



THE ACTIVITIES OF THE NATIONAL SPACE RESEARCH & DEVELOPMENT AGENCY, NIGERIA, IN THE AREA OF GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

presented by:

Nurudeen Suleiman
Nigeria Communication Satellite Limited (NIGCOMSAT), NASRDA.
Abuja-Nigeria.

www.nasrda.org



INTRODUCTION



NASRDA

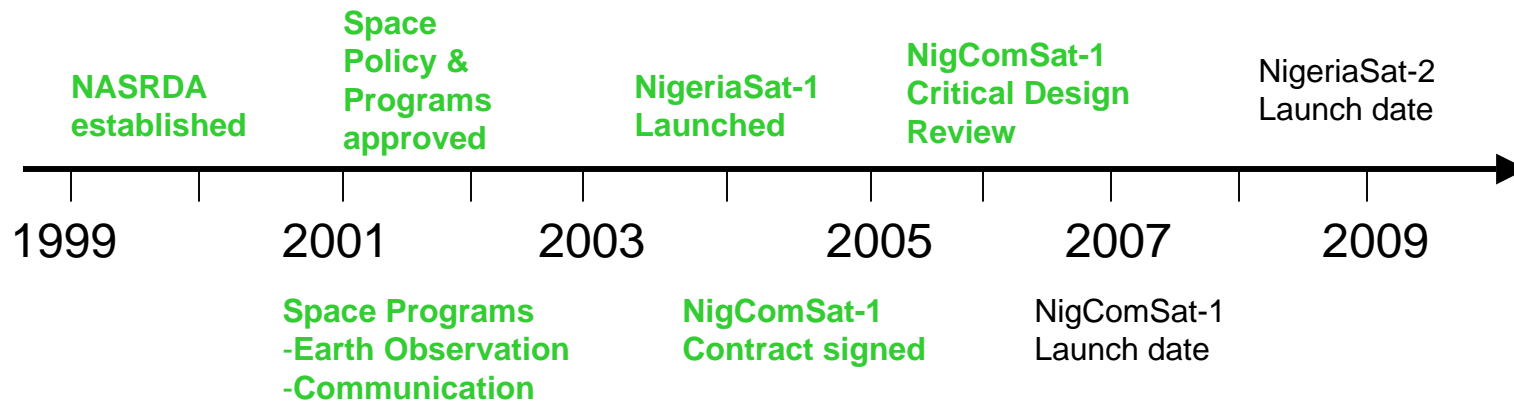


NASRDA : National Space Research & Development Agency (NASRDA)

- agency under the Federal Ministry of Science & Technology

Mission: The use of home-grown capabilities for space science research, development and applications

Historical Perspective:





Programs & Centres





GNSS Overview



- GNSS is one of the most promising space application tools in the Area of exploration and peaceful uses of outer space.
- The positioning and timing capabilities based on GNSS space technology are generating extensive emerging markets for new services and advanced applications when used either as land-alone systems or in synergy with other systems.
- GNSS is safer, more reliable navigation and positioning service for civil use in areas of disaster management, monitoring of the environment, geosciences, precision agriculture, resource conservation, surveying, oil and gas, telecommunication, mapping, transport, civil aviation and timing.



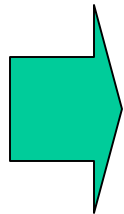
NASRDA GNSS ACTIVITIES



ACTIVITY 1: NigComSat-1 L-Band Navigation



- Realizing the strategic and economic importance of satellite navigation, NASRDA decided to play a key role by participating in the development of a Global Navigation Satellite System answering the needs of civil users.
- NIGCOMSAT-1 has two (2) **Navigation payloads** due for launch March 2007.
 - Provides Navigation Overlay Service (NOS) based on the European Geostationary Navigation Overlay Service (EGNOS).
 - Two L-band Signals transmitted, L1 and L5
 - Global coverage.



Meet our augmentation requirements in aviation, maritime, survey, defence and security, water, transportation, telecommunication, environmental, mapping and agriculture.



ACTIVITY 2: GNSS Awareness And Capacity Building



GNSS Technology Applications Training Workshop

26th-28th April, 2005. Abuja.

Aim: To demonstrate Nigeria's capacity building effort to enhance the use of (GNSS).

Presence: Honorable Minister Science & Technology, Prof. Turner T. Isoun, Honorable Minister Water Resources Alh. Mukthar Shehu Shagari, Director-General, NASRDA, Prof R. Boroffice & other top-level government officials.

Participants:

- Private Organizations
- Public Organizations:-
 - Ministries (Science & Technology, Solid Minerals, Environmental, Water Resources, Aviation, Agriculture, Petroleum, Works, Transportation, Federal Capital Development Authority, Power and Steel)
 - Surveyor-General office.
 - Government agencies (Power Holding Company, Nigerian Telecommunication Limited, Water Corporation)
 - Tertiary & Military institutions



Focus & Objectives



FOCUS: The focus of this workshop among others is on specific applications of the use of existing and future GNSS and their augmentations to:

- improve global environmental objectives.
- sustainable development programs
- deepen understanding of applications in the developing countries like Nigeria

OBJECTIVES:

The specific objective of the training workshop include the following:

- Generating public awareness on the intrinsic value of GNSS.
- Bringing the benefits of the availability and use of GNSS signals to the awareness of decision makers and technical personnel from potential user institutions.
- Identifying and articulating actions that could be taken and partnerships to be established by potential users.
- Demonstrating how navigation and positioning technology could help solve problems of regional or global significance.
- Demonstrating the utilization of geospatial data resources in decision-making on issues relating to economy and national development.
- Demonstrating the essential element of application of GNSS in the field of survey, mapping, SDI and related disciplines as sound and reliable information (real time) and communication technologies.



Sectors/Programs



The **different sectors/programs** in which experts outlined the various applications and use of GNSS technologies includes:

Defence

Aviation

Environment

Agriculture

Water / Marine

Survey & Mapping

Petroleum

Solid minerals

Transportation

Population

Oil & Gas

Telecommunication

various backgrounds of participants



effective & meaningful discussions relevant to different fields of human endeavor



Mechanisms



Presentations & Break out sessions

- critical questions & observations were raised and addressed

Field trips

- on the second day which afforded the participants the opportunity to observe practical demonstration of GNSS applications in Nigeria.

Exhibition booths

for demonstrations & interaction between the participants

- local: NASRDA, Telemetry Nigeria, Edge Environmental Services, etc.
- international: Bridge-Mons Ltd/Asrata PTY (South Africa); Leica-GeoSystem (Switzerland), etc.

Communiqués

- recommendations were drawn and communiques were issued to the government and people of Nigeria at the end of the workshop.



Benefits



- Afforded stakeholders the opportunity to discover the use of GNSS technology in specific areas of their mandate.
- Provided a forum for partnership between government & private sectors to come up with programs that harness all areas of the use & applications of this emerging technology.
- Created an avenue for the stakeholders & participants to interact and broaden the understanding of the applications of GNSS to wide range of sectors.
- Enhanced capacity building of the participants.



ACTIVITY 3: Vehicle Tracking System

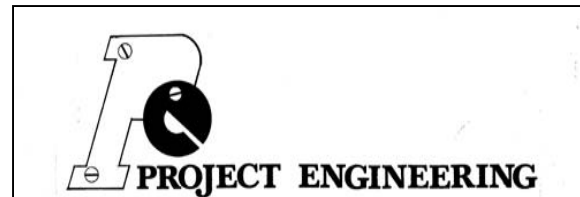


A very recent activity of NIGCOMSAT LTD (NASRDA) in GNSS technology is an *ongoing* pilot smart vehicle tracking system.

NIGCOMSAT collaborators in this pilot are:

Project Engineering (USA)

& *Teknobil (Turkey).*





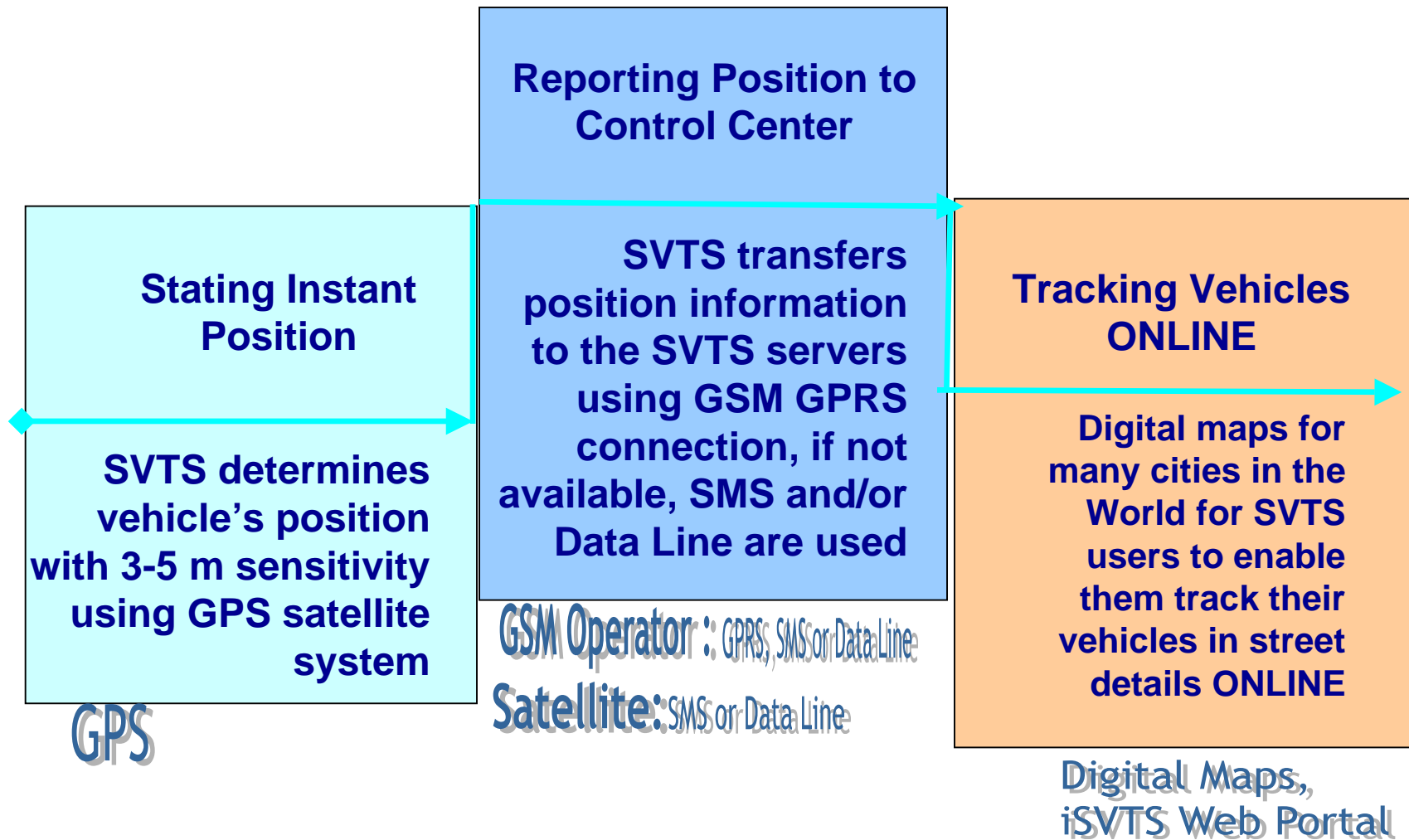
Importance of Telematics & Vehicle Tracking



- **Fleet management and Tracking technologies**
 - Logistics companies can increase efficiency
 - Optimization of journey
 - Buses/operators can inform travellers on the expected time of arrival of the next bus
 - Companies can avoid unauthorized mileage and reduce fuel costs
 - Recovery of stolen vehicles
 - Improved customer care
 -much more
- **Route guidance and information systems**
 - emergency calls with automatic transmission of location
 - breakdown assistance with communication of the car position
 - recovery after theft
- **Emergency services**
 - Shorten the rescue chain
 - Gaining time and saving lives
- **Traffic management**
 - The monitoring and management of traffic fluidity will be significantly facilitated when a great number of cars are equipped with satellite navigation receivers and guidance system
- **Advanced Driving Assistance Systems**
 - improve mobility and active safety



Vehicle Technology Overview





Main Components of Tracking Technology



GPS Satellites

- There are 24 GPS Satellites orbiting the entire globe, transmitting, positioning and timing data all the time



Vehicle Unit

- Designed adaptable, modular vehicle unit for perfect solution
- Includes GPS unit, GSM unit and have connection ports (for communication and Telematics sensors)



Communication Media

- GSM/Thuraya SIM card is placed in control box for both way data transfer and communication



Web-access Digital Maps

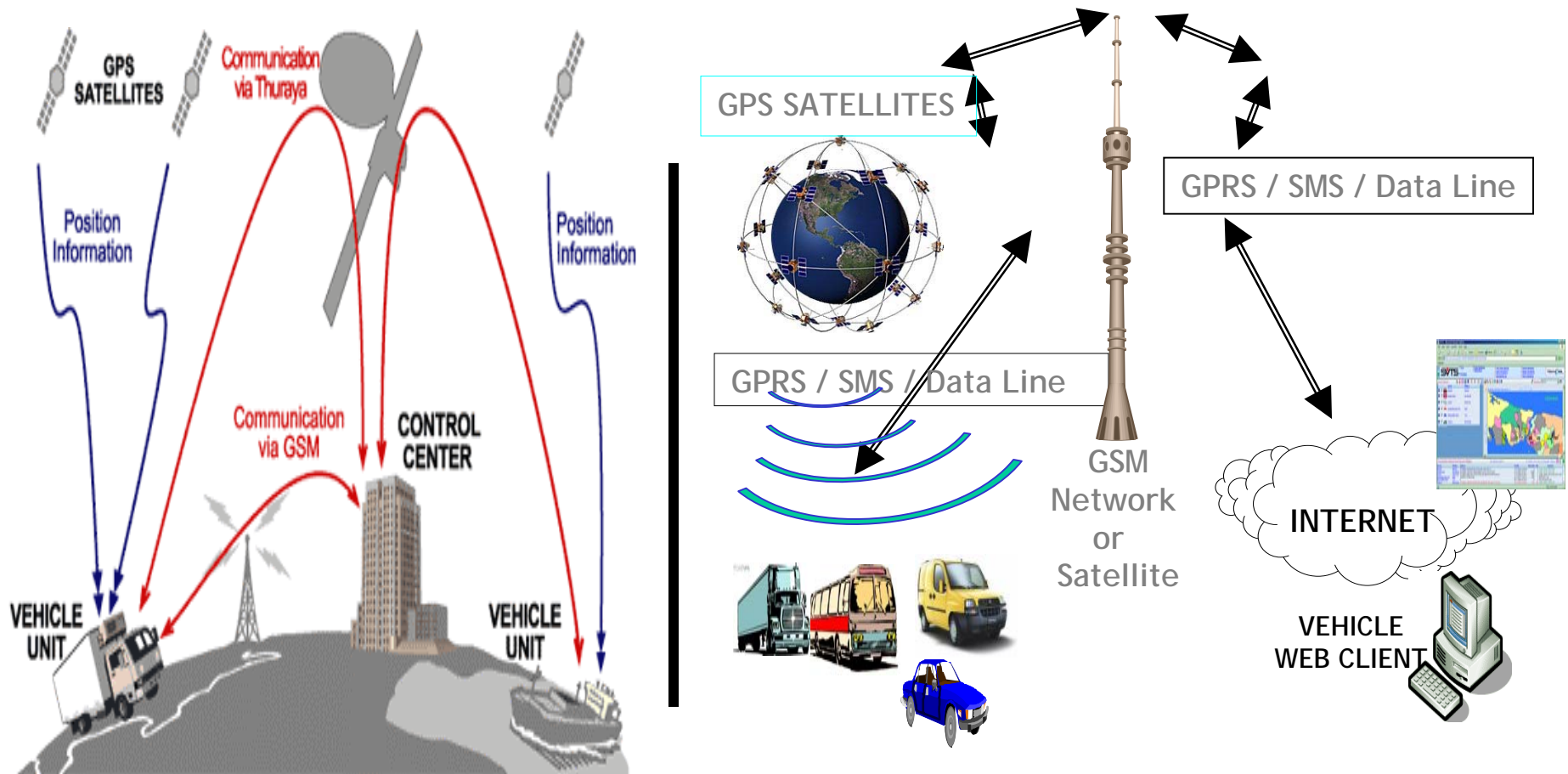
- Detailed digital maps developed enable companies to monitor their vehicles street level ONLINE

ISVTS - Subscriber Login

| | | |
|----------|--------------------------|--------------------------------------|
| Username | <input type="text"/> | |
| Password | <input type="password"/> | English ▾ |
| Company | <input type="text"/> | <input type="button" value="Entry"/> |



How Does Vehicle Tracking Work?





Vehicle Tracking Features *(a few examples)*



WHERE is the vehicle now?

You can track your vehicles ONLINE on detailed digital maps

What is the SPEED now?

You can monitor instant speed of your vehicles ONLINE

Have the vehicles exceeded SPEED LIMITS?

SVTS may alert you immediately when your vehicles exceed speed limits

Any diversion from ROUTE?

SVTS may alert you when your vehicles enter/leave predefined POINT/REGION/ ROUTE

STANDARD FEATURES

What is TEMPERATURE of vehicle?

By monitoring your vehicle's temperature ONLINE, you can enhance quality of your logistics service

Which DRIVER uses which vehicle ?

With driver ID sensor, you can detect driver ONLINE

What is FUEL-LEVEL of vehicle?

You can track fuel-level of your vehicles ONLINE for professional fleet management

Which Vehicle carries an ORDER?

By integrating your barcode system with SVTS, your customers can track their orders ONLINE.

OPTIONAL FEATURES

ONLINE tracking & Analysis of PAST DATA



Features Example -I



- *Events trigger automatic position reporting*

The screenshot displays a software interface for vehicle tracking. The main window shows a map of Istanbul with a vehicle icon labeled 'GPRS_VU_1' and a list of warning events. The events are as follows:

- 34 ABC 123 Alarm
- 34 ABC 123 Exited Zone
- Vehicle at Control Point
- 34 ABC 123 Ignition On
- 34 ABC 123 Exited Route
- 34 ABC 123 Entered Zone
- 34 ABC 123 Vehicle has exceeded idle time
- 34 ABC 123 Vehicle has exceeded upper speed limit(0)

The interface also includes a table at the bottom with the following data:

| Display Name | Plate | Address | Latitude | Longitude | Date-Time | Distance | Speed | Eve... | Des... |
|--------------|------------|--------------------------------|-----------|-----------|-------------------|----------|-------|--------|--------|
| GPRS_VU_1 | 34 ABC 123 | ÜSKÜDAR OTO YIKAMAYA AIT YO... | 41.019123 | 29.070854 | 23.12.2003 15:... | 0 | 0 | | |



Features Example -II



- When the vehicle passes the pre-defined control points, system users are informed.

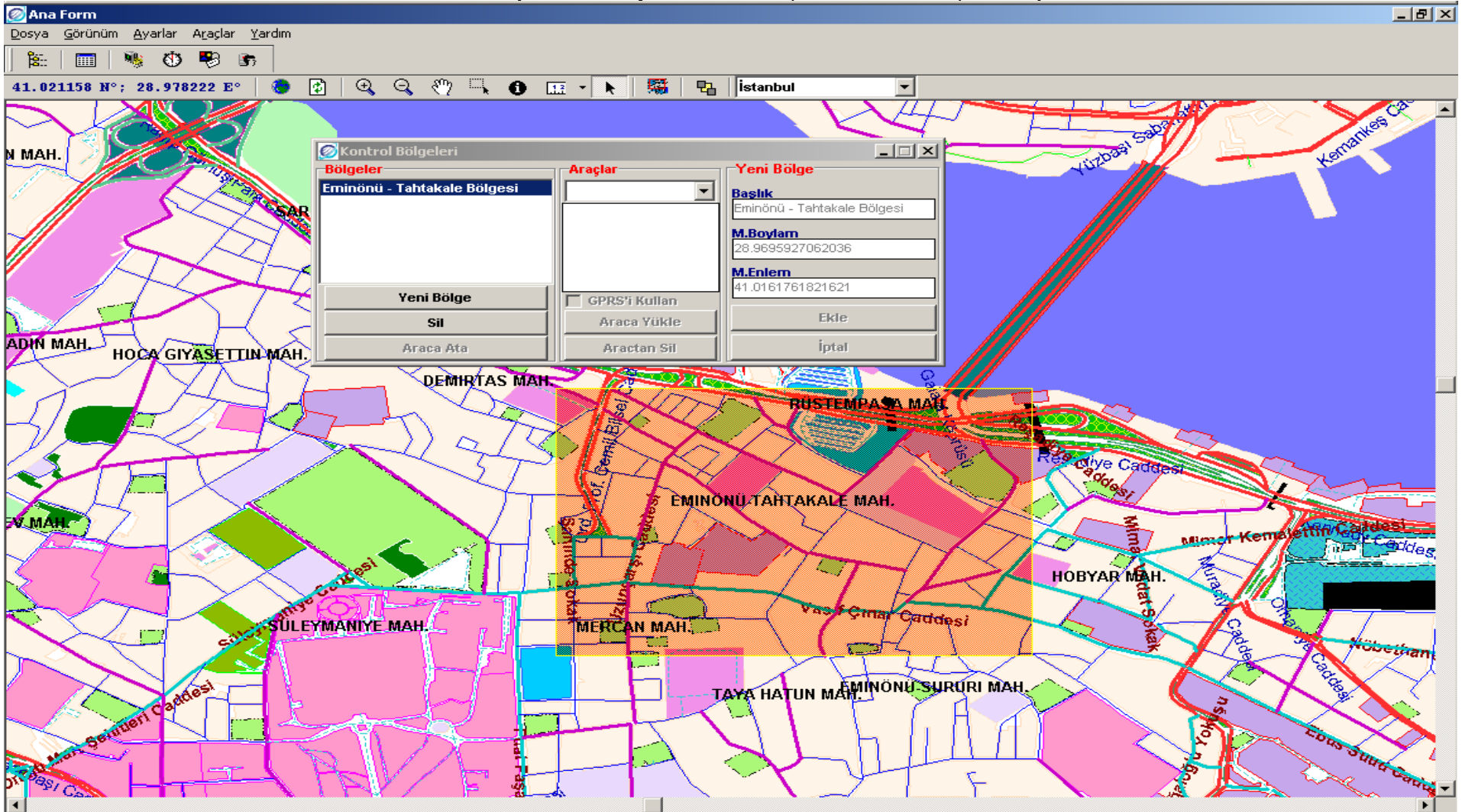
The screenshot displays a GIS application window titled 'Ana Form'. The main map area shows a street network in Istanbul, with a green area labeled 'Stad Kontrol' (Stadium Control) and a blue area labeled 'Mecidiyeköy Caddesi'. A red line indicates a vehicle's path. The 'Kontrol Noktaları' (Control Points) dialog box is open, showing a list of control points with 'Stad Kontrol' selected. The dialog has tabs for 'Genel', 'Görüntü', and 'Ayarlar'. The 'Genel' tab is active, showing options for 'Etiketi' (Label), 'Renk' (Color: ciBlue), 'Font' (Font: iWebdings), 'Boyut' (Size: 20), and 'Sembol' (Symbol). The 'Araçlar' (Vehicles) section is also visible, with a dropdown menu and an 'Araca Ata' (Assign to Vehicle) button.



Features Example - III



- System users are informed when the vehicle enters or exits the pre-defined zones (security stations, stadiums, etc..).





Features Example -IV



- *When a vehicle leaves a road, system users are informed.*

The screenshot displays a navigation application window titled "Ana Form". The interface includes a menu bar with "Dosya", "Görünüm", "Ayarlar", "Araçlar", and "Yardım". Below the menu is a toolbar with various navigation icons. The main map area shows a street network in Istanbul, with a blue route marked by red arrows. A pop-up window titled "Rotalar" is open, showing a list of routes (currently "Route0") and control options. The "Hassasiyet : İsim :" section has a dropdown set to "50" and a text field containing "2". Below this are buttons for "Sil" and "Araça Ata". The "Araçlar" section has a dropdown menu. At the bottom of the pop-up, there is a checkbox labeled "Set using gprs" and four buttons: "Araça Yükle", "Aktif Hale Getir", "Pasif Hale Getir", and "Aractan Sil". The map shows streets such as "Burhaniye Mah.", "Eski Kısıklı Caddesi", and "Kısıklı Caddesi (Eft)". The coordinates "41.030499 N°; 29.054253 E°" are displayed at the top left of the map area, and "İstanbul" is shown in the top right corner of the map area.



Benefit of Vehicle Tracking



- **EFFECTIVE FLEET MANAGEMENT**

You can manage your fleet very effectively by monitoring instant positions and status (speed, fuel level, temperature) of your vehicles

- **EMERGENCY ASSISTANCE**

Ensures safety of your vehicles, your drivers and load

- **EFFECTIVE COMMUNICATION**

You can communicate very effectively about status of the vehicles and transfer data both way

- **TRAFFIC FLOW MONITORING**

Collecting data from many vehicles will provide important instantenous traffic data

- **THEFT RECOVERY**

The system can be used to disable and recover stolen vehilces

- **ENHANCE PRODUCTIVITY**

SVTS contributes to productivity and efficiency by enabling mobile asset utilization

- **IMPROVED CUSTOMER CARE**

The companies enable their customers to monitor the vehicles serving them directly on the Web.

- **MAINTENANCE MONITORING**

Companies can monitor the maintenance situation for their vehicle

- **REPORT & TRACK PAST DATA**

You can store all data transmitted from your vehicles for measuring performance of fleet objectively.

- **REDUCE FUEL COST**

You can save significant amount of fuel by optimizing journey of your fleet effectively and stopping unauthorized mileage

- **TRANSPARENT PUBLIC SERVICE**

Public sector companies can enable the public to monitor their activities on line.

- **ONLINE WRITTEN GPRS BASED MESSAGING WITH THE SALES (OR ANY OTHER) TEAM ON THE ROAD**

Companies can exchange messages with their teams in the field.



ACTIVITY 4 *...in the pipeline*: An Early Warning System For Malaria (MEWS)



Conclusion



The various activities of NASRDA & NIGCOMSAT Limited in particular is aimed at:

- increasing awareness on the use of GNSS applications
- adopting applications of GNSS technology
- identifying actions that could be taken and partnership that could be established amongst potential users.

**NIGCOMSAT(NARSDA) IS DRIVING GNSS KNOWLEDGE
& USE IN NIGERIA**



THANK YOU