

# Latest Wireless Deployment Trends for Smart Cities

19<sup>th</sup> of April 2017

4.15pm – 5.00pm

Dubai, United Arab Emirates (UAE)

Ronald van Kleunen  
CEO, Globeron Pte Ltd  
ronald@globeron.com



**2017 BICSI Middle East & Africa Conference & Exhibition**  
Internet of Things - Data Centre, Wireless, Infrastructure  
April 19 & 20, 2017 | Al Multaqa Ballroom,  
Dubai International Convention and Exhibition Centre, Dubai

**Bicsi**  
MIDDLE EAST  
& AFRICA

# Urban Villages / Ruralization

Villages move into Cities



Road chaos after traffic lights broke down in Xi'an, China, in 2014. Traffic control sensors are vulnerable to hacking.



Source: <https://www.theguardian.com/technology/2015/may/13/smart-cities-internet-things-security-cesar-cerrudo-ioactive-labs>





# What is the definition of a Smart Nation / Island / City / Town / Village ?

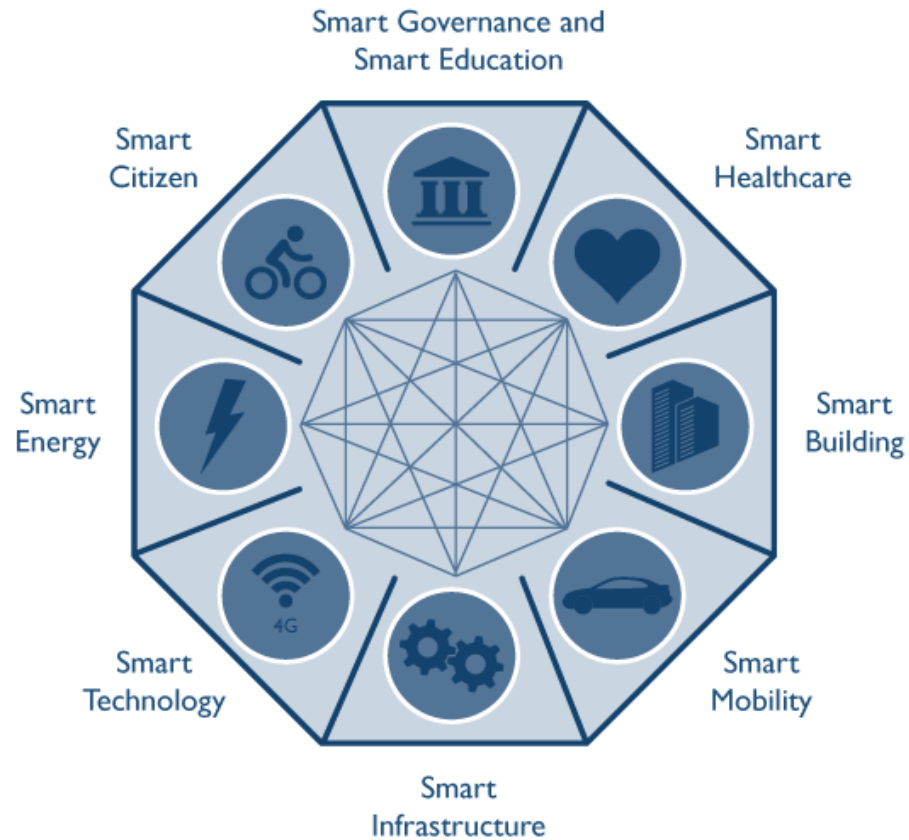


2017  
INFRASTRUCTURE  
REPORT CARD

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# SMART CITY CONCEPTS



Source: Frost & Sullivan



# ITU and UNECE

## United for Smart Sustainable Cities (U4SSC)

Source: <http://www.itu.int/en/ITU-T/ssc/united/Pages/default.aspx>



ITU and UNECE launched "United for Smart Sustainable Cities" (U4SSC) in response to the **Sustainable Development Goal 11: "Make cities and human settlements inclusive, safe, resilient and sustainable"**.



# Internet of things (IoT) and smart cities and communities (SC&C)

**ITU-T Study Group 20 (SG20)** is responsible for the development of international standards to enable the coordinated development of IoT technologies in smart cities, including machine-to-machine communications and ubiquitous sensor networks. This Study Group is also involved in studies relating to big data aspects of IoT and smart cities and communities.

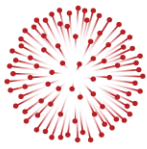
**Last meeting: 13 -23 March 2017, Dubai, UAE**



Unleashing the  
potential of the  
Internet of Things







# Smart Nation SINGAPORE

### Towards Being World's First Smart Nation

Singapore is building a Smart Nation that functions beyond the capabilities of a Smart City. With an ultra-high speed, pervasive, intelligent and trusted ICT infrastructure, as well as a vibrant ICT ecosystem with a ready pool of tech talent, which are achievements of the IN2015 masterplan, Singapore is ready to be a Smart Nation.

#### WHERE SINGAPORE STANDS TODAY

- DELIVERING E-GOVERNMENT**: 1st in the world of "digital government" in a comparative study by Accenture in 2014.
- DOING BUSINESS IN SINGAPORE**: 2nd most competitive economy and most trusted country in the World Economic Forum's "Global Competitiveness Technology Report 2014".
- LIVING IN SINGAPORE**: 1st in Asia with the highest quality of living in 2014 report by Mercer Survey.

#### DIGITALLY-ENABLED POPULATION

- data.gov.sg**: DRIVE SOCIAL INNOVATION WITH DATA. 8,800 datasets released to date on open data platform.
- OneInbox**: USEFUL E-SERVICES FOR CITIZENS. Receipts and bills, government letters.
- ACCESS TO COMPUTER**: 97% of families have a computer at home.
- ACCESS TO BROADBAND**: 87% of households have a broadband connection at home.

#### SKILLED TECH TALENT

Singapore is home to more than **146,000** infocomm professionals, with a wide range of training and development opportunities.

#### VIBRANT TECH INDUSTRY & STARTUP ECOSYSTEM

- STARTUP INVESTMENT**: S\$17 billion in venture capital funding by Singaporean and foreign investors in 2014.
- ACCELERATOR**: 100+ startups have been supported by the Singaporean government.
- ACCREDITATION**: Accredited by the Singapore Accreditation Council (SAC).

#### TECHNOLOGY-ENABLED SECTORS

Singapore continues to drive adoption of tech to enhance innovation and productivity across the various economic sectors.

- NATIONAL ELECTRONIC HEALTH RECORD**: 36 healthcare providers, including hospitals, general practitioners and specialists.
- KEY FOR PRODUCTIVITY AND GROWTH (KPG) PROGRAMME**: S\$500 million to fund and support companies to invest in the adoption and development of ICT.
- E-GOVERNMENT ONLINE GOVERNMENT SERVICES**: 98% of public services are available online.
- EFFECTIVE LEARNING AND TEACHING**: 50 applications adopted in schools for e-learning.

#### SEAMLESS & PERVASIVE CONNECTIVITY

- Next Gen Nationwide Broadband Network**: Singapore's wired network. NBN achieved nationwide fibre coverage since mid 2013. More than **550,000** subscribers served by 27 different service providers.
- Wireless @SG**: Hotspots to increase to **10,000** by 2015, and to double to **20,000** by 2016.
- FOURTH GENERATION**: Telecommunication services deployed nationwide since June 2013.

#### TRUSTED REGULATORY FRAMEWORK

- PERSONAL DATA PROTECTION**: Do Not Call Registry launched on 2 January 2014, with **> 600,000** numbers and about **3,000** organisations registered.
- ENABLING SPECTRUM EFFICIENCY**: To regulate use of TV White Space spectrum band, increasing capacity and data connectivity, and allowing consumers to access more options for wireless services.

## SKILLED TECH TALENT

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**NATIONAL INFOCOMM COMPETENCY FRAMEWORK (NICF)**  
Continual Education Training Centres to develop and launch NICF accredited courses in areas such as strategic IT risk management and enterprise business analytics.



**CORPORATE PARTNERS FOR PROFESSIONAL DEVELOPMENT**  
Centres of Attachment and Company-Led Training Programme to equip both young and experienced tech talent with expertise to take on higher-value ICT roles.

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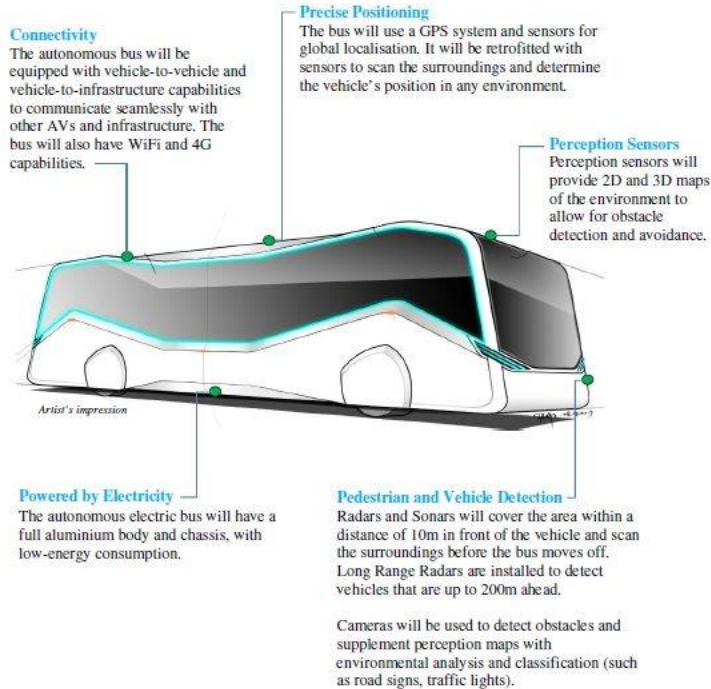
Source: <https://www.smartnation.sg/>  
<http://smartisland.com/wp-content/uploads/2015/02/Singapore-Smart-Nation.png>





# Singapore: Autonomous Buses by 2020 (Driverless)

## ST Kinetics' Autonomous Bus Prototype



Source:

<http://www.channelnewsasia.com/news/singapore/driverless-buses-to-be-rolled-out-on-singapore-s-roads-by-2020/3666002.html>



# Singapore: Solar powered Trash Bins every 50m freewifi@Orchard





# South Korea, Songdo: Clever Rubbish

The waste disposal system is also impressive - or it would be if you could see it. Because there are no rubbish trucks trawling the streets or vast bins dotted around blocks of flats. Instead, all household waste is sucked directly from individual kitchens through a vast underground network of tunnels, to waste processing centres, where it's automatically sorted, deodorised and treated to be kinder to the environment.



The waste system sucks rubbish directly from kitchens to a processing centre

Source: <http://www.bbc.com/news/technology-23757738>



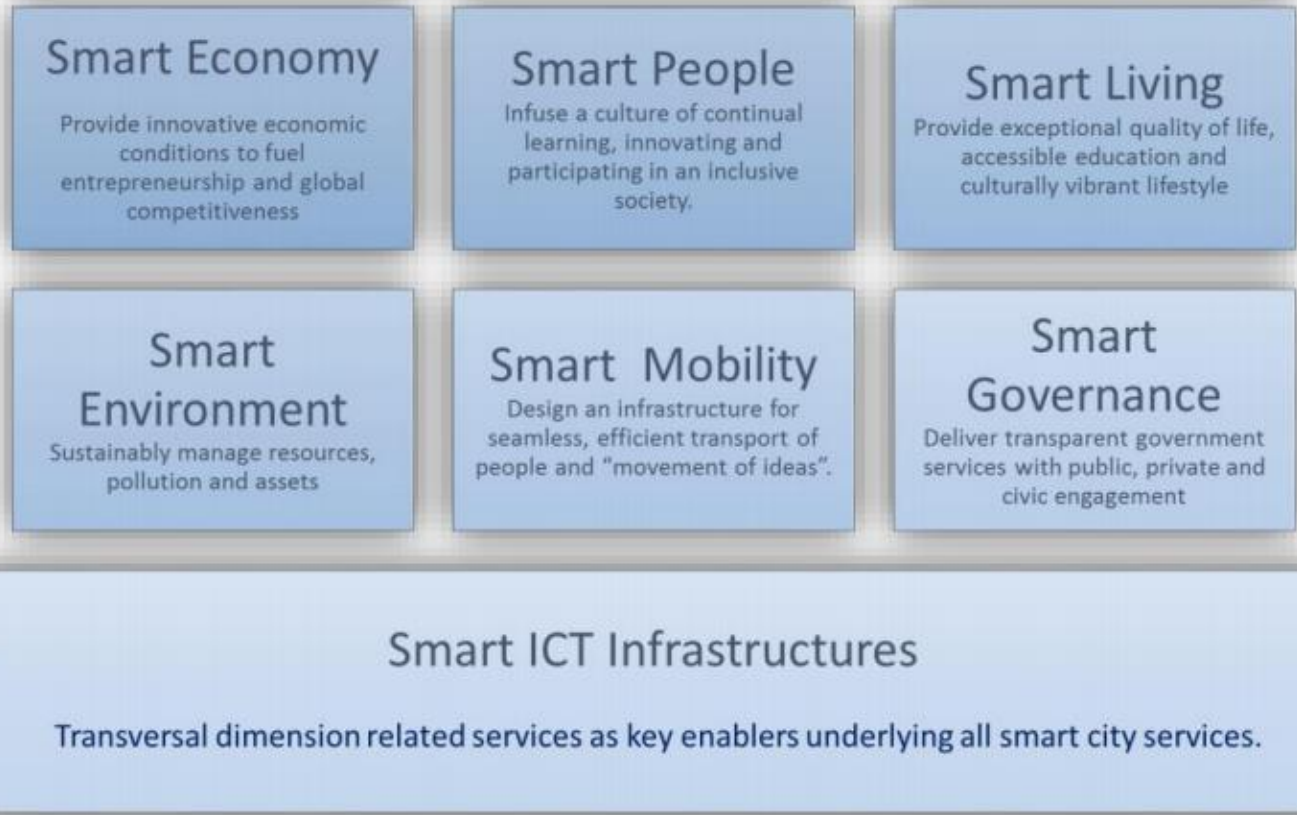


# Dubai Smart City Dimensions (Smart Dubai, 2016)



ITU-T

Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The Case of Dubai



Dubai the first city in the world to have analysed the smartness and sustainability of its urban services taking the ITU standardized KPI's.



# Smart City Expo – World Congress

smart city expo  
WORLD CONGRESS

14-16 NOVEMBER 2017  
BARCELONA  
GRAN VIA VENUE



EVENT

CONGRESS

ABROADS

EXHIBIT

VISIT

MEDIA

PARTNERS

CONTACT



Source: <http://www.smartcityexpo.com/en/>





# Digital Thailand and adoption of BICSI's ANSI/BICSI-002 Data Center Standard

The Trend Toward Thailand 4.0

Dr. Adisak Srinakarinn  
Electronic Government Agency (EGA)



10 Year Goals

- 1. Competitiveness**  
Thailand will place in the top 10 of the World Competitiveness Scoreboard  
Thailand will place in the top 40 of the ICT Development Index (IDI)  
Digital sectors will make at least 20% contribution to GDP.
- 2. Equal Opportunities**  
All Thais will have access to broadband internet, as a basic utility.
- 3. Human Capital**  
All Thais will be digitally literate.
- 4. Government Reform**  
Thailand will place in the top 50 of the UCI e-Government rankings.

Digital Thailand



EGA



**Data Center Standard  
for Thailand**

Engineering Institute of Thailand  
under H.M. The King's Patronage

Present by  
Mr. Prasitt Hemwarapornchai  
Chairman of Data Center Standard Sub-committee

**WHAT IS DATA CENTER**

ANSI/TIA 942, ANSI/BICSI-002  
A building or portion of a building with the primary function to house a computer room and its support areas.

Source:

[https://www.bicsi.org/uploadedfiles/BICSI\\_Website/Global\\_Community/Presentations/Southeast\\_Asia/12\\_Thailand4.0.pdf](https://www.bicsi.org/uploadedfiles/BICSI_Website/Global_Community/Presentations/Southeast_Asia/12_Thailand4.0.pdf)

[https://www.bicsi.org/uploadedFiles/BICSI\\_Website/Global\\_Community/Presentations/Southeast\\_Asia/1\\_DCStandard.pdf](https://www.bicsi.org/uploadedFiles/BICSI_Website/Global_Community/Presentations/Southeast_Asia/1_DCStandard.pdf)





# Spectrum Management

## The 3rd Annual Middle East & North Africa Spectrum Management Conference

The meeting point for the MENA spectrum community!

24 & 25 January 2017 / Dubai . UAE

Event Partners



The Arab Spectrum  
Management Group  
(ASMG)

Event Hosts



Source: [www.mena-spectrum.com](http://www.mena-spectrum.com)  
(24+25 January 2017 Dubai, UAE)

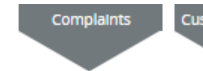


# Spectrum Management in UAE

Telecommunications Regulatory Authority (TRA) of the United Arab Emirates (UAE)

Source: <http://www.tra.gov.ae/en/services-and-activities/frequency-spectrum-management/services/nfp-plans.aspx>

## NATIONAL FREQUENCY PLAN



For searching in the Table of National Frequency Allocation, following unites shall be used:

**KHz** for frequencies up to 28 000 kHz inclusive

**MHz** for frequencies above 28 000 kHz up to 10 500 MHz inclusive

**GHz** for frequencies above 10 500 MHz.

Start Frequency (Optional)

End Frequency (Optional)

Radio Services (Optional)



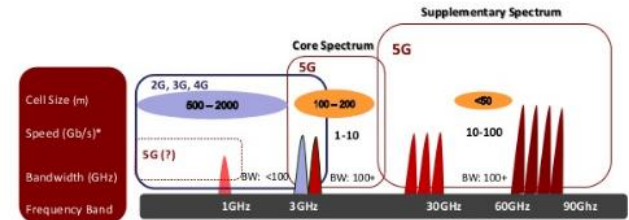
# Wireless Trends and Smart Cities

(low bandwidth sensors and high bandwidth applications)



5G (Mobile/Celular)  
Frequency

## 5G & Spectrum



IEEE  
802.11

Wireless LAN (WLAN)  
Frequencies: 2.4 GHz and 5 GHz



ZigBee® Bluetooth®



Field Area Network (FAN)  
Low-Power Wide-Area Network (LPWAN)





# Applications

- Location Based Services (LBS)
  - Outdoor (with GPS – Global Positioning Systems)
  - Indoor (Location Maps)
- Connected consumers
  - Shopping Mall / Supermarket
- Track family members (Kids)
- or items (Scooters)
- Home automation / integration
  - Thermostat / Air-Con / Door-locks / etc.

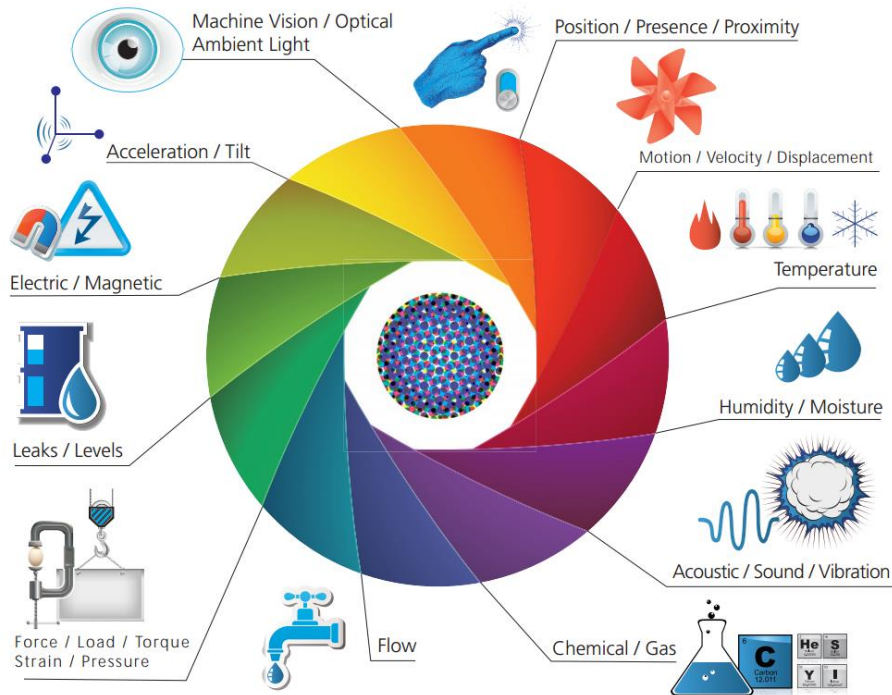


# Applications

- Parking Application
  - Only pay for what you use
  - Or enable it if you forgot to buy a parking ticket
- Food ordering (queue busting)
  - In a restaurant using tablets
- Bank branches
  - Run applications from tablets to reduce queues

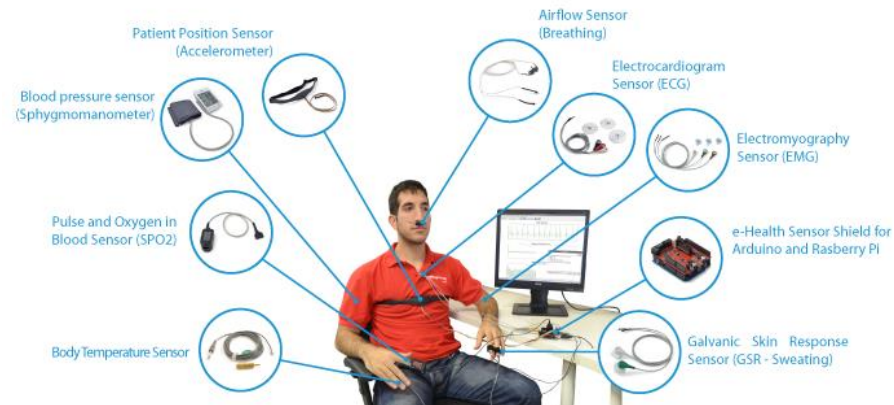


# Industrial sensors



Source: Harbor Research

# Health Sensors



Source:

<https://www.cooking-hacks.com/documentation/tutorials/ehealth-biometric-sensor-platform-arduino-raspberry-pi-medical>







# ... a Smart integrated environment



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