application is an 100% Web Based Enterprise LevelOpen Platform Application that is capable of Integrating with a host of Third Party Hardware using Industry Standard protocols like Bacnet, Modbus, OPC, Lonworks, SNMP, XML etc at the South End and further Integrate with Third Party Applications like Facility Management, Advance Graphics Management, Energy Management etc at the North End using MQTT, Obix, XML etc.

The Intent of Using a Platform is to ensure that the same remains 100% Agnostic to any Brand of Hardware and also is capable of Seamlessly Integrating with any type of Application Software.

(I)StateData Centre at Department of Information Technology

The IoT Application will be hosted on Department of Information Technology State Data Centre Servers. The department will benefit from the extra security infrastructure available at DoIT.

(J)<u>Status of the Project</u>:

The Hon. Chief Minister has mentioned the Safe Goa 24x7 EMS scheme envisaged by the Department in the Budgetary Speech 2017-18.

The Safe Goa 24x7 Emergency Monitoring System was installed at 12 Multi-National Companies, 4 Starred Hotels, 1 Mall and 1 High-Rise Building on trial basis for a period of6 months, which has given the dept. a tremendous insight in today's era of Remote Monitoring of Automatic Fire Alarm and Allied systems.

The Project has been awarded by Fire & Security Association of India at Bangalore at the Finest India Skills & Talent Event 2018 inthe category of Best Emergency Response

The draft notification for mandatorily installing the IOT gateway at the various occupancies has been forwarded to the Govt. for approval.

Once approved Directorate of Fire and Emergency Services under the Safe Goa 24x7 Emergency Monitoring System will connect the Fire Alarm System, Fire Protection System and other Emergency System of various occupancies to the Central Command Center, Zonal Control Rooms and Local Fire Station Control Rooms for Live Monitoring of the status of the Fire Alarm System & Fire Protection System.

In addition to the Remote Monitoring the Command & Control Centre will have a Customized Incident Management Module to help the Fire & Emergency Services Department in Logging Incidents, Creating Reports and Managing the Alarm Events Effectively.

The process to upgrade the existing Communication Infrastructure of Headquarters Control Room, Zonal Command Centre Control Room and the Local Fire Station Control Room to acquire, commission and maintain the total Integrated Communication System including incorporation GPS based Automatic Vehicle Tracking with Vehicle navigation features and Distress Call Response System is underway.

The project is planned to cover the Headquarters Control Room (1), Zonal Command Centres (2), Local Fire Station Control Room (12) and Fire & Emergency Appliances (64) at present and any further expansion in the respective jurisdiction.

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