出國報告（出國類別：國際會議）

參加 GeoSmart Asia 2015 會議

報告書

服務機關：內政部
姓名職稱：邵技正泰璋
葉技士全德
服務機關：內政部國土測繪中心
姓名職稱：劉正倫 主任
蔡技正汶諭
派赴國家：馬來西亞
出國期間：104年9月28日至104年10月1日
報告日期：104年12月31日

摘　要

「GeoSmart Asia 2015」會議於104年9月29日至104年10月1日於馬來西亞吉隆坡舉行，會議主題是邁向下一個大躍進(Towards next big leap),主要探討亞太地區空間資訊技術發展與區域永續發展及智慧應用。該會議中也邀請了印尼、菲律賓等國家測繪製圖機構、國際製圖學會總裁、國際地理空間協會(OGC)技術長及美國、澳洲、日本、韓國、泰國、越南、菲律賓、斯里蘭卡、孟加拉等個國家在地理空間資訊情報及製圖方面的政府、機構、專家及學者發表各該機關的發展與應用。其中內政部國土測繪中心(以下簡稱國土測繪中心)受邀簡報本國地理空間資訊技術及應用發展現況，以與各國與會代表交流。

為表彰亞太地區各政府及機構在空間資訊應用方面的卓越表現，特設立「亞洲地理空間獎」，並於大會啟始會議時頒獎，國土測繪中心產製的「通用版電子地圖(Taiwan e-Map)」榮獲「亞洲地理空間應用卓越獎」。

會議歷時3天，共139場簡報發表，除全體會議宣達不斷發展智能地理空間技術與政府及企業之地理空間解決方案外，依地理智能基礎設施、亞太地理情報、油礦探勘、土木電力、氣候變遷、災害管理、土地管理、智慧城市、地理治理及智能應用等專題，分為6個場地，進行國際專業交流。

國土測繪中心利用地理空間相關技術，發展地理(國土)資訊系統相關基礎圖資維護與供應機制，一方面期望透過利用相關技術快速產製高精度基礎圖資，另一方面亦期望相關技術能支持圖資快速更新作業。透過參與本次會議，能了解空間地理資訊相關應用領域、空間地理技術最新發展和應用前景以及東南亞相關國家在NGIS建置和發展情形，以作為我國推動空間地理資訊技術應用與發展之參考。

關鍵字：GeoSpatial、GIS、UAV、OneMap

參加 GeoSmart Asia 2015會議報告

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壹、緣起及目的

一、主辦單位地理空間媒體與通信公司(Geospatial Media and Communications)為促進世界地理空間技術運用與瞭解，每年舉辦7場國際級研討會，其中亞太地區2015年結合智慧城市及情報應用，於馬來西亞吉隆坡召開亞洲智慧地理論壇「GeoSmart Asia 2015」國際研討會，主辦單位經理 Megha Datta 於本(104)年7 月3日以電子郵件邀請內政部國土測繪中心(以下簡稱國土測繪中心)主任於該國際會議 GeoLand 專題會議中進行演說，以空間資訊相關技術應用於土地管理方面為主題，經與主辦單位聯繫結果，主辦單位同意國土測繪中心指派蔡技正汶諭為特別來賓，並負擔會議期間住宿及往返機票費用(如附錄一)，於 GeoLand 簡報主題為我國土測繪圖資與整合流通之現況與未來展望，報告我國各項基礎圖資的種類、產製方式、應用技術、供應流通及未來發展願景。

二、國土測繪中心配合國家地理資訊系統發展，辦理基礎圖資測繪工作，其中最重要的通用電子地圖，為政府首次自製之核心圖資，內容包含路網、水系、建物區塊、重要地標及行政區界等。為積極參與國際事務，增進亞太地區內國家產官學界交流，宣揚我國治理成果，乃報名參加「GeoSmart Asia 2015」亞太地理空間應用卓越獎選拔活動，期望為國爭光。經過嚴格評審後，成為本次獲獎的4個國家之一。因此由國土測繪中心主任劉正倫代表前往領獎，並由內政部地政司2位主辦測繪與土地管理業務之同仁一同參加，以觀摩學習它國測繪技術應用及土地管理施政成效。

貳、出國行程

一、 會議時間及地點

本次會議時間自104年9月29日至10月1日，地點在馬來西亞吉隆坡的普度拉世界貿易中心（PWTC，Putra World Trade Centre）。

圖1:普度拉世界貿易中心的位置

圖2:普度拉世界貿易中心外觀

二、 本次行程

日期	行程	任務
9/28（一）	臺灣 — 吉隆坡	啟程（抵達吉隆坡）
9/29（二）	吉隆坡	參加 GeoSmart Asia 2015會議
9/30（三）	吉隆坡	參加 GeoSmart Asia 2015會議
10/1（四）	吉隆坡— 臺灣	參加 GeoSmart Asia 2015會議 回程

表1:行程表

圖3:臺灣與馬來西亞吉隆坡相對位置

圖4:KualaLumpur 機場到 PWTC

參、會議重要內容

一、 辦理單位

「Geospatial Media and Communications」是一家地理空間媒體公司，其使命是在全球舞臺上透過出版物與會議討論來建立各類地理空間技術應用的運用及瞭解。除了舉辦區域性及國際性的地理空間會議和展覽，該公司建置有世界性及最大的地理空間網站平台 www.geospatialworld.net，及擁有享譽國際最大的地理空間資訊月刊雜誌「Geospatial World」。Geospatial Media and Communications 公司所屬之亞太空間資訊論壇(Asia Geospatial Forum)是亞太地區地理空間資訊產、官、學各界在亞太地區集合技術與應用上的重要會議與展覽會，每年都會在亞太地區不同的國家舉行。自2002年開始，亞太空間資訊論壇已經在泰國、馬來西亞、中國、印尼、新加坡和越南等亞太地區的國家舉辦並聚集平均約800個地理空間資訊的社區。會議除能具體提升地理空間資訊的工業水平及擴大在區域形象的目標外，其

圖5:地理空間媒體與通信公司的 CIS(企業識別

目的是使地理空間資訊界於區域和全球相關問題上能有一個更容易溝通的場合，會議也讓網路使用與決策者，終端用戶和學術界及地理空間資訊產業界在探討更深度的議題時作為一個商業發展溝通的平臺。

地理資訊系統為一項以電腦學為基礎結合現代空間學、資訊學和管理學等的新興技術，在美國、日本等發達國家，已形成地理資訊產業和社會化地理資訊系統（Social GIS），在全球數位化目標管理的今天，地理資訊系統被視為一項重要的數位化技術，且正積極地影響著社會經濟發展的各個層面。地理資訊系統包含圖 (map)及屬性(attribute)，MIS與GIS可以有交集的部份就是屬性的部份；透過結合MIS的資料庫設計結合，地理資訊系統在查詢上可以看到屬性資料在點、線、面上的空間狀態，分別應用在下列不同領域：資源管理(Resource Management) 、資源配置(Resource Configuration) 、城市規劃和管理(Urban Planning and Management) 、土地資訊系統和地籍管理(Land Information System and Cadastral Applicaiton) 、生態及環境管理與模擬(Environmental Management and Modeling) 、地理探勘(GeoMining)及地學研究與應用(Application in GeoScience)。

二、 會議內容

本次會議自104年9月29日至10月1日為期3天，主題係地理空間(GeoSpatial)相關技術及其應用於各界的成果，包含農業應用(GeoAgri)、智慧建模(GeoBuild Smart Infrastructure)、空間情報(GeoIntelligence)、油礦探採(Exploration-Mining&Oil)、政府應用(Governance and smart Application)、快速道路維護(Enhancing Highway Management and Maintenance)、氣候變遷及防災(Climate Change & Disaster Management)、電子工程相關(GeoGrid-Electricity)、土地管理(GeoLand)等，其中國土測繪中心受邀在GeoLand簡報。第1天均在主會場，第2天及第3天分為5至6個場地交流，主要贊助商Trimble公司及Bentley公司應用該公司技術在各領域應用的成果，亦穿插於各場次內報告分享解決方案，大會議程如下：

GEO SMART ASIA 2015

29 September – 1 October, 2015
Putra World Trade Centre, Kuala Lumpur, Malaysia

PROGRAMME SCHEDULE

29th SEPTEMBER, 2015

Time (hrs)	Dewan Tun Hussein Onn	Tun Dr Ismail
0900 – 1030	Inaugural, Vision Session and Asian Geospatial Excellence Awards	
1030 – 1100	Networking Tea/Coffee Break	
1100 – 1300	Plenary 1: Evolving Smart Geospatial Technologies	
1300 – 1400	Lunch	
1400 – 1600	Plenary 2: Geospatial Solutions: Empowering Government and Enterprises	
1600 onwards	Geospatial Leadership Forum (by invitation only) 1730-1930	Exhibition Opening and Visit to Exhibition1600-1800

30TH SEPTEMBER, 2015

Time (hrs)	Bilik Negeri Sembilan	Bilik Pahang	Bilik Perak	Bilik Pulau Pinang	Bilik Johor / Kedah	Tun Dr Ismail (Exhibition Hall)
0900-1100	ASEAN Geospatial Summit (by invitation only) (0930-1030 hrs)	Trimble Technology Track	GeoAgri	GeoBuild Smart Infrastructure	GeoIntelligence Asia Pacific	
1100-1230	DigitalGlobe Tech Track	Networking Tea/ Coffee Break	FARO Tech Track			
1230-1330	Lunch					
1330-1500	ASEAN Geospatial Summit (by invitation only)	Youth Forum	GeoAgri	GeoBuild Smart Infrastructure	GeoIntelligence Asia Pacific	Exploration - Mining & Oil
1500-1600	Networking Tea/Coffee Break					
1600-1730	ASEAN Geospatial Summit (by invitation only)	Youth Forum	GeoAgri	GeoBuild Smart Infrastructure	GeoIntelligence Asia Pacific	Exploration - Mining & Oil

1ST OCTOBER, 2015*

Time (hrs)	Bilik Negeri Sembilan	Bilik Pahang	Bilik Perak	Bilik Pulau Pinang	Tun Dr Ismail Hall (Exhibition Hall)
0900-1100	GeoGrid (Electricity)	Climate Change & Disaster Management	GeoLand	Enhancing Highway Management and Maintenance with Geospatial (Training of PLUS Berhad members)	Geo-governance and Smart Applications
1100 - 1130	Networking Tea/Coffee Break				
1130 - 1300	GeoGrid (Electricity)	Climate Change & Disaster Management	GeoLand	Enhancing Highway Management and Maintenance with Geospatial (Training of PLUS Berhad members)	Technology Session: Sensors & UAVs
1300 - 1400	Lunch				
1400 - 1530		Climate Change & Disaster Management	GeoLand	Enhancing Highway Management and Maintenance with Geospatial (Training of PLUS Berhad members)	Technology Session: Emerging trends & technologies
1530 - 1600	Closing Session				

www.www.geosmartasia.org

(一) 會議由馬來西亞科學部副部長阿部巴卡爾穆罕默德主持，首先進行頒獎。為表彰亞太地區各政府及機構在空間資訊應用方面的卓越表現，特設立「亞洲地理空間獎」，並於大會啟始會議時頒獎。國土測繪中心產製的「通用版電子地圖(Taiwan e-Map)」榮獲「亞洲地理空間應用卓越獎」，由國土測繪中心主任劉正倫代表授獎。

圖6:國土測繪中心榮獲2015亞洲地理空間資訊卓越獎，我國授獎代表國土測繪本中心劉主任正倫(右1)接受頒獎者馬來西亞科技部副部長阿部巴卡爾穆罕默德頒贈獎座。

圖7:國土測繪中心榮獲2015亞洲地理空間資訊卓越獎，我國代表與頒獎者馬來西亞科技部副部長阿部巴卡爾穆罕默德(右3)合影，【國土測繪中心劉主任正倫(左3)、內政部葉技士全德(左2)、內政部邵技正泰璋(右1)、國土測繪中心蔡技正汶諭及通用版電子地圖廠商代表(左1)】

(二)大會主題；地理空間的未來展望，由4位主要演講者輪番報告，分別為來自澳大利亞新威爾斯大學教授 Trinder；新加坡土地管理局地理空間處處長 NG Siau Yong；馬來西亞測繪測繪局局長 Datuk Sr Ahmad Fauzi Bin Nordin；馬來西亞總理府行政現代化和管理規劃部副主任 Suhazimah 博士。

1. Trinder 教授講述澳洲與亞洲在空間科學上的戰略合作，報告內容包含: 澳大利亞動態基準、澳大利亞國家定位基礎設施、基礎空間數據框架、地籍2034、全球領先的 Lidar QA / QC 工具及無人機在澳大利亞的市場發展等。

圖8:澳大利亞新威爾斯大學教授 Trinder

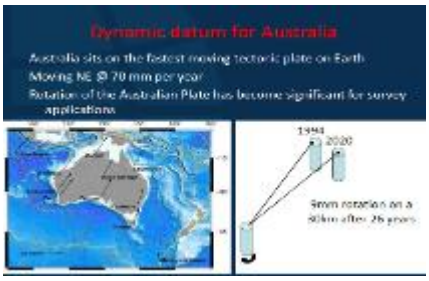


圖9:介紹澳洲的動態基準，澳洲版塊以每年7公分速率向東北移動

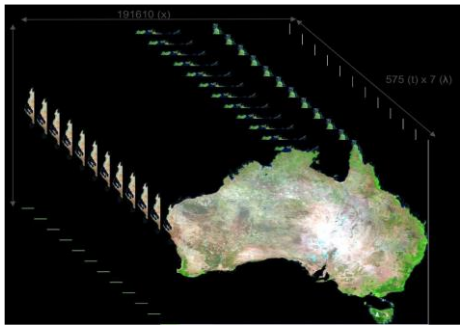


圖10:澳大利亞結合空間科學儲存15年的 LandSat5跟 LandSat7衛星影像資料

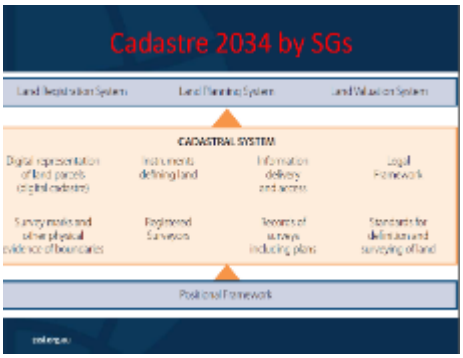


圖11:澳大利亞地籍測量2034年發展的目

2. 新加坡土地管理局地理空間處處長 NG Siau Yong 講述一個推動智能城市計畫的關鍵：地理空間資訊技術，報告內容包含:新加坡 NSDI、新加坡智慧國家計畫、新加坡地理空間資訊服務、OneNationOneMap 及空間資訊技術應用與革新等。

圖12:新加坡處長 NG Siau Yong

圖13:新加坡空間資訊的資訊流

圖14:新加坡 OneMap 政策

圖15:新加坡積極帶領民眾使用圖資

3. 馬來西亞總理府行政現代化和管理規劃部 ICT 副主任 Suhazimah 博士講述地理

空間資料的管理—協作與整合，報告內容包含:馬來西亞第11個5年計畫2016-2020、政府資料交換與開放、地理空間價值與大數據分析和物聯網、地理空間資訊管理等。

圖17:馬來西亞 Suhazimah 博士

圖18:空間資訊與大數據分析及物聯網的關

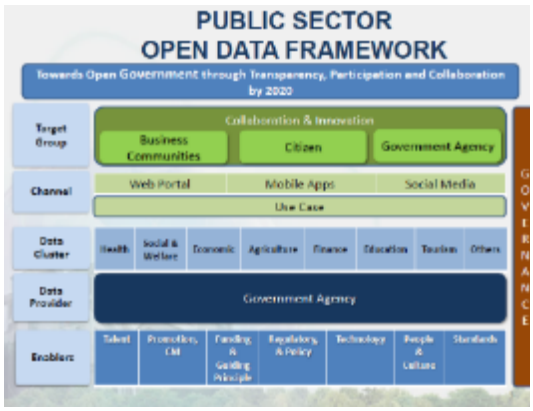


圖19:政府機關間 Open Data 的架構

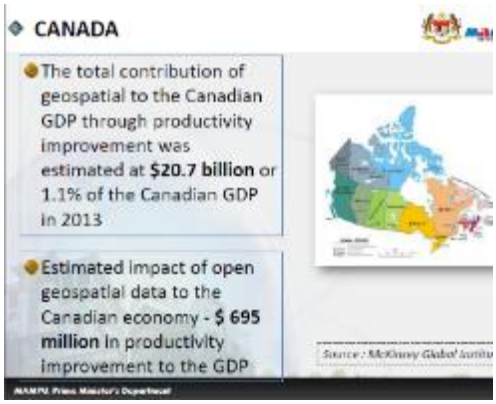


圖20:空間資訊產值，2013年加拿大20.7億

4. 馬來西亞測繪局局長 Sr Ahmad 講述:邁向下一個大躍進-地理空間資訊產製與管理，報告內容包含: 地理空間資料生產、運用大數據技術管理大量空間資料、新技術(雲端計算、專家系統、人工智慧、物聯網)應用於空間資訊、空間定位技術發展等。

圖21:馬來西亞測繪局長 Sr Ahmad

圖22:大跳躍的時代，空間資訊應用層面更

圖23:室內定位多種方式

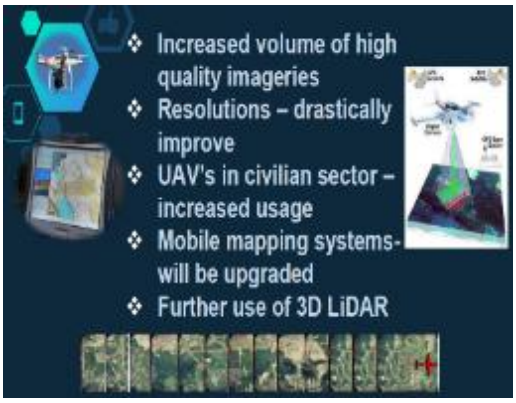


圖24:內涵豐富的影像資料來源

(三) 本次會議特別舉辦亞太地理空間資訊峰會(ASEAN Geospatial Summit)，時間為第2天的整天，分為3個時段邀請亞太地區各國國家測繪部與太空部門首長報告並互相交流，受邀報告機關與代表有:馬來西亞測繪局局長；印尼地理空間資訊局 Geospatial Information Agency (BIG)主題地理空間信息部副主任 Dr. Nurwadjedi ；新加坡土地管理局地理空間處處長 NG Siau Yong；馬來西亞航天局局長 Dr Noordin Bin Ahmad ；越南測繪局技術和經濟評估辦公室主任 Vu Tien Quang；越南太空技術研究所 Lai Anh Khoi ；日本宇宙航空研究開發機構曼谷辦事處主任兼執行秘書 Masanobu Tsuji；澳大利亞測繪空間科學研究所主任 Dr Zaffar Sadiq Mohamed-Ghouse；印尼航空航天研究所遙感技術與數據中心主任 Dedi Irawadi 等9人。會議中報告人針對該機構相關測繪、太空技術與應用最新的發展與未來展望提出報告，並透過互相提問交流各國的經驗。能夠在一個會議中聽到亞太地區6個國家測繪與空間資訊相關成果與發展，是一個非常難能

可貴的機會，報告內容都可作為內政部與國土測繪中心相關測繪業務與技術發展的參考。

(四) 本次受邀進行簡報及我國出國人員專長的主題係土地管理相關的 GeoLand 專場，時間為第3天的整天，分為3個時段，計有12位來自菲律賓、新加坡、美國、斐濟、澳洲、我國及馬來西亞等國代表依序報告，報告者簡介及 GeoLand 議程如下所示：

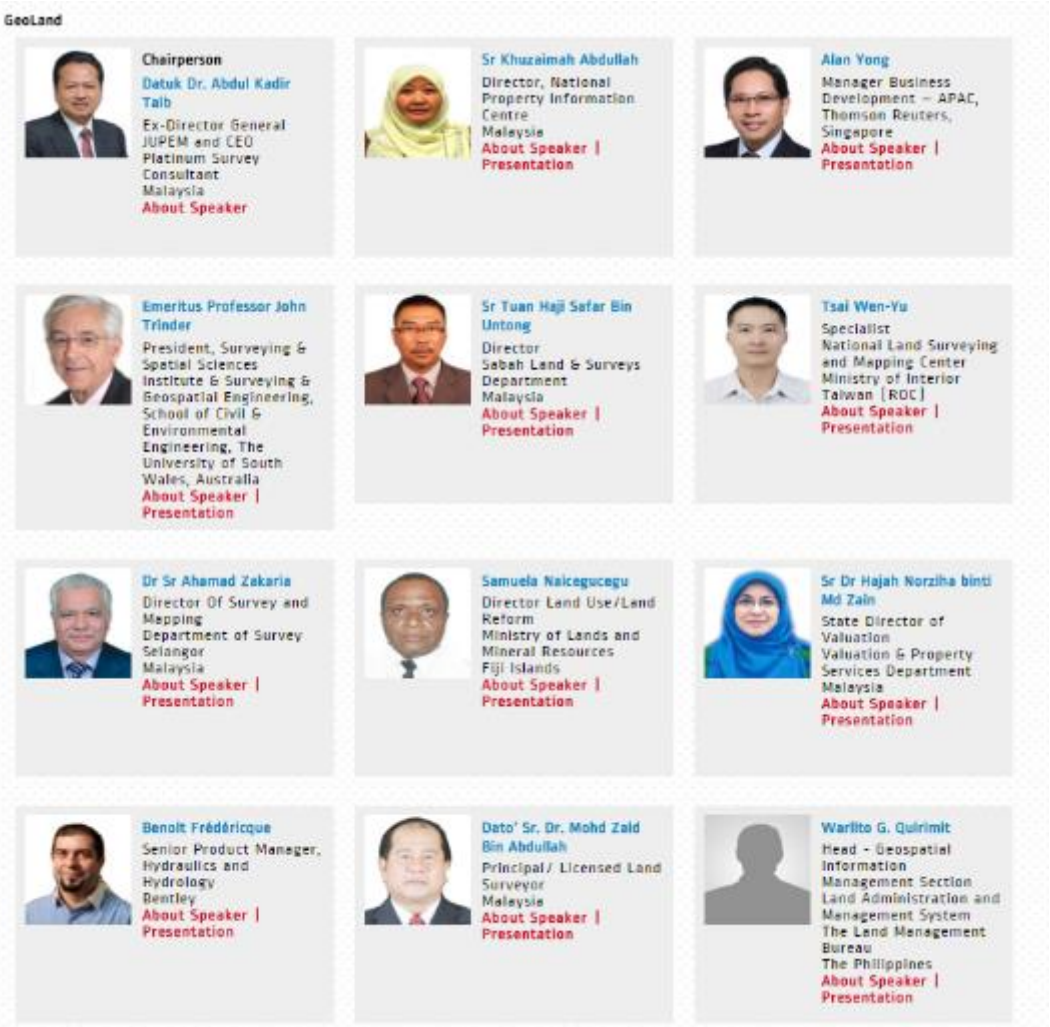


圖25:GeoLand 專題討論12位報告者

0900 – 1100 HRS: SESSION 1

SPEAKERS

Sr Khuzaimah Abdullah
Director, National Property Information Centre, Malaysia
Topic: Property Market Performance Indicators : Making Sense Of Napic's Data

Alan Yong
Manager Business Development - APAC, Thomson Reuters, Singapore
Topic: The Life Cycle of a Property

Emeritus Professor John Trinder
President, Surveying & Spatial Sciences Institute (SSSI), Australia
Topic: Contributions of the Geospatial Fields to Monitoring Sustainability of the Urban Environments

Dato' Sr Dr Mohd Zaid Bin Abdullah
President, Association of Authorised Land Surveyors, Malaysia

Samuela Naicegucegu
Director Land Use/Land Reform, Ministry of Lands and Mineral Resources, Fiji Islands
Topic: Geospatial Technology Supporting Land Administration The Fiji Island Scenario

Q & A and open house discussions

圖26:GeoLand 第1段議程

1130 – 1300 HRS: SESSION 2

Sr Tuan Haji Safar Bin Untong
Director, Sabah Land & Surveys Department, Malaysia
Topic: Geo-Cadastre in Land Administration: Sabah's Experience

Tsai Wen-Yu
Specialist, National Land Surveying and Mapping Center, Ministry of Interior
Taiwan (ROC)
Topic: The Current Development and Future Perspectives of Mapping and Circulation National Land Map Data in Taiwan

Benoit Frédéricque
Senior Product Manager, Hydraulics and Hydrology, Bentley Systems
Topic: 3D Cadastre: Bentley Systems' Perspective on Today's Motivations and Opportunities

Q & A and open house discussions

圖27:GeoLand 第2段議程

1400 – 1530 HRS: SESSION 3

Warlito G. Quirimit
Head of the Geospatial Information Management Section, The Land Management Bureau, The Philippines
Topic: Land Administration and Management System (LAMS) Philippines: - Improving Land Governance in the Philippines

Dr. Ahamad Zakaria
Director Of Survey and Mapping Department of Survey Selangor, Malaysia
Topic: Digital Cadastral Database (NDCB) in Selangor – The Way Forward

Sr. Dr. Hajah Norziha binti Md Zain
State Director of Valuation, Valuation & Property Services Department, Malaysia
Topic: Embarking On Geospatial Technologies in Real Estate

Q & A and open house discussions and closing

圖28:GeoLand 第3段議程

1. 馬來西亞正在建置國家數值地籍資料庫(NDCDB，National Digital Cadastral DataBase)，雪蘭莪洲(Selongor)測繪處處長說明，這個資料庫並不包含沙巴洲(Sabah)和沙勞越洲(Sarawak)，目的是整合不同部門及公司所測繪的地籍成果，在成果轉入資料庫前，有必要的驗證程序-預處理(如圖29)，預處理後可見該區域與資料庫的差異已改善(如圖30)，空間資訊系統使用 ESRI 所開發的商用軟體 ArcGIS，圖台伺服器並未限制連線，畫面如圖31，整個 NDCDB 都公開讓使用者查詢，進入圖台後(如圖32)，可以看到選用 ArcGIS JavaScript API 的資訊，除了使用 API，還可以選用 ArcGIS.com Map 、GoogleEarth、ArcMap、ArcGIS Explorer 等介面來查詢。當縮小比例尺後，可以看見相關的圖籍管理方式，編號由右而左、由上而下，每幅圖分4幅後的 ABCD 編碼，是以象限二開始逆時針編列。有關地籍資料(含地籍圖)，目前也僅提供查詢使用，如需相關實體資料，仍需依照規定付費取得。

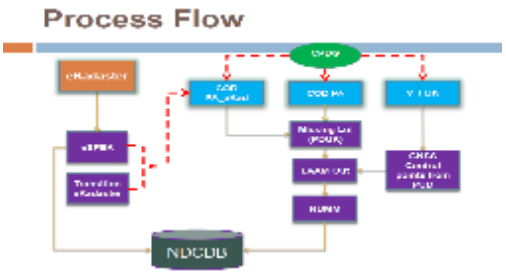


圖29:NDCDB 資料預處理流程

圖30:預處理前後差異

圖31:雪蘭莪洲測繪系統登入畫面

圖32:NDCDB 資料預處理流程

圖33:NCDCB:Selangor 畫面

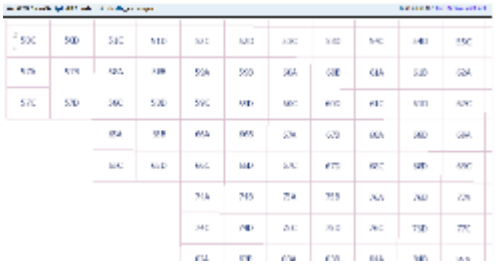


圖34:NDCDB 圖幅管理方式

2. 馬來西亞沙巴洲測繪處長也介紹沙巴專屬的數值地籍資料庫 DCDB，同樣使用 ERSI 公司的 ArcGIS 產品，甚至開發 Android 及 IOS 使用的查詢介面(如圖35及36)。

圖35:沙巴洲的 DCDB

圖36:沙巴 DCDB 使用的軟體

3. 馬來西亞土地測量技師協會主席介紹了當地地籍測量現代化的過程(如圖37)及計畫分工情形，由中央訂定5年中程計畫政策及計畫大綱，州政府督促地方政府辦理詳細規劃後，陳報州政府匯整後轉報中心政府，再由中央政府完善計畫，爭取預算執行(如圖38)。

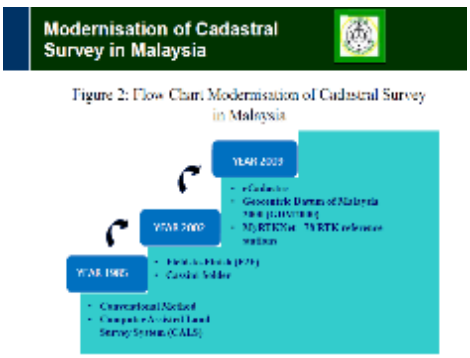


圖37:馬來西亞地籍測量現代化過程

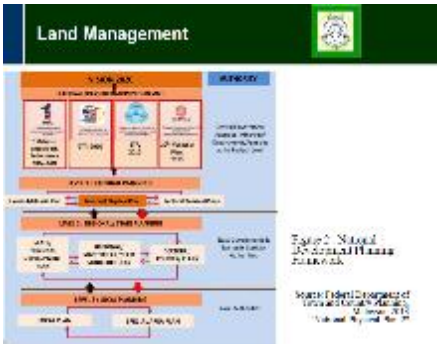


圖38:地籍測量計畫的綜整

(五) 馬來西亞大學數位中心 muhammad jafni jusof，以光達雷射掃描技術，提出進行保護馬來西亞古蹟遺產的工作經驗，在會議中，他就四個計畫案：古代面具、古代沈船、古代建築物及其室內三維建模的光達掃描建檔過程及珍貴影像分享給與會者。

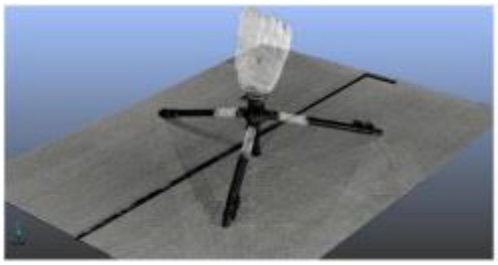


圖39:古代面具(Mah Meri Mask)

圖40:古代造船廠(The Pangkor Boat Builders)

圖41:古代體育場(The Merdeka Stadium)

圖42:高分辨率 HDR 全景虛擬實境

(六) RIEGL 馬來西亞籍的經理 Lim Chor Sheng 介紹有關 VUX 系統，VUX 系統是該公司所稱世界第一部無人機載測繪等級的掃描儀，可以進行每秒50萬點的雷射點雲放射和330度視角的掃瞄，具有輕巧精密的優良設計，可以滿足各種不同類型的客戶需求，安裝在不同的無人機載具上，同時 VUX 系統僅需要1組單獨的供電來源，其掃描數據可儲存在240G 容量的 SSD 中，或藉由 USB 設備透過 TCP/IP 協定傳輸到儲存設備中，測量精度可達10mm，測量速度達每秒200線，頻率達550KHz，最高可在1,000英呎高空進行掃描，在簡報會議中，C. S. LIM 介紹 VUX-1系列、VUX 系統、RIEGL RiCOPTER-無人機載的可攜式平台，同時介紹其相關的應用案例。

圖43:RiCOPTER

圖44:The VUX-SYS with the VP-1 helicopter pod

(七) 本此獲獎的單位比較特別的是由菲律賓大學組成的團隊，在國家科技部支援下，利用空載光達掃描資料進行的研究項目-Phil-LiDAR 2 -Nationwide Detailed Resources Assessment using LiDAR 計畫。此計畫源自全國災害風險和暴露評估與減災計畫(Disaster Risk and Exposure Assessment for Mitigation ，DREAM)。在菲律賓每年約有20個颱風侵襲菲律賓。颱風造成洪水在全國範圍破壞 、人員死傷，嚴重影響國家的進步和發展。在環境的不斷變化下，颱風和洪水未來預計將持續增加數量和強度，將造成菲律賓這樣的島嶼國家，進一步的災害。為回應國家和人民對這樣的自然災害因應需要，菲律賓在2011年通過了全國災害風險和暴露評估與減災計畫，透過此計畫生產菲律賓關鍵流域最新的、詳盡的和高分辨率的三維（3D）的洪水風險圖，讓菲律賓政府能夠更適時因應災害的影響。計畫主要使用 LIDAR 設備收集高程數據，掃描覆蓋流域的涵蓋菲律賓1/3水系洪水平原，收集有關洪水建模數據。透過實地調查，執行河流分析和測深數據採集的行為，以確保收集到的空載光達數據的準確性。將蒐集到的各項數據進行數據處理，包含儀器校正、正射糾正和資料編輯，使用 GIS 軟體，如 ArcView 產製產品。最後將產製之數值高程模型用於生產模型及運用洪水分析模產製洪水地圖，再加上雨量數據，產生洪水風險圖和水位預測模型。

Phil-LiDAR 1計畫是 DREAM 計畫的擴展，目的是生產剩餘的菲律賓2/3水系 3-D 洪水和災害地圖。除了解決減輕災害風險和適應氣候變化，從這個項目產生的資源資訊，也將提供全國各行業的有用的信息需求。Phil-LiDAR 2 -Nationwide Detailed Resources Assessment using LiDAR 計畫的目的是生產使用空載光達資料的

各種應用詳細的資源地圖，如:生產高價值作物等。Phil-LiDAR 2補充了現有各個國家政府機構的方案，並協助當地政府部門在菲律賓的自然資源製圖方面的應用。空載光達和其它遙感和地理資訊系統的技術被用於產生高分辨率的資源的地圖和資源脆弱性圖。這些提供了該國的自然資源詳細的評估，如高價值的農作物、 灌溉評估、水產養殖生產、森林保護、 沿海資源、水文和可再生能源資源。Phil-LiDAR 2計畫透過整合國家各大學院校和私立高等教育研究機構研究人員的協力合作，是菲律賓首創不同的省份的最多學科領域專家、最大的合作計畫，共有769位研究人員和專家進行了 Phil-LiDAR 計畫培訓程序，讓 LIDAR 資料能夠被個領域的專家充分使用進行研究，協助政府進行各個領域的應用。本計畫也同時受到菲律賓農業部、環境和自然資源部、能源部和科技部的支持，為國家型重大計畫。(如附錄二)

圖45:菲律賓 LiDar 計畫1跟2簡介

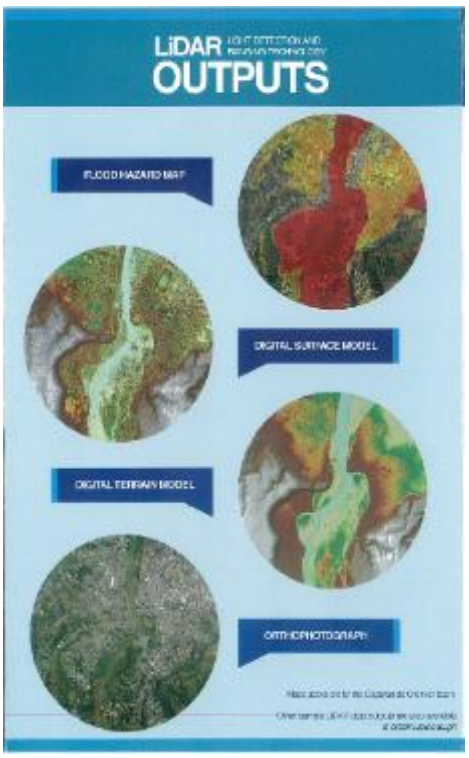


圖46:輸出成果

三、 重要參展廠商

總共有24個攤位，面積9~40平方公尺不等，分布狀況詳照片一，廠商列表如下圖，從類型多寡來看，大多集中在解決方案之成果展示，後端應用才是大家所關注的，致力於硬體開發的廠商畢竟屬於少數大廠才有能力，而有引進台灣市場的大概也以 Trimble 能見度最高，其他的都很少見，軟體部分在台灣比較常見的大概就屬 MapInfo、Bentley 為主。

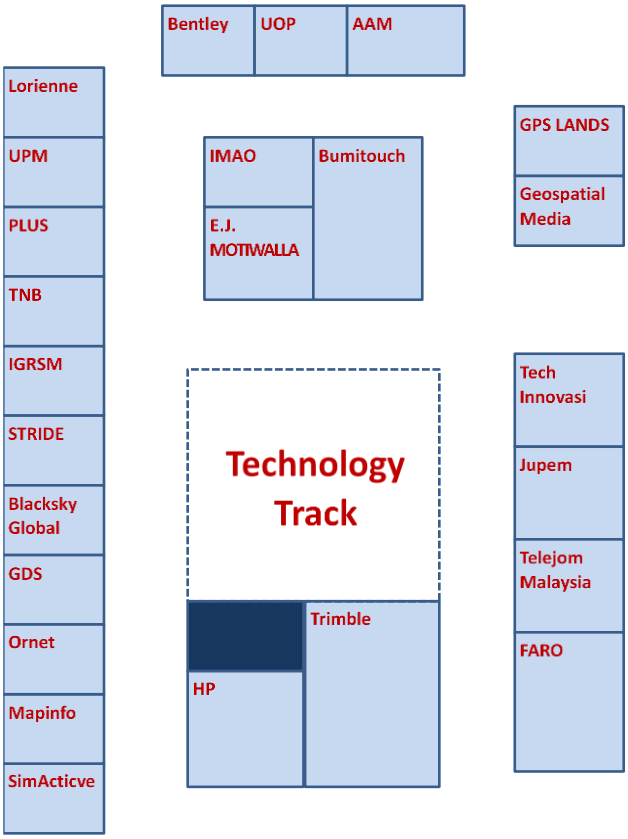


圖47:展場廠商分布圖

AAM，空間資訊服務公司，蒐集分析展示等各項空間資訊，且採用雷射掃描、高解析度為衛星影像、球形成像等技術。http://www.aamgroup.com/

Bentley，建築、工程及 GIS 軟體廠商，並提供解決方案，主要軟體為 MicroStation、ProjectWise、AssetWise 等，另亦涵蓋 BIM 領域，提供適當工具軟體。https://www.bentley.com/

Blacksky Global，衛星影像服務供應商，預計於2016發射6顆地面解析度為1米的遙測衛星，最終於2019年完成60顆衛星的佈署。，http://www.blacksky.com/

Bumitouch，土地測量及光達航拍服務公司，位於馬來西亞當地，提供遙感探測、測繪科學、土地管理等全方位的服務公司。http://bumitouchplmc.com/

E.J. MOTIWALLA，小型測量工具及套疊系統供應商。http://www.ejmotiwalla.com.sg/

FARO，測量技術與儀器供應商，特別著重在三維雷射掃描部分，提供高精度三維測量成果，可應用在工程、探勘與事故現場重建等服務，服務據點囊擴歐洲、美洲、亞洲、大洋洲等區域，現場展示不少儀器及附屬工具。http://www.faro.com/

GDS，採用空載光達和數位影像測量技術蒐集數據，提供快速、高精度與符合成本效益的解決方案， 目前應用在電信業、河川區域、鐵路、礦業與都市規劃等領域。

Geospatial Media 國際性空間資訊組織，為本次大會的主辦單位。http://geospatialmedia.net

GPS LANDS，空間資訊整合及測繪套疊技術服務公司，在東南亞地區代理 RIEGL 雷射掃描儀，並且提供各界地面、空中的測繪服務。http://gpslands.com.my/

HP，資訊業界大廠，針對企業、個人及政府部門提供各項 IT 基礎設施與解決方案，大比例尺輸出設備為各測繪界不可或缺的得力助手。http://www.hp.com/

IGRSM，馬來西亞空間資訊及遙感探測學會。http://www.igrsm.com/

IMAO，數位航空影像及光達擷取公司。https://www.imao-fr.com/index.php?lang=en

JUPEM，馬來西亞測繪局。https://www.jupem.gov.my/

Lorienne，專業地圖軟體與解決方案服務供應商。http://lorienne.com/en/

MapInfo，地理資訊系統軟體公司，並提供相關解決方案，http://www.mapinfo.com/

Ornet，馬來西亞光譜儀器製造設計公司，應用於通訊、微波、光學、光纖、實驗室等領域。http://www.ornets.com/final/index.php

SimActive，航攝、衛星影像及無人機應用軟體公司。http://www.simactive.com/en

STRIDE，馬來西亞國防部科學及技術研發機構。http://www.stride.gov.my/

TECH Innovasi，馬來西亞地理資訊服務公司。http://www.techinnovasi.com.my/

Telekom Malaysia，馬來西亞電信公司，提供通信與解決方案服務 https://www.tm.com.my/

TNB，馬來西亞境內最大的電力公司。http://www.tnb.com.my/

Trimble，各項測量專業儀器製造商，並提供各項空間資訊解決方案，囊括測量、農業、車隊派遣、建築及公公建設領域，服務據點包括全球各地區。http://www.trimble.com/

UPM，馬來西亞吉隆坡大學。http://www.upm.edu.my/

肆、參加會議心得

一、參與成果發表會，提升國際能見度

本次國際會議為亞太地區各國空間地理資訊成果發表會，各國均拿出最具說服力的成果展現在此國際場合，GeoSpatial Media and Communications Ltd.雖然是印度公司，但馬來西亞分公司經營情形已深入產官學界，在此氛圍下的國際會議，各界都能感受到不虛此行，除了積極展現自己國家的成果外，提升國際能見度。

國際會議使用的語言是英文，必須具備一定的語言能力才能在臺上臺下溝通，對於參與者英文能力的磨練有所助益，未來有機會，應積極鼓勵國內測繪及空間資訊相關機關，多多派員參與此種會議，透過各國成果發表交流與技術經驗分享，除可作為檢視目前工作發展情形外，更可作為未來創新與發展的活水源頭。

二、空間資訊大數據，資訊圖像受重視

空間資訊技術本身就是處理非常大量的資料，加上近年資料更新機制的觀念，大數據的應用，在資料整理成資訊後，仍有太多的資訊需要傳達，令人眼花撩亂，因此，最近興起資訊圖像化觀念(Infographics)，將資訊圖表以整合的觀念排列後，用1個畫面敘說1個完整概念，可以再逐個進入了解細節，內容沒有不同，不同的是界面。在幾場專題的報告中，注意到 Prezi 這個雲端簡報工具，跳脫一般大家慣用的 Powerpoint 軟體，一張一張投影片間其實要連結其因果關係甚是困難，但該雲端工具採用更直覺及近似心智圖的方式來呈現要表達的內容，並用簡潔動畫連結呈現，講授者必須先將內容融會貫通後，改用更全面的方式來表達授課內容，更利於聽者吸收資訊。

三、政府資料整合開放，國家底圖一致共用

亞太地區國家，如新加坡、馬來西亞與印尼，在測繪及地理資訊領域的發展狀況，ONE MAP 已是發展目標，透過要求政府相關部門對資料互相開放並予以整合。新加坡更進一步的希望從 SMART CITY 發展至 SMART NATION ，與新加坡環境與資訊技術相輔相成，訂定明確之政策目標。目前，我國也已規劃相關計畫實行中，國家底圖這部分應該也可以逐步達成。 本次參加會議各國的測繪與空間資訊機關在該國均為負責主導空間資訊整合的部會一級機關，反觀我國測繪及空間資訊

事權仍屬分散，交談之間，頗令他國感到訝異。

另外空間資訊收集必須花費大量經費，因此國家空間資料開放政府各單位使用，才能充分發揮資料的價值。本次會議中了解菲律賓除了將全國河川流域空載光達 LiDAR 的掃描資料運用在製作最新且詳盡的的三維（3D）的洪水風險圖外，亦由相關部會與該國各大學院校和私立高等教育研究機構研究人員的合作，共有769位研究人員和專家進行了 Phil-LiDAR 計畫，擴大資料運用層面，在個各領域裡產出重要的成果，充分發揮 LiDAR 資料價值。反觀我國，中央地質調查所自99年起辦理國土保育地質敏感區調查分析計畫，利用空載光達技術(LiDAR)測製高解析度數值地形製作與影像，進行地質敏感區分析、地質特性與地形分析、地質災害潛勢分析，已具有相當成果，惟空載光達資料並無法提供其他單位使用，致許多單位仍自行辦理，造成資源浪費。

四、 **空間資訊產業蓬勃發展，官界學界齊頭並進**

本次國際會議仍規劃各家廠商介紹各家商用產品的區域，展場規劃在主會議廳旁的舉行，其中也有主題在展場中央的 Technology Track 區塊舉行，蠻特別的規劃，也讓產業商的攤位一直充滿著人氣，連帶的有更高的宣傳廣告效益。規劃的幾個大主題外，幾個主要贊助商也規劃發表自身最新的技術與成果，讓與會的代表除了解各議題外，也能進一步與業界直接溝通，了解市場趨勢。在產業蓬勃發展，百家爭鳴的同時，學術界及各國政府也積極參與，學術界研究成果本次也發表多項使用產業界技術或產品達成的研究，例如馬來西亞大學利用 UAV 加上 LiDar 對於棕櫚樹林掃描後，分析植株數量及每棵樹的大小，預估棕櫚油產量；各國政府也積極採用產業界的技術推行各項政策，如馬來西亞測繪局採用 ArcGIS 系統解決方案。

或許台灣的測繪市場不夠大，本次研討會的許多贊助商如 FARO 並不多見，而 TRIMBLE 引進臺灣的儀器也非全系列的。因此，本次對於這些國際贊助商，本國代表也是大開眼界，趁機瞭解各家產品。在 TRIMBLE 的廠商代表中有幾位是畢業自國立成功大學的測量及空間資訊學系的僑生，曾來我國學習深造再回到當地服務，這代表著我們的這部分高等教育也已具規模與口碑，僑生不遠千里來求知，將

所學發揮在職場上，不啻為最佳的宣傳代言，值得欣慰。學界是產業界最好的後盾，政府是產業界技術實現應用的平台。

伍、 建議

一、規劃空間資訊國際交流，展現我國空間資訊能量

看到他國舉辦隆重、盛大的國際研討會，讓我們覺得有機會和聽到、看到各國在測繪與空間資訊的發展，或益良多。而對主辦國家而言，更是展現該國在測繪與空間資訊成果的強大展現，也吸引世界上多數有名的測繪與空間資訊專業與設備廠商參展，也可帶動各國人士前來參訪甚至旅遊，擴大經濟效益。

相較各國，我國在測繪與空間資訊領域的發展已有相當成果，由我國主辦大型測繪與空間資訊國際會議時機應該也已成熟。思考我國舉辦大型國際會議的方式，由於大型研討會涉及的專業層面多，空間資訊應用又是各部會皆需要，但要由公部門自己辦理的可能性不大。未來應可整合各部會相關機關資源，由一個機關依採購法主辦委外專業服務(這次主辦單位就是專辦空間資訊研討會及評獎國際公司)，讓臺灣浮上國際舞台，展現空間資訊科技應用在臺灣發展多年的具體成果。

二、善用無人飛行載具 ，完成數位城市圖資

本次會議已有主題探討建物資訊模型(BIM)在空間資訊的發展，結合 UAV 搭在相關設備，如 LiDAR、傾斜相機、多光譜儀等設備，除能快速蒐集資料外，亦能建立相關建物模型，發展相關施政應用。未來應可利用 UAV 快速蒐集資料的特性，針對空間模型施政應用研究，再研擬相關整合推廣計畫，逐步建立數位城市模型。

目前也有相關政府部門應用 UAV 製作相關成果使用，惟因為可能只是使用於特定用途，而未規範相關作業方式，如此要達成資料共享，仍有疑慮。國土測繪中心已 UAV 作業建立標準作業規範與程序，並且也接受各機關委託進行 UAV 航拍與成果製作。未來可以積極將相關標準推廣各機關使用，以獲取具一致性且可用的成果，並嘗試建立 UAV 航拍影像與相關成果共享機制，發揮資源整合效益。

三、擴大政府資訊整合，充分發揮資源效益

在空間資訊技術發展日新月異與空間資訊資料日益龐大的同時，各國也都發現政府間資訊開放與整合的重要性。空間資訊取得必須耗費相當經費，如能整合政府各部會的資訊，除可以避免重複蒐集的費用外，更可以讓相關成果易於整合與應用。目前亞太各國都已朝政府部會間資訊開放與整合方向發展，除推動 ONE MAP 政策外，更強調資料共用與共享。尤其以菲律賓 Phil-LiDAR 計畫，更是結合農業部、環境和自然資源部、能源部和科技部及大學院校和私立高等教育研究機構研究人員，讓 LIDAR 資料能夠被個領域的專家充分使用進行研究，協助中央和地方政府發展各個領域的應用。

經濟部中央地質調查所在今年將完成涵蓋臺灣本島轄區高精度 LiDAR 資料蒐集，並完成高精度 DEM、DSM 成果與地質敏感、地質特性與地質災害潛勢分析。而因資料管制問題，高精度 LiDAR 資料並未能提供相關部會使用，而造成部分機關自行辦理。目前所有高精度 DEM、DSM 成果與原始 LiDAR 資料都將移交內政部，未來應可參考各國作法，將高精度 LiDAR 資料提供需求部會機會使用，發展各自領域的應用，才能避免資料重複蒐集，並充分發揮資料價值。

陸、本次會議相關照片

開幕及頒獎典禮議程

GeoSmart Asia 2015 主會場

我國代表_左起劉主任正倫、蔡技正汶諭、葉技士全德、邵技正泰彰

GeoBUIZ 會場

GeoBUIZ 會場

絡繹不絕的大會登錄處

贊助商大牆面

專題討論會場

GeoArgi 會場內

來賓介紹旋翼 UAV 應用

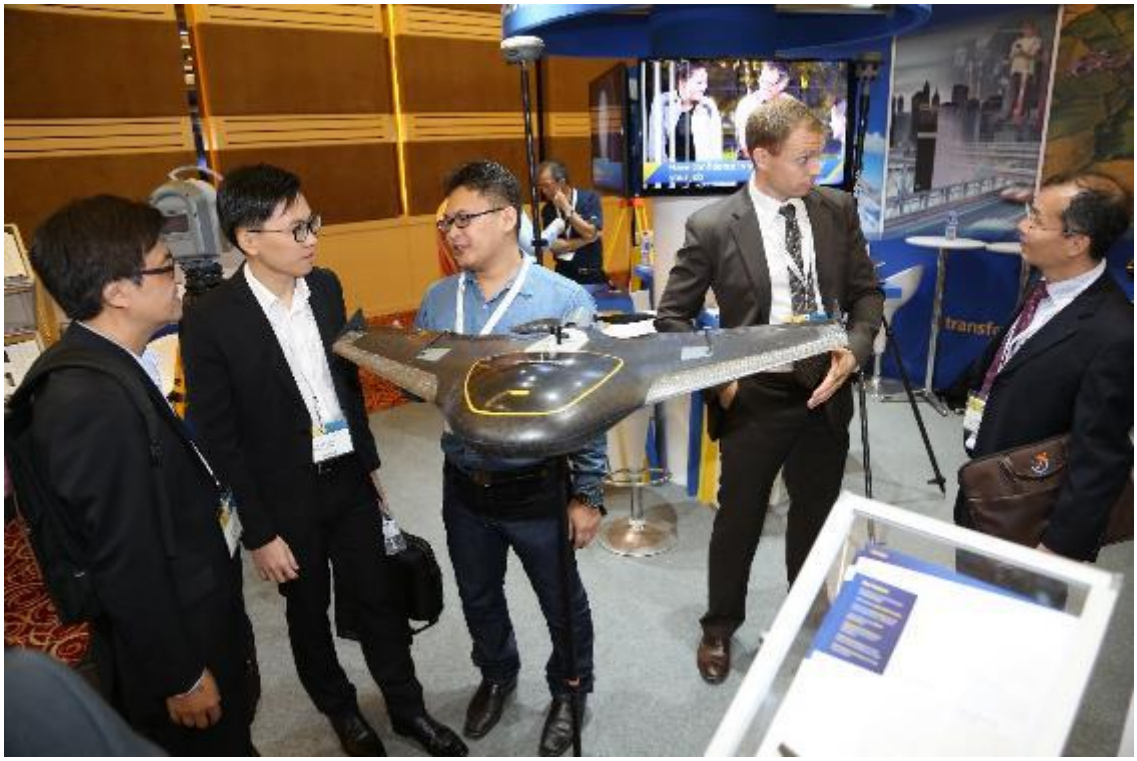
邵技正泰璋(後中)專注聽演說

國土測繪中心蔡技正簡報

斐濟島代表提問

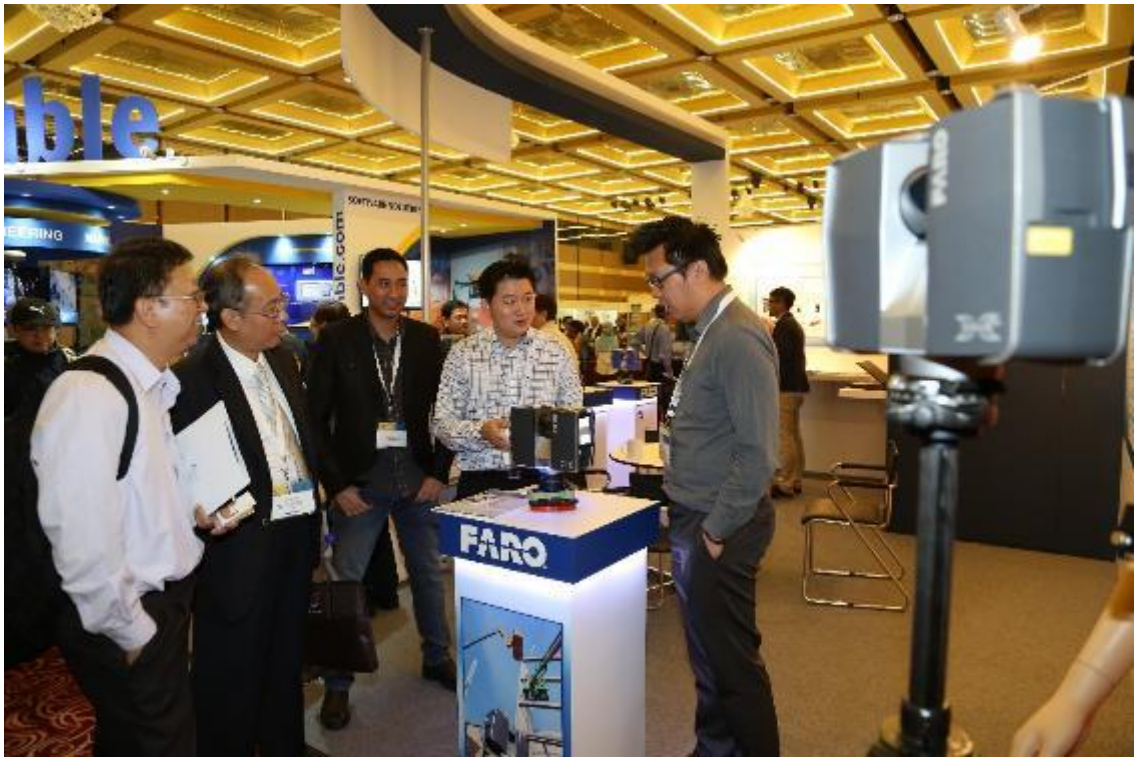
Bentley 攤位

Trimble 攤位



Trimble 的無人飛機

廠商展覽場地交流區



劉主任正倫詢問儀器功能規格

劉主任正倫瞭解他國地形圖成果

廠商介紹令人側目的無人飛機

蔡技正汶諭觀摩智慧建模

柒、附錄

附錄一　邀請國土測繪中心簡報過程

一、 104 年 7 月 3 日主辦單位經理 Megha Datta 電子郵件及邀請函，邀請國土測繪中心主任劉正倫在 GeoLand 專題會場，發表有關空間地理資訊技術在土地管理方面應用的演說

From: Megha Datta
Sent: Friday, July 03, 2015 4:24 PM
To: master@mail.nlsc.gov.tw
Subject: Invitation to Address GeoLand Asia, Kuala Lumpur

Dear Mr. Jeng-Lun Liu,

Greetings from Geospatial Media!

This is with reference to the conversation I had with your office a while back. With this, I would like to extend a warm invitation you to deliver an address **in "GeoLand Asia" program at GeoSMART Asia in Kuala Lumpur.**

Just to provide you a background, Geospatial Media has a vision to 'Make a Difference through Geospatial Knowledge in World Economy and Society'. We achieve our vision by publishing a monthly magazine, hosting a resource portal (www.geospatialworld.net), a LIVE channel (www.geobuiz.com) and organizing national, regional and international conferences on geospatial technologies. Please read more about us at www.geospatialmedia.net

Taking forward our organization vision in Asia we are organizing **GeoSmart Asia 2015 (Former Asia Geospatial Forum) from 29th Sept – 1st Oct in Kuala Lumpur.** With the theme "Towards Next Big Leap", the forum will not only talk of geospatial industry across various sectors like Land, registry, mining, AEC, municipality, utilities, urban planning, real estate but will also touch upon upcoming segments contributing to progressive & sustainable development of region. The forum shall attempt to bring together leaders from policy making agencies, user organisations, technology companies and academic institutions on a common platform to share, learn, deliberate, collaborate and provide business and technology direction to geospatial community in the region. This initiative is being supported by various National Mapping Agencies like Jupem (Malaysia), SLA (Singapore), NAMRIA (Philippines). The forum will see a participation of 1200+ delegates.

Please find attached the formal invite letter, flier of GeoSmart Asia and Concept note of GeoLand. The details of the conference can be viewed at www.geosmartasia.org.

As part of GeoSmart Asia we are organizing a one-day programme on GeoLand Asia which will focus on the innovations that geospatial technologies are making especially for smarter applications in land administration segment, which are economical, easy to apply, scalable and lend to improving work efficiencies. The programme will create an atmosphere for dialogue between land administration stakeholders in order to explore innovative use of technologies for cadastral mapping, connecting property rights information to digital maps and delivering smoother, better services for citizens using technology.

Understanding your role, knowledge and commitment we would like to invite you to address "GeoLand Asia". Your perspective will be highly valuable input for executives of geospatial industry and provide them necessary insight.

I shall be very grateful to him for his kind consent to address GeoSMART Asia.

Kind regards,
Megha

****

Ms. Megha Datta
Industry Manager - National Geospatial Information Organisations (NGIOs)
Geospatial Media and Communications Pvt. Ltd.
A-145, Sector - 63, NOIDA (U.P.) India - 201301
Tel: +91 120 4612500
Fax: +91 120 4612555
Mobile: +91 9811049987
Skype: megha.datta

July 03, 2015

Mr. Jeng-Lun Liu
Director - National Land Surveying and Mapping Center
Ministry of the Interior
4F, No. 497, Liming Rd., Sec.2
Taichung City 408, Taiwan (R.O.C.)

Subject: Invitation to deliver an address during Seminar on Land Administration to be held during GeoSmart Asia, September 29th -Oct 1st, 2015 at Putra World Trade Centre, Kuala Lumpur, Malaysia

Dear Mr. Liu,

Warm greetings from Geospatial Media & Communications!

With this, I invite you to deliver an address during the session **"GeoLand Asia"** with the theme ***Geospatial Technology supporting Land Administrative Practices*** to be held during GeoSmart Asia conference. The one-day programme on GeoLand Asia will focus on the innovations that geospatial technologies are making especially for smarter applications in land administration segment, which are economical, easy to apply, scalable and lend to improving work efficiencies. The programme will create an atmosphere for dialogue between land administration stakeholders in order to explore innovative use of technologies for cadastral mapping, connecting property rights information to digital maps and delivering smoother, better services for citizens using technology.

Just to provide you a background, Geospatial Media and Communications has a vision to *'Make a Difference through Geospatial Knowledge in World Economy and Society'*. Taking our vision forward, we are organizing **GeoSmart Asia 2015** (Former Asia Geospatial Forum) from **29th Sept – 1st Oct, 2015** in **Putra World Trade Centre, Kuala Lumpur, Malaysia**. With the theme ***"Towards Next Big Leap"***, the forum will not only talk of geospatial industry across various sectors like Land, registry, mining, AEC, municipality, utilities, urban planning, real estate but will also touch upon upcoming segments contributing to progressive & sustainable development of region. The forum shall attempt to bring together leaders from policy making agencies, user organisations, technology companies and academic institutions on a common platform to share, learn, deliberate, collaborate and provide business and technology direction to geospatial community in the region. This initiative is being supported by various National Mapping Agencies like Jupem (Malaysia), SLA (Singapore), NAMRIA (Philippines). The forum will see a participation of 1200+ delegates.

Understanding your role, knowledge and commitment we would like to invite you to address "GeoLand". Your perspective will be highly valuable input for executives of geospatial industry and provide them necessary insight.

I shall be very grateful to you for your kind consent to address GeoSMART Asia.

Thank You,
Yours sincerely,

MEGHA DATTA
Industry Manager - NGIO

Geospatial Media and Communications Sdn Bhd
D-5-13A, Block D, Capital 4,Oasis Square
No. 2, Jalan PJU 1A/7A, Ara Damansara
47301 Petaling Jaya, Selangor, Malaysia
Tel: +6 03 7859 8411
Fax: +6 03 7859 8412
www.geospatialmedia.net

GeoLand Asia 議程

GeoLand Asia

30 September, 2015 Kuala Lumpur, Malaysia

Theme: Geospatial Technology supporting Land Administrative Practices in Asia

About GeoLand Asia

In view of the critical role that land, as a resource plays in sustainable development of economies, the countries in the Asia and Pacific region have long been making serious efforts to improve their land governance and administrative practices by undertaking a variety of changes to legal, institutional, social and technological set up. Steps have been specifically taken for:

- Increasing registration of property rights
- Use of new information and communications technologies
- Streamlining of laws and regulations
- Institutional reforms
- Boosting capacity building efforts
- Ensuring anti-corruption plans, good governance monitors and internal audit functions

Over the years, the role and use of geospatial and other Information and Communication Technologies (ICTs) have greatly helped to make most of these processes faster, secure, scalable and sustainable. Countries like Malaysia, Thailand, Indonesia, Philippines, China, Cambodia, Laos, Vietnam and Brunei have all achieved reasonable progress in streamlining their land administrative practices and in turn, the land agencies have been contributing directly or indirectly to economic and social development. However, use of technology is also wrought with many issues. Application of technology does not always yield expected results, might not be scalable or sustainable or may need frequent updations, training of human resource or may be just too expensive to maintain or start with etc.

The one-day programme on GeoLand Asia to be held during GeoSmart Asia will focus on the innovations that geospatial technologies are making especially for smarter applications in land administration segment, which are economical, easy to apply, scalable and lend to improving work efficiencies. The programme will create an atmosphere for dialogue between land administration stakeholders in order to explore innovative use of technologies for cadastral mapping, connecting property rights information to digital maps and delivering smoother, better services for citizens using technology.

Programme Objectives:

1. Assess the progress made by countries in the region with respect to achieving *smart* land administration
2. Identify the supportive role that the geospatial industry can play in achieving better land administration
3. Identify economical and innovative geospatial tools and techniques for land administration
4. Discuss on the roadblocks and ways to overcome them with respect to industry's role in achieving well functioning land administration

Target audience:

1. Cadastral mapping agencies
2. Land and Property registration agencies
3. Private industry serving land administration sector
4. Funding and multilateral agencies working in land administration
5. NGOs
6. Researchers and academicians

Programme outline:

Wednesday, 30th September, 2015

0930 – 1100 hrs	**Session on Experience of Land Administrators**
1100 – 1330 hrs	Networking Coffee Break, Visit to Exhibition and Lunch
1330 – 1500 hrs	**Session on Role of Geospatial Technology in Land Administration**
1500 – 1600 hrs	Networking Coffee Break and Visit to Exhibition
1600 – 1730 hrs	**Session on Technology Innovations and their Successful Implementation**

About GeoSmart Asia

GEOSMART ASIA 2015

29 Sept – 1 Oct, 2015
Putra World Trade Centre,
Kuala Lumpur, Malaysia

Over the years, Asia Geospatial Forum has established itself as the most premier conference and exhibition on geospatial technologies and applications in Asia Pacific. The conference welcomes about 800+ high profile delegates from policy makers, technology providers, end-user segments and academic communities across the region every year. As our response to address the evolution, changes and innovation of geospatial technology, Asia Geospatial Forum is Now GeoSmart Asia. The brand new GeoSmart Asia shall delve into the immense scope and the very critical role of advanced, latest and smarter geospatial technologies across various sectors that contribute to progressive and sustainable development of the region.

About Geospatial Media and Communications

Geospatial Media and Communications has been exclusively dedicated to promote and facilitate growth of geospatial industry and connect the same with major domains worldwide like Land Administration. Headquartered in India, it has localised presence in United Arab Emirates, Brazil, South Africa, Malaysia, The Netherlands and United States of America. We are a strong team of more than 80 highly skilled and specialized professionals hailing from multitude fields including space technology, engineering, geo-information, geology, journalism, marketing and international business.

二、 **104** 年 **7** 月 **6** 日國土測繪中心劉主任回信詢問另指派演講人及補助事宜

From: 10003@mail.nlsc.gov.tw [mailto:10003@mail.nlsc.gov.tw]
Sent: 06 July 2015 13:27
To: megha@geospatialmedia.net
Subject: Re: Invitation to Address GeoLand Asia, Kuala Lumpur
Importance: High

Dear Ms. Megha Datta,
Sorry for replying you late .
I am honorable to receive the invitation to deliver an address in “GeoLand Asia” program at GeoSMART Asia .
I will consider about it as soon as possible.
By the way, I have questions as follows:
1. May I recommend my colleague to be a speaker?
2.The invitation include accommodatiom and flight costs or not?

Best Regares ,
Liu Jeng-Lun
Director-General
National Land Surveying and Mapping Center
Ministry of Interior
Taiwan,ROC

三、 **104** 年 **7** 月 **6** 日 **Megha Datta** 立即回應，同意劉主任指派專人演講，並同意補助來回機票及 **3** 晚住宿

From: Megha Datta <mailto:megha@geospatialmedia.net>
Sent: Monday, July 06, 2015 4:56 PM
To: 10003@mail.nlsc.gov.tw
Subject: [NLSC Suspected spam] RE: Invitation to Address GeoLand Asia, Kuala Lumpur
Dear Mr. Liu Jeng-Lun,

Thank you for the response. Yes, you can recommend a senior colleague to represent National Land Surveying and Mapping Center, Taiwan to deliver an address at GeoLand Asia programme. We will be pleased to offer economy class return airfare and three nights’ accommodation to a senior representative for the conference duration.

Regards,
Megha

四、 **104 年 7 月 15 日本中心劉主任指派測繪資訊課蔡技正汶諭辦理此次簡報，蔡技正回復簡報主題**

From: 蔡汶諭 [mailto:22062@mail.nlsc.gov.tw]
Sent: 15 July 2015 13:22
To: megha
Cc: 蔡課長季欣; 10003@mail.nlsc.gov.tw
Subject: RE: Invitation to Address GeoLand Asia, Kuala Lumpur

Dear Ms. Megha Datta,

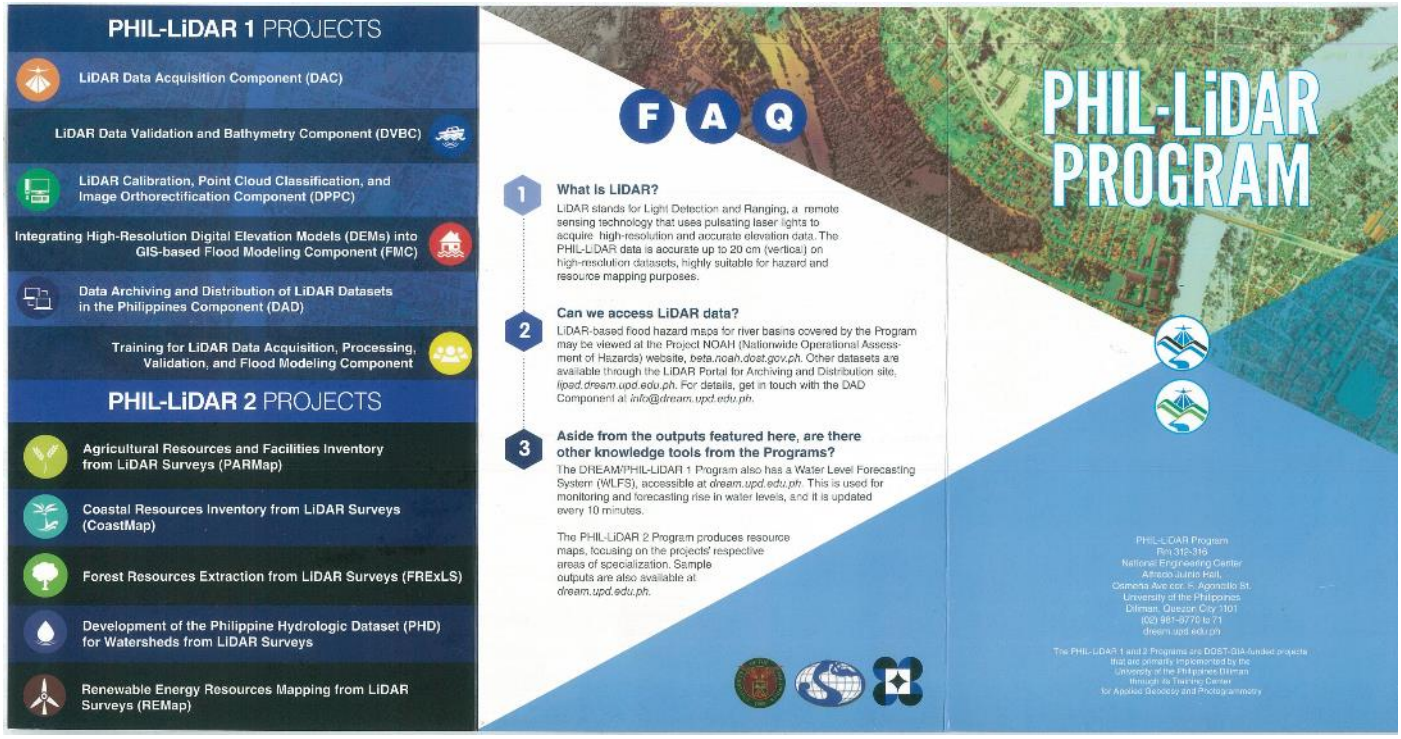
I am an underling of Director Liu. Glad to be designated to deliver an address to GeoSmart Asia 2015 Confernce.
We will share the theme " The Current Development and Future Prespectives of Mapping and Circulation Natonal Land Map Data in Taiwan" at Geoland Asia.
The attachment word file including the abstract and my sketch.

Best Regards,

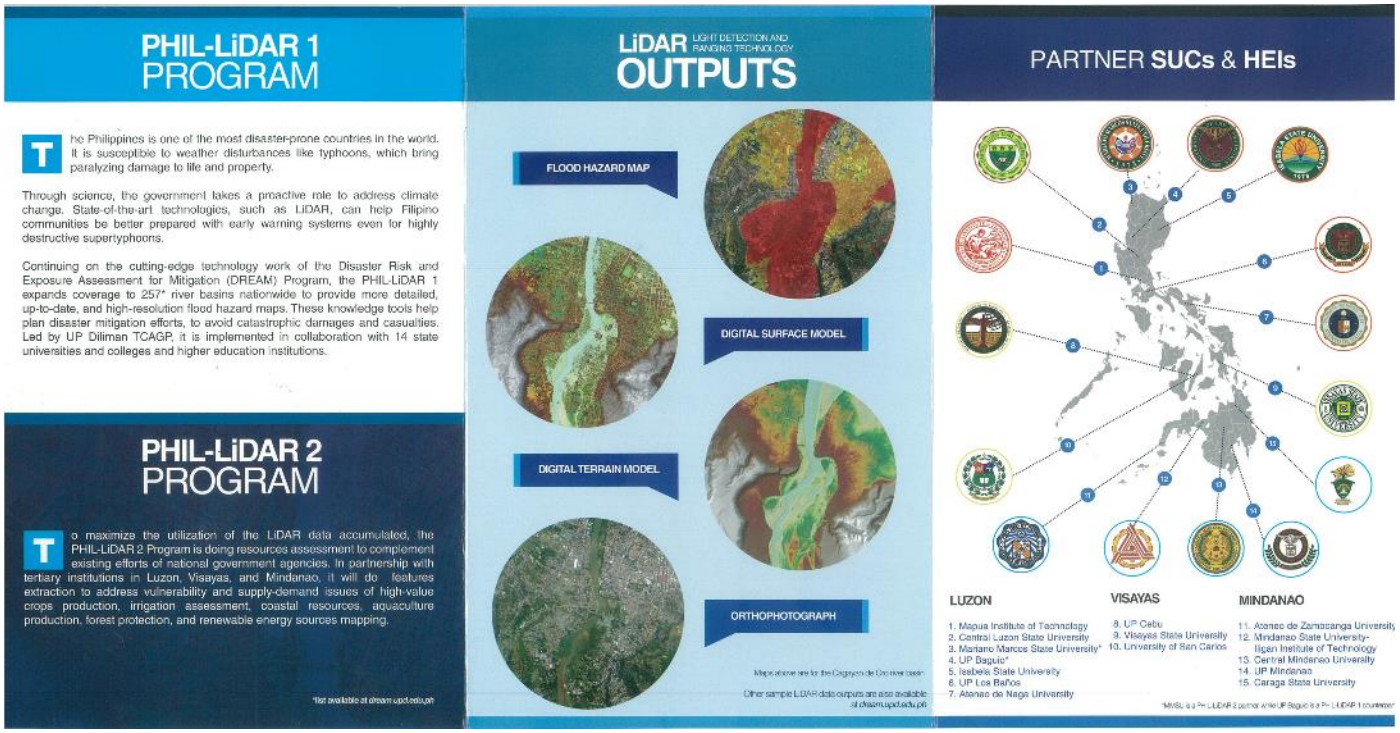
Tsai Wen-Yu
Specialist, National Land Surveying and Mapping Center, Ministry of Interior,Taiwan,R.O.C.

附錄二、菲律賓得獎項目 Phil-LiDAR 2宣傳摺頁

(正面)



(反面)



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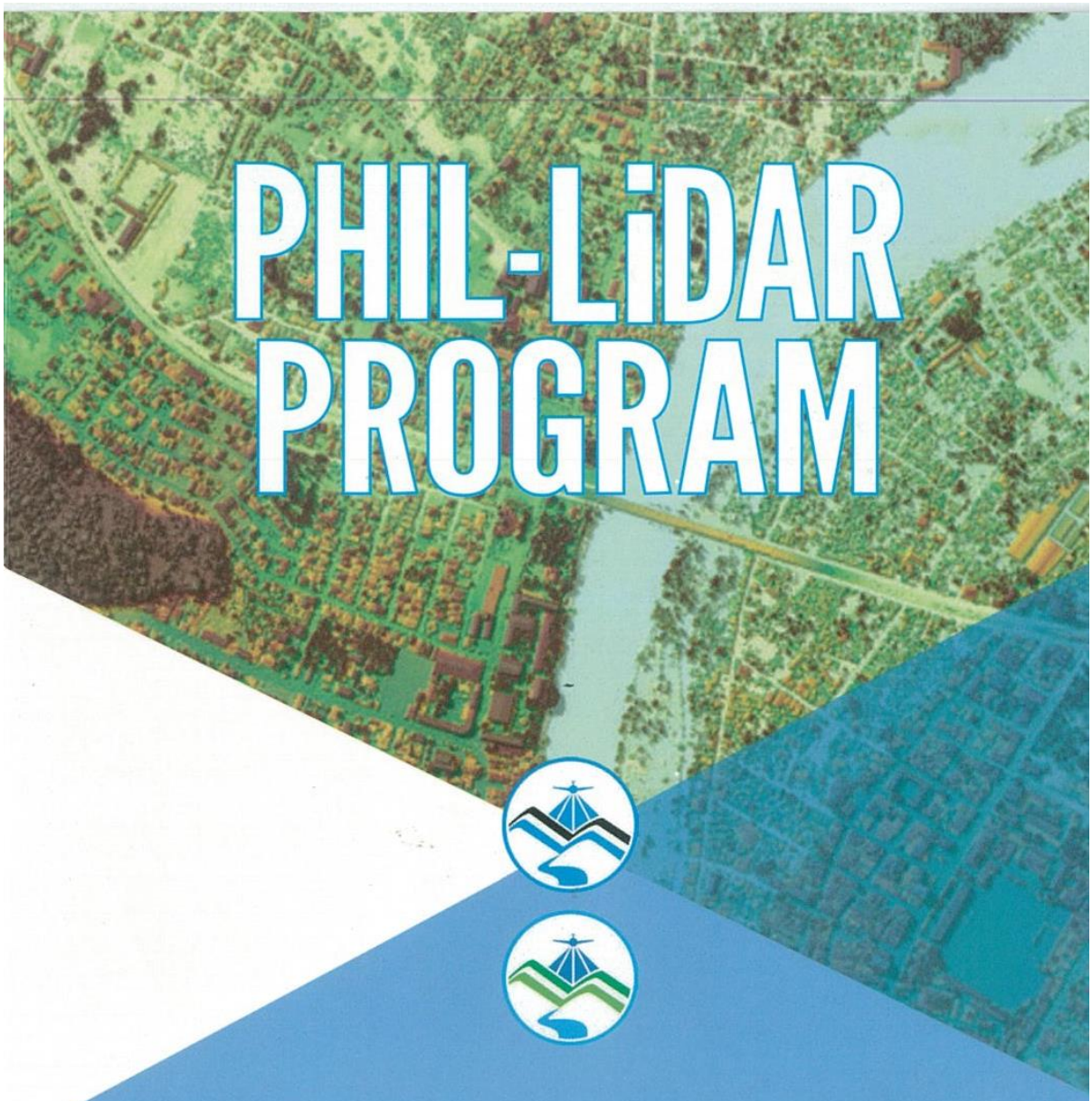


PHIL-LiDAR PROGRAM

PHIL-LiDAR Program
Rm 312-316
National Engineering Center
Alfredo Juinio Hall,
Osmeña Ave cor. F. Agoncillo St.
University of the Philippines
Diliman, Quezon City 1101
(02) 981-8770 to 71
dream.upd.edu.ph

The PHIL-LiDAR 1 and 2 Programs are DOST-GIA-funded projects
that are primarily implemented by the
University of the Philippines Diliman
through its Training Center
for Applied Geodesy and Photogrammetry

PHIL-LiDAR 1 PROGRAM

The Philippines is one of the most disaster-prone countries in the world. It is susceptible to weather disturbances like typhoons, which bring paralyzing damage to life and property.

Through science, the government takes a proactive role to address climate change. State-of-the-art technologies, such as LiDAR, can help Filipino communities be better prepared with early warning systems even for highly destructive supertyphoons.

Continuing on the cutting-edge technology work of the Disaster Risk and Exposure Assessment for Mitigation (DREAM) Program, the PHIL-LiDAR 1 expands coverage to 257* river basins nationwide to provide more detailed, up-to-date, and high-resolution flood hazard maps. These knowledge tools help plan disaster mitigation efforts, to avoid catastrophic damages and casualties. Led by UP Diliman TCAGP, it is implemented in collaboration with 14 state universities and colleges and higher education institutions.

PHIL-LiDAR 2 PROGRAM

To maximize the utilization of the LiDAR data accumulated, the PHIL-LiDAR 2 Program is doing resources assessment to complement existing efforts of national government agencies. In partnership with tertiary institutions in Luzon, Visayas, and Mindanao, it will do features extraction to address vulnerability and supply-demand issues of high-value crops production, irrigation assessment, coastal resources, aquaculture production, forest protection, and renewable energy sources mapping.

*list available at *dream.upd.edu.ph*

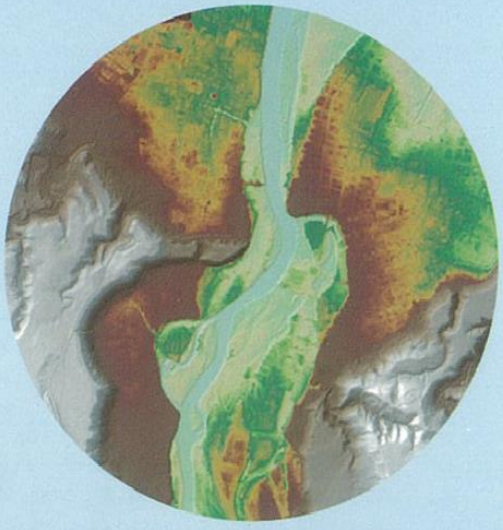
LiDAR OUTPUTS

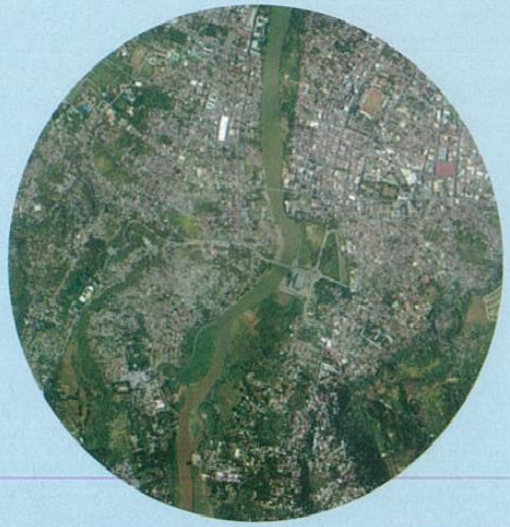
LIGHT DETECTION AND RANGING TECHNOLOGY

FLOOD HAZARD MAP

DIGITAL SURFACE MODEL

DIGITAL TERRAIN MODEL





ORTHOPHOTOGRAPH

Maps above are for the Cagayan de Oro river basin

Other sample LiDAR data outputs are also available at *dream.upd.edu.ph*

PARTNER **SUCs** & **HEIs**

LUZON

1. Mapua Institute of Technology
2. Central Luzon State University
3. Mariano Marcos State University*
4. UP Baguio*
5. Isabela State University
6. UP Los Baños
7. Ateneo de Naga University

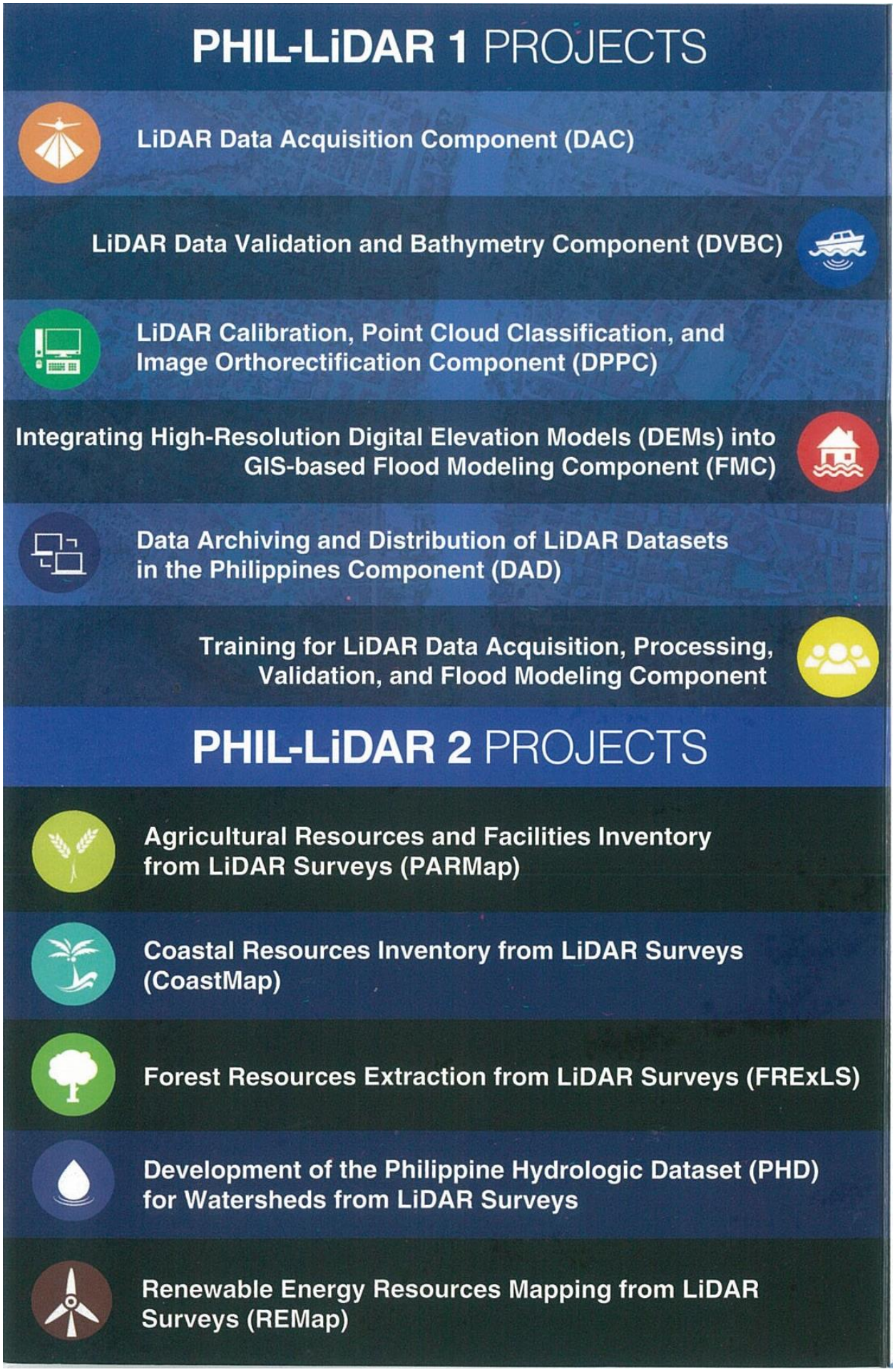
VISAYAS

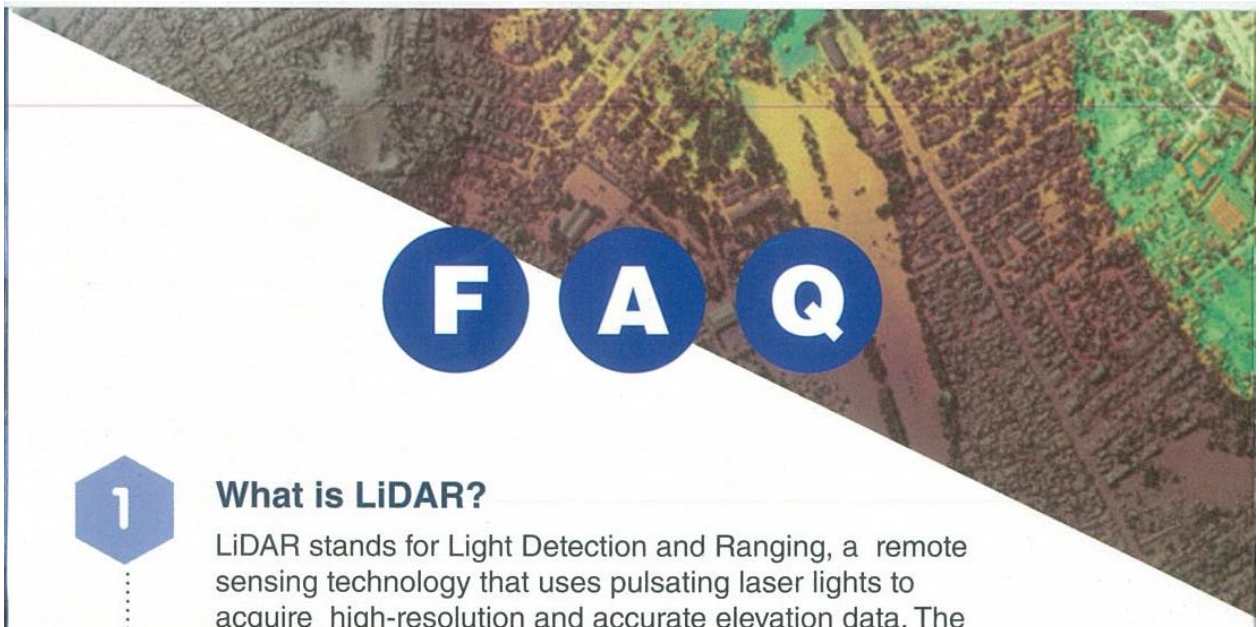
8. UP Cebu
9. Visayas State University
10. University of San Carlos

MINDANAO

11. Ateneo de Zamboanga University
12. Mindanao State University-Iligan Institute of Technology
13. Central Mindanao University
14. UP Mindanao
15. Caraga State University

*MMSU is a PHIL-LiDAR 2 partner, while UP Baguio is a PHIL-LiDAR 1 counterpart


PHIL-LiDAR 1 PROJECTS
LiDAR Data Acquisition Component (DAC)
LiDAR Data Validation and Bathymetry Component (DVBC)
LiDAR Calibration, Point Cloud Classification, and Image Orthorectification Component (DPPC)
Integrating High-Resolution Digital Elevation Models (DEMs) into GIS-based Flood Modeling Component (FMC)
Data Archiving and Distribution of LiDAR Datasets in the Philippines Component (DAD)
Training for LiDAR Data Acquisition, Processing, Validation, and Flood Modeling Component
PHIL-LiDAR 2 PROJECTS
Agricultural Resources and Facilities Inventory from LiDAR Surveys (PARMap)
Coastal Resources Inventory from LiDAR Surveys (CoastMap)
Forest Resources Extraction from LiDAR Surveys (FRExLS)
Development of the Philippine Hydrologic Dataset (PHD) for Watersheds from LiDAR Surveys
Renewable Energy Resources Mapping from LiDAR Surveys (REMap)



FAQ

1 What is LiDAR?

LiDAR stands for Light Detection and Ranging, a remote sensing technology that uses pulsating laser lights to acquire high-resolution and accurate elevation data. The PHIL-LiDAR data is accurate up to 20 cm (vertical) on high-resolution datasets, highly suitable for hazard and resource mapping purposes.

2 Can we access LiDAR data?

LiDAR-based flood hazard maps for river basins covered by the Program may be viewed at the Project NOAH (Nationwide Operational Assessment of Hazards) website, *beta.noah.dost.gov.ph*. Other datasets are available through the LiDAR Portal for Archiving and Distribution site, *lipad.dream.upd.edu.ph*. For details, get in touch with the DAD Component at *info@dream.upd.edu.ph*.

3 Aside from the outputs featured here, are there other knowledge tools from the Programs?

The DREAM/PHIL-LiDAR 1 Program also has a Water Level Forecasting System (WLFS), accessible at *dream.upd.edu.ph.* This is used for monitoring and forecasting rise in water levels, and it is updated every 10 minutes.

The PHIL-LiDAR 2 Program produces resource maps, focusing on the projects' respective areas of specialization. Sample outputs are also available at *dream.upd.edu.ph.*

附錄三：國土測繪中心應邀簡報資料

GEOSMART ASIA 2015 內政部國土測繪中心 National Land Surveying and Mapping Center, Ministry of the Interior

About the presenter

- Specialist in Survey Information section of NLSC in Taiwan.
- Graduated from the Surveying Engineering Department of National Cheng Kung University.
- Among 20 years of service in the NLSC, engaged 15 years in field measurement for Cadastral Resurveying, also do some control point maintenance, and dedicated to Information Security and maps management last 2 years.

2

Outline

Introduction of NLSC

Prospect

About NGIS

Major Works

3

- NGIS is a national geographic information system.
- The system incorporates graphic and attribute (text and symbolic) information on ground and underground features. Units of governments can overlap theme maps to obtain, process and analyze geospatial information based on their administrative demand.
- The Council for Economic Planning and Development under Executive Yuan led the National Geographic Information System Steering Committee (NGISSC) in 2006 and has actively assisted in integration, communication and negotiation among various government agencies.
- NGIS has **7 applications-oriented teams** & **9 major spatial database**.

5

6

- The National Land Surveying and Mapping Center, Ministry of the Interior (NLSC) is the national surveying and mapping agency in Taiwan.
- We work for NGIS Land Information Database, Land-use Planning Database and Topographic Database.

- Planning , promoting and actualizing the Basic Survey and Application survey
- Supplying, managing and maintaining Survey products
- Developing & Researching on Survey technology
- Planning and compiling Survey policies
- Cultivating professional survey personnel

8

One National One Map

9

■ Core and base map data measuring and update maintenance

Core data				
Cadastral Map	Taiwan e-Map	Topographic maps	Land Use maps	UAV

Base data			
pipelines data	Socio-economic data	Transportation Network Data	Ecological environmental information

11

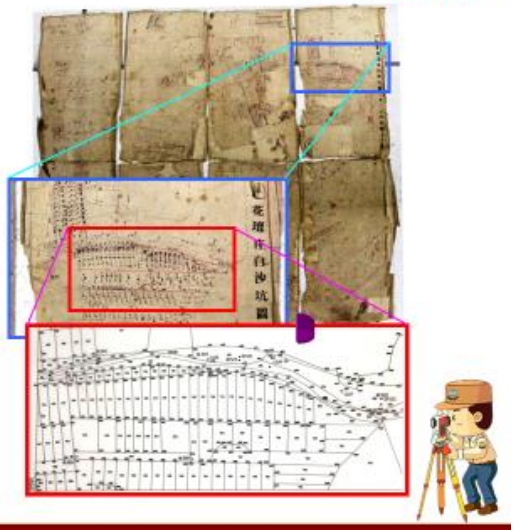
Cadastral Survey

- Cadastral map currently used in Taiwan fall under 3 categories :
  - Graphed maps, digitized maps, digital maps
- At the end of 2014, 98% of territory have been surveyed and registered.
- The remaining 2% lands that have yet to be surveyed and registered are mostly in the river ranges.

12

Cadastral Resurvey

- Update cadastral information
  - district with graphed or digitized maps
- Cadastral resurvey projects began in 1973
  - Digital-based method implemented since 1989.
  - Cadastral resurvey project is proceeding as planned.



Taiwan Electronic Map (Taiwan e-Map)

- The only Electronic Map made by government.
  - 10 categories and 23 layers

Road	Block	Mark	Administrative boundaries	Control point
Doorplate	Water	Building	Aerial photograph	Rail

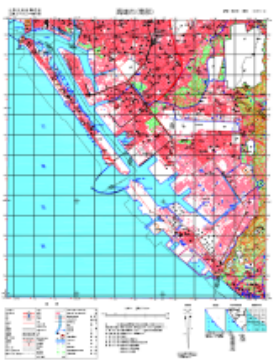
  - Accuracy 1.25m
  - Updated every two years
  - Free for everyone
  - Has English version

High accuracy of position and resolution of orthophoto	• accuracy of position is higher than 1.25 meters • resolution of orthophoto is higher than 25 centimeters
Integrate useful existent materials	• collect aerial photos、DTM、topographic maps、doorplate data、traffic network maps...
Stereoscopic measurement and field investigation	• use photogrammetry method to plot maps and go to field to register attributes

- Import unmanned aerial vehicle systems and mobile mapping system to update map data.

Topographic maps

- Scale 1/5,000、1/25,000、1/50,000、 1/100,000
- The maps at scale of 1:5,000, called base maps, are made by photogrammetry, the accuracy of position is higher than 2.5 meters and the accuracy of elevation is higher than 0.5 meter at even bare places.
- The maps at scale of 1:25,000 and 1:50,000 are both made from the generalization of base maps.
- 10 Layers



Control point	Artificial Structure	Water	Public Utility Network	Land Cover
Boundary Line	Transportation	Landform	Marginal Data	Landmark

16

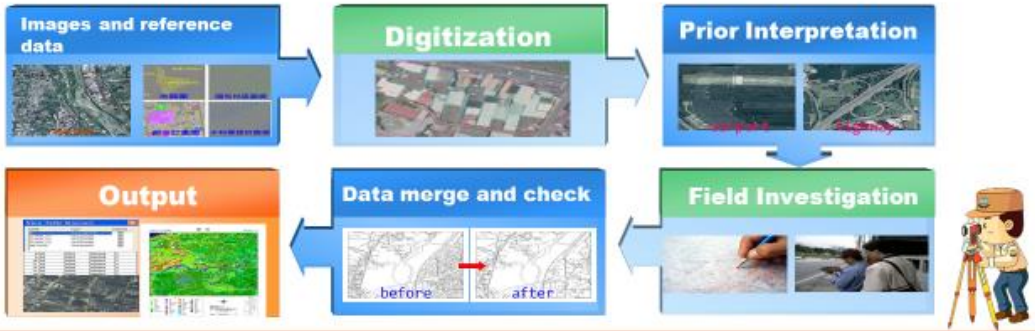
- Improved operation mode to get more accurate results.

	Traditional operation	New operation
Measurement methods	Aerial perspective drawing + Fieldwork	1. Do the control measurement with the "e-GNSS real-time kinematic positioning system". 2. Integrate Existing Layer Information. 3. Use LIDAR DEM to map contour and other terrain data.
Cost	NT$53,000/sheet	NT$30,000/sheet (Save 43%)

17

Land Use maps

- By taking advantage of aerial remote sensing imaging technology, auxiliary GIS data and some ground surveying, the land use status will be recorded in detail as geometric space information.



18

- Land use category
  - CLASS I : 9 types
  - CLASS II : 41 type
  - CLASS III : 103 types

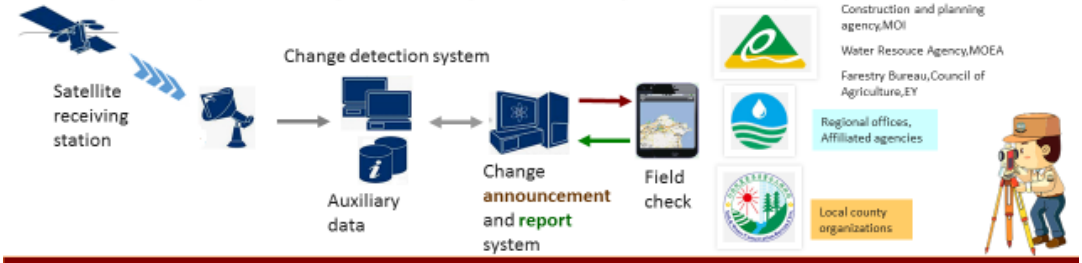
Class I	Class II	Class III
Agriculture	4	11
Forest	3	12
Transportation	4	12
Water	7	17
Building	4	12
Public Utility	6	14
Amusement	2	6
Mineral Utility	3	6
Others	8	13

- 2008 the nationwide investigation completed.
- Update Cycle: 2 years.

19

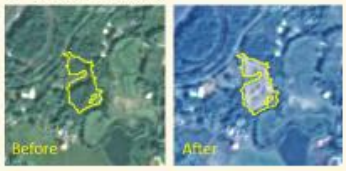
National Land Monitoring

- The National Land Use Monitoring Program uses satellite imagery to prevent environmental destruction caused by illegal development.
  - observe the unauthorized land use changes using multi-temporal satellite images
  - through a Web-based geographical information system (GIS), the area's map coordinates and government administrative districts are identified
  - report suspicious changes to local government agencies and request an on-site survey

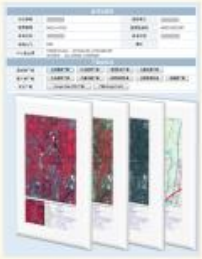


20

✓ Change analysis



✓ The Web-based GIS data



✓ field investigators

Minority change type

◆ Newly-built

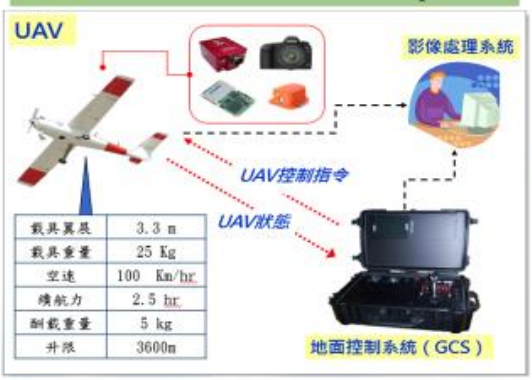
◆ Recenly-exploited

◆ Coast line change detection

21

Unmanned aerial vehicle system(UAS)

2011 NLSC built the Unmanned Aeroplane



載具翼展	3.3 m
載具重量	25 Kg
空速	100 Km/hr
續航力	2.5 hr
酬載重量	5 kg
升限	3600m

22

Assist in disaster prevention and rescue work

23

■ Development Service System for Public

National Land Surveying and Mapping Information Integrated Circulation Warehousing Services Website

➡ Provide the service of search and purchase surveying and mapping data.

National Land Surveying and Mapping Information Web Map Service System

➡ provide free WMS and WMTS services. Provide overlap layers and Web Map API service.

24

National Land Surveying and Mapping Information Integrated Circulation Warehousing Services Website

- This website bases on national land surveying spatial database, connecting the purchase system and electronic toll collection platform. People can easily search and purchase surveying and mapping data on this website.

25

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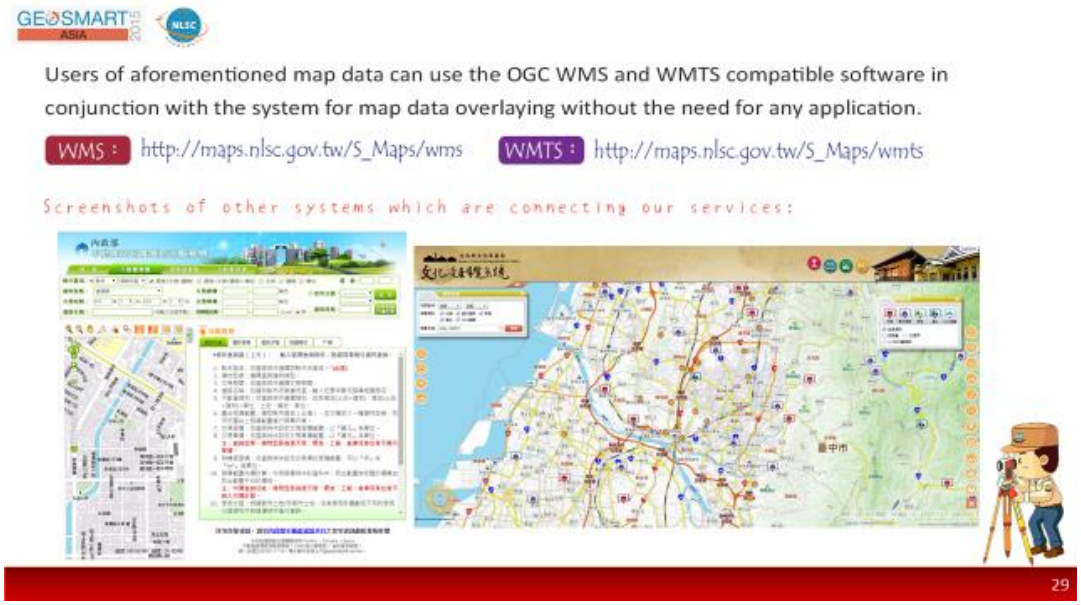
National Land Surveying and Mapping Information Web Map Service System

- Integrate the core and basic maps, such as Common Version Electronic Map, Land Use Map and others.
- Publish WMS、Web Map Tile Service(WMTS) and Web Map API service.
- Can be used by mobile.

27


6 positioning methods :
Doorplate
Administrative region
Road
Intersection
Landmarks
Coordinate
Land lot number
The system now has 24 layers for overlaying :
New English Map Layer
28


Users of aforementioned map data can use the OGC WMS and WMTS compatible software in conjunction with the system for map data overlaying without the need for any application.
WMS : http://maps.nlsc.gov.tw/S_Maps/wms
WMTS : http://maps.nlsc.gov.tw/S_Maps/wmts
Screenshots of other systems which are connecting our services:
29


Prospect
30

Prospect

- One Nation One Map
  - Dynamic Update Taiwan e-Map Included in the administrative process.
    - Import Multiple Mapping System and new technology.
- Build national base charts of marine area
  - Secondary update the Electronic Navigation map
- Develop land use monitoring.
- Publish WFS and API service.

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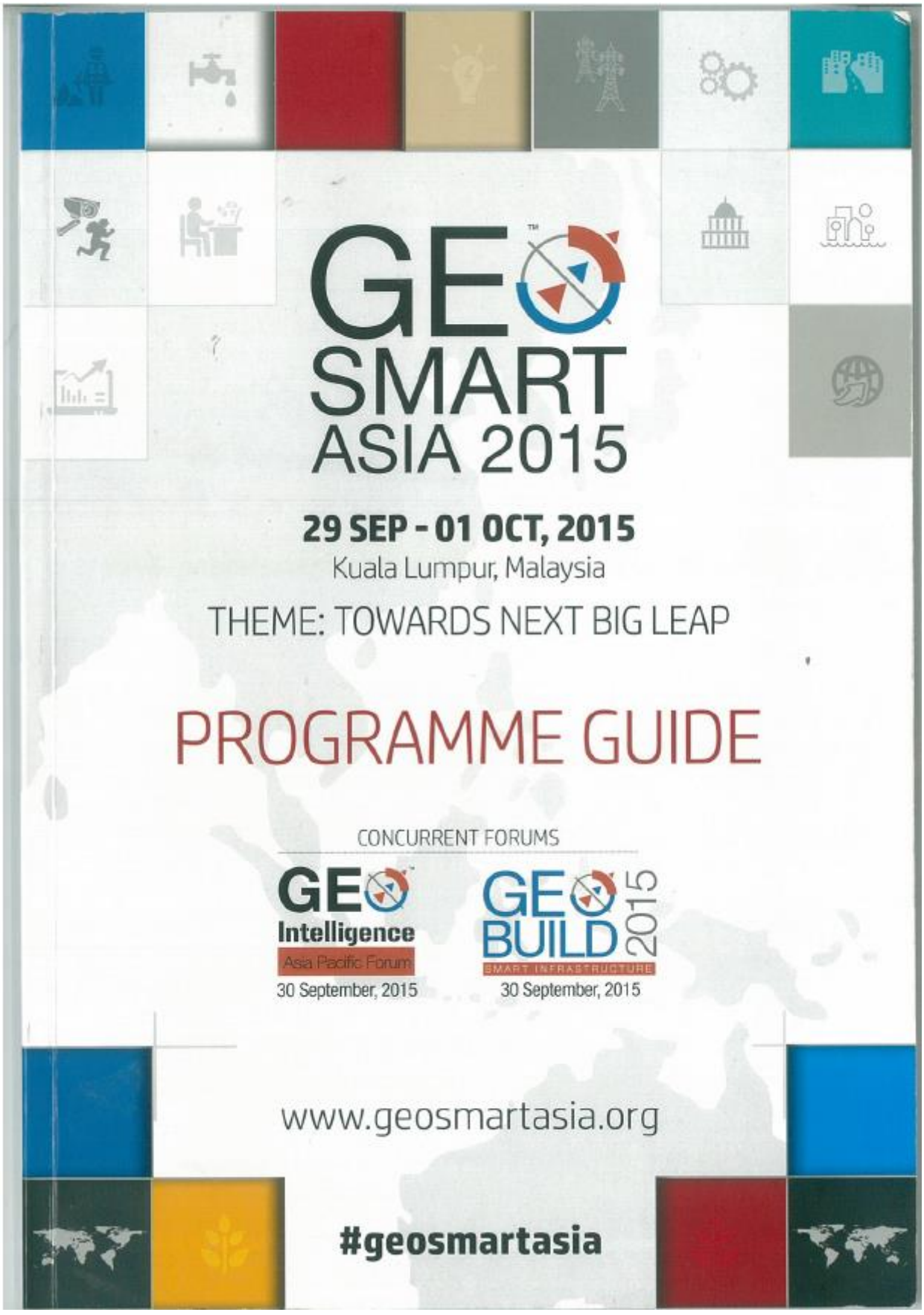
Thank you for your listening

附錄四：本次會議議程(會場秩序冊封底)



GEO SMART ASIA 2015

29 September – 1 October, 2015
Putra World Trade Centre, Kuala Lumpur, Malaysia

PROGRAMME SCHEDULE

29th SEPTEMBER, 2015

Time (hrs)	Dewan Tun Hussein Onn	Tun Dr Ismail
0900 – 1030	Inaugural, Vision Session and Asian Geospatial Excellence Awards	
1030 – 1100	Networking Tea/Coffee Break	
1100 – 1300	Plenary 1: Evolving Smart Geospatial Technologies	
1300 – 1400	Lunch	
1400 – 1600	Plenary 2: Geospatial Solutions: Empowering Government and Enterprises	
1600 onwards	Geospatial Leadership Forum (by invitation only) 1730-1930	Exhibition Opening and Visit to Exhibition1600-1800

30TH SEPTEMBER, 2015

Time (hrs)	Bilik Negeri Sembilan	Bilik Pahang	Bilik Perak	Bilik Pulau Pinang	Bilik Johor / Kedah	Tun Dr Ismail (Exhibition Hall)
0900-1100	ASEAN Geospatial Summit (by invitation only) (0930-1030 hrs)	Trimble Technology Track	GeoAgri	GeoBuild Smart Infrastructure	GeoIntelligence Asia Pacific	
1100-1230	DigitalGlobe Tech Track	Networking Tea/ Coffee Break	FARO Tech Track			
1230-1330	Lunch					
1330-1500	ASEAN Geospatial Summit (by invitation only)	Youth Forum	GeoAgri	GeoBuild Smart Infrastructure	GeoIntelligence Asia Pacific	Exploration - Mining & Oil
1500-1600	Networking Tea/Coffee Break					
1600-1730	ASEAN Geospatial Summit (by invitation only)	Youth Forum	GeoAgri	GeoBuild Smart Infrastructure	GeoIntelligence Asia Pacific	Exploration - Mining & Oil

1ST OCTOBER, 2015*

Time (hrs)	Bilik Negeri Sembilan	Bilik Pahang	Bilik Perak	Bilik Pulau Pinang	Tun Dr Ismail Hall (Exhibition Hall)
0900-1100	GeoGrid (Electricity)	Climate Change & Disaster Management	GeoLand	Enhancing Highway Management and Maintenance with Geospatial (Training of PLUS Berhad members)	Geo-governance and Smart Applications
1100 - 1130	Networking Tea/Coffee Break				
1130 - 1300	GeoGrid (Electricity)	Climate Change & Disaster Management	GeoLand	Enhancing Highway Management and Maintenance with Geospatial (Training of PLUS Berhad members)	Technology Session: Sensors & UAVs
1300 - 1400	Lunch				
1400 - 1530		Climate Change & Disaster Management	GeoLand	Enhancing Highway Management and Maintenance with Geospatial (Training of PLUS Berhad members)	Technology Session: Emerging trends & technologies
1530 - 1600	Closing Session				

www.www.geosmartasia.org

附錄五：本次會議演講者資料

SPEAKERS

Inaugural Session

Chief Guest

Hon. Datuk DR. Abu Bakar Bin Mohamad Diah

Deputy Minister of Science, Technology & Innovation Malaysia

Vision Session

Dr. Suhazimah Binti Dzazali

Deputy Director General (ICT)
MAMPU
Prime Ministers Department
Malaysia
About Speaker | Presentation

NG Siau Yong

Director
GeoSpatial Division
Singapore Land Authority
Singapore
About Speaker | Presentation

Datuk Sr Ahmad Fauzi Bin Nordin

Director General of Survey & Mapping
Department of Survey & Mapping
Malaysia
About Speaker | Presentation

Emeritus Professor John Trinder

President
Surveying and Spatial Sciences Institute & Surveying & Geospatial Engineering
School of Civil & Environmental Engineering
The University of South Wales
Australia
About Speaker | Presentation

Plenary Panel 1: Evolving Smart Geospatial Technologies

Dr. Nitin Kumar Tripathi

Professor of Geoinformatics (RS & GIS)
School of Engg and Technology
Asian Institute of Technology
Thailand
Presentation

John Whitehead

Sales Director – Asia Pacific & India
Trimble
About Speaker | Presentation

Rodney Chaffee

Head of Sales for Asia-Pacific
FARO
Singapore
About Speaker | Presentation

Derren Yong

Senior Director-APPC Commercial Sales
DigitalGlobe
Singapore
About Speaker | Presentation

Kaushik Chakraborty

Territory Executive
Southeast Asia, Bentley
About Speaker

Plenary Panel 2: Geospatial Solutions – Empowering Government and Enterprises

Fu Yuming
Vice Dean
School of Design and Environment
National University of Singapore
Singapore
About Speaker
Presentation

Tadashi Sasagawa
Executive Dierctor
PASCO Corporation
Japan

Dato' Dr. Nadzri bin Yahaya
Deputy Director General (Energy)
Ministry of Energy, Green Technology & water (KeTTHA)
Malaysia
About Speaker

Josh Alban
Vice President – Sales
Planet Labs
USA
About Speaker |
Presentation

Dr. Nurwadjedi
Deputy of Geospatial Thematic Information
Badan Informasi Geospasial
Indonesia
About Speaker |
Presentation

GeoIntelligence Asia Pacific Forum

Lt Gen (Dr) AKS Chandele, PVSM, AVSM (Retd)
President – Defence, Security and Public Safety
Geospatial Media & Communication

Lt Gen SH Kulkarni, PVSM, AVSM, VSM (Retd)**
Former Director General
Mechanised Forces
Indian Army
India

John Taylor
Senior Director
Government - Asia Pacific region Bentley Systems
About Speaker

Dinesh Sathyamoorthy
Senior Research Officer
Science & Technology Research Institute for Defence
Malaysia
About Speaker |
Presentation

Prof. Dr. Iyyanki V Murali Krishna, Dr Raja Ramanna Distinguished Fellow
Defence Research and Development Organisation (DRDO)
India
About Speaker |
Presentation

Ir Rozinah binti Anas
General Manager
Malaysian Emergency Response Services (MERS) 999
TM Government Telekom Malaysia Berhad
About Speaker |
Presentation

Professor Dr. Aruna Gopinath
National Defence University of Malaysia (NDUM)
About Speaker |
Presentation

Lieutenant Colonel Associate Professor Ajaya Kumar A/L Kurup (Retd)
National Defence University of Malaysia (NDUM)
About Speaker |
Presentation

Lieutenant Colonel Professor Ahmad Ghazali bin Abu-Hassan (Retd)
National Defence University of Malaysia (NDUM)

Lieutenant Colonel Abdul Rahman Alawi (Retd)
National Defence University of Malaysia (NDUM)
About Speaker |
Presentation

Captain Martin A. Sebastian RMN (Retd)
Research Fellow
Maritime Institute of Malaysia
About Speaker |
Presentation

GeoAgri

Chairperson & Lead Speaker

Dr. Siva Balasundram

Country Representative/Associate Professor
The international Society of Precision Agriculture
Malaysia
About Speaker | Presentation

Khoo Hock Aun

Director, The GROW Centre & Managing Director, Cosmo Bio fuels Group, Kuala Lumpur, Malaysia Vice-Chair-The Roundtable on Sustainable Biomaterials, Switzerland
About Speaker | Presentation

Dr. Zainol Abidin

Managing Director, Agrostevia Worldwide [M] Sdn. Bhd
Kuala Lumpur
Malaysia
About Speaker | Presentation

Sutha Veloo

Assistant Director
Planning & ICT Division,
Department of Agriculture
Ministry of Agriculture and Agro-Based Industry
Malaysia
About Speaker | Presentation

Mohd. Hafiz Bin Mohd Hazir

Researcher
Malaysian Rubber Board
Malaysia
Presentation

Siti Hajar Md Nor Azam

Senior Scientist, Precision Agriculture Unit, Sime Darby Research, Malaysia
About Speaker | Presentation

Fatwa Ramdani

Director of Geoinformatics, Research Center, Faculty of Computer Science, University of Brawijaya
Indonesia
About Speaker

John Whitehead

Sales Director – Asia Pacific & India
Trimble
About Speaker | Presentation

Scot Craig

Regional Sales Manager
Trimble's Agriculture Division
About Speaker | Presentation

Doria Tai Yun Tyng

Principal Assistant Director
Lands and Surveys Department
Sabah Malaysia
Presentation

Mark Yong

CEO
Garuda Robotics
Singapore
About Speaker | Presentation

Dr Jeyanny Vijayanathan

Research Officer
Soil Management Branch Forest Plantation Programme Forest Research Institute Malaysia [FRIM],Malaysia
About Speaker | Presentation

GeoLand

Chairperson

Datuk Dr. Abdul Kadir Taib

Ex-Director General JUPEM and CEO Platinum Survey Consultant
Malaysia
About Speaker

Sr Khuzaimah Abdullah

Director, National Property Information Centre
Malaysia
About Speaker | Presentation

Alan Yong

Manager Business Development – APAC, Thomson Reuters, Singapore
About Speaker | Presentation

Emeritus Professor John Trinder
President, Surveying & Spatial Sciences Institute & Surveying & Geospatial Engineering, School of Civil & Environmental Engineering, The University of South Wales, Australia
About Speaker | Presentation

Sr Tuan Haji Safar Bin Untong
Director
Sabah Land & Surveys Department
Malaysia
About Speaker | Presentation

Tsai Wen-Yu
Specialist
National Land Surveying and Mapping Center
Ministry of Interior
Taiwan (ROC)
About Speaker | Presentation

Dr Sr Ahamad Zakaria
Director Of Survey and Mapping Department of Survey Selangor
Malaysia
About Speaker | Presentation

Samuela Naicegucegu
Director Land Use/Land Reform
Ministry of Lands and Mineral Resources
Fiji Islands
About Speaker | Presentation

Sr Dr Hajah Norziha binti Md Zain
State Director of Valuation
Valuation & Property Services Department
Malaysia
About Speaker | Presentation

Benoit Frédéricque
Senior Product Manager, Hydraulics and Hydrology
Bentley
About Speaker | Presentation

Dato' Sr. Dr. Mohd Zaid Bin Abdullah
Principal/ Licensed Land Surveyor
Malaysia
About Speaker | Presentation

Warlito G. Quirimit
Head - Geospatial Information Management Section
Land Administration and Management System
The Land Management Bureau
The Philippines
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GEOGRID (Electricity)

Chairperson & Lead Speaker
Sr Dr. Mohd Yunus Bin Mohd Yusoff
Director of Survey (Utility Mapping Division), Department of Survey and Mapping (JUPEM), Malaysia
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Romeo S Anano
Chief
Information Services Division
Department of Energy
The Philippines
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Eric Broussouloux
Asia Regional Manager
IMAO
France
About Speaker | Presentation

Dr. Ong Hang See
Deputy Dean
Universiti Tenaga Nasional
UNITEN
Malaysia
About Speaker | Presentation

Mohd Azahar Ab Aziz
Manager
Map Management, Geomatics Unit
IT & Business Solutions Unit, ICT Division
Tenaga Nasional Berhad
Malaysia
About Speaker | Presentation

Jerome Richard P. Felizarta
Staff Engineer
Network Asset Planning – Substation Asset Planning Department
MERALCO
The Philippines
About Speaker | Presentation

Dr. Anuar Ahmad
Senior Lecturer
Faculty of Geoinformation & Real Estate
Universiti Teknologi Malaysia
Malaysia
About Speaker | Presentation

Trudy R Ganendra
Managing Director, Ground Data Solutions R&D Sdn Bhd
Malaysia
About Speaker | Presentation

Dr. Sukanta Kumar Jena
Sales and Program Management Head – China, HK & SEA,
CYIENT Ltd.
Malaysia
About Speaker

Faro Technology Track

Ryan Almonte
Sales Engineer
FARO Singapore Pte Ltd
Singapore
About Speaker

Giorgia Rossi
Sales Manager
GEXCEL SRL
Italy
About Speaker

Jackson Cham
Technical Sales Manager
Bandwork GPS Solutions
Kuala Lumpur
About Speaker

Md Afif Bin Abu Bakar
Technical Engineer for Faro Laser Scanner Atama Tech Sdn Bhd Johor, Malaysia
About Speaker

Youth Forum

Moderator
Dr. Shahnawaz
Director (S & SE Asia)
UNIGIS International
University of Salzburg
Austria

Bui Quang Thanh
Deputy Dean
VNU University of Science
Vietnam
About Speaker

Prof Madya Dr Alias
Lecturer
Department of Forest Production
University Putra Malaysia

Dr. Nitin Kumar Tripathi
Professor of Geoinformatics (RS & GIS)
School of Engg and Technology
Asian Institute of Technology
Thailand

Dr Lam KC
Senior lecturer of Geography, Faculty of Social Sciences & Humanities, National University of Malaysia

John Whitehead
Sales Director – Asia Pacific & India
Trimble

Mineral Exploration – Mining & Oil

Chair Á Lead Speaker
Fatwa Ramdani
Director of Geoinformatics Research Center
Faculty of Computer Science
University of Brawijaya
Indonesia
About Speaker

Shailesh Shankar
Manager –Sales Engineering, Digital Globe

Andrew Chien
UniDimenxi
Presentation

Khairul Faizi B M Taib
TDTG Department
Petronas
Malaysia
Presentation

Fatwa Ramdani
Director of Geoinformatics Research Center
Faculty of Computer Science
University of Brawijaya
Indonesia
About Speaker

Richard Sugandha
3D Laser Scanning Manager | Asia Infrastructure & Environment
Jacobs
Malaysia
About Speaker

Akbar Cita
Center for Geological Survey
Geological Agency Ministry of Energy and Mineral Resources
Indonesia
About Speaker

Saiful Nizam B Mustafa
Geomatics Department
Petronas
Malaysia
Presentation

Climate Change & Disaster Management

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Chair & Lead Speaker
Profesor Dr. Fredolin Tangang
Chairman of the Research Centre for Tropical Climate Change, Universiti Kebangsaan Malaysia
Presentation

Chair & Lead Speaker
Masanobu Tsuji
Director-Bangkok Office
Japan Aerospace Exploration Agency & Executive Secretary Asia Pacific Regional Space Agency Forum
Japan
About Speaker | Presentation

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Chair & Lead Speaker
Sr Dr. Azhari bin Mohamed
Department of Survey & Mapping (JUPEM),Malaysia
About Speaker

Ling Leong Kwok
Section Chief - Weather and Climate Models Development Section
Malaysian Meteorological Department
Presentation

Azhar Bin Ishak
Head of Meteorological Division, Marine Science Technology, Malaysia
About Speaker | Presentation

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Dr. Dickson Lukose
Head Knowledge Technology Cluster, MIMOS Berhad
Presentation

Jojene R. Santillan
Chief Science Research Specialist
CSU Phil-LiDAR 1 Project
Caraga State University
The Philippines
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Professor Dr. Roslan Zainal Abidin
President, Infrastructure University Kuala Lumpur
About Speaker
Presentation

Tan Siew Siong
Regional Sales Manager, GNSS Infrastructure Division
Trimble
Presentation

Dwi Wahyuni Nurwihastuti

Lecturer
Department of Geography
State University of Medan
Indonesia
About Speaker

Dr Eng Ariel C. Blanco

Head, Environmental Systems Applications of Geomatics Engineering [EnviSAGE]
College of Engineering,
University of the Philippines
The Philippines
About Speaker | Presentation

Asep Yusup Saptari

Lecturer, Geodesy & Geomatics – Institute of Teknologi Bandung, Indonesia

Engr. Meriam M. Makinano-Santillan

Associate Professor
College of Engineering and Information Technology
Caraga State University
Philippines
About Speaker | Presentation

Norisam Abd Rahaman

Section Manager, PLUS Berhad, PLUS Malaysia
Presentation

G-Governance & Smart Applications

Chairperson

Gatot Pramono

Head - Marine Thematic Mapping and Integration Division, Badan Informasi Geospasial, Indonesia

Sr Bernard Liew Chau Min

Deputy Director [Survey]
Lands And Surveys Department
Sabah
Malaysia
Presentation

Wan Mohd Hafiz

Master architect for Geo Mobile Platform
Telekom Malaysia

Mary Joy Buitre

Science Research Specialist, Philippine Council for Industry, Energy and Emerging Technology Research and Development, The Philippines
Presentation

Jean-Pascal Butté

International Business Development, Lorienne
France
Presentation

Md Afif Bin Abu Bakar

Technical Engineer for Faro Laser Scanner Atama Tech Sdn Bhd Johor, Malaysia
About Speaker

Shyam Parhi

Programme Manager
Federal Aviation Administration
USA
Presentation

Ooi Wei Han

Research Officer
Space Application and Technology Development Division
National Space Agency [ANGKASA]
Malaysia
About Speaker | Presentation

Sensors/Lasers & UAVs

Lim Chor Sheng
Managing Director
GPS Lands (M) Sdn Bhd
Malaysia
Presentation

☒ #

Sr Dr. Zainal A. Majeed
Department of Survey & Mapping (JUPEM)
Malaysia
Presentation

Jackson Cham
Technical Sales Manager
Bandwork GPS Solutions
Kuala Lumpur
About Speaker

Kenneth Smillie
Segment Manager Mobile Mapping & Solutions – APAC
Leica Geosystems Singapore
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Muhammad Jafni b. Jusof
Digital Content Designer,
Centre for Creative Content and Digital Innovation, University Malaya, Malaysia
About Speaker |
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Pasawat Tipyotha
Solutions Specialist, Geospatial Division, Trimble, APAC

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Dr. John K. Hornsby
BlackSky Global
Presentation

Emerging Trends & Technologies

Chairperson
Vu Tien Quang
Chief of Technology and Assessment Office
Department of Surveying and Mapping
Vietnam

Lee Kok Wai
Country Business Manager, HP Singapore
Presentation

Vincent Kessler
Regional Sales Manager,
Geospatial Division, Trimble
Presentation

Shahrizal Ide Moslin
Head of Space Application Development Unit Space Application & Technology Development Division National Space Agency (ANGKASA)
Malaysia
About Speaker |
Presentation

Ahmad Hizami Rosehaizad
Manager -Mapping and Content Development, Geomatics Department, Telekom Malaysia Berhad
Presentation

Muhammad Fakhri Hassni
Technical Support Engineer,
Global-trak System
Presentation

ASEAN Geospatial Summit

Datuk Sr Ahmad Fauzi Bin Nordin

Director General of Survey & Mapping
Department of Survey & Mapping
Malaysia
About Speaker | Presentation

Dr. Nurwadjedi

Deputy of Geospatial Thematic Information
Badan Informasi Geospasial
Indonesia
About Speaker | Presentation

NG Siau Yong

Director
GeoSpatial Division
Singapore Land Authority
Singapore
About Speaker

Dr Noordin Bin Ahmad

Director General
Malaysia Space Agency (ANGKASA)
Malaysia

Lai Anh Khoi

Space Technology Institute
Vietnam
Presentation

Vu Tien Quang

Chief of Technology and Assessment Office
Department of Surveying and Mapping
Vietnam
Presentation

Masanobu Tsuji

Director-Bangkok Office
Japan Aerospace Exploration Agency & Executive Secretary Asia Pacific Regional Space Agency Forum
Japan
About Speaker | Presentation

Dr Zaffar Sadiq Mohamed-Ghouse

Manager - Business, Research & International Relations
CRC for Spatial Information, Australia & Director, Surveying Spatial Sciences Institute
Australia
About Speaker | Presentation

Dedi Irawadi

Director for Remote Sensing Technology and Data Centre
National Institute of Aeronautics and Space (LAPAN)
Indonesia
Presentation

GeoInfrastructure & Smart Cities

Moderator and Speaker
Mohd Rizal Mohd Rosly

Managing Director / Co-Founder BIMAsia Malaysia
Presentation

Moderator and Speaker
Jason D Clark

Director
Spatiali Pty Ltd
Australia
About Speaker | Presentation

Moderator and Speaker
Carsten Roensdorf

Practice Manager
Future cities, Standards and 3D, Ordnance Survey International
UAE
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Jugal Makwana

BIM Director - APAC
AECOM
Singapore
About Presentation

Dr Victor Ong

Managing Director
ONE SMART Engineering
Singapore
Presentation

Ryan Valdez

Asset Information Development Manager, Manila Water Company, Inc. The Philippines
Presentation

Dr. Abbas Mazlan
CEO
REDtone IOT Sdn Bhd
Malaysia
Presentation

Raghunath Babu Guduru
VP - Surbana International Consultants
Singapore

Michael De Lacy
Business Development Consultant
AAM Group
Australia
About Speaker | Presentation

Naveen Bhat
Bentley Systems
About Speaker | Presentation

Azlan Zainal
Business Development Manager [Building & Infrastructure Engineering Services]
Strand Aerospace Malaysia

Sonny Andalis
BIM Specialist BCA Centre for Construction IT Singapore
About Speaker | Presentation

Giorgia Rossi
Sales Manager
GEXCEL SRL
Italy
About Speaker | Presentation

Robin Littau
VP Business Development
Singapore
About Speaker | Presentation