

2014 GNSS.asia Taiwan Industry Collaboration Seminar Report

Deliverable D2.6.4

I. Introduction

On 11 March 2014, the ECCT GNSS.asia Taiwan team hosted several distinguished Information and Communication Technology (ICT) experts at the GNSS.asia Taiwan Industry Collaboration Seminar at NTUH International Convention Centre in Taipei. The seminar, attended by 150 representatives from Taiwanese and European government and companies, brought together technical experts and policy makers from the EU and Taiwan to share information on global navigation satellite system (GNSS) application trends and best practices as well as to discuss potential business opportunities and EU-Taiwan partnership in ICT fields.

The objective of this seminar was for industry experts to gather insights on the current opportunities for GNSS downstream cooperation, and present up-to-date market information on various application domains, as well as to offer the opportunity for direct B2B matchmaking. Based on the observation on activities and trends of the local industry, the Taiwan team set up three main themes for the seminar: GNSS receiver & Sensor Fusion, Telematics & Car Communication, and LBS & Internet of Things.

II. Attendee list

Company name	Participant name
Speakers	
European GNSS Agency (GSA)	Justyna Redelkiewicz
European Economic and Trade Office (EETO)	Viktoria Lovenberg
Department of Industrial Technology (DoIT), MOEA	Wen-Hsin Chan
IMEC Taiwan	Wen-Yen Lin
STMicroelectronics	Giuseppe Izzo
STMicroelectronics	Edoardo MERLI
Bosch Sensortec	Leopold Beer
Ford Automotive	Francis Fang
TomTom Asia	Max Lai
Taiwan Telematics Industry Association (TTIA)	Paul Chou
LiDAR Tech	Jin-King Liu
Advantech	Jeff Chen
Industrial Technology Research Institute (ITRI)	Michael Li
Institute for Information Industry (III)	Eddie Lai
Alcatel-Lucent	Zhenjun Zhu
Decathlon	Vincent Kuan
Taoglas Limited	Peter Knaz
GeoThings	Kuo-Yu Slayer Chuang
Fertta Communications	T.H. Shee
Iguassu Software Systems a.s.	Petr Bares
GNSS Team	
GNSS.asia/SpaceTec	Raine Horn
ECCT	Pascal Viaud
ECCT	Freddie Hoeglund
ECCT	Duncan Levine

ECCT	Angela Hsiao
Private Companies	
MediaTek	Siefried Chang
KYEC	Bernard Hsu
ASE	Elisha Yang
Compal	鄭清松
UMC	李明彰 Philip Lee
System & Technology	藍明傳 Michael Lan
WAVEGIS Technology	李盈村 Richard
RoyalTek	唐自立
RoyalTek	林本驊
Locosys Technology	Roger Liu
Locosys Technology	Stella Chang
Locosys Technology	Brenda Yuan
Locosys Technology	Emma Chen
GlobalTop Technology	蔡政憲
GlobalTop Technology	俞行行
Haitec	黎瑋
Haitec	李怡珊
Haitec	陳智先
Haitec	蘇裕鈞
Wistron	Jessica Huang
Wistron	Lynn Chueh
Sunplus Technology	石光志
Sunplus Technology	Tang Cheng Chen
Pegatron	童旭田
Pegatron	賴哲彥
Pegatron	黃中于
Pegatron	Jeremy Lai
Pegatron	林冠宇
Jet Opto	蔡家祥
Ubiqconn	王健雄
Quanda Storage	卓裕山
Quanda Storage	Robert Hu
E Lead	柯佳青
E Lead	吳憲昭
E Lead	歐姿青
Wonde Proud	陳志炫
ANSS BD	Jack Chang
FIC	Van Liu
Chunghwa Telecom Laboratories	林柏儔
Chunghwa Telecom Laboratories	陳志誠
Chunghwa Telecom Laboratories	王嘉綸
Chunghwa Telecom Taipei Division	黃正鑫
Taiwan Mobile	David Su
Taiwan Mobile	蔡乙嘉
Far Eastern Group	喻芝蘭
Yofa Technology	李秋明
Wieson Technologies	Jimmy Ho

SAMPO	Vincent Lee
KA TA Investment	謝學仁
Promate Electronic	Ted Jiang
PRINCO	楊之光
Integrated Service Technology (IST)	Jeffrey Lee
Epistar	梁立田
Macronix	謝文輝
Macronix	黃盛絨
Rebit Digital	萬國珍
GCOM Technology	呂炳福
GCOM Technology	李俊龍
Evest Corp.	謝光曜
Evest Corp.	溫健宗
Evest Corp.	Amanda Chen
Sinhua Electronics co., Ltd.	陳裕華
Arphic Technology	陳萬治
EEC	張景傑
Mercury Media	周中興
承運汽車服務中心	楊倉隆
31 Technology	陳明誌
31 Technology	簡敏玲
瑞宣科技	何宏哲
國豐	林信賢
天鷹科技	吳俊偉
積盛科技	蔣以恕
南山人壽證券投資部	陳可宣
Fubon Life	Christopher Kung
愛盛科技股份有限公司	賴孟煌
帆宣系統科技	姚昶宇
UBIK	Mei Ling Tsai
OPUS 先進微系統科技	林蘭玉
WIN-GNSS Technology Group	Winpower Chang
Wel-com Tech	Johnson Chang
Elidea Digital Entertainment	Chenho Chen
新琪科技	陳政泰
Government agencies & Research institutions	
Automotive Research & Testing Center (ARTC)	陳舜鴻
Automotive Research & Testing Center (ARTC)	蔡文博 Winpo Tsai
Automotive Research & Testing Center (ARTC)	黃隆洲
Committee of Communications Industry Development, MOEA	黃松平
III	Michelle Tsai
III	Augustine Tsai
III	Frank Tsai
III	Pamela Chen
III	Dennis Chen
III	Chris Chen
III	Sailer Huang
III	Bing Lee

III	Mavis Fan
ITRI	駱韋仲
ITRI	趙永晟
ITRI	王欽宏
ITRI	Rosalyn Chen
ITRI	Tzong-Tsong Miao
ITRI	Sandra Chang
ITRI	曾蕙如
ITRI	Edie Wang
ITRI	Stephen Chung
Institute of Transportation, MOTC	Ja-Ching Chou
Chung Cheng Institute of Technology National Defense University	羅本詰
TBAF	Jessica Fu
SEMI Taiwan	Terry Tsao
BSMI, MOEA	蔡碧茹
National Space Organisation, NARL	鄭竣吉
National Space Organisation, NARL	葉志輝
National Space Organisation, NARL	陳永盛
Telematics Promotion Office	Sonic Liao
Telematics Promotion Office	Betsy Sun
Telematics Promotion Office	Claire Hsu
ITS Taiwan / NTU	S.K. Jason Chang
Taiwan Telematics Industry Association (TTIA)	Miranda Tsai
European Companies	
ST Microelectronics	Polly Yang
Taoglas Limited	Wayne Yang
Ford Automotive	Sophia Su
Robert Bosch	Danny Yang
Robert Bosch	Bern Barkey
ABLE H&S	Jimmy Hwang
IMEC Taiwan	Vikey Liao
Nokia/Here	吳冠峻
FURUNO	Genta Shinohara
Iguassu Software Systems	Surivatsa Tumala
TomTom Intl. BV	Lawrence Chang
Thales Taiwan	Chris Lin
Thales Taiwan	Fabrice Ancey

III. Main highlights

Giuseppe Izzo, Chairman of the ECCT, Viktoria Lövenberg, Deputy Head of the European Economic and Trade Office (EETO), Chan Wen-hsin (詹文鑫顧問), Adviser to the Department of Industrial Technology (DoIT) under the Ministry of Economic Affairs (MoEA) delivered opening remarks at the seminar during which they welcomed greater information exchanges and future cooperation between Europe and Taiwan.

In his welcoming remarks ECCT Chairman Giuseppe Izzo said that over the past two years the ECCT, through the Taiwan chapter of the GNSS Asia project, has been actively involved in developing research and industrial partnerships between EU and Asian organisations related to the European GNSS systems. As more satellites are launched over the next two years and the availability and coverage of the signal gradually improves, the project will move into an exciting new phase as early services become available. There has already been huge growth in the location based services market and further growth will be stimulated by the increased affordability of smartphones and other GNSS-enabled platforms. These developments bring with them great business opportunities for both European and Taiwanese firms, he concluded.

Viktoria Lövenberg described the GNSS project as ambitious. She said that satellite technology is a powerful driver of the economy and will help create new jobs. Important steps have been taken through GNSS.asia by linking stakeholders and there are interesting opportunities. She also highlighted the EU's Horizon 2020, the biggest EU research and innovation programme ever with nearly €80 billion of funding available over seven years from 2014 to 2020, which will offer many opportunities for funding and international collaboration and is crucial for the success of GNSS.

Chan Wen-hsin said that Taiwan is glad to be a part of the GNSS programme. Besides DoIT's involvement, Taiwan's leading research institutes, the Industrial Technology Research Institute (ITRI) and the Institute for Information Industry (III) have been involved and are actively pursuing Horizon 2020 projects together with European partners. Chan said that DoIT will continue to support funding for R&D in satellite technology in Taiwan.

Angela Hsiao, GNSS.asia Taiwan Team Leader began the seminar presentations by introducing GNSS.asia Taiwan. She noted that the objective of the seminar is to bring together the main stakeholders to spur EU-Taiwan research and industrial partnerships on GNSS applications and receivers. GNSS.asia began at the start of 2012, runs for 30 months and has the dual objectives of fostering business link-ups and international cooperation.

After Ms Hsiao's introduction, experts from the European GNSS Agency (GSA), Taiwanese industrial research institutions, as well as major European and Taiwanese companies and innovative GNSS companies gave presentations on the latest trends in the GNSS market, best practices and potential business opportunities in the GNSS downstream sector between Europe and Taiwan. Three main themes presented in the seminar were: GNSS receiver & sensor fusion, telematics & car communication, and Location Based Services (LBS) & the Internet of Things (IoT).

Introductory session

Topic: Overview of the global GNSS market and EU funding opportunities

Speaker: Justyna Redelkiewicz, Market Development Project Officer, European Global Navigation Satellite Systems Agency (GSA)

Mrs Redelkiewicz gave an update on the current status of the European Galileo programme and GNSS programmes, an overview of the global GNSS market, as well as the funding opportunities in Horizon 2020. The European satellite navigation policy is presently implemented through the EGNOS and Galileo programmes. The European Commission has delegated upstream matters (such as satellite roll-out) to the European Space Agency while GSA is responsible for the downstream sector.

Mrs Redelkiewicz noted that with the launching of six to eight satellites by 2015, the Galileo Satellite System will have its initial operational capability and start early services by 2015. Users will be able to benefit from these services in combination with US GPS and other systems, such as the Russian GLONASS. The Open Service will be Galileo's freely accessible service for positioning, navigation and timing. It will be fully interoperable with GPS and will be used for many mass-market applications, including smartphones and in-car navigation. The Galileo Search and Rescue (SAR) service will be an important tool for locating people in distress. It will provide a 'forward link' for the detection of distress beacons, as well as a unique 'return link' feature that sends a detection acknowledgement message. In this way, people in distress will know that help is on the way. SAR will be Europe's contribution to a co-operative effort on humanitarian search-and-rescue activities – known as COSPAS-SARSAT – which helps save 1,300 lives every year.

The GNSS.asia team has held discussions with many players in Taiwan's downstream sector including chipset and application providers. Mrs Redelkiewicz acknowledged that Taiwan is especially interested in LBS and road services, noting the rapid growth in built-in navigation systems in cars and how new Intelligent Transport System (ITS) services are taking the use of GNSS far beyond in-vehicle navigation. New policies and regulations in Europe will accelerate the business case for these trends. For example, the European Parliament voted a compromise that by October 2015 all new cars and light vans in Europe have to be equipped with Galileo and EGNOS enabled "eCall", emergency devices that alert rescue services to crashes. The in-vehicle eCall system uses emergency call technology to automatically alert services to serious road accidents. It gives the location to help them arrive faster, save lives, reduce injuries and cut congestion costs.

Mrs Redelkiewicz also noted the huge growth in LBS, which she described as a perfect fit with the contemporary fast pace of life, especially in large cities because they respond to the growing needs for mobility in urban environments and for getting to destinations quickly. They also facilitate faster social networking. This combined with increased affordability of smartphones and other GNSS-enabled platforms will drive the future growth of the LBS market expected to be 10% CAGR over the next decade. Smartphones comprise 90% of LBS devices sold.

Mrs Redelkiewicz concluded her presentation by encouraging more EU-Taiwan cooperation in the Horizon 2020 Galileo-related projects.

Session I: GNSS receivers and sensor fusion

Topic: Infotainment and telematics

Speaker: Edoardo Merli, Marketing & Application Director of Automotive Product Group, Greater China and South Asia Region, ST Microelectronics

In this session Mr Merli described how with new technologies in telematics, positioning and infotainment, solutions and applications will evolve and change. Cars are now connected and there is a large range of automotive telematic applications ranging from emergency, navigation, diagnostic, tracking, security and insurance. These are opening up new business models.

Telematics is one of the biggest growth areas in the automotive space but telematics is not limited to automotive applications. Massive volumes are expected from consumer/industrial applications such as tracking people, animals, containers, valuable goods, trains and ships. Companies involved in automotive telematics naturally are very enthusiastic about the EU's decision to make "eCall" safety applications compulsory in new cars and vans in 2015. They are hoping governments in other markets will adopt similar legislation.

STMicroelectronics has released its Teseo II single-chip satellite-tracking integrated circuit to the European Space Agency (ESA) and the European Commission Joint Research Center (JRC) for testing for eCall approval. The testing campaign is coordinated by the European GNSS Agency as part of its effort to accelerate Galileo adoption. The Teseo II is a standalone satellite receiver able to use signals from multiple satellite navigation systems, including GPS, the European Galileo system, Russian GLONASS, and Japanese QZSS. This multi-constellation approach keeps many satellites in sight, delivering advantages such as shorter time-to-first-fix and continuous tracking with enhanced accuracy, even under challenging circumstances such as driving through urban canyons.

There are a lot of new players in the automotive space and some (such as Apple and Google) are forming partnerships with automakers. In the past the automotive market was closed with fixed relations between automakers and dealers but the new players are disrupting the traditional players such as in the infotainment space.

ST is developing GNSS multi-constellation receivers for the automotive market, which provide better accuracy, scalability and flexibility. While more satellites in the air will improve accuracy, getting accurate positioning out of satellite range such as in canyons, tunnels and buildings requires the integration of multi-sensors with satellites. When a satellite signal is not available, a variety of sensors will be able to give an accurate position. Mr Merli explained how ST has developed a Dead Reckoning (DR, the process of calculating one's current position by using a previously determined position) software engine to provide users with accurate estimates of a vehicle's position and velocity by

combining information from satellites and sensors. A large number of Microelectromechanical systems (MEMS) sensors will be needed in buildings, tunnels and other places not accessible by satellite signals to enable accurate positioning for LBS and to give users the same smooth experience both indoors and outdoors. In cars of the future the combination of sensors, cameras, GNSS and radar will be integrated with infotainment systems into one seamless platform. But to realize this, you need the right kind of products with the right functions at the right price.

Topic: GNSS Promotion Alliance (GNSSPA)

Speaker: Paul Chou, Secretary General, Taiwan Telematics Industry Association (TTIA)

In his presentation, Mr Chou introduced TTIA and announced the establishment of the Global Network Satellite System Promotion Alliance (GNSSPA) working group. GNSSPA will promote automotive satellite applications in Taiwan (for civilian business operations only) and cooperate with related associations worldwide. TTIA is a government supported organization aimed at developing the telematics industry. Its main functions are to make recommendations on policy to the government, establish international platforms to act as bridges for global public, the private sector and academic institutes and to coordinate among domestic associations.

The association has worked on promoting e-bus solutions and smart taxi dispatching systems among other projects. It is now promoting automotive satellite applications for the purpose of enhancing information for search and rescue, farming and fishing while cultivating the satellite industry in Taiwan in line with international standards.

The members of GNSSPA will include academics in Taiwan and over 20 industrial representatives from global satellite operators in Taiwan. GNSSPA plans to participate in the establishment of five major industrial chains, in the integration of the various relevant work and operations, including R&D on antennas, chip development, module integration and map data.

GNSSPA will serve all six of the global satellite systems and will consult experts in related associations actively to establish Taiwan's satellite industry standards, test specifications, test fields and provide certification services. Mr Chou said he is working with GNSSAsia and companies to set up a working group or task force and he welcomed others to join in new marketing initiative.

Topic: Sensing the future: Where do we go from here

Speaker: Lin Wen-Yen, Sales Director, IMEC Taiwan

In his presentation, Mr Lin presented expected future trends in GNSS receivers and sensor fusion. 30 years ago the TV series Night Rider gave us a vision of the future of the car as well as other devices. Many of these are already a reality today such as smart watches. 92% of people are now using mobile devices to get information and a further growth of 35% is predicted between 2012 and 2016. More and more positioning-enabled solutions are being used and many are helping us to save time and money. For example, the average driver spends 106 days of her life looking for parking. In Taiwan, that number is likely to be even higher given the limited number of parking spaces, especially in the cities. A parking

finder app is the solution to eliminating all this wasted time. But for it to work it will need satellites and sensors.

Thanks to semiconductor innovation, the size of antennas has been shrunk considerably over the years. IMEC works on semiconductor technology such as antennas for high precision GNSS devices as well as medical devices such as wireless cardiac monitoring patches, brainwave monitoring devices and sweat analysis sensors.

The CEO of Cisco predicts that the total value from the internet of things will reach US\$14.4 from 2013-2023 given the rapid increase in applications from connected health, smart grids, smart buildings and smart factories. These can be used for food quality control, sweat sensors (which can measure sweat, stress levels and dehydration) while air quality sensors are useful in places like China given serious air pollution.

Mr Lin concluded that more work needs to be done to realize the great potential. In particular smaller devices will increase mobility and accuracy, ultra-low power will lead to greater autonomy, reconfigurable technologies will enable new functionality and spectra, and new materials will be applied for sensing the environment.

Topic: From inertial to contextual sensing

Speaker: Leopold Beer, Regional President, Asia Pacific, Bosch Sensortec

In his presentation Beer presented technologies from inertial to contextual sensing by focusing on state-of-the-art MEMS solutions. Silicon is a much better material than steel for micro mechanical structures. MEMS, miniature systems which usually combine tiny mechanical structures with electronic circuits, are the main sensor clusters employed for indoor tracking and they are necessary for enabling the next generation of wearable devices and the Internet of Things (IoT).

MEMS first became prominent with a gaming device in 2006. Since then growth has been exponential, especially since the launch of smart phones. Given the rapid improvement in performance, shrinking size and lower cost over the years, it is now possible to have 2-3 MEMS in each smart phone.

One of the major challenges today is how to reduce power consumption. To solve this you need smart solution that turns off functions when they are not in use. Most of technologies for IoT are already there but the services are not yet in place and the business models are not yet defined
Bosch is launching partnerships to drive this.

All levels of integration are available today which means that individual developers don't need to know how various systems work. To go from inertial to contextual sensing you need accuracy, size and power efficiency but the biggest challenge is to integrate all systems and get them to work well together. In addition, a standardization of interfaces is needed.

Session II: Innovative GNSS applications

In Session II, three innovative GNSS companies: Taoglas (Ireland), GeoThings (Taiwan), and Iguassu (Czech Republic) presented their innovative products and solutions in GNSS applications.

Topic: Taoglas antenna solutions

Speaker: Peter Knaz, Senior Technical Sales Manager, Taoglas Taiwan

With headquarters in Ireland and facilities in the United States and Taiwan, Taoglas is engaged in the business of antennas for the telecom, automotive and medical industries. Mr Knaz noted that it is relatively easy to make GPS antennas but there are several physical challenges for covering all systems. The market is heading towards smart antenna modules for embedded device applications. The advantages of this is they are plug'n'play solutions, which reduce development and component costs but the disadvantage is that customers have differing requirements regarding noise and space.

Topic: Geothings and Open GeoSMS

Speaker: Slayer Chuang (Kuo-yu)

Geothings is a spin off from ITRI. The company has developed an LBS location standard and APP, which could be used for emergency and road side assistance services as well as in disaster-hit areas to coordinate emergency response teams, volunteers or other relief efforts such as delivering emergency supplies instantly. Geothings has developed an iHelp APP which allows users to quickly send pre-defined geo-tagged SMS messages with their status and profile to the emergency call center in Taiwan. The advantage of such an APP is that there is no need for a roaming package because it uses SMS. It can also be used by people who cannot speak or hear. In addition, the beauty of such an APP is that it would not require language skills for people travelling abroad.

Topic: Iguassu Software Systems

Speaker: Petr Bareš, Managing Director, Iguassu Software Systems

Iguassu Software Systems (ISS) is a Czech Republic-based company. It is a member of the Czech Space Alliance, an industry association of 14 companies of which Mr Bareš has been the president since its foundation in 2006. ISS has won more contracts from the European Space Agency than any other Czech company. It participated in the writing of the Czech National Space Plan for the government. The company is focused on EGNOS ground segment applications of space related subsystems, processing of space-based data, real-time processing. The company is looking for partnerships related to its free EGNOS educational tools for universities, which can be adapted for specific country or language needs, as well as R&D cooperation.

Session III: Telematics & car communication

Topic: European connected vehicles development and deployment status

Speaker: Michael Li, Deputy Division Director, Industrial Technology Research Institute (ITRI)

In his presentation, Mr Li gave an update on the status of connected vehicles development and deployment in Europe, and its development of cooperative Intelligence Transportation System (ITS).

Mr Li spoke about technology related to communication between vehicles (V2V) and infrastructure. Vehicles are already connected to one another, the internet, the cloud and pedestrians but the connection speed is still not fast enough. Vehicle safety applications require very low latency and existing technology cannot satisfy this need. Dedicated short range communications (DSRC) technology is suited to this.

Spectrum standards for DSRC are similar in the US and the EU. The US Department of Transportation (DoT) announced a decision to move ahead with vehicle-to-vehicle communication technology for light vehicles in February 2014. While the implementation will take several years, the DoT's announcement sends a signal to the market that will significantly enhance development of this technology and pave the way for market penetration of V2V safety applications. Similarly, in Europe, the European Committee for Standardization (CEN) and the European Telecommunications Standards Institute (ETSI) confirmed at the sixth ETSI workshop on ITS in Berlin, that the first set of car-car standards are now available and connected cars in Europe are on the way.

A number of associations are now working on development and rollout including the Amsterdam group, a strategic alliance for key stakeholders with the common objective to facilitate joint deployment of cooperative ITS in Europe. Several field testing projects of road infrastructure and management systems are in the works. For example, the corridor stretching from the Netherlands, Germany and Austria, which deploys roadside units dedicated to car-to-car communications, is set to start operating in 2015. This is just one of many such deployment projects, all of which apply the same standards and system specifications to ensure interoperability.

ITRI has been involved in supporting car makers and suppliers. It has been working with the USDoT since 2009 as well as the French SCORE@F project and participating in standard setting mechanisms and ETSI interoperability tests. ITRI has also held a contest for innovative applications.

Mr Li concluded by saying that many governments globally have demonstrated their commitment towards realizing connected vehicles in the near future. The first set of European ITS standards is complete and ready for large-scale deployment and key stakeholders in Europe are planning to deploy C-ITS in 2015. ITRI is developing DSRC solutions for connected vehicles while Taiwanese companies are moving fast and offer many partnership opportunities.

Topic: AppLink, car connectivity and infotainment

Speaker: Francis Fang, Connected Services Manager, Asia Pacific, Ford Motor Company

Francis Fang presented Ford's "AppLink", car connectivity and infotainment. Ford expects the global auto market to increase in size by another 30% from current levels to 109 million vehicles by 2020. In Taiwan, the smart phone penetration is expected to reach 80% by 2018 and most new car buyers are also smart phone users.

People want to stay connected while driving. They also want the experience to be personalized. For safety reasons, voice operated functions need to work well. Ford's Applink allows users to use phones for entertainment, phone calls and other apps on their phone through voice-activated commands. 1.5 million vehicles are already equipped with Applink, according to Mr Fang and it will soon be available in Asia. This number is expected to rise to seven million by 2015.

Ford is working with application developers to integrate their efforts with its own vehicle developers. Genivi is an open source platform maintained by Ford to integrate apps, smartphones and vehicles. Ford believes this provides a win-win solution because it is license-free and gives customers the content they want on a larger screen.

According to Bill Ford, cars are becoming mobile communication platforms and this is a great untapped opportunity. Looking ahead, in-car systems will become more responsive and seamless given connection to the cloud to personalise the experience. For example, the desired radio station can be automatically switched on, the temperature can be adjusted precisely, the best traffic route will be chosen based on conditions and a parking space will be found in advance.

Topic: Intelligent transportation by seamless and valuable services

Speaker: Jeff Chen, Chief Technology Officer, Advantech Corporation Limited

Two of the most influential factors in the 21st century are urbanization and high tech evolution. We need solutions to deal with large populations in cities. Logistics and transportation is therefore a major focus of Advantech in addition to healthcare and the home. IT is the backbone of living in a megacity. We need good cars that are as safe as possible as well as railways and metros.

Advantech is involved in many public transport projects in Europe and Taiwan, providing computers and modules such as fare collection modules, traffic management systems and toll systems. It also provides components for Taipei's U-bike and e-tag systems.

A valuable lesson that Advantech has learned through experience is that people will decide if your system is good or bad. A user-friendly approach that seamlessly combines hardware and software that is easy to use is therefore crucial. In addition, machines have to be able to withstand and operate effectively in harsh environmental conditions. Companies also have to be open and flexible to changing market needs. For example, a good e-bus system needs to combine automated fare collection with an intelligent traffic management system and a fleet management system. To make an ebus system work you need to satisfy passengers, manage the behavior of drivers and work with traffic authorities. Fleet management involves managing driver behavior and optimising operational expenditures.

So-called "big data" will be increasingly useful in the future. For example, fire-fighting services will be able to work much more effectively when fighting a fire in a building if they have instantly-accessible information on the layout of the building and the number of people living there. Communication tools linked to other emergency services such as a real-time GPS map showing the location of ambulances

would also improve the effectiveness of emergency response coordination. Besides emergency services, smart IT systems are increasingly being deployed in the logistics industry to link multiple players in the supply chain. For example, retailers will increasingly use smart systems to transport and track time-sensitive items such as perishable food.

Session IV: LBS and the Internet of Things (IoT)

Topic: Introduction and applications of airborne LiDAR

Speaker: Liu Jin-king, CEO, LiDAR Technology

In his presentation Mr Liu introduced his company's innovative technology, airborne LiDAR. Light Detection And Ranging (LiDAR), is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light. Using this technology the company produces geoinformation (geomatics) products and applications such as topographical maps. These can be used to analyse features such as surface water and ground subsidence (e.g. along Taiwan's high speed rail line). Another area is location-based services (LBS).

LiDAR is applied to various areas such as close range laser scanners and mobile systems in cars and ships. Google uses LiDAR to get 3D images of landscape or buildings. LiDAR mapping is also used to create digital models in film. For example, the environmental apocalypse movie "The Day After Tomorrow" used the technology. For the film, a team scanned 13 blocks of New York City using LiDAR. Three other teams then photographed each building from inside a building directly across the street. They then mapped photos onto models and added water and people to create the realistic images of chaos depicted in the movie.

Taking readings of 1-10 points per square metre combined with full waveform inversion, it is possible to get very detailed topography even when a direct view of the surface is blocked by dense forest canopy. Recent improvements in full waveform LiDAR can enhance signals if trees or other objects disrupt the signal, improving the results for geological and other analysis. LiDAR can provide a wealth of information on things like fault lines and volcanos.

In 2010 LiDAR Technology started a detailed mapping programme for disaster topography in Taiwan. The company has found very important geological features such as active faults near Taipei (Mr Liu reassured the audience that the definition of active could mean active within the last 20,000 years). They also analysed the areas hit by typhoon Morakot in 2009, providing valuable analysis to help estimate the potential for landslides and floods in the future.

Topic: Geofence – A low power implementation

Speaker: Max Lai, GNSS Fellow, TomTom International BV

The speaker focused on the new technology of Geofence. A Geofence is a virtual perimeter on a geographic area. When a mobile device enters, exits, stays inside or outside the Geofence, the action is

known as a Geofence event and a notification or signal indicating the event is generated from the application software. Geofencing applications are used in fleet management, Location Based Services (LBS), mobile advertising, child location services, auto check-in at venues and agriculture.

The challenge facing Geofencing is to how limit its large power consumption needs. Shifting to silicon and creating a smart system that automatically switches off power-hungry applications when not in use helps to reduce power consumption. TomTom's innovation is that it can support any shape and handle challenging environments. Moreover, receivers need to operate at full power in critical zone areas but TomTom's solution tries to keep this area as small as possible. Lai's presentation included a demonstration on how the Geofence works when users are close to a Geofence border.

Topic: The Internet of Things

Speaker: Eddie Lai, Director, Sensor Network & Smart Grid Center (SNSI), Institute for Information Industry (III)

The speaker gave an overview of the Internet of Things (IoT) and current developments at III. IoT refers to uniquely identifiable objects and their virtual representations in an internet-like structure (objects with an IP address/URI connected via a mostly wireless network) that have the ability to communicate with one another and cloud or control centres.

The number of users and applications is growing. By 2020 there will be billions of users, millions of applications and 212 billion Internet of Things (IoT) objects. Given the huge volume the potential for applications and profits is enormous. Cisco CEO John Chambers estimates that IoT will generate US\$14 trillion in profits between 2013 and 2023.

III has worked with the Ministry of Transportation and Communications (MoTC) and the Taipei City Government to collect real-time traffic data via GPS and conduct advanced data computing and analysis. In addition, it has worked with partners to develop BestLINK, an enhanced Wi-Fi transmission with an extended range of up to 250km, In-Snergy, a cloud-based energy management system, AMI, an advanced metering infrastructure and GNSS Fast Cold Start, which cuts down the length of time to acquire a satellite signal to just three seconds. III is also working on geotagging for digital photos so you can record where you took a photo.

Topic: Where mobile meets cloud

Speaker: Zhu Zhen-jun, Senior Director, Emerging Technologies and Commercialization, Alcatel-Lucent

The speaker focused on service innovations leveraging 4G/LTE and Location-Based-Services (LBS) technologies. The company is helping its customers to establish new applications and business models, not just faster internet. LTE will provide more precise location based services. Small cells in buildings will provide better and more accurate coverage, especially indoors.

A lot of new services can be developed including navigation, entertainment in 4G as well as crowd sourced traffic information. The network can provide more accurate positioning and improved big data collection.

Retail, logistics and fleet management businesses will find LBS technology essential but we are just scratching the surface in terms of new uses. For example, having access to elevator traffic data in office buildings, could be useful for a number of consumer businesses catering to office workers. Faster interaction with the cloud is important although not all information can be stored in the cloud. The right balance needs to be found to optimize what is in the cloud and what is stored on the device.

Mr Zhu concluded that there are great LBS market opportunities. He cited statistics from Pyramid Research predicting that global LBS market revenue will reach US\$10.3 billion in 2015, up from just US\$2.8 billion in 2010. Stand-alone personal navigation devices (PNDs), Google and Nokia are shifting the business model from payment to advertising-funded. Telecom carriers have unique advantages as enablers of LBS service innovation.

Topic: GNSS products used in sports applications

Speaker: Vincent Kuan, Geonaute Product Engineer, Decathlon

The speaker's presentation introduced his company's GNSS products used in sports applications. The company's products include robust devices that register items such as distance travelled and heart rate. Built-in sensors measure barometer and compass readings to help hikers, cyclists and runners. Devices can be connected to mobile phones and can be programmed to buzz or vibrate to alert users about important information as well as dangers, such as dangerously elevated pulse-rates.

Mygeonaute is a range of exercise-monitoring products combined with a cloud-based platform that helps sportspeople monitor, compare and analyse their sports activities. It allows users to measure their performance and share it with friends. The company is now also developing a coaching service. To make devices and services even better, a number of challenges will need to be addressed including reducing the still 30-plus second delay in connection times, reducing power consumption, shrinking devices further (especially antennas and batteries), improving accuracy (GNSS will be more accurate than GPS) and introducing wireless re-charging functionality.

Panel discussion

During the panel discussion that followed the presentations, TH Shee, Co-founder of Fertta Communications led the discussion among the panelists and participants on industrial cooperation between Europe and Taiwan in the GNSS downstream sector. Panelists concluded that GNSS technology holds enormous potential for business and social development. However, given the enormously diverse and complex nature of GNSS technology, it is important to develop a range of partnership in different industries. The problems of accuracy, cost and power can only be resolved by through partnerships that draw on experts from all the relevant fields. Panelists concluded that both Europe and Taiwan are key players in the future of GNSS development.

Data policy that addresses both the technical challenges related to data storage as well as privacy concerns is a major challenge that needs to be resolved to spur innovation.

Another conclusion reached is that the user experience is crucial. People want different things and user interfaces must be adapted to make devices and applications user-friendly and fun. The central focus of all service providers, therefore, should always be on how to solve the problems and meet the needs of users.

On the question of the future of other satellite players such as Beidou, panelists reiterated that the crucial difference between them and GNSS is that GNSS is a civilian-controlled system and that Europe has a strong commitment to providing an open system for global civilian benefits and not military use. The seminar concluded with the finalization of several propositions on establishing links between Taiwanese partners and European companies.

IV. Specific actions to follow up

The seminar has allowed the Taiwan team to capture well the capacity and interests of some key companies to develop GNSS-related applications in the future. These companies also have the intention to intensify the business with Taiwanese and European industry. The team will keep a close contact with the targeted companies by providing more up-to-date information on Galileo, GNSS.asia activities (ie. the 3rd EU-Asia Industry Collaboration Seminar and European Space Solutions Conference in Prague in June; ITS Europe Congress in Helsinki in June), Horizon 2020 and technological news in the GNSS field.

DoIT of MOEA, III, ITRI, TPO and TTIA have shown their support to the GNSS.asia project and its future activities. The DoIT is planning to combine the force of public and private sectors and propose initiatives and promotion strategy to encourage the development of GNSS applications in Taiwan. Taiwanese government has also set up incentives to encourage the local participation to European Horizon 2020 projects. The team therefore needs to follow up the local government's plan and strategy for further cooperation opportunities.

European companies who were not able to attend the seminar this time will be informed by the team and provided with information of potential local companies for more business opportunities. Local companies who have shown their interest in GNSS.asia will be contacted or visited individually to understand the companies' products, solutions and their requirement for European business partners.

V. Outcome of side event

On 10 March, the day before Taiwan Seminar, the Taiwan team arranged two meetings with the Taiwanese public stakeholders and the European Economic & Trade Office (EETO) to intensify the

conversation between the Taiwan public sector and European representatives. These meetings are a follow-up action after the first meetings during the Taiwan Workshop on November 2012.

Meeting with DoIT, MOEA, ITRI, III, TPO and TTIA

The meeting was hosted by Advisor to DoIT, Mr. Wen Hsin Chan. Experts from the Institution for Information Industry (III), Industrial Technology Research Institution (ITRI), Telematics Promotion Office (TPO), and Taiwan Telematics Industrial Association (TTIA) gathered with the ECCT's GNSS.asia team to look for a better understanding of the Galileo programme and GNSS.asia project, as well as the state of art of Horizon 2020 programme. This is the second time that key Taiwanese players in policy, research and industry sides were able to discuss together with the GSA representative, GNSS.asia global coordinator, and GNSS.asia Taiwan team on the future of EU-Taiwan industrial cooperation for the Global Navigation Satellite System (GNSS).

The discussion has served to present the current status of Galileo Programme and GNSS.asia project, market trends in GNSS, Horizon 2020 funding opportunities and the EU-Taiwan industry cooperation. The attendees agreed that it is urgent to promote the EU-Taiwan cooperation, notably within the scope of Horizon 2020. Mr. Wen Hsin Chan of DoIT, MOEA, Mr. Paul Chou of TTIA, as well as representatives from III and ITRI expressed their interests to understand more about the Horizon 2020 funding opportunities and the ongoing GNSS development and applications in Europe with more available elements provided from the GSA.

Meeting with EETO and ECCT CEO

The European representatives had opportunities to meet the Deputy Head of Office of EETO, Viktoria Lövenberg, and ECCT CEO, Freddie Hoeglund to exchange ideas on the continuation of GNSS.asia project and the EU-Taiwan cooperation in the future.

VI. Conclusion

Comparing with the Taiwan Workshop in 2012, the team has witnessed a much greater participation from the audience (70 participants in 2012, 150 in 2014); as well as a higher appreciation from the Taiwan industry in various domains. The Taiwan industry and the GNSS market have matured in the development of cross-sectors applications within the multi-GNSS environment. GNSS receivers, sensor fusion, telematics and car communication continue to be the hot topics in the Taiwanese GNSS market. There are more and more differentiated applications in Location Based Services (LBS), such as for the outdoor activities, commercial services, and telecommunication. Under the big umbrella of Internet of Things (IoT), Taiwan industry has started to take a closer look at the role of GNSS in the development of IoT applications.

As Galileo is a strategic programme and Horizon 2020 supports its global uptake, there is a need to have the European Commission involved and to bring key messages directly addressed to both the

government representatives and companies. Taiwanese government directs and supports the island's development of Science & Technology, and the business orientation with a top-down decision-making structure. Therefore, the interaction between the EC and the local government regarding Galileo, GNSS.asia and Horizon 2020 programmes in general would be crucial.

There is a need to stimulate the interaction between companies in Taiwan and in Europe as planned precisely within the scope of the GNSS.asia project. After receiving positive feedback from the seminar, the GNSS consortium and the local team have to plan more follow-up activities in 2014 to encourage the industrial interaction. Taiwanese companies have shown their great interest in cooperating with potential European partners.

VII. Appendix

2014 全球衛星導航系統歐台產業合作研討會 GNSS.ASIA TAIWAN INDUSTRY COLLABORATION SEMINAR

11 March 2014
NTUH International Convention Center



Co-hosts



Sponsors



For more information, please contact (English/French/Chinese):
Angela Hsiao, angela.hsiao@ecct.com.tw, +886 2 2740-0236 Ext.226
Websites: taiwan.gnss.asia / www.ecct.com.tw



The GNSS.asia Project is funded by the European Commission under the Seventh Framework Programme grant agreement No. 287244

Seminar Agenda 會議議程

Time	Programme	Speakers
8:45-9:15	Registration	
9:15-9:45	Opening Remarks	Giuseppe IZZO Chairman, ECCT Angela HSIAO GNSS.asia Taiwan Leader, ECCT Viktoria LOVENBERG Deputy Head of Office, EETO Wen-Hsin CHAN 詹文鑫 Adviser, Science & Technology, DoIT, MOEA
9:45-10:05	Overview of global GNSS market and EU funding opportunities	Justyna REDELKIEWICZ MUSIAL European GNSS Agency (GSA)
10:05-10:30	Coffee Break + Networking	
	Session I: GNSS Receiver & Sensor Fusion	
10:30-10:50	Telematics, Positioning and Infotainment: how solutions and applications will evolve and change	Edoardo MERLI Marketing & Application Director of Automotive Product Group, Greater China and South Asia Region, ST Microelectronics
10:50-11:00	Introduction of GNSS PA in Taiwan	Paul CHOU 周宗保 秘書長 Secretary General, TTIA
11:00-11:20	Sensing the future: Where do we go from here?	Peter LEMMENS GM, IMEC Taiwan
11:20-11:40	From inertial to contextual sensing	Leopold BEER Regional President, Asia Pacific of Bosch Sensortec
11:40-11:45	Q & A	
11:45-12:15	Session II: Innovative GNSS Company Pitches: Taoglas , Geothings and Iguassu	
12:15-13:10	Lunch + Networking	
	Session III: Telematics & Car Communication	
13:10-13:30	European Connected Vehicles Development & Deployment Status	Michael LI 李夏新 副組長 Deputy Division Director, Division for Telematics & Vehicular Control System, Information and Communications Research Laboratories, ITRI
13:30-14:00	AppLink, Car Connectivity and Infotainment	Francis FANG Connected Services Manager, Asia Pacific, Ford Motor Company
14:00	Intelligent transportation and seamless services	Jeff CHEN 陳贊鴻 資深副總 & 技術長 Senior Vice President & CTO, Advantech Co. Ltd.
14:20-14:25	Q & A	
14:25-14:40	Coffee Break + Networking	
	Session IV: LBS and Internet of Things	
14:40-15:00	Introduction and Applications of Airborne LiDAR	Jin-King LIU 劉進金 執行長 CEO, LiDAR Technology
15:00	Geofence – A Low Power Implementation	Max LAI GNSS Fellow, TomTom Intl BV
15:20-15:40	Internet of Things	Eddie LAI 賴維新 主任 Director, Sensor Network and Smart Grid Center, Institute for Information Industry
15:40-16:00	Service Innovations Leveraging 4G/LTE and Location-Based Technologies	Zhenjun ZHU Senior Director, Emerging Technologies and Commercialization, Alcatel-Lucent
16:00-16:20	GNSS products used in sport applications	Vincent KUAN 關名順 Geonaute Product Engineer, Decathlon
16:20-16:30	Break + Networking	
16:30-16:55	Session VI: Panel Discussion	
16:55-17:00	Closing remarks & Lucky Draw	GNSS.asia Team

The responsibility for the views presented in this document lies exclusively with the members of the GNSS.asia consortium and do not necessarily reflect the views of the European Commission or the European GNSS Agency.



Group Photo – Morning session



Group photo – Afternoon session



Seminar venue



Seminar venue



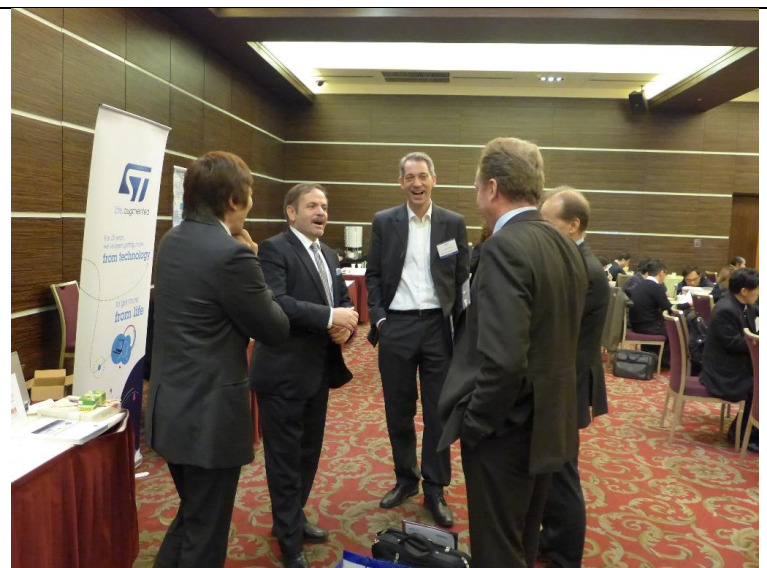
Seminar venue



Company Booth



Panel Discussion



Networking



Speaker: Justyna Redelkiwicz, GSA



Rainer Horn, GNSS.asia coordinator



Speaker: Wen Yen Lin, IMEC Taiwan



Leopold Beer, Asia Pacific of Bosch Sensortec