

Latest Wireless Deployment Trends for Smart Cities

Ronald van Kleunen

5th of October 2017

International Convention Center (ICC)

Cape Town, South Africa



5TH OCTOBER, 2017

2017 BICSI SOUTH AFRICA CONFERENCE, CAPETOWN

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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

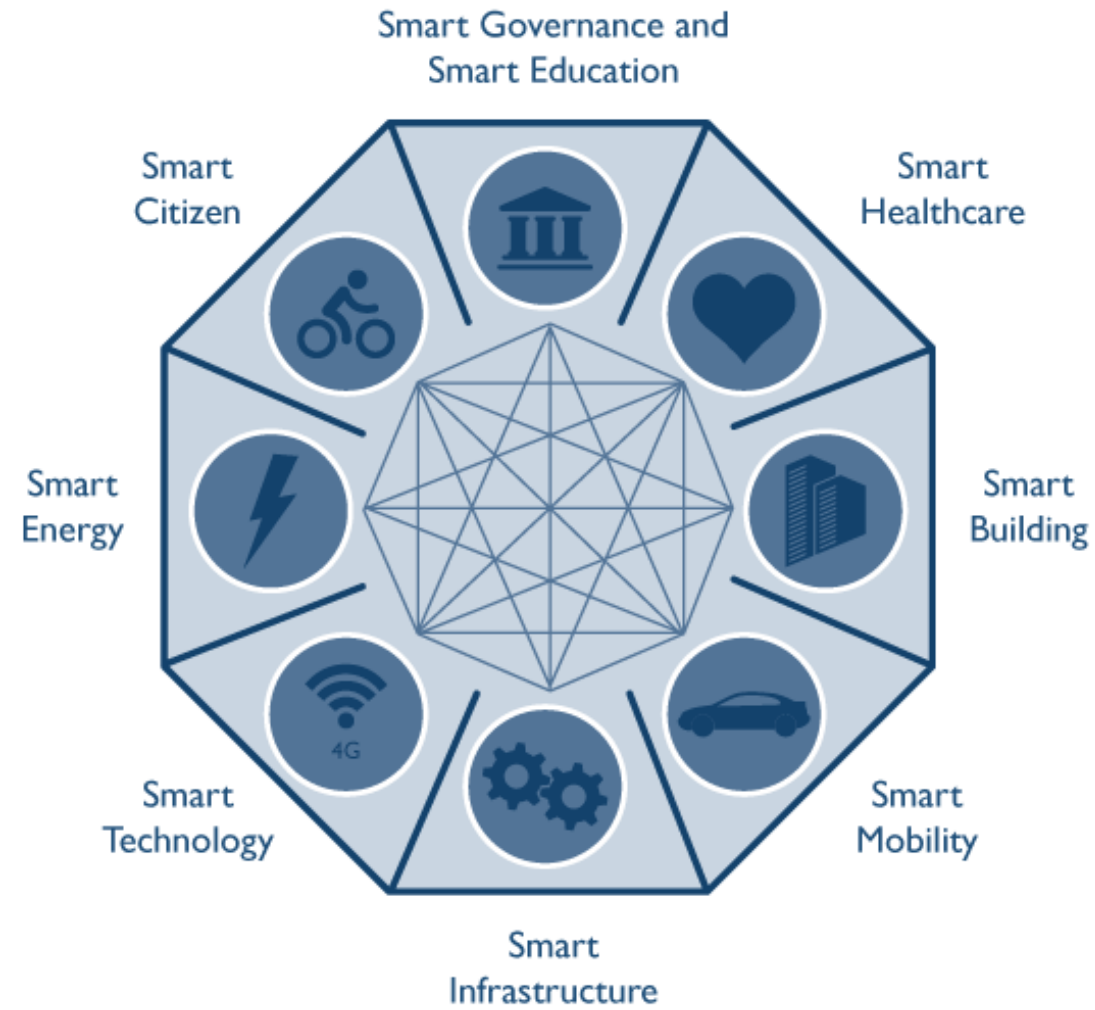
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SMART CITY CONCEPTS



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"**.



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 use of "digital government", a comparative study by Accenture in 2014.
- DOING BUSINESS IN SINGAPORE** (2nd): Most competitive economy and most innovative country in the World Economic Forum's "Global Information Technology Report 2014".
- LIVING IN SINGAPORE** (1st): In Asia with the highest quality of living in 2014 report by Mercer Survey.

DIGITALLY-ENABLED POPULATION

- DRIVE SOCIAL INNOVATION WITH DATA**: 8,800 datasets released to public to help agencies and citizens.
- USEFUL E-SERVICES FOR CITIZENS**: OneMap and government letters.
- RAISE THE ADOPTION OF INTERNET ACCESS**: \$58 million Digital Inclusion Fund to assist low-income households.
- ACCESS TO COMPUTER**: 97% of resident households in Singapore with internet-capable computers.
- ACCESS TO BROADBAND**: 87% of Singapore households with broadband.

SKILLED TECH TALENT

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

- NICF**: 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.

VIBRANT TECH INDUSTRY & STARTUP ECOSYSTEM

Key IDA initiatives - IDA Labs, Acceleration and Accelerator - to boost the tech ecosystem.

- IDA LABS**: Support the collaboration of individuals, companies and government agencies to generate innovative IT solutions in production.
- STARTUP INVESTMENT**: \$51.7 billion in venture capital.
- ACCELERATOR**: An incubator for high-growth Singapore-based tech product startups.
- ACCREDITATION/IDA**: Accredited by the Singapore Infocomm Development Authority (SIDA) to ensure quality and standards.

TECHNOLOGY-ENABLED SECTORS

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

- NATIONAL ELECTRONIC HEALTH RECORD**: 36 healthcare centres, in-home health, specialist clinics and public.
- ICT FOR PRODUCTIVITY AND GROWTH (IPG) PROGRAMME**: \$5500 million for small and medium enterprises (SMEs) to step up on the adoption and innovative use of ICT.
- COMPREHENSIVE ONLINE GOVERNMENT SERVICES**: 98% of public services in Singapore are available online for majority of them being "transacted online".
- EFFECTIVE LEARNING AND TRAINING**: 50 applications submitted for the FutureSkills programme.

SEAMLESS & PERVASIVE CONNECTIVITY

- SINGAPORE'S WIRED NETWORK**: NGNBN 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.

SEAMLESS & PERVASIVE CONNECTIVITY

SINGAPORE'S WIRED NETWORK

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FOURTH GENERATION

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TRUSTED REGULATORY FRAMEWORK

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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.

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

Connectivity
The autonomous bus will be equipped with vehicle-to-vehicle and vehicle-to-infrastructure capabilities to communicate seamlessly with other AVs and infrastructure. The bus will also have WiFi and 4G capabilities.

Precise Positioning
The bus will use a GPS system and sensors for global localisation. It will be retrofitted with sensors to scan the surroundings and determine the vehicle's position in any environment.

Perception Sensors
Perception sensors will provide 2D and 3D maps of the environment to allow for obstacle detection and avoidance.

Powered by Electricity
The autonomous electric bus will have a full aluminium body and chassis, with low-energy consumption.

Pedestrian and Vehicle Detection
Radars and Sonars will cover the area within a distance of 10m in front of the vehicle and scan the surroundings before the bus moves off. Long Range Radars are installed to detect vehicles that are up to 200m ahead.

Cameras will be used to detect obstacles and supplement perception maps with environmental analysis and classification (such as road signs, traffic lights).

Artist's impression



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

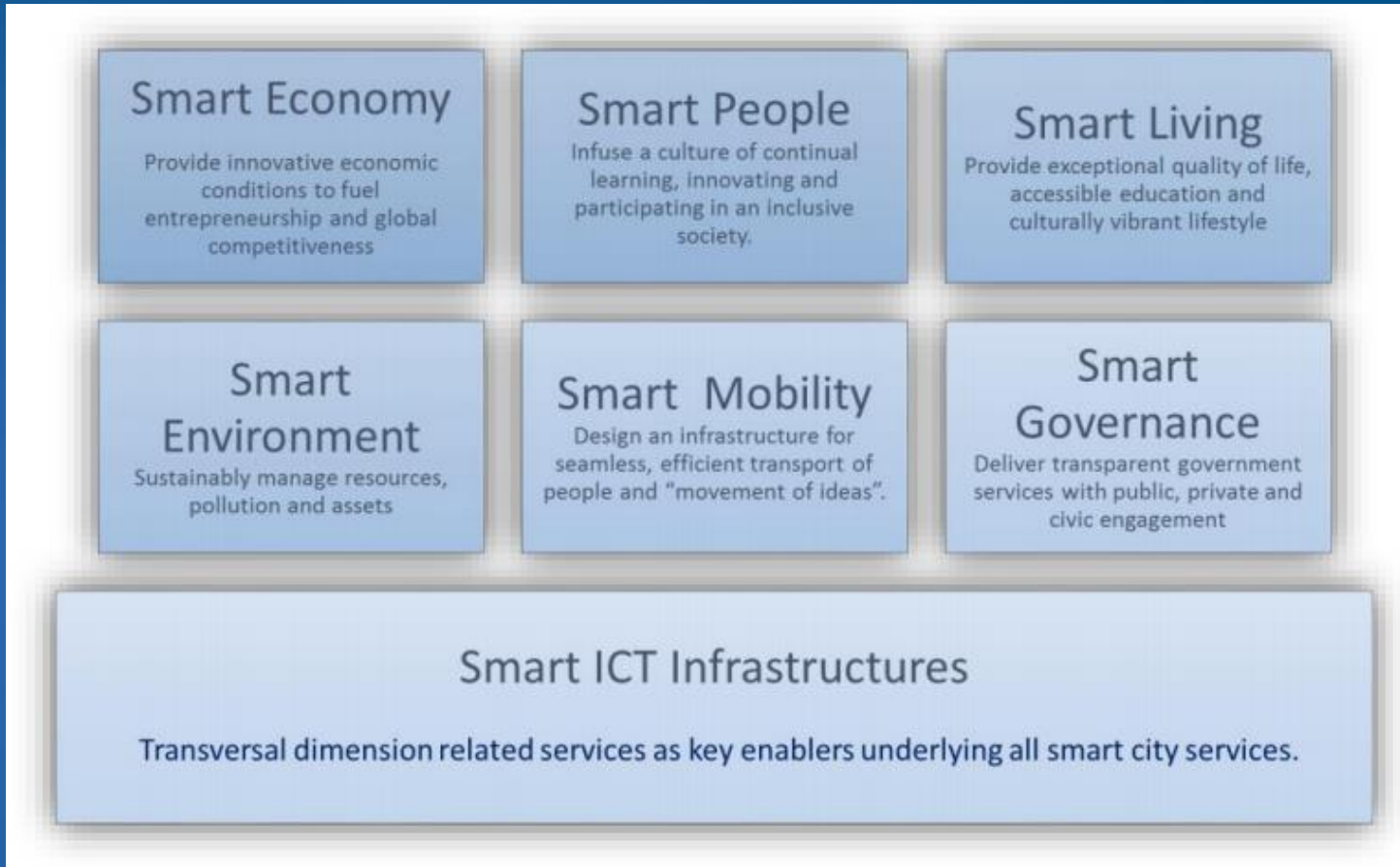
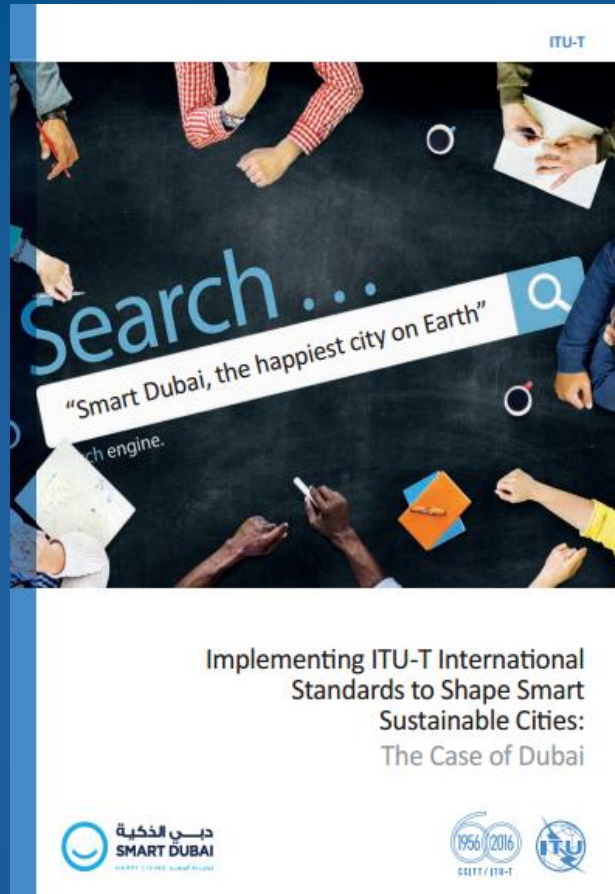
The waste disposal system is also impressive - or it would be if you could see it. Because there are no rubbish trucks trawling the streets or vast bins dotted around blocks of flats. Instead, all household waste is sucked directly from individual kitchens through a vast underground network of tunnels,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



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



Smart City Expo – World Congress



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 Srinakarín
Electronic Government Agency (EGA)



10 Year Goals

- 1. Competitiveness**
Thailand will place in the top 15 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 UN e-Government readings

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/1_DCStandard.pdf



Spectrum Management

The 3rd Annual Sub-Sahara SPECTRUM MANAGEMENT CONFERENCE

The meeting point for the Sub-Saharan spectrum community!

November 2017 / Nairobi . Kenya (tbc)

https://eu-ems.com/summary.asp?event_id=4344&page_id=9305

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

The meeting point for the MENA spectrum community!

24 & 25 January 2017 / Dubai . UAE

https://eu-ems.com/summary.asp?event_id=3308&page_id=7913 / www.mena-spectrum.com

<https://eu-ems.com/> Previous Spectrum Management events in Senegal, Morocco

All Spectrum Management series: <http://www.spectrum-series.com/>



Spectrum Management in South Africa

Independent Communications Authority of South Africa (ICASA)

National Frequency Plan

<https://www.icasa.org.za/LegislationRegulations/EngineeringTechnology/RadioFrequencySpectrumManagement/NationalFrequencyPlan/tabid/655/ctl/ItemDetails/mid/2506/ItemID/13916/Default.aspx>

Spectrum Allocation Table:

<https://www.icasa.org.za/LegislationRegulations/EngineeringTechnology/RadioFrequencySpectrumManagement/FrequencySpectrumUsageandAvailability/tabid/394/ctl/ItemDetails/mid/1288/ItemID/12762/Default.aspx>

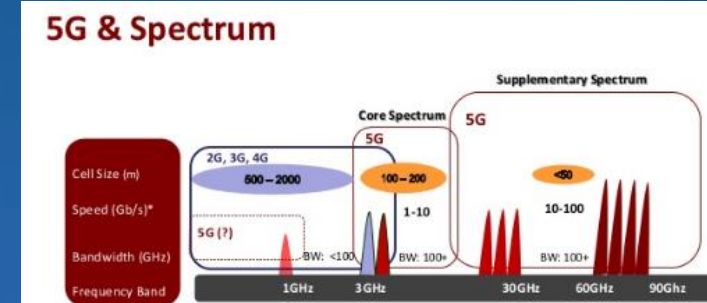
<http://www.icasa.org.za/Portals/0/Regulations/Spectrum%20Usage%20and%20Spare%20Frequencies/Spectrum%20usage%20and%20Availability/Spectrum-Usage-Availabilty-Q1-2016.xlsx>



Wireless Trends and Smart Cities (low bandwidth sensors and high bandwidth applications)



5G (Mobile/Cellular)
Frequency



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



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.



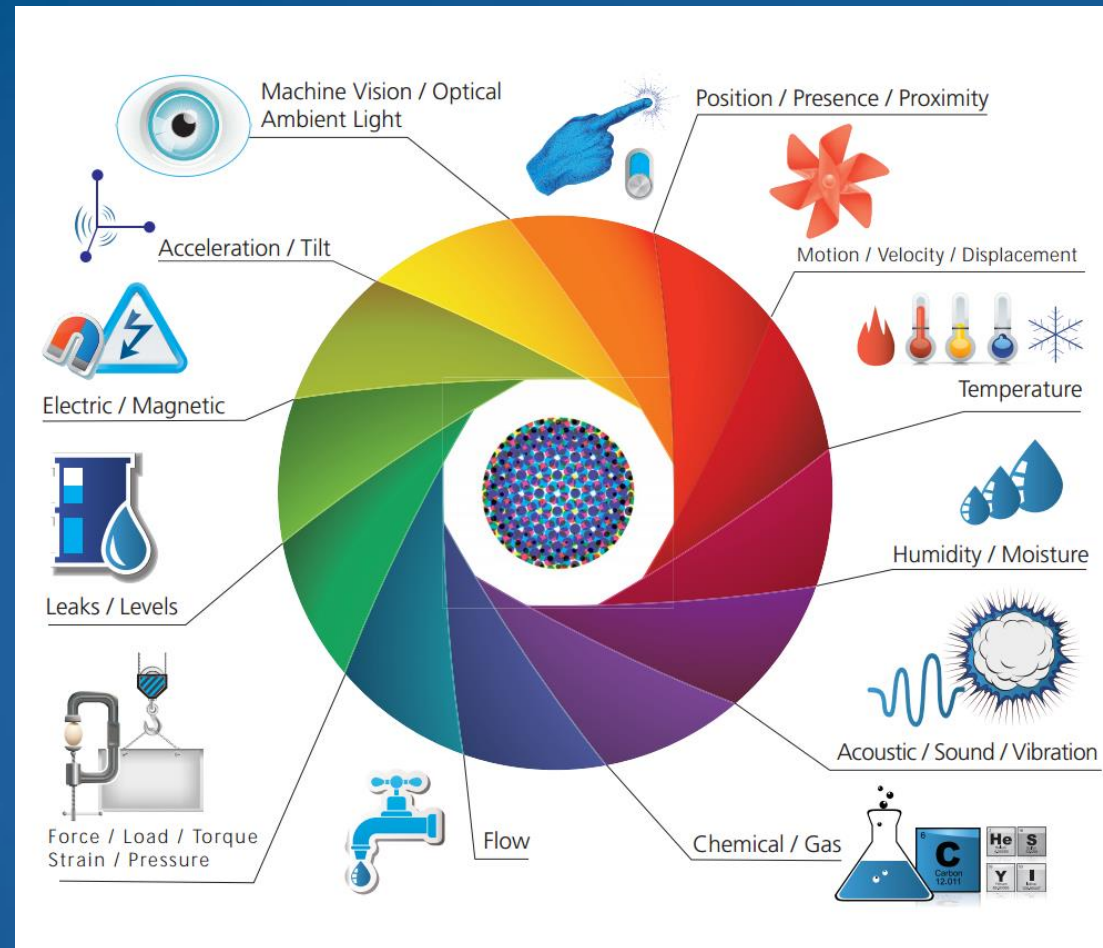
Applications

- 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



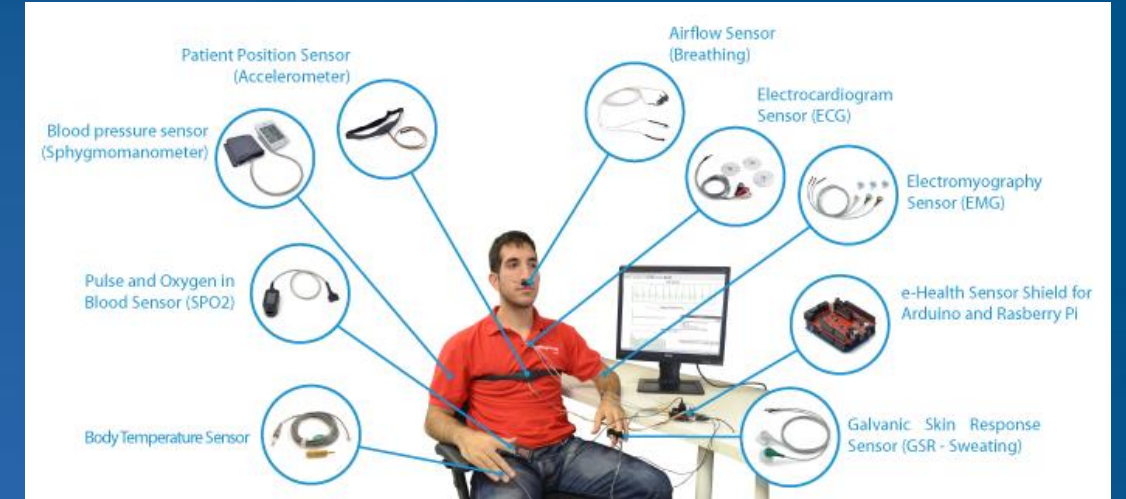


Industrial sensors



Source: Harbor Research

Health Sensors



Source:

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



BICSI Professionals are needed to create ...

- ✓ Architects and Consultants
- ✓ Audiovisual (AV) Professionals
- ✓ Authorities Having Jurisdiction (AHJs)
- ✓ BICSI Credential Holders
- ✓ Broadband Service Providers
- ✓ Cabling Installers and Technicians
- ✓ Civil Engineers
- ✓ Communications Managers—Corporate and Government
- ✓ Communications Resellers and VARs
- ✓ Construction Managers (CMs)
- ✓ Data Center Designers and Engineers
- ✓ Electronic Safety and Security Professionals
- ✓ End Users
- ✓ Facility Owners and Managers
- ✓ General Contractors
- ✓ ITS Contractors
- ✓ ITS Design Consultants
- ✓ Management Professionals
- ✓ Marketers
- ✓ Military Personnel
- ✓ Network Designers and Administrators
- ✓ Outside Plant (OSP) Engineers
- ✓ Project Managers—Government, Military, Civilian and Corporate
- ✓ Quality Controllers
- ✓ Sales Engineers and Professionals
- ✓ Wireless/Digital Professionals



... a Smart integrated environment



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