

## ANNEX C

June 2014

### FACTSHEET *Smart and Connected Jurong Lake District*

#### Background

Singapore is pushing towards becoming a world leading Smart Nation to use technology to enhance transport, healthcare and other public services. Singapore will need to build up multiple aspects of our national capabilities – from infrastructure, industry to governance – that will improve the quality of life for individuals and business productivity for enterprises. In a Smart Nation, we also seek to create an anticipatory Government that can better serve our citizens and empower citizens to make better decisions and meaningful choices to better their lives.

In a future Smart Nation, the connected transport infrastructure, with real-time intelligence, works hand-in-hand with connected vehicles and people to give the best travel experience that is reliable, timely and convenient. Relevant information is provided in real time to the right traffic junction, car, truck, pedestrian, etc. to optimise their capabilities, while aggregated information is used for increasing overall traffic handling capabilities, both from the operational and planning perspectives. It becomes possible for traffic junctions to vary traffic signaling timings in real-time to minimise traffic congestion. For drivers, more real time information on traffic and parking conditions could translate into less time spent on the road. For commuters, it becomes possible to choose different forms of transport based on their individual requirements, leveraging real-time data such as queue length at taxi stands, crowdedness at stations and bus stops, road and weather conditions, etc. For the wheelchair-bound, parents with prams, etc., it becomes easier to get information on accessible routes, alerting accessible buses of impending rides, etc.

The smart nation is also keenly aware of the need to optimise the use of our limited natural resources such as land, electricity, water, etc., while also providing a good quality of life. In highly urbanised, tropical Singapore, with greater environment sensing, better planning and continuous improvement to our outdoor spaces becomes possible. Increasing access to energy data can also translate to greater awareness and knowledge of the effectiveness of our energy efficiency efforts. We can continually improve our energy consumption, saving costs and contributing to a greener environment.

Being aware is a key step to being smart. From operational aspects such as knowing the cleanliness state of public spaces, to understanding how people move (in aggregate) for better physical infrastructure planning, real-time situational awareness makes it possible to proactively resolve issues and plan to minimise future problems.

Technologies for sensing become key as it is impractical to deploy humans for scalable and reliable sensing operations. Connected, multi-use sensors can be a key technological enabler for improving the situational awareness, which could allow better services and experience to be delivered for everyone.

### **About the Jurong Lake District (JLD) initiative**

Jurong Lake District (JLD) is one of the new growth areas identified in URA's Master Plan to support our economic growth for the next 10 to 15 years, and to decentralise commercial activities out of the city centre. Located in western Singapore, JLD will be the largest commercial and regional centre outside the city centre.

The vision is for JLD to be a leading model for Singapore in developing a mixed-used urban area that is sustainable, smart and connected. It will be developed into one of Singapore's new high-density districts, as part of Singapore's blueprint for sustainable development.

As part of our efforts to realise our aspirations, IDA in collaboration with URA, EDB and other government agencies such as BCA, HDB, JTC, LTA, NEA, NLB, NParks and SLA<sup>1</sup> have launched the Smart and Connected JLD Pilots and Trials initiative, which aims to test-bed Smart Nation applications that improve the quality of life and enable sustainable use of resources.

JLD is a "live test-bed/living lab", where connectivity infrastructure, such as Above Ground (AG) Boxes<sup>2</sup> and over 1,000 sensors will be deployed to pilot a wide variety of solutions, focusing on three main areas – urban mobility; sustainability; and improving sensing and situational awareness. IDA and partner agencies are currently working with more than 20 companies and start-ups<sup>3</sup> to progressively deploy and trial innovative technology from Q3 2014.

More pilots and trials could potentially be conducted in JLD in future. Viable solutions arising from the trials will also be considered for full-scale deployment in other development areas to support Singapore's journey towards being a Smart Nation.

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<sup>1</sup> Building & Construction Authority (BCA); Singapore Economic Development Board (EDB); Housing and Development Board (HDB); JTC Corporation (JTC); Land Transport Authority (LTA); National Environment Agency (NEA); National Library Board (NLB); National Parks Board (NParks); Singapore Land Authority (SLA) and Urban Redevelopment Authority (URA)

<sup>2</sup> AG Boxes will provide a ready-built common infrastructure for sensor deployment by supplying points to access fibre-optics connectivity and power. This reduces the need for unnecessary groundwork, thereby reducing deployment time and cost. We target to install these AG Boxes in common outdoor areas where there is demand for sensor-based technologies. These places include bus stops, parks and traffic junctions.

<sup>3</sup> Selected through an open Call-for-Collaboration

## Solutions to be deployed

### On the area of urban mobility

1. M1 will trial a seamless **connectivity solution for vehicles**, enabled by connectivity optimally switched between cellular and WIFI networks (at designated hotspots such as bus stops). This will allow data to be transmitted and collected from the vehicles. Such a technology could potentially enable enhanced vehicular fleet management such as monitoring and routing, through near real-time upload and download of a wide variety of data (e.g. video, road or weather conditions). Possibilities include better bus rides, more timely deliveries, etc.
2. RFNet, Panasonic and Elixir Technology will trial a **smart queue monitoring system** that uses advanced video sensing to determine, in real-time, the length and flow of queues. For example at taxi stands, the queue and taxi arrival status can be determined. Possible downstream usage could be at shopping centre taxi stands -- when information like potential wait times is provided to consumers, this can then help commuters make informed travel choices. In addition, the information can potentially be sent to taxi companies to alert them of potential taxi demand at busy taxi stands.
3. ST Electronics (Training & Simulation) will trial a **smart mobile walking navigation guide**, which enables the general users and specifically, users with movement constraints and certain mobility needs to navigate and traverse at ease in a highly urbanised environment. Walking routes can be customised to cater for the needs and preferences of different groups of users including senior citizens, parents with children in prams, physically impaired and cyclists. For example, only wheelchair accessible routes can be specified or fully sheltered routes for rainy days.
4. NUS will develop and test **algorithms to determine vehicular and pedestrian movement, as well as queue length**, at traffic junctions using video sensing. This aims to provide better estimation of congestions at traffic junctions. At each junction, this can potentially enable real-time optimised traffic light signaling, to benefit both drivers and pedestrians. Such data can potentially enable better overall understanding of the road network, so as to help improve the overall traffic handling capacity of our roads.
5. ST Electronics (Info-Comm Systems) will develop a common **traffic simulation platform**, to simulate and evaluate different traffic control algorithms. The objective is to identify potential ways to improve traffic signal control plans, which can help increase the traffic handling capacity of the road

network in JLD. The company will be working with the Institute of Infocomm Research to on the algorithms and models to simulate traffic flow and control.

6. NUS and SMART will trial an **autonomous buggy** to ferry passengers in the parks/gardens within JLD. The trial will seek to gauge public reactions to the autonomous vehicle, as well as to help refine the comfort and other aspects of the vehicle based on public feedback. This can potentially enable residents to have better outdoor mobility experiences, especially those which may have difficulties walking longer distances. For example, the elderly can ride to different parts of parks to enjoy different amenities and scenery.

On the area of sustainability:

7. BioMachines will pilot **uClim, a web-based service** that aims to empower planners with real-time environmental information such as temperature, relative humidity and air quality, to enable them to **monitor, quantify and visualise microclimate**. For example, urban planners could potentially use uClim to help plan, design and take action in creating comfortable outdoor spaces, where people can enjoy outdoor activities and social gatherings.
8. Green Koncepts and ST Electronics (Info-Comm Systems) will pilot an **enhanced energy management and benchmarking platform**, which aims to enable buildings and public spaces to better monitor, benchmark energy consumption and track effectiveness of initiatives to reduce energy usage.
9. Green Koncepts and ST Electronics (Info-Comm Systems) will also pilot **smart park lighting**, with the capability to adjust lighting based on factors such as time of the day and motion detection. It will also be able to automatically detect faulty lighting. This can improve park operational efficiency and reduce inconvenience to park users.

On the area of improving sensing and situational awareness:

10. Temasek Polytechnic and ZWEEC Analytics will trial an **automated system for determining the cleanliness of public areas**, using advanced video sensing and smart bin technologies. In future, this could lead to more optimised and effective deployment of cleaning resources. Such technology could potentially be used in areas where there are already video capabilities, using the footage for other uses besides surveillance.
11. ST Electronics (Info-Software Systems) will test an **automated system for detection of people smoking in prohibited zones**, using advanced video sensing technologies. This can potentially enable more optimised deployment of public officers and improve the overall quality of environment for residents.

12. NCS will trial a mobile system to aid in the **automated detection of illegal parking**, using advanced video sensing technologies. This can potentially enable more optimised deployment of public officers and improve public safety, for example detecting cars parked illegally at fire engine access points. NCS will be tapping on the video analytics capabilities of the Institute for Infocomm Research for this project.
13. ST Dynamics will trial a **platform that leverages the smartphone as a sensor**, to enable smartphone owners to contribute sensor data such as transport choices, bumpiness of a bus ride. This will allow commuters to voluntarily contribute data to potentially enable, in the future, better planning of routes, roads, etc. The data could also be analysed to determine the quality of a trip, over time helping to improve the transport experience.
14. Quantum Inventions will trial a **system that mitigates issues faced by GPS-based positioning** in urban canyons, which is common in highly urban and dense cities such as Singapore. The system aims to correct issues such as multi-path interferences and reflection. Drivers and pedestrians could then navigate more accurately around the more densely built-up areas of Singapore.
15. ST Electronics (Info-Comm Systems) will trial a **real-time, multi-modal positioning solution** to provide location information in an urban environment, especially in areas where GPS signals are unavailable (such as when indoors). The solution will leverage a multitude of information sources and technologies (e.g. Wireless fingerprinting) to provide location information. Other than improving navigation (driving and walking), this could also help enhance location-based services be more accurate and reliable, for example child locators for parents. The Institute of Infocomm Research will provide research services to develop the localization technology and algorithms.

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