

GNSS. asia

EU EXPERTS WORKSHOP TAIWAN (ECCT)

05-06-2012



GNSS.ASIA TAIWAN KICK-OFF MARCH 16TH

▪ EU-Taiwan Telecom & Technology Forum

▪ Objectives

- Official Kick-off event for our project in Taiwan
- To gain public awareness on Galileo and GNSS.asia

▪ Inputs:

- GNSS.asia was the Gold sponsor for the T&T Forum
- Attendants were up to **130 people**, ICT and telecommunication companies (HTC, Advantech, CSR, ST, WNC, MITAC, TomTom), research institutes and industrial association (TTIA).
- Christophe Forax, ICT and audiovisual expert (EC), was one of the keynote speaker.

▪ Outputs:

- Communicated and obtained contacts with companies with interests in the GNSS market.
- Excellent participation & media coverage (radio, web, magazine, newspaper)
- Also promoted and supported ESNC 2012 kick-off in Taiwan
- One new member at the ECCT!



GNSS Industrial Cooperation with EU
officially listed in Taiwan MOEA 2012 agenda

GNSS.
asia

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UNDERSTANDING OF THE BACKGROUND



TAIWAN ECONOMICAL ENVIRONMENT

- **Taiwan is coming out of its deepest recession in modern times...**
 - Taiwan position in the new economic world order.
 - Economic Co-operation Framework Agreement (ECFA) signature with China
 - After-Fukushima impacts on Japanese outsourcing and investment booster to Taiwan
 - Competitiveness of Taiwan's export industries and foreign investment attractiveness
- **Taiwan's pivotal geographic location in the Far East**
 - Strategic transit point for multinational companies seeking to enter the Asian market
 - Innovative management and strong backbone of SMEs (97% of registered companies)
- **Consolidated manufacturing base and ww leader in the ICT industry**
 - Key players in semiconductor, electronics and terminal devices
 - Taiwan is No. 1 in semiconductor foundry service and IC packaging & testing services
 - Taiwan ranked No. 2 in global IC design industry
 - Taiwan owns the largest number of 300mm fabs in the world
 - Made by Taiwanese (ww shipment): 85% of PNDs, 65% of Smartphones, 86% of Tablets... Taiwan's ICT industry expected to keep booming though 2015 (smartphones, tablets, ultrabooks, smart TVs, e-book readers and Cloud Computing)



Source: CCEF



“CHAIWAN”: COMPLEMENTARY ROLES

Mainland China's Strength:

1. Product assembly
2. Large blue collar labor force
3. Large market
4. 42% of Taiwan Exports

Taiwan's Strength:

1. Home to global-leading tech industries
2. Access to large talent pool: R & D, financial services
3. Business ties with China, Japan and SE Asia
4. Better IP protection than China
5. Testing ground for China in service industries

Mainland China, a Taiwanese « hinterland » :

- 75.000 Taiwanese companies
- 23 million employees
- 150 Md US\$ Investment
- 25 % of mainland China exports

Source: CCEF

TAIWAN GNSS POLICY

- **Taiwan has no National GNSS system in place / under planning**
 - Taiwan's GNSS position is focusing on GNSS downstream sector
 - Taiwan is really interested and motivated by international cooperation on GNSS
 - One request from Taiwan TPO to push the idea to host a Galileo ground station in Taiwan
 - Taiwan government also expressed its concern about GNSS standardization...
- **Taiwan's focus on exportable GNSS downstream sector**
 - Key leadership on many technologies and applications area, addressing worldwide market (export). Limited domestic development opportunities (Road, Agriculture...)
 - Unique position in the downstream supply and value chain + diversification efforts
 - From competition "threat" to *co-opetition* strategy: integration, go-to-market (China)
- **Taiwan's GNSS "Industrial Policy"**
 - GNSS Systems follower (GPS, GLONASS...): *need to put Galileo in Taiwan's roadmap!*
 - As of today, Taiwan cannot cooperate with China on Compass (Beidou)
 - Lack of "GNSS National Agency" pushed by GNSS.asia Taiwan
 - **Short-term policy** (i.e. Industrial Return on Investment): key challenges for European players

Taiwan visto una buena posición para desarrollar conjuntamente un sistema de navegación avanzada | By Oficina Economica y Cultural de Taipei en el Peru

Taiwan seen well-poised to jointly develop advanced navigation system
2012/03/23 20:37:18

Taipei, March 23 (CNA)
Taiwan and Europe could jointly tackle the growing market for a new satellite navigation system, given Taiwan's strength in the field of electronics and semiconductors, a tech expert from the European Chamber of Commerce Taipei (ECCT) said Friday. Pascal Viaud, co-chair of the ECCT's Technology Committee, said that the worldwide GNSS (global navigation satellite system) market is growing fast...

2012 加利略創新實作大賽 (Prototyping Topic of Galileo Pro)
啟動
工研院主辦「2012 加利略創新實作大賽」啟動典禮，ITS-TAIWAN 副理事長張學孔教授 (左起)、台北歐洲商會技術委員會聯合主席 Pascal Viaud、工研院資通所副所長周勝輝、經濟部技術處科技專案室文彥、德國 AZO 總經理 Thorsten Rudolph、台灣車載資通訊產業協會秘書長周宗保等共同參與。工研院 / 提供



Taiwan in pole-position per lo sviluppo congiunto dei sistemi avanzati di navigazione
Focus Taiwan, 23 marzo.



Taiwan potentieller Partner bei Satellitennavigationsystemen

Taipei - 24. März 2012 - Taiwan und Europa sollten angesichts eines wachsenden Marktes gemeinsam Geräte für das neue Satellitennavigationssystem entwickeln.

BUZZING...

Galileo : l'UE promet son futur système de navigation par satellite auprès des industriels taiwanais

Lundi 26 mars 2012
Concurrent des systèmes globaux de navigation par satellite (GNSS) américain (GPS) et russe (GLONASS), le système européen Galileo doit entrer en service à partir de 2014. Une échéance à laquelle l'Union européenne (UE) veut préparer les industriels taiwanais grâce à un projet de coopération lancé ce mois-ci à Taiwan.

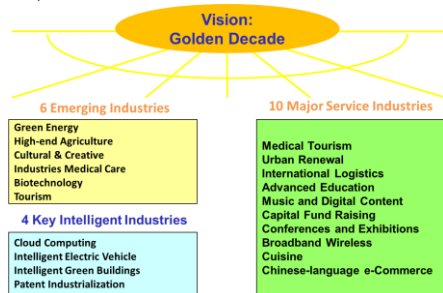


DRIVERS FOR GNSS.ASIA

- **Taiwan driving forces**
 - Internationalization (global markets and regional pivotal location)
 - Technological progress & competitiveness: from IC Manufacturing field to electronics system integration...
 - Diversification: Strong SME backbone, emerging market segments (ICT for X) risks mitigation, higher-value-added activities, services (eg. distribution into China)...

Government Action Plan: i-Taiwan

Besides, an action plan to promote Taiwan's smart handheld devices was approved by the Cabinet in March 2012 (NT\$20 billion in private investments and 150,000 jobs to be generated)



Source: MOEA (2011)

- **Existing bilateral ties**
 - European Union role as number one investor to Taiwan...
 - ITRI pivotal role in Taiwan (presence in Germany, ESNC / Galileo Pro).
 - Important network and influence from Private Sector's professional association (TEEMA, TTIA, MNA...)



ASSESSMENT OF THE GNSS DOWNSTREAM SECTOR



GNSS.ASIA'S VISIT TO AUTOTRONICS (APRIL 2012)



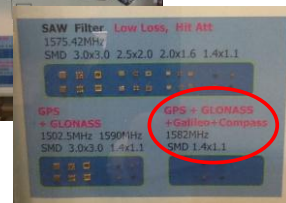
ASKEY's 5 in One SIP Module
(incl. GNSS receiver)



Car Black Boxes everywhere...
and new app (Pet locator)



TST



TST getting ready for Multi GNSS!

Major Group	System ODM companies	GNSS companies
ACER	WISTRON	WNB
MiTAC - SYNnex	MIC, MTC	Mio, NAVMAN, MAGELLAN
MSI	MSI	FUNTORO
ASUS	PEGATRON	GARMIN-ASUS, AZUREWAVE, ASKEY
KINPO - COMPAL	COMPAL	COMPAL COMMUNICATIONS
QUANTA	QUANTA	ROYALTEK
FORMOSA PLASTICS	FIC	FTI

GNSS.asia Taiwan Database: 130+ entries



TAIWAN DOWNSTREAM SEGMENT

- **Taiwan users market dominated by the LBS segment (2012 shipment: 150Mu)**

Strong growth (>60% YoY)

Worldwide export oriented + China « White Box » market focused

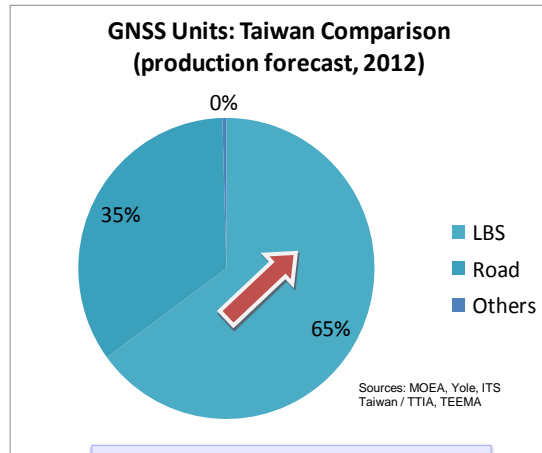
- **Road used to be the Killer segment (~80Mu)...**

Taiwan PNDs have reached its peak!

Strategic push on the 4C (car electronics) to keep Taiwanese balancing activities

Emerging killer app: Car black boxes (400Ku shipped in 2011 only for Taiwan)

Limited domestic opportunities (eg. ITS...)



Made by Taiwanese (ww shipment market share):

- 85% of PNDs,
- 65% of Smartphones
- 86% of Tablets...

POTENTIAL OF TAIWAN MARKETS (RE-EXPORT)

- **Semiconductors manufacturing & Sensor Fusion trend**

- Chipset and receivers for *All* kind of users market (mainly for 3C) – Upstream strong position
- Major trend to integrate multi sensing chips into advanced functionalities and apps (eg. Multi-GNSS)
- Strong expertise in SiP (System in Package, TSV, 2.5D interposers, 3DIC...), on top of established SoC-capable design houses (System on Chip)
- Inertial applications to complement GNSS sensor: more and more integrated (MEMS, SiP...)

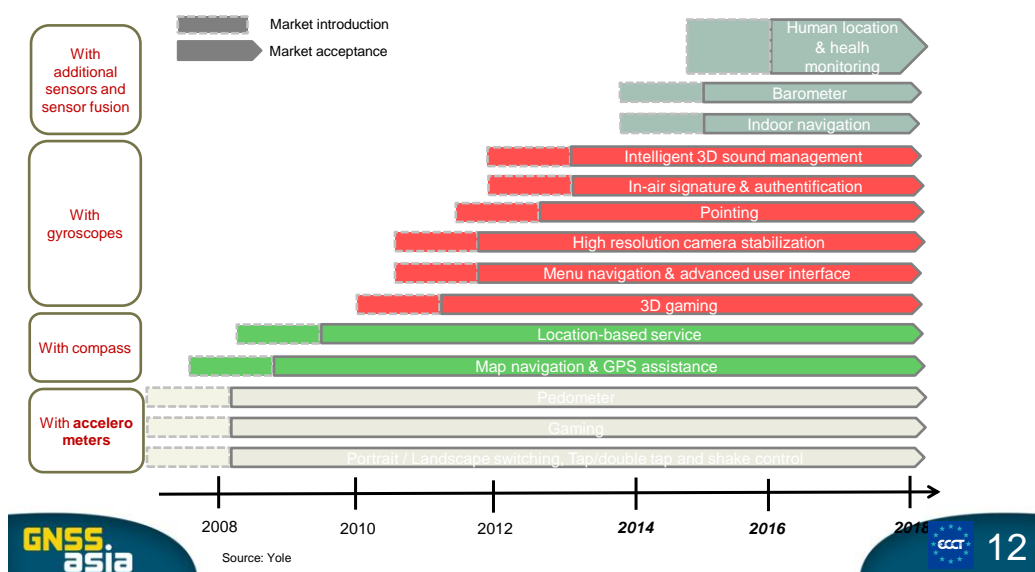
- **LBS : Taiwan ICT industry leadership**

- Smartphones and Tablets
- Taiwan EMS and OEM/ODM for Smart Handhelds(eg. Honhai, Wistron, Pegatron...) for system integration
- Turnkey solutions, complete supply chain including components distribution and logistics (Synnex, WBG)

- **Road: Intelligent transportation system (ITS) , telematics industries, car black boxes...**

- Rapid progress in Taiwan on ITS / Telematics, pushed by Taiwan strategy on 4C
- Infotainment Market is set to achieve good growth in 2012, thanks to connectivity and telematics options
- Electronics for Automotive market: mainly car after-sales market (Car Black Boxes system is a booming niche market : 400Ku expected only for Taiwan market – MITAC, PAPAGO, etc...)

INCREASING NUMBER OF MOBILE PHONE APPLICATIONS FOR INERTIAL SENSORS

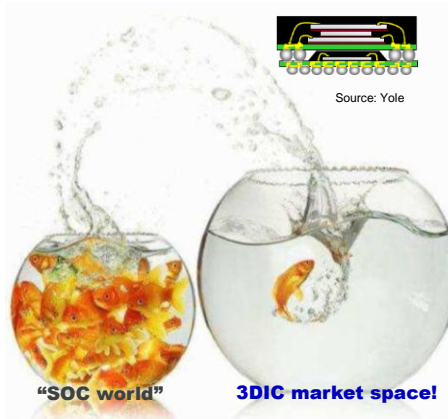
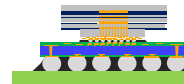


TAIWAN'S OTHER APPS: VERY LIMITED OPPORTUNITIES!

- **GNSS.asia assessed other kind applications for Taiwan Market:**
 - Search and Rescue in mountains...
 - Natural Disaster Reduction and Monitor (Earthquake, Typhoon, floods, mudflows and landslides and fires in forests)
 - For instance, Taiwan forestry bureau uses GNSS (GPS) to monitor fires in forests.
 - Agriculture & Environmental Protection: Forestry and environment protection and conservation, Endemic Species protection, Biodiversity information collection, Geographic information systems (GIS) mapping
 - No industrial player on agriculture advanced equipment and tools, but high-end agriculture is one of Taiwan key priorities (also for export): high-quality tea plantation in mountain area...
 - Fisheries / Boat: no industrial player involved on GNSS systems. Taiwan fishery fleet is largely dominated by Japanese import on GPS devices...
 - Aviation: no industry, limited activities on civil aviation GNSS development...
 - Car/Vehicle makers: very limited industrial players (Luxgen HEV/EV leveraging Yulon). 378,000 new cars registered in Taiwan in 2011. Strong industrial base on two-wheel vehicles (GIANT bicycles, scooters), on top of important domestic market.

APPLICATIONS VS. TECHNOLOGIES

- **Taiwan user's applications:**
 - Taiwan is the less populated area of all GNSS.asia countries under assessment (23M inhabitants): limited domestic market
 - Taiwanese users are early adopters + tech savvy (3C)
- **Taiwan Market should be considered as a trading / transformation hub for GNSS**
 - Major Taiwan export is electronics components, equipment and tools (46.8% in value – 2011, source: DGBAS)
 - Major Taiwan import is *also* electronics component, equipment and tools (31.6%)
- **Taiwan has a unique position in the ww supply and value chain of nano-, micro- and electronics market:**
 - Semiconductors, ODM/OEM, EMS...
 - **3D Packaging/SiP:** Taiwan represents about 69% of investment and material usage of this "Mid-End" ww market (Taiwan 2012: Material = US\$451M, Equipment: = US\$543M).



Source: Yole

Source: ASE

TAIWAN GNSS SWOT

STRENGTH

LBS devices: ww integrator and exporter
 ICT industrial leadership
 Semiconductor ecosystem
 System in Package / 3DIC
 Gateway to China user's market
 Pivotal Hub in the Far East
 EMS/ODM/OEM

WEAKNESS

GNSS for Agriculture
GNSS for Aviation
 S/W business is less developed
 Less apps oriented (vs. technology)
 Narrow domestic market (but tech savvy)
 Sensor Fusion algorithm
 MEMS (Inertial hardware)
 Lack of GNSS Agency (central point)

OPPORTUNITY

Road segment: from PNDs to ITS/Telematics
 ICT diversification: ICT for Car
 Car Black Boxes (Sensor fusion)
 No GNSS national policy: Follower!
 Multi-sensing / Multi-GNSS integrated component (flexible / low cost)
 Large SME base

THREAT

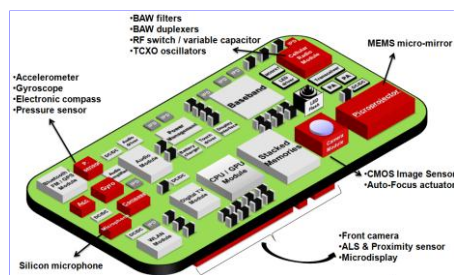
Smartphones & Tablets manufacturing market totally dominated by Taiwanese!
 Public Procurement (despite GPA) for domestic market (infrastructure...)
 International isolation
 Short-term focus (vs. Galileo timing)
Chaiwan GNSS? – Compass (Beidou) market development in China

POTENTIAL OF INDUSTRIAL COOPERATION



COMPLEMENTARITIES BETWEEN EU AND TAIWAN

- Apps vs. Technology
- System on chip vs. System in package (SOC vs. SiP)
- Software vs. Hardware
- Sensor fusion algorithm vs. 3D Packaging
- More-than-Moore vs. Moore's Law (eg European MEMS leading position)
- Solution vs. System integration



Source: Yole



Source: STM

IDENTIFICATION OF BUSINESS SECTORS OF INTEREST

▪ Micro and Nano Electronics

Key industrial cooperation area between Europe and Taiwan: Highly integrated ecosystem and supply chain

- IC Design: Taiwan Houses partnership, in particular linked to design kits (HTC, Apple, White Boxes...)
- IC Front-End: MEMS for Inertial modules and combo (Taiwan MEMS Foundries: US\$80M in 2012)
- IC Back-End: 3D (SiP) capabilities in Taiwan for sensor fusion and multi-GNSS receiver integration

▪ Smartphones and Tablets

LBS segment as #1 market (full value and supply chain): from receiver up to complete devices, with a strong focus on smart handheld sector

Smart handheld devices production value projected to reach US\$43.2b in 2015 (from IC design to application services) – Sources: MOEA

- Software integration and applications development (Go to Greater China Market)
- Components to system integration
- ODM/OEM Business Model

▪ Road: 1st diversification priority for Taiwan ICT

- ITS & Telematics applications, systems and solutions
- Car Black Boxes: sensor fusion (Imaging, Inertial, GNSS), Regional Go-to-Market



TAIWANESE INTERESTED ENTITIES

- Industrial research institutes: ITRI and III
- Industrial associations: TTIA, ITS Taiwan, TEEMA, MNA
- IC Foundry: TSMC, UMC, APM, tMt
- IC Design: MediaTek, Mstar, Novatek, Realtek, Pixart, Sitronix
- IC Manufacturers: TST, ASKEY, Skytraq, Domintech
- S.A.T.S.: ASE, SPIL, THEIL, PII, KYEC
- GPS devices/PND: Holux, RoyalTek, E-LEAD, MiTAC (Mio), ASKEY, Maction (PAPAGO!), WNC, Funtoro, Naviking...
- Smartphones & Tablets (OEM): HTC, ASUS, Acer
- Systems (ODM): Advantech, Wistron, MSI, PEGATRON, Quanta, Compal, MiTAC, Gigabyte...





GNSS.ASIA TAIWAN STRATEGY



- **Industrial Cooperation vs. Applications related cooperation:**
 - *Upstream Technologies* to be considered as the first priority: **Micro and Nano Electronics**
 - Taiwan technological key strengths for major trends: **Sensor Fusion** and **Multi-GNSS** integration
 - Taiwan ecosystem and integrated supply chain, to boost go-to-market strategy (including China)
 - European key complementary areas: Software integration, sensor fusion algorithm, SOC design, MEMS design (Inertial module and combo)
- **Applications cooperation strategy:**
 - Focus on **LBS** (leveraging Taiwan strong leadership on smartphones and tablets)
 - Consider cooperation on **Road** segment, considering Taiwan's motivation to diversify its ICT industry: ICT for Car, as a first priority for Taiwan + European key strengths

	LBS	Road	Aviation	Agriculture	Civil Protection	Maritime Transport
TAIWAN	• Very Advanced - expected to keep growing (export to ww and China market)	• Advanced- expected to grow, due to Taiwan prioritization (ICT for car)	• Very Limited – No interest	• Very Limited – Limited interest on forestry & high-end agriculture (tea...)	• Limited – Some interest and growth on natural disaster search & rescue and crisis management	• Very Limited - Totally relies on Japan GNSS devices and solution import

ISSUES TO BE CLARIFIED

- ITS development and strategy at ITRI, including government promotion strategies and local development.
- Practices and issues on public procurement in Taiwan (GPA: progress on ECCT position papers)
- Taiwan Government's new action plan on the promotion of Smart handheld devices (March 2012)
- Government transition:
 - MOEA heads: major changes!
 - "ICT Minister" still under *definition*...
- **Idea to create a GNSS one-stop-shop agency in Taiwan, to be developed (Invest in Taiwan, ITRI, MOEA)**

IMPACT ON THE ROADMAP / SEMINAR

- **EU Industrial Seminar (September 26th)**
 - Possibility to invite Country's delegation in Brussels to the event (Taiwan & China in the same room?)
- **GNSS Workshop (November 6th)**
 - Co-organized with the ITST-2012 international conference (sponsors include IEEE, NCU, TTIA...).
 - Cross-feeding event to our GNSS.asia workshop organized in parallel (visibility, international delegations on site, Taiwan ITS tour and visits...)
 - GNSS.asia: Daniel Ludwig (TBC) and Taiwan team
 - GSA: Justyna REDELKIEWICZ, Project Officer



INDUSTRIAL COOPERATION: NEXT STEPS...

- **Keep supporting information flow from Galileo to relevant stakeholders in Taiwan...**
- **Recommend and start GNSS-related industrial cooperation**
 - Simplify interfaces in Taiwan, linked to GNSS activities: “One-stop-shop” concept under discussion...
 - Leverage existing activities and extend them (eg. Galileo masters)
 - Focus on “ICT for GNSS” industrial cooperation (CFI)
- **Support piloting and implementation of these activities**
 - Develop novel ideas to promote “open lab” concept, industrial cooperation platform (micro and nano-electronics), and smart integration (SoC, SiP, H/W & S/W on LBS and Road segment)
 - Investigate “Clusters-to-Clusters” concept (C2C), in order to support permanent representation of European Technology clusters in Taiwan (and vice-versa), embracing SME, Public research centers, academics and multinational companies *co-opetition* (eg. Minalogic, DSP Valley, Silicon Saxony...).
 - Possibility to leverage Annual Work programme for Grants in 2012 for Cooperation with ICI: “Business Cooperation Programme for Chinese Taipei (Taiwan) – Q3-Q4 2012”

“The programme will also promote closer business cooperation between the EU and Taiwan in specific sectors such as ICT, ...”
 - Opportunity to create on-site “ICT4X” cooperation enabling platform, directly in Hsinchu Science Park (ECCT going to Island wise expansion, out of Taipei...) Q1-Q2 2013



GNSS. asia

Thank You
謝謝

05-06-2012

