



Emergency Response Systems

From:

Dr.C.R.Bannur

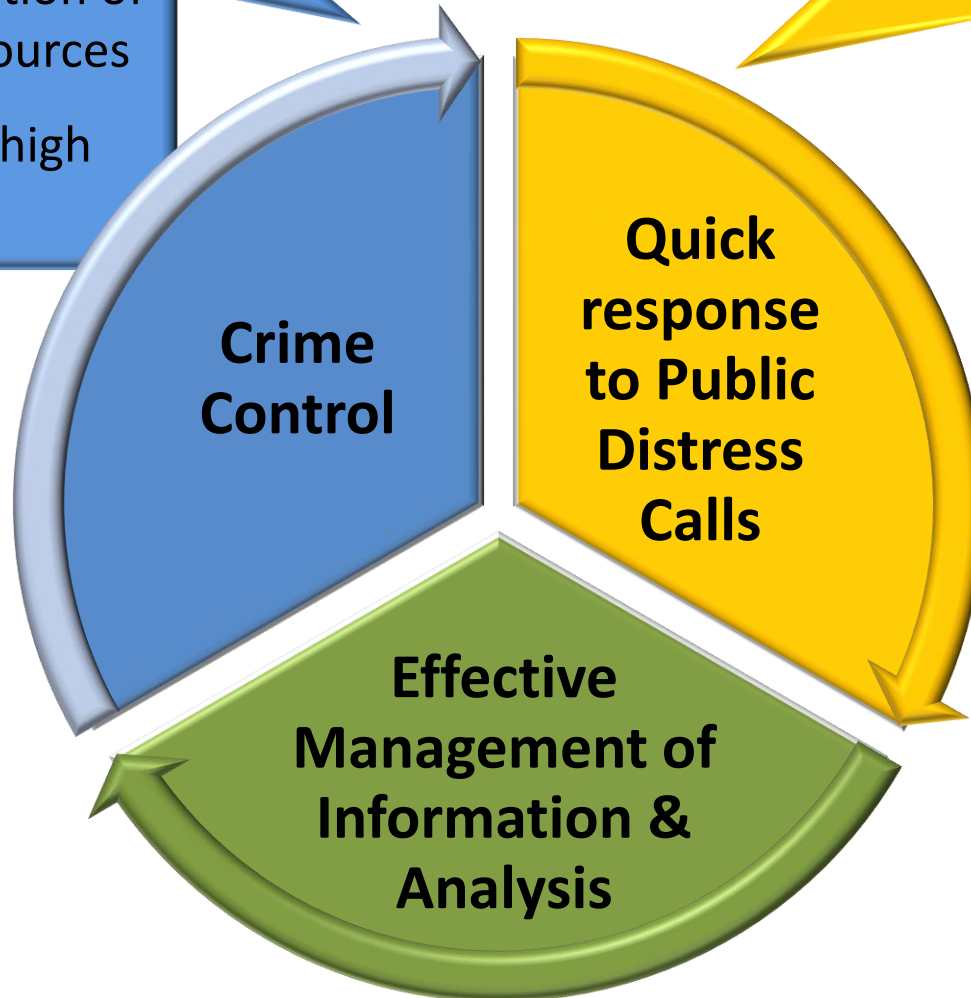
Sr.Divisional Director, Defense & Security Division
Rolta, Rolta Tech. Park, MIDC, Marol, Mumbai – India

crbannur@rolta.com

+919323285660, +919987338216

ERS - Necessity

- Quick & accurate location information
- Improved utilization of constrained resources
- Demarcating of high risk areas



- Real-time location of incidents and response teams at any time
- Directing response teams by shortest route
- Accurate & secure information

ATR - Necessary action has been taken, Fire Under control, Preliminary investigation completed, 3 Injured persons, taken to hospital



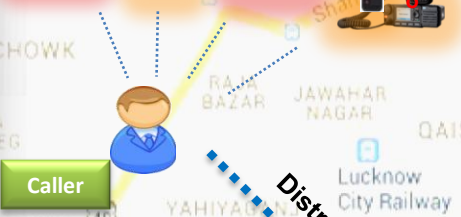
Responding Units installed with MDT



Police Station With CAD Web Application



Landline Cellular SMS Radi



Caller Distress Call to Control Room (Voice/Text/Image/Video)



Fire Station Inform to Other Agency

Real time status update through Image/Video ATR - Necessary action has been taken, Fire Under control, Preliminary investigation completed, 3 Injured persons, taken to hospital

Hospital



Agency Other

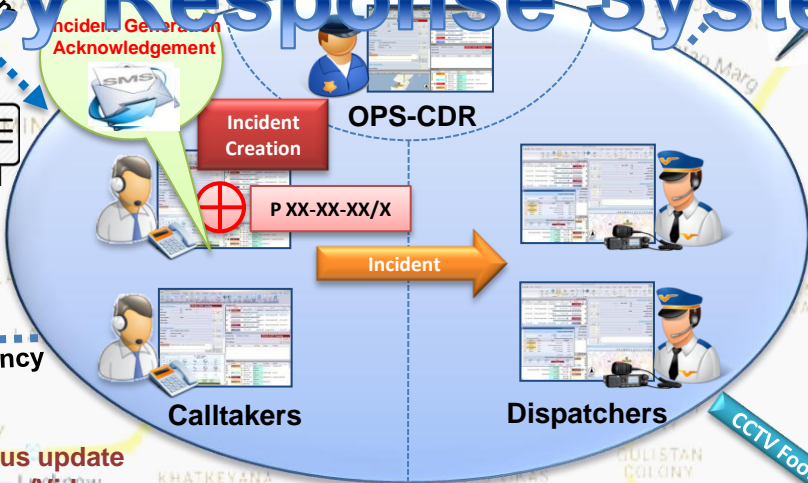
Assign Incident

Additional Resources

Instruction

Feedback

Emergency Response System - Workflow



Internet WAN

Incident Closure

Senior Officer with CAD Smartphone App



Police Control Room

CCTV Footage



ERS - Functional Components



Rolta Geo CAD Key Features

CAD User Interoperability



Login Credentials

English

ROLTA GeoCAD

User Name: SANOU SINGH

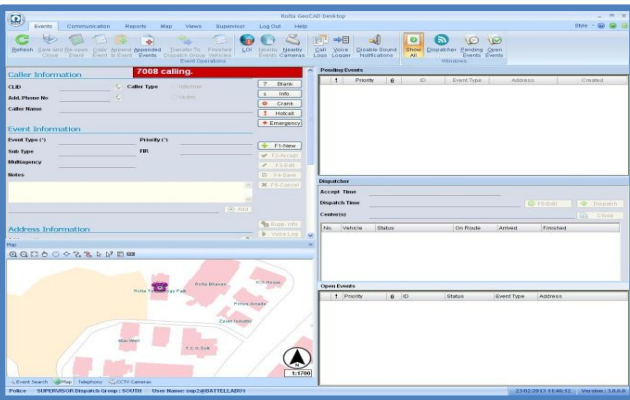
Password:

Role: Call Taker

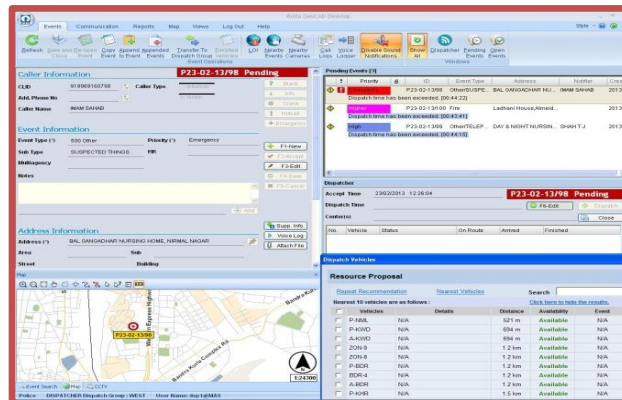
Agency: Call Taker

Dispatch Group: Supervisor

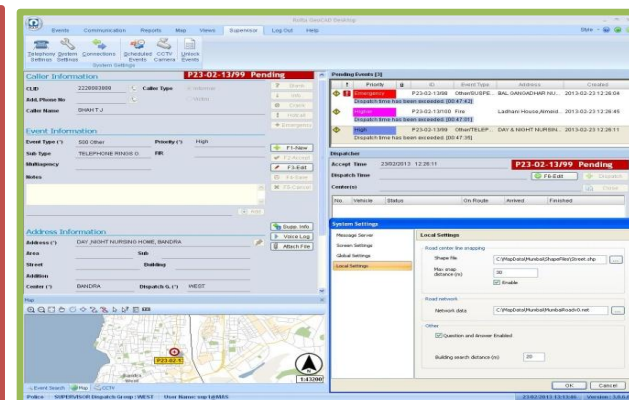
OK Cancel



Calltaker



Dispatcher



Supervisor

Flexibility to switchover between Call Taker, Dispatcher & Supervisor based on user defined Login credential

Multi-Monitor & Soft Phone



Multi Monitor Configuration



Inbuilt Soft phone



Multi-monitor configuration for Call Taking/Dispatching forms, GIS map, Video monitoring

Inbuilt Soft Phone with Telephone directory & Caller History

Multi-Lingual Support



Rollta GeoCAD Desktop

CFS Communication Reports Map Views Log Out Help

Refresh CFS Notify Save and Re-open Copy Append Appended Transfer To Finished Scheduled LOI Nearby Call Voice Search Caller Close CFS CFS to CFS CFS Dispatch Group RUs CFS CFS Operations Nearby Logs

CFS Information P28-08-14/26 Dispatched Pending CFS [16]

CFS Type(*)	Robbery
Sub Type	Bank
Priority (*)	Emergency
Comments	Robbery Happened Help required.
Notes	

Rollta GeoCAD Desktop

सी० एफ० एस० संचालन रिपोर्ट मानचित्र दृश्य सवारत सहायता

रिफ्रेश सी०एफ०एस० कॉलर को सुरक्षित सी०एफ०एस० सी०एफ०एस० सी०एफ०एस० जुड़ी प्रेषण समूह समाप्त सी०एफ०एस० रुचि नज़दीकी कॉल स्वर खोजें सचिन करें और बंद करें घसगसनि एनिलिपि मे जोड़े सी०एफ०एस० रकनानरण निनिधि वाकन निर्धारण स्थान सी०एफ०एस० विवरणका अभिलेखक नज़दीक विवरणका

सी० एफ० एस० विवरण P25-08-14/25 नवित लंबित सी०एफ०एस० [16]

प्रकार (*)	Alcohol / Drugs	नवीन-F1
उप प्रकार	अधिकार	स्वीकार-F2
प्राथमिकता (*)	Routine एफआइअ	सम्पादन-F3
विवरण		दुर्जे करें-F4
टिप्पणी		निरस्त-F5
		एस. ओ. पी.
		पूरक सूचना
		दस्तावेज संल...
		स्वर अभिलेख
		जोड़े

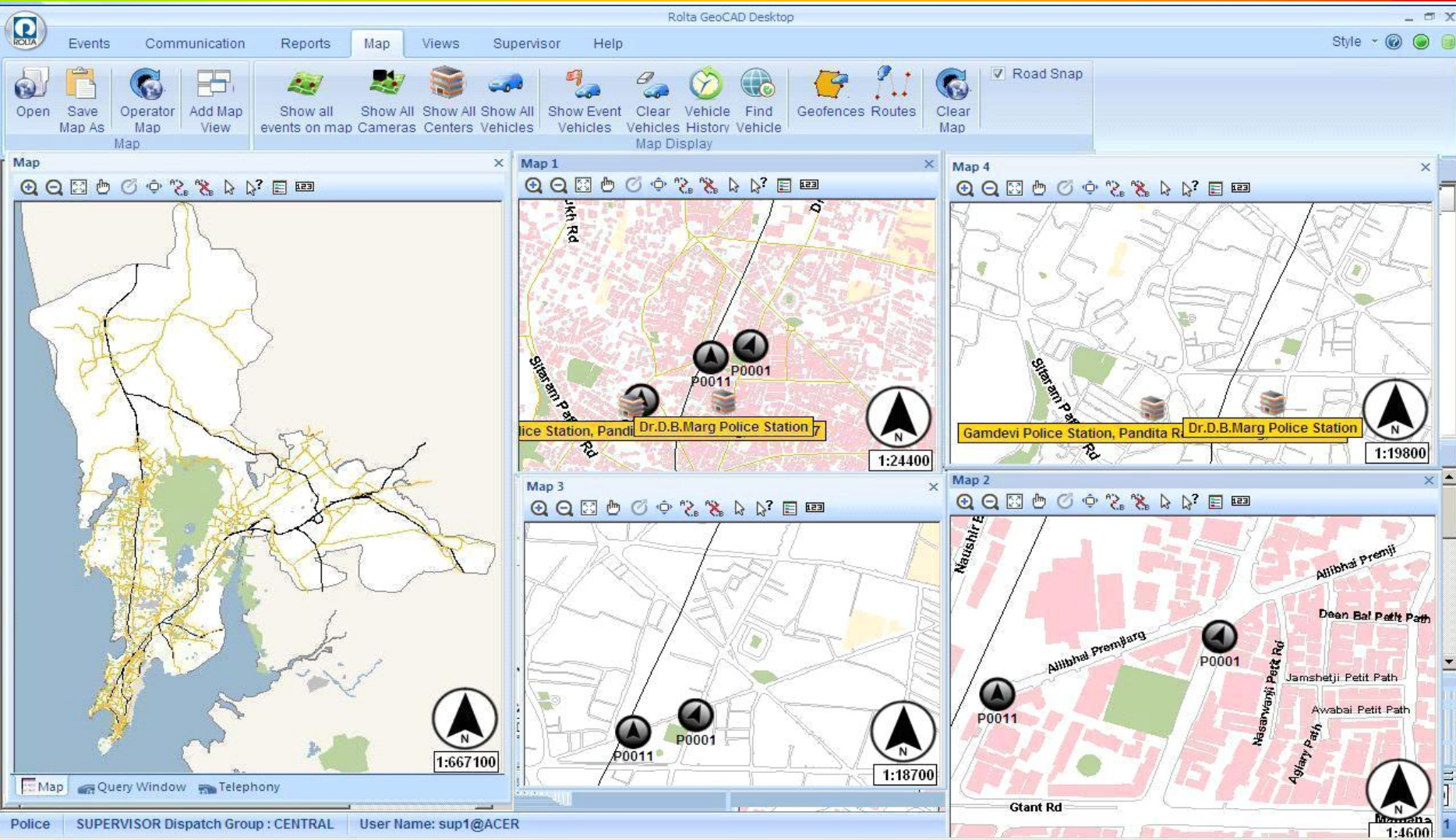
प्राथमिकता 0

- Routine (प्रेषण समय अधिकतम सीमा)
- Others (प्रेषण समय अधिकतम सीमा)
- Routine (प्रेषण समय अधिकतम सीमा)
- Routine (प्रेषण समय अधिकतम सीमा)

प्रेषणकर्मी

Support for Multiple Languages GUI

Multiple Map Windows



The screenshot displays the Rolta GeoCAD Desktop software interface. The main window is titled "Rolta GeoCAD Desktop" and features a menu bar with "Events", "Communication", "Reports", "Map", "Views", "Supervisor", and "Help". Below the menu bar is a toolbar with various icons for map operations such as "Open", "Save", "Operator", "Add Map", "Show all events on map", "Show All Cameras", "Show All Centers", "Show All Vehicles", "Show Event Vehicles", "Clear Vehicles", "Vehicle History", "Find Vehicle", "Geofences", "Routes", and "Clear Map". A "Road Snap" checkbox is also visible.

The interface is divided into several map windows:

- Map:** A large overview map on the left side of the interface, showing a wide geographic area with a scale of 1:667100.
- Map 1:** A zoomed-in map window showing a street grid with two police stations marked as "P0011" and "P0001". The scale is 1:24400.
- Map 4:** Another zoomed-in map window showing a different area with two police stations marked as "P0011" and "P0001". The scale is 1:19800.
- Map 3:** A zoomed-in map window showing a street grid with two police stations marked as "P0011" and "P0001". The scale is 1:18700.
- Map 2:** A zoomed-in map window showing a street grid with two police stations marked as "P0011" and "P0001". The scale is 1:4600.

The bottom status bar displays "Police SUPERVISOR Dispatch Group : CENTRAL" and "User Name: sup1@ACER".

System supports multiple map windows for simultaneous monitoring of multiple events/response units

Standard Operating Procedures



ROLTA GeoCAD Desktop

Menu: CFS, Communication, Reports, Map, Views, OPS-CDR, Log Out, Help

Tools: Refresh, CFS Search, Notify Caller, Save and Close, Re-open CFS, Copy CFS, Append to CFS, Appended CFS, Transfer To Dispatch Group, Finished RUs, Scheduled CFS

Windows: LOI, Nearby CFS, Call Logs, Voice Logger, Disable Sound Notifications, Show All, Dispatcher Pending CFS, Open CFS, CFS with OPS-CDR

Caller Information P14-02-14/94 Pending

CLID: 7485986745 | Caller Type: Informer Victim

Add. Phone: | Help Line: | Comm. Medium: Mobile | Email: | Caller Name: | Caller Address: address

CFS Information

CFS Type(*): 100 CRIME AGAINST CHILDREN | Sub Type: 101 ASSAULTED NEEDING MEDICAL ATTENTION | Priority (*): High | FIR: | Description: | Notes: | SOP | Supp. Inf. | Attach File | Voice Log | Add Task | Route

Task Information

No task defined.

Address Information Nearby CFS are available

Address (*): 4th Lane Darukhana, Sewri, SOUTH | Area: SOUTH | Sub: Sewri | Street: 4th Lane Darukh... | Building: | Placewise: | Map: 1:42400

Pending CFS [42]

Priority	ID	CFS Type	Address	Created
Normal	P22-02-14/288	OTHERS/ILL...	LT MARG JUNCTION	2014-02-22 1...
Dispatch time has been exceeded. [17d 06:41:07]				
Low	P03-02-14/2	CITIZEN AFF...	Cuffe Parade, SOUTH	2014-02-03 1...
Dispatch time has been exceeded. [36d 07:31:36]				

Standard Operating Procedures

Standard Operating Procedures for Police Control Room

1. Terrorist attacks and bomb blast

The reported incidence of crime in the title of the event, control, peace and order and responsibility for action...

Control room operator on duty and charge

1. Operators terrorist attack / bomb blast took place that should be rushed to the scene immediately.
2. Operators scene around available resources should be directed to reach the scene.
3. Caller ID information with the help of the event.
4. PCR Mobile will verify the information sent to the scene.
5. Operators and supervisors will instruct all related resources.
6. The event a vehicle is used in the border district, police and the range / zone control will notice.
7. Resources were dispatched to the scene to monitor the situation.
8. As required to access the site will direct you to the scene.
9. Thereafter, the operator of the site conditions / zone control will be transmitted.
10. Spot all SMS status reports will be transmitted to the scene.
11. Thereafter, the entry will complete all tasks in the scene.
12. The Union address on other sites remain vigilant and event should be broadcast.

After being confirmed by the charge controller the following :-

1. Station in-charge, post -charge, field officer, City / PA, Senior Superintendent of Police, I...

Standard Operating Procedures

Police Control Room duty of mobile: (PCR-Mobile)

First arriving at the scene PCR will keep protecting mobile event and will go there, stop the action and information available to the Control Room:-

1. The affected area, women, children and elderly persons on priority action to get out safely.
2. Additional front handle until the arrival of the police force.
3. Injured persons rushed to the near by hospital.
4. Injury toll
5. These men, women and children
6. No. of injured and taken to hospital where he was taken to the hospital name
7. Remaining PCR mobile send injured to the hospital
8. Control Room and the seriously injured have been discharged to familiarize them with the actual number of casualties.
9. Ensuring that the notice of the local police should not discharged without any injuries.
10. The injured / deceased person's name, address and age are known to provide the control room.

Police Control Room supervising officer's duty of:-

Supervision of Police Control Room, Additional Superintendent of Police Officer / Deputy Superintendent of Police, in charge of the control room will have the following responsibilities:

1. Additional Superintendent of Police Control immediately reached Control Room to control the situation.
2. Needed nearby PCR confirmation notice sent to the scene to be mobile.
3. Will Make sure to inform all the resources.
4. According to Deputy Superintendent of Police Control Room is located near the spot PCR mobile, other police forces and the field officer on the scene and PCR will send mobile to the nearest public hospital.
5. Shall ensure that all relevant information has been received and completed by the...

SOP for Call takers, Dispatchers, Supervisors & MDT Users based on Incident Type

Roleta GeoCAD Desktop GUI



ROLTA

Roleta GeoCAD Desktop

Application User Languages Style

CFS
Communication
Reports
Map
Views
Log Out
Help

Refresh
CFS Search
Notify Caller
Save and Close
Re-open CFS
Copy CFS
Append CFS
Append CFS to CFS
Transfer To Dispatch Group
Finished RUs
Scheduled CFS

LOI
Nearby CFS
Call Logs
Voice Logger
Disable Sound Notifications
Show All
Dispatcher Pending CFS
Open CFS

CFS Information

P28-08-14/26 Dispatched

CFS Type(*)	Robbery	F1-New
Sub Type	Bank	F2-Accept
Priority (*)	Emergency FIR	F3-Edit
Comments	Robbery Happened in ABC Bank, Near to Railway Factory Road Help required.	F4-Save
		F5-Cancel
Notes		SOP
		Supp. Inf.
		Attach File
		Voice Log

Pending CFS [16]

Priority	ID	CFS Type	Address	Created
! Routine	P25-08-14/25	Alcohol / Drug...	554/1518,Kailashpuri ...	2014-08-25 1...
Dispatch time has been exceeded. [2d 18:59:42]				
! Others	P22-08-14/15	Voice Pollutio...	Cantonment,Cantt Jan...	2014-08-22 1...
Dispatch time has been exceeded. [5d 20:58:57]				
! Routine	P22-08-14/14	Voice Pollutio...	Cantonment,Cantt Jan...	2014-08-22 1...
Dispatch time has been exceeded. [5d 20:59:10]				
! Routine	P22-08-14/12	Voice Pollutio...	Cantonment,Cantt Jan...	2014-08-22 1...
Dispatch time has been exceeded. [5d 23:33:53]				
! Routine	P22-08-14/11	Voice Pollutio...	Kasturba Marg,Canton...	2014-08-22 1...
Dispatch time has been exceeded. [5d 23:36:06]				

Address Information

Address	V G Railway Colony-128,Railway Colony Road,Railway Colony,Aal...		Placewise
Area	Aalambag PS	Sub	Railway Colony
Street	Railway Colony...	Building	V G Railway Colony-128
Additional			
Disp. G. (*)	Beeta East Zo...	Center (*)	Manaknagar PS

Dispatcher

Accept Time: 28/08/2014 10:30:35

Dispatch Time: 28/08/2014 11:43:35 Dispatch

Veh. Center(s): Aalambag PS To OC

No.	Vehicle	Status	On Route	Arrived	Finished
1	P0026	On Route	11:43:38		

Open CFS [45]

Priority	ID	Status	CFS Type	Address
! Priority	P08-06-14/108	Open	Forcible Man...	Rana Pratap Marg,Narhi,H...
! Routine	P20-08-14/5	Open	Bomb Threat	Railway Colony,Aalambag ...
		Released		
! Emergency	P20-08-14/7	Open	Dead Body F...	Railway Factory Road,Rail...
		Released		
! Emergency	P08-06-14/109	Open	Terrorism & B...	Ashok Marg,Civil Lines,Ha...
		Released		

Call Taking Guide

Question	Answer

Scale: 1:36400

Alerts IP Cameras 3D Map Telephony Interface Map

Police | Site: LKO | Role: Dispatcher | Dispatch Group: Beeta East Zone | User Name: vivek@WIN-8KK3RMKKQ50
28/08/2014 11:44:46 | Version: 4.1.0.56

Rolta GeoCAD Web



CFS - Rolta GeoCAD Web

9.1.1.11/roltageocadweb/Events.aspx

GeoCAD Web

Logged in as vivek Feedback · Logout

CFS Fleet Monitoring Reports Charts Analysis Dashboards Patrolling BOLO Crime Analytics

Dispatch Group All Center All Search CFS and vehicles... Settings

Active CFS (336) Show All Refresh

Priority	ID	CFS Type	Address	Date	Status
Routine	P07-06-14/96	Crime against Women - Rape	Kaisarbagh Officers Colony, Kaisarbagh Officer's Colony, Kesharbah Thana PS	07/06/14 15:25	Dispatched
Emergency	P07-06-14/97	Crime against Women - Rape	Rana Pratap Marg, Narhi, Hazratganj Thana PS	07/06/14 16:23	With CO/SSP
Emergency	P07-06-14/98	Murder	Sarojini Nagar, Sarojini Nagar Thana PS	07/06/14 18:16	Dispatched
Others	P08-06-14/99	Animal Related	Chini	08/06/14 11:02	Dispatched
GPS13 - Aminabad PS	-	-	-	-	Waiting for P01-08-14/2
GPS17 - Sahadtganj PS	-	-	-	16:24	Released
GPS19 - Talkatora PS	-	-	-	16:49	Dispatched
GPS21 - Vazirganj Nala PS	-	-	-	16:27	Released
Priority	P08-06-14/100	Explosion	Ashok Marg, Civil Lines, Hazratganj Thana PS	08/06/14 12:35	Dispatched
Priority	P08-06-14/101	Accident	Birbal Sahni Institute of Palaeobotany, Lucknow, Babuganj, Hasanganj Thana PS	08/06/14 13:11	Dispatched
GPS27 - Hasanganj PS	-	-	-	-	Waiting for P12-06-14/387
Emergency	P08-06-14/102	Crime against Women - Rape	Rana Pratap Marg, Narhi, Hazratganj Thana PS	08/06/14 14:24	Dispatched
GPS10 - P.C.T. PS	-	-	-	14:28	Dispatched

Bird's Eye view of CAD operations through Browser

Fleet Monitoring



Fleet Monitoring - Rolta GeoCAD Web

9.1.1.11/roltageocadweb/FleetMonitoring.aspx

GeoCAD Web

Logged in as vivek Feedback · Logout

CFS Fleet Monitoring Reports Charts Analysis Dashboards Patrolling BOLO Crime Analytics

Dispatch Group: All, Center: All, Vehicles: Select all (GPS1, GPS10, GPS11, GPS12, GPS13)

Vehicle Positions: Last positions, Latest records (1500)

Vehicle History: Start date (28/08/2014), Start time (00:00), End date (28/08/2014), End time (12:32)

Playback: Very Fast

Online tracking: by 10 secs

Geofences, Notifications

Vehicle Information

Name : GPS12
 Center : Manaknagar PS
 Date : 01/06/14 15:51:44
 Speed : 32
 Heading : NE
 Region : Lohia Path, Civil Lines, Beeta East Zone
 Geofence :
 Status : Moving

No	Vehicle	Center	Date	Speed	Heading	Region	Geofence	Status
177	GPS12	Manaknagar PS	01/06/14 15:43:01	18	NE	Maharaja Mahemudabad Road, Kaisarbagh, Charlie West Zone		Moving
178	GPS12	Manaknagar PS	01/06/14 15:42:52	15	NE	Kaisarbagh, Charlie West Zone		Moving
179	GPS12	Manaknagar PS	01/06/14 15:42:40	11	NE	Maharaja Mahemudabad Road, Kaisarbagh, Charlie West Zone		Moving
180	GPS12	Manaknagar PS	01/06/14 15:42:34	10	NE	Kaisarbagh, Charlie West Zone		Moving
181	GPS12	Manaknagar PS	01/06/14 15:42:24	14	NE	Kaisarbagh, Charlie West Zone		Moving
182	GPS12	Manaknagar PS	01/06/14 15:42:14	11	NE	Maharaja Mahemudabad Road, Kaisarbagh, Charlie West Zone		Moving
183	GPS12	Manaknagar PS	01/06/14 15:42:06	5	NE	Maharaja Mahemudabad Road, Lalbagh, Charlie West Zone		Moving
184	GPS12	Manaknagar PS	01/06/14 15:41:57	11	NE	Parivartan Chowk, Lalbagh, Beeta East Zone		Moving

Displaying 1 - 300 of total 430

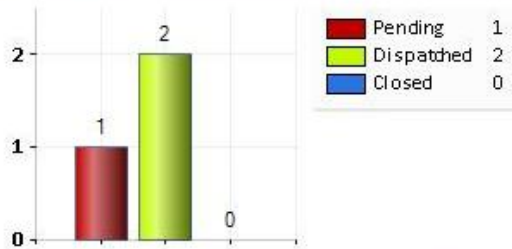
Dashboards



Dashboards Last 24 Hours

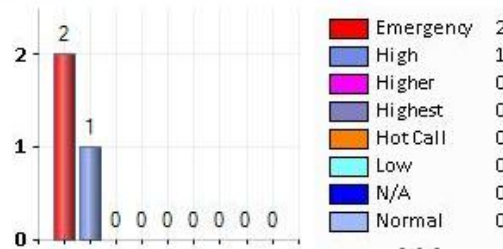
Last Updated 19.03.2014 11:41:39

CFS Status



[View Details](#)

CFS Status - Priority Wise



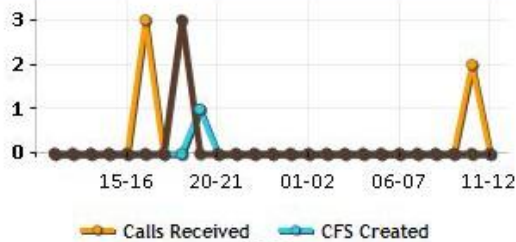
[View Details](#)

Average Response Time

Response	Time
Average Call Taking Time	00:00
Average Dispatch Time	04:37
Average RU Response Time	00:00
Average CFS Closing Time	00:00

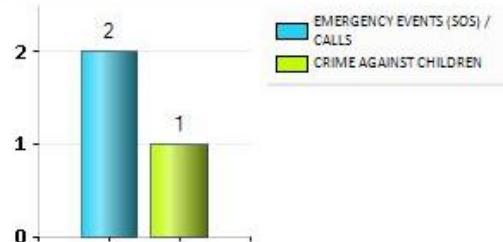
[View Details](#)

Calls Received vs CFS Created



[View Details](#)

CFS Type Distribution



[View Details](#)

Responding Unite Modem Update Status



[View Details](#)

Rolta GeoCAD Mobile for Responding Units



Authentication

BOLO

Incident Detail

Patrol Chart

Shortest Path

Roleta GeoCAD MDT - v4.1.7.0

BYCULLA P0059 0 km/h Nilesh Shahane CS DB GPS

Search Vehicle No. Search **BOLO found**

Bolo Information

Vehicle No. mh-15-DA-37382

Vehicle Type Jeep

Vehicle Model Ax4

Vehicle Color Red

Created On 19 February 2014 19:35:31

Offence
Offence 1
Offence 2
Offence 3

Bolo Action

Captured Not Captured

Action Type (*) Vehicle Seized

Action Taken Vehicle seized at M.G. Road

Save

Additional Information

Traffic Impact

LOI Search

POI Creation

Data Communication

Text / Audio based ATR Messaging Support

BOLO - Be On Look Out

Rolta GeoCAD Mobile for Smartphones for Senior Officers

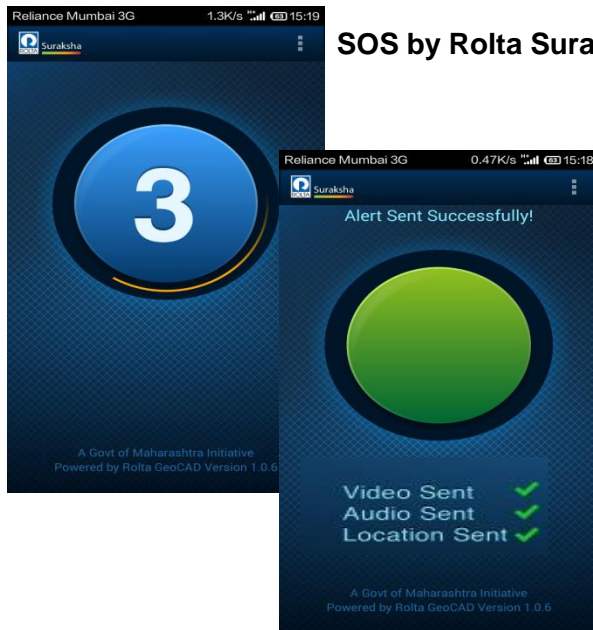


- Secure user access (OTP)
- Incident Alert & List
- Incident Details
- GIS Map Display, Incident / RU location
- Incident - Monitoring, Instruction & Feedback
- View Command Logs
- Dashboard

Integrated Women Safety (SOS) App



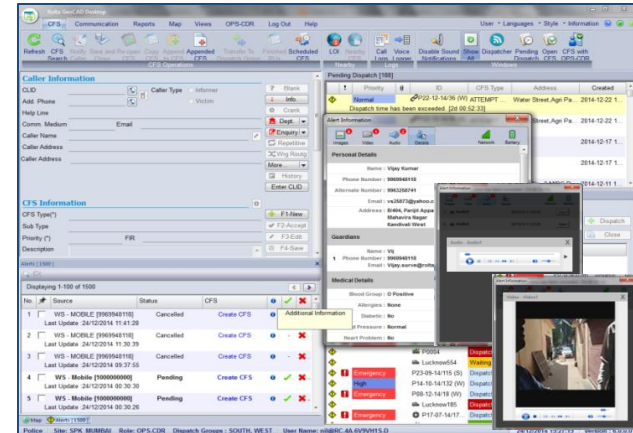
Rolta Suraksha Apps on Smartphone
for Emergency Alert



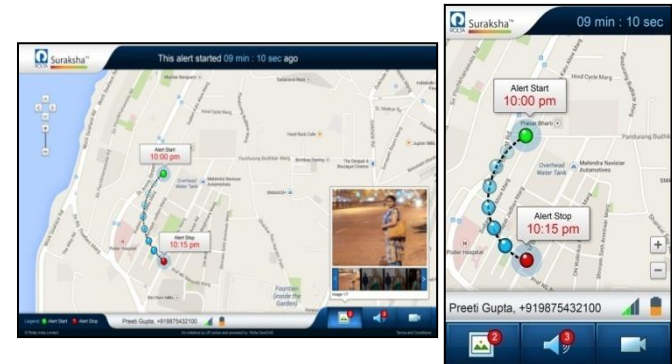
SOS by Rolta Suraksha Apps

Alerts Send

Rolta GeoCAD at Police Control Room

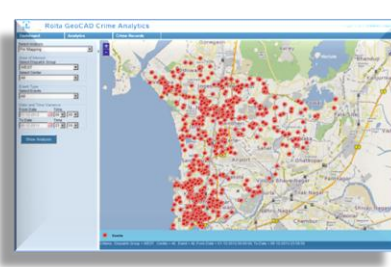
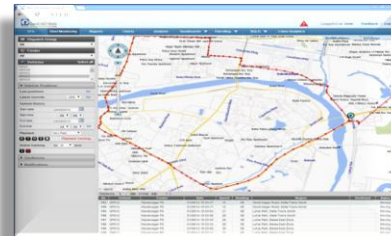


Rolta Suraksha for Parent / Guardian Smartphone



Integrated Rolta GeoCAD & Rolta Suraksha (Women Safety App)

Rolta's Unique ERS Solution



- ✓ Rolta IP, Customizable as required
- ✓ Field proven Solution, Deployed in India and Middle East
- ✓ Comprehensive solution - 100+ Key features
- ✓ Strong Domain expertise
- ✓ Future ready product
- ✓ Available for desktop, web, MDT , Mobile platform
- ✓ Rapid Deployment, easy to configure & Maintain
- ✓ Rich and Optimized integrated GIS & Telephony
- ✓ Multi Agency integration support
- ✓ High Availability Architecture with active failover
- ✓ Mobility Support

DISTRESS CALL MINUTES AFTER A BOMB BLAST AND HOSTAGE S

Events Communication Reports Map Views Supervisor Log Out Help

Refresh Acknowledgment to Caller Save and Re-open Close Event Copy Append Event to Event Appended Events Transfer To Dispatch Group Vehicles Finished Events LOI Nearby Events Nearby Cameras Call Logs Voice Logger Disable Sound Notifications Show All Dispatcher Pending Events Open Events

Caller Information 2229266666 calling...

CLID Caller Type Informer Victim

Add. Phone

Caller Name

Caller Address Comm. Medium

PRN

Buttons: Blank, Info., Crank, More..., History(178)

Event Information

Event Type(*)

Sub Type(*)

Priority(*) FIR

Multiagency

Notes

Task Information

No task defined.

Buttons: Add Task, Route, Loc.wise

Address Information

Address (*)

Map



Pending Events

!	Priority	ID	Event Type	Address	Created

Dispatcher

Dispatcher

Buttons: Dispatch, Close

!	Priority	ID	Status	On Route	Arrived	Finished

Open Events

!	Priority	ID	Status	Event Type	Address

INCOMING

ACCEPT

Events Communication Reports Map Views Supervisor Log Out Help

Refresh Acknowledgment to Caller Save and Re-open Close Event Copy Append Appended Events Transfer To Dispatch Group Event Operations Finished Vehicles LOI Nearby Events Nearby Cameras Call Logs Voice Logger Disable Sound Notifications Show All Dispatcher Pending Open Events Events Windows

Send To ... EVENT TRANSFER

Caller Information

P20-06-14/1 Pending

CLID: 29266666 **Caller Type** Informer Victim

Add. Phone:

Caller Name: Anonymous

Caller Address: **Comm. Medium**

PRN:

Event Information

Event Type(*): 6200 BOMB BLAST

Sub Type(*): BOMB BLAST

Priority (*): Emergency

Multiagency: Fire, Medical

Notes:

Task Information

No task defined.

Address Information

Address (*): Midc,WEST

Area: **Sub**

Street: **Building**

Addition:

Disp. G. (*): WEST **Center (*)** MIDC

Pending Events [1]

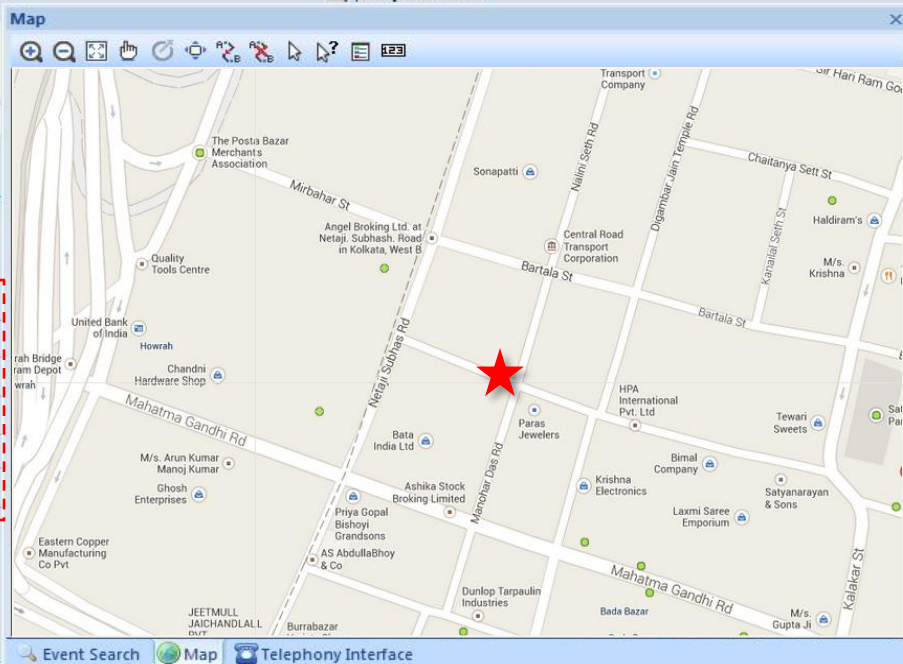
Priority	ID	Event Type	Address
Emergency	P20-06-14/1	BOMB BLAST...	Midc,WEST
Waiting for dispatch [00:00:26]			

Dispatcher

Accept Time: 20/06/2014 12:37:57 **P20-06-14/1 Pending**

Dispatch Time:

Arrived	Finished
<input type="text"/>	<input type="text"/>



ALERT RECEIVED AT C2

Camera Video Wall

Camera Hierarchy Section

Sites

PTZ Control Section

SOP



BOMB BLAST ALERT
21 seconds ago
Camera Surv Camera 1
Acknowledge



Archived

Dismiss All

STANDARD OPERATING PROCEDURE - COLLABORATION

STANDARD OPERATING PROCEDURE - Code#00427A (BOMB BLAST)

Alert Manager

TASK	DESCRIPTION	REMARKS	ACTION	STATUS	USER
ALERT	Tactical C4i Team	<input type="text"/>	ALERT		
ALERT	Ambulance & Nearest Hospital	<input type="text"/>	ALERT		
NOTIFY	CP, ACP, DM, DC	<input type="text"/>	NOTIFY		
ALERT	Adjacent Commisionerate	<input type="text"/>	ALERT		
SHARE	Event details	<input type="text"/>	SHARE		
	Video Footage	<input type="text"/>	SHARE		
ALERT	Railway, CSTC, Tramways	<input type="text"/>	UPDATE		
ALERT	Cellular Operator to susper	<input type="text"/>	TRACK		
ALERT	Forensic Team	<input type="text"/>	ALERT		
DEBRIEF	PCR - Update	<input type="text"/>	Y N		
	SITRIP - Tactical C4i	<input type="text"/>	Y N		
	Medical - Update	<input type="text"/>	Y N		
ARCHIVE	Video, Call Records, System Logs	<input type="text"/>	ARCHIVE		
REPORT	Collate & Generate Report	<input type="text"/>	GENERATE		
CLOSE	Debrief & Close Event	<input type="text"/>	LOG		

Event Closed



Archived

Dismiss All

Camera 1 Acknowledge

Technology Limitations & Way Forward

We Can't do

Influence the movement of the earth's tectonic plates

Divert major storms

Reliably predict the timing or intensity of volcanic eruptions

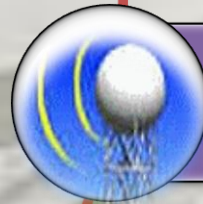
We Can do



Setting up Automated emergency Response Systems for quicker response with SOPs



Setting up early warning sensors with communication backbone for Disaster Management



Integrated systems for seamless information exchange



Advanced Technology for analysis, accurate prediction & mitigation

THANK U