3 day Residential Training Program on
“Internet of Things”
in association with NIT, Warangal
22-24 June 2017 @ APHRDI Training Center, Bapatla.

Dr AM Varaprasad, Ex-DRDO Scientist
RCI, Dr APJ Abdul Kalam Missile Complex,
spacedevelopmentnexus.com / advisory-member
Director, CENTRE FOR ISRO GNSS STUDIES & Professor, ECE
St Ann’s College of Engg & Technology, Chirala,
www.sacet.ac.in amvaraprasad@gmail.com
This Lecture is Dedicated to the Missile man of India
Dr APJ Abdul Kalam
SPACE DEVELOPMENT NEXUS
www.spacedevelopmentnexus.com/advisory-member
IOT Lecture on  23 June 2017 @ APHRDI, Bapatla.
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Location of ‘Things’
GPS for IOT
Usage Instructions
Internet connection and GPS (Global Positioning System) / Location, must be enabled (ON) for using the application.

For menu options, click on the menu icon near logo, or on the logo or Ausodhyatmika text in the address bar else swipe from extreme left to right of the screen.

Please read the instructions provided in the menu bar, book icon.

Ausodhyatmika is Mobile for Good Awards 2016 Winner App

The award was presented at National Level, powered by NASSCOM Social Innovation forum, an initiative of Vodafone Foundation in association with Grant Thornton and NextGen.

The Mobile for Good Awards aim to recognise, promote and support mobile innovations for driving social change in India.
App for blood donation launched
App to be launched to save lives of road accident victims

Jun 15, 2017, 01:14 AM IST | Andhra Pradesh

Krishna District Collector B Lakshmikantham on Wednesday said that a special app would be launched soon keeping information regarding trauma centre, blood bank and ambulance in the reach of the victims of road accidents. Accompanied by Traffic DCP TK Rana, the Collector convened a private and government hospitals’ coordination meeting on trauma care here.
India’s own GPS / NavIC
(Navigation with Indian Constellation)
GPS satellites: 6 orbits, 4 sats in each orbit; Medium EO / altitude 20000km

24 satellite GPS constellation in motion with the earth rotating. Notice how the number of satellites in view from a given point on the earth's surface, in this example in Golden, Colorado, USA (39.7469° N, 105.2108° W), changes with time.

Japan Regional GPS with 3 satellites
IRNSS : Indian Regional Navigation Satellite System
Some IOT Applications

(scope for IOT in Govt Depts.)
Light House
Vodarevu

DGLL, Ministry of Shipping
Disaster management
Fishermen Safety
Wireless Smart Sensor Network (WSSN) for Smart Bridges
Software test

Hardware test

Final hardware assembly on the bridge site
INTELLIGENT TRANSPORTATION APPLICATIONS

(1) Electronic Toll Collection:

• Today, most toll roads are equipped with an electronic toll-collection system, like FASTag & E-Zpass, that detects and processes tolls electronically.

• FASTag is a device that employs Radio Frequency Identification (RFID) technology for making toll payments.

Courtesy: HowStuffWorks
Smart Public Transportation System

- Backhaul – 4G, WiMAX, GSM, HSDPA
- GPS Module
- 802.15.4 Module
- Environmental Sensors attached
  - Gas Sensors: CO, CO2, NO2
  - Weather Sensors: Temperature, Air Pressure, Humidity
- 802.15.4 Module

Internal sensors
- Movement detection sensor (for detecting the number of passengers)

Payment System
- NFC device
- Mobile payment

SPT Server

HSDPA/WiMAX/LTE

Mobile Device

User

SPT Station

Ethernet
ADSL
Fiber
HSDPA
$g_{\text{peak}}$ levels at 45 kmph

$g_{\text{peak}}$ attenuation on vehicle frame is 79% near the middle of trailer
Vibration Levels in $g_{rms}$: Belgian Pave Track at 15kmph & 20kmph

- Max. input level in vertical direction at 20 kmph is 0.21 which has reduced to 0.15 on missile nose cone indicating 28.5% attenuation.
- Responses in lateral and axial directions are lesser than those in vertical direction.
IoT to enable the elderly and disabled

IOT and smart homes, market is targeting the youngsters. People with disabilities and the elderly can also take advantage from IOT and smart homes, being able to stay for longer years in their own home. Providing smart homes to the elderly and equipping the disabled with IOT technologies to comfort them, makes sense.
Industries, Food Processing, Agri Business, Commerce, and Public Enterprises

• Industrial Internet of Things encompasses industrial machinery; transportation equipment (cars, trains, and planes); health care equipment; and mega systems like smart buildings, smart cities.

• Using IoT to track everything on the floor of a factory—tools, parts, work in progress, people.

• Industrial IoT / Smart Manufacturing
  Robots at work in the Industrial IoT
Offshore industry IOT
Smart Energy and Smart city
IoT in the energy sector - crucial component in Smart Cities
CTG/ Cardiotocography can be used to monitor a baby's heart rate and a mother's contractions while the baby is in the uterus.

**REMOTE MATERNITY CARE**

Remote Maternity Care is a solution for safely monitoring a baby's heart rate and uterine contraction activity at home. Using mobile devices, patients can perform non-invasive CTG tests at any time and in any place. Data is automatically transferred to the dedicated Remote Medical Care Center for a detailed analysis. Medical staff interpret the test results within the framework of dedicated procedures, and take action where any risk to the health or life of patient or baby is identified.

**BENEFITS OF REMOTE MATERNITY CARE**

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<th>For the Medical Unit</th>
<th>For the Patient</th>
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<td>Monitoring patients between appointments</td>
<td>Home CTG monitoring at any time</td>
</tr>
<tr>
<td>Shorter times of hospital treatment</td>
<td>Continuous registration of the baby’s health</td>
</tr>
<tr>
<td>Monitoring high-risk pregnancies</td>
<td>Greater comfort and increased sense of safety thanks to 24-hour care</td>
</tr>
<tr>
<td>Convenient access to patients’ medical data</td>
<td>Shorter response time to life and health threats</td>
</tr>
<tr>
<td>Improvement of image and boost of institutional reputation</td>
<td>Easier and safer access to patients’ own medical data</td>
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SERP, Women Empowerment, Child Welfare, Disabled and Senior Citizens Welfare

Child welfare
IOT platform with 15 sensors.

Connect easily to MySignals using your own Android / iOS App
TOURISM

Hospitality at hotel room: **Smart hotel room, coffee maker, smart lighting**

Air travel: **IOT enabled Check-in, security & document verification**

Smart charger: (IOT enabled) From roof top up to 13 feet.

Smart luggage: smart lock, display true weight, GPS tracked.

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Smart Luggage Market is expected to grow at a CAGR of 26.4% during the forecast period 2016-2022 to touch an aggregate of $2,353.2 million by 2022.
IOT salinity Water monitoring system for aquaculture/ fisheries
Marketing & Warehousing, Animal Husbandry, Dairy Development, Fisheries

Fish farming / Aqua culture : IoT water quality

C-EC101 (salinity)

C-MT101 (soil moisture)

Model 9100 (sensor node for fish farming)

Model 902 (sensor node for livestock)
IoT is a boon for the Indian Dairy Industry!

➢ To maintain pH of milk in the range 6.5 to 6.7 and prevent spoilage while transporting the milk to the chilling centres.
➢ Improve cattle production by accurate detection of esterous for artificial insemination
➢ To detect health issues early and prevent loss of cattle.

Fujitsu’s connected cow IoT technology
Marketing & Warehousing, Animal Husbandry, Dairy Development, Fisheries

IoT is a boon for the Indian Dairy Industry!

IoT Connected Cattle: How wearables and the cloud help farmers get their cows pregnant

"Connected Cows?" - Joseph Sirosh (Strata + Hadoop 2015)
Agriculture, Horticulture, Sericulture and Agri-Processing

Precision farming
IOT connected Farm and Android Apps for agriculture

**Precision Farming (2.5 cm)**
Field Solutions & Services
- Land Preparation
- Soil testing
- Planting & Seeding
- Spraying & Spreading
- Irrigation
- Harvest
- Water Management
- Specialty Crops
- Correction Services

Trimble Autopilot™ Hybrid Kit
- Display
- Ag25
- Operator Seat Switch
- Factory installed Steering Sensor
- Factory installed Hydraulic Valve / Manifold
Environment and Forests, Science and Technology

Water quality

Air Quality

Insects Monitoring

Monitor insects online using IOT sensors & camera.
SMART TEXTILES
Automating Textiles  Leveraging IoT

WEARABLE ELECTRONICS
- They can be used in wearable textiles to dial telephones, pager messages and control music from MP3 players.
- Examples include a business suit with a mobile phone incorporated, a child’s anorak with a tracking device, sportswear to monitor heart rate, aerobic outfits with music players incorporated, and club wear which changes colour etc.

GPS Jacket

Health care T-shirt

MAX6656  Bluetooth
MAXQ622  ECG
MAX3204  Accelerometer
MAX8671

Wireless, hands-free communication

Fabric area networks (FANs) enable electronic devices to exchange digital information, power, and control signals within the user’s personal space and remote locations. FANs use wireless RF communication links using currents measuring one nanoamp: these currents can transmit data at speeds equivalent to a 2400-baud modem.
TECHNOLOGIES OF IOT

Legend:
- Sensor
- Level of demand

8 segments, unlimited opportunities
What Does a 4-Dimensional Sphere Look Like?

Thank you for your attention