

出國報告（出國類別：研討會）

參加「全球空間資料基礎建設協會  
(GSDI ASSOCIATION)」第 9 屆年會及  
國際研討會

服務機關：內政部

姓名職稱：參事兼主任沈金祥

派赴國家：智 利

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## 摘要

全球空間資料基礎建設協會(GSDI ASSOCIATION)，英文全名為 GLOBAL SPATIAL DATA INFRASTRUCTURE ASSOCIATION，成立於西元 2002年，為一個非營利的全球性組織，其成員主要來自全球五十餘個已開發及開發中國家，包括美國聯邦地理資料委員會FGDC、開放式地理空間協會Open Geospatial Consortium (OGC)、環境系統研究所ESRI等以及各國從事地理資訊系統領域之政府、非政府組織及私人團體或感興趣之個人，該組織成立的目的為促進各國空間資料基礎建設發展，加速國土資訊產業更新、維護、流通供應及加值應用等作業，以提昇各國政府機關行政效率及服務品質，加速國土資訊之產業發展。內政部於94年10月4日以政府機關組織名義加入該協會成為會員，希望能透過參與GSDI國際組織與會員國交流，獲取先進國家的經驗與技術標準建議，加速我國國土資訊系統之推展作業，並早日完成與國際接軌之目標。

本(95)年「全球空間資料基礎建設協會」於智利聖地牙哥舉辦年會並同時辦理第9屆國際研討會(GSDI-9)，會議期程自11月6日至10日，共計5日，會中除邀請專題報告外，另訂有研討主題，包括貧困減輕、環境保持、災難預防及運輸、健康、地籍等空間資料基礎建設之應用等議題。

內政部本次以政府機關名義派員參加國際 GSDI 協會第 9 屆年會，並於會中報告我國國土資訊系統推動過程與未發展望，普獲各會員國及與會人士重視。雖然會中中國國家測繪局以書面抗議我國以中華民國內政部名義參加，不符合聯合國慣例，但大會採低調處理，仍然同意我方以上述名稱與會，並於開幕典禮中，由大會主席（智利國防部長）宣佈我方代表為貴賓之一。就我方代表報告之論文而言，與會人士（尤其美國代表前任理事長及美國國家地理測量局）對我政府積極投入國土資訊系統之開發，並由高層組成推動小組進行基礎建設之協調整合工作頗為肯定，會後皆期望我國能持續將推動經驗與國際社會共同分享。

為利加速我國國土資訊系統推展並達國際接軌之目標，報告內謹建議：(一)持續定期參加 GSDI 年會及國際研討會，將我國推動空間地理資訊系統及應用成果與國際分享，俾爭取國際認同。(二)我國宜積極擴大參予 GSDI 協會之相關活動。(三)參予 GSDI 協會正式會員可改由政府輔導非政府組織為之。。

**關鍵詞：**

環境系統研究所 (ESRI)；

美國聯邦地理資料委員會 (FGDC)；

地理資訊系統(GIS)；

全球空間資料基礎建設協會(GSDI, ASSOCIATION)；

詮釋資料 (Metadata)；

開放式地理空間協會 (OGC, Open Geospatial Consortium)；

空間資料基礎建設 (SDI)；

## 壹、前言

全球空間資料基礎建設協會(GSDI ASSOCIATION)，英文全名為GLOBAL SPATIAL DATA INFRASTRUCTURE ASSOCIATION，成立於西元2002年，為一個非營利的全球性組織，其成員主要來自全球五十餘個已開發及開發中國家，包括美國聯邦地理資料委員會FGDC、開放式地理空間協會Open Geospatial Consortium (OGC)、環境系統研究所ESRI等以及各國從事地理資訊系統領域之政府、非政府組織及私人團體或感興趣之個人，該組織成立的目的為促進各國空間資料基礎建設發展，加速國土資訊產業更新、維護、流通供應及加值應用等作業，以提昇各國政府機關行政效率及服務品質，加速國土資訊之產業發展。本部於94年10月4日首次以政府機關組織名義加入該協會成為會員(如附件1)，希望能透過參與GSDI國際組織與會員國交流，獲取先進國家的經驗與技術標準建議，加速我國國土資訊系統之推展作業，並早日完成與國際接軌之目標。

本(95)年「全球空間資料基礎建設協會」將於智利聖地牙哥舉辦年會並同時辦理第9屆國際研討會(GSDI-9)，會議期程自11月6日至10日，共計5日，會中除邀請專題報告外，另訂有研討主題，包括貧困減輕、環境保持、災難預防及運輸、健康、地籍等空間資料基礎建設之應用等議題，各項研討主題值得國內推動國土資訊系統之參考及借鏡。

由於內政部負責我國國土資訊系統推動規劃標準及倉儲系統建置等工作事項，且本次GSDI年會及研討會係本部加入成為會員後之第1次會員大會及主題研討，為能瞭解該協會實際運作方式及宣導我國推動國土資訊系統之經驗與成果，乃應該協會邀請研提我國國土資訊系統推展計畫(The National Geographic Information System in Taiwan)報告乙篇，並經該協會審查通過，應邀請於會中作專題報告簡報(如附件3)。

## 貳、與會過程與研討會內容

本年「全球空間資料基礎建設協會」舉辦之第9屆國際研討會(GSDI-9)，除邀請專題報告外，另訂有研討主題，包括貧困減輕、環境保持、災難預防及運輸、健康、地籍等空間資料基礎建設之應用等議題，論文發表及演說計超過200場次，。本人除於會中代表內政部發表論文，報告我國國土資訊系統推展計畫(The National Geographic Information System in Taiwan)外(論文全文如附件二)，另利用時間選擇參加值得國內推動國土資訊系統參考之相關場次，俾吸取他國經驗與方式供作借鏡。僅將參與場次論文重點分類摘述如后：

### (一)、空間資料基礎建設

1. 邁向GSDI：改善資料整合達世界水準(Moving Towards Global Spatial Data Infrastructure: Improving Data Integration at the Global Level)

在國際社會中，有一普遍的共識，即是需要建立一個全球空間資料基礎建設(GSDI)，並保證互通性，以提升投資收益，使地理空間資料能分享於地理訊息用戶社區。然而，既然已意識到這樣的一個全球SDI之需求，國際社會也應有效地採用地理空間資料之標準。

這篇論文因此提議一個架構以改進資料整合、資料品質及具世界水準的慣例和永續標準。如果全世界的地理社區使用這種架構將使投資效益最大化，同時使得多餘的地理空間減到最小，以符合公共衛生、災難回應、土地使用管理、城市規劃、農業、森林、教育和其他重要的部門對於社會和經濟發展需要。

2. 全球空間資料基礎建設：願景與概念仍然相關嗎(Global Spatial Data Infrastructure: Are the Vision and Concepts Still Relevant)?

全球空間資料基礎建設是由資料分享與計畫合作協調努力而逐步發展而成。其中計畫合作協調努力是由資訊社會概念、在網際網路溝通與地理空間工具的技術革命下連接產生的。在 1990 年代中晚期的願景、概念、全球空間資料基礎建設定義，是由全球空間資料基礎建設會議的參與者所共識達成的。願景、概念在當時被破天荒的提出，對於今日空間資料基礎建設計畫提供了一個強而有力的基石。

全球空間資料基礎建置願景與概念的相關性，在今日而言，仍不輸給 10 年前開始建置之初的情形。

### 3. 學習建置全球性空間資料基礎建設－以 SALB 計畫在美洲的實作為例(Lessons Learned Towards the Creation of a Global SDI: The Example of the SALB Project in the Americas)

任何 SDI（空間資料基礎建設）的活動完全依賴地理空間資料才能運作，因此建置生產無接縫（seamless）及一致性（homogeneous）的全球性資料集，已成為一種挑戰。

聯合國地理資訊工作小組（UN Geographic Information Working Group, UNGIWG）於 2001 年開始執行一項名為 SALB 的計畫，該計畫提供了一個工作平台，讓所有的聯合國會員國共同收集、管理、展示及分享地理資訊。

本論文以 SALB 計畫在美洲的實作為例，分享及共同學習如何建置全球性空間資料基礎建設。

### 4. 澳洲與瑞士空間資料基礎建設架構之比較(A Framework for Comparing Spatial Data Infrastructures : An Australian-Swiss Study)

發展空間資料基礎建設的重要因素之一，是要方便資料共享與資料取得。為了達到空間資料基礎建設資料的取得與空間資料的使用，必須具備資料管理、詮釋資料、網際服務

及相關處理程序等知識。在很多不同的領域都發展其不同的空間資料基礎建設，因此有很多不同的方法來了解與評估其成功的水平。要達到此目標的重要方法是比較各國的空間資料基礎建設。

本報告主要是描述在一定的資料管理、詮釋資料、網際服務基準下，評比澳洲與瑞士空間資料基礎建設資料計畫。

#### 5. 評估開發中國家空間資訊基礎建設之關鍵因素 (Towards Key Variables to Access NSDIs in Developing Countries)

本研究係揭示如何選用一組可衡量的關鍵因素，俾用以評估各開發中國家的 NSDI (國家空間資訊基礎建設計畫)，這研究也是基於世界三個不同洲際 (拉丁美洲、亞洲及非洲中之六個開發中國家) (哥倫比亞、古巴、尼泊爾、印尼、奈及利亞及衣索匹亞) 之個案調查而得。

為利空間資料的管理及運用，世界各國均進行發展其空間資料基礎建設 (SDI)，雖然這些國家均宣稱他們已參與 SDI 的發展，但 Masser 在 2005 年則聲稱此事須審慎以對。

開發中國家均規劃各項實施計畫用以發展 NSDI，而其遭遇到最主要的困境，則在於欠缺關注、資源、有經驗的人力、有效率的行政程序及資料。

迄今對於發展 NSDI 所付出之努力，並未有系統化的稽核及評估，為此，維基尼根大學，載爾佛持技術大學及墨爾本大學等澳洲學術界，已啟動一項計畫發展遍及全球 NSDI 的評估架構，此架構之運用將助於已開發及開發中國家建置有效率、有效益及協調一致的 NSDI。

由於每一個國家在歷史、法制、經濟、技術、文化及制度等面向均有其獨特之處，故各國在建置 NSDI 時亦有其不同之優缺點，因此，建置 NSDI 之有效策略及 NSDI 計畫本身，均將會有所異同，故而本研究認為建立一套共同標準評估因



素是有其必要的，而問題是在於如何定義這些關鍵因素。

在本研究中，相當數量的基本因素經嚴謹的檢視有的評估架構後已被確認，在徹底檢視 6 個國家實例後，從最初基本已確認的因素中，已發展一份經縮減後之可行的因素清單，而源自於對三大洲之 NSDI 個案研析及 6 個國家之分析比較，獲得了實例研析後的一組可共用之因素，接著，一群被選擇出之 SDI 專家學者亦提出其對開發中國家評估 NSDI 的因素，而這些因素經與先前實例研析所獲得的因素做了合適的比對。

從研究的結果觀之，下列對開發中國家 NSDI 發展之評估因素已被選用，包括：數位資料的取得、建物的容量、共享的意願、人力資本、對發展 SDI 的體認、資料流通機制、資金、領導者位階、計畫願景、制度面、社會政治穩定性、資料適通性、詮釋資料及各別國家為發展 NSDI 所採取的實施計畫等。此外各國對 NSDI 發展策略之強化及創新其獲得的量化因素，亦有助於此評估架構的發展。

## 6. SDIs 有哪些特點? (Are SDIs Special)

從考慮與其它種類資訊架構的共通性而不是僅集中在他們有何特殊性，所以了解 SDIs 和他們的影響將相當有好處的。資訊架構常被內嵌予他們自己的社會制度之中。在他們的發展、採用和應用過程中會遇到相當多的挑戰和挫折。對資訊架構的評估必須僅超過效能指標。在發展資訊架構過程中的一個主要的挫折，在實作時不忽視其不穩定及抵觸環境的狀況時，要如何為資訊架構需求的穩定和不中斷作準備。如何找到在靜態和動態架構之間的平衡？本文中提出一慣遠景的主要原則 - 被評估及相信 - 對於處理這個瓶頸過程有所幫助。具體而言，技術和演員網路理論的 Orlikowski's 雙重性可以為這作出規定。雖然 SDIs 可能不獨特且不同於在基礎架構的其他類資訊，而本文中關於空間概念的議題是很重要的。發展、採用和任何資訊基礎架構

的應用 - SDIs 和其他類資訊基礎架構很相似 - 在不同的空間(或地理)層級，因為他們有社會環境的差異而有不同。技術和官僚政治問題和價值好像在更高的水準上支配資料的處理，然而社會議題和人類價值扮演為一個較低的人類行為，屬親密層級的角色。圍繞不同地理和管理水準的資訊基礎架構，可能面對他們必須處理不同的問題，而須抵觸不同社會的制度。這項挑戰資訊基礎架構的階層概念，在那裡有較高水準的基礎架構，可能被再分解成較低水準的架構並且由他們來組成。他們可能沒有合併。這篇報告對開發中國家資訊基礎架構的發展、採用和應用作簡要的討論。資訊基礎架構容易侵蝕目前慣例的執行，在大多數開發中國家之中，會給人有印象深刻並且高等的想法。最後，這篇報告為空間地理資訊社會建議了一些可能的作法 - 未來 SDI 將展現什麼？

## (二)、詮釋資料

### 1. 利用詮釋資料協助整合多種來源之更新(Using Metadata to Help the Integration of Several Multi-source Sets of Updates)

現今，空間資料逐漸地可在網際網路上取得，而使用者也很容易更新他們的資料庫，許多不同來源的異動資料，可以各種不同方式、不同的資料品質及不同的更新週期提供給使用者。

在本文中，研究當我們整合異質異動資料(heterogeneous update)時，可能遭遇的問題，並提出處理程序，來幫助使用者有效率地整合不同來源的異動資料至他們的資料庫中。這個處理程序係採用詮釋資料(Metadata)來選擇最佳的整合方式，這裡所使用的詮釋資料符合 ISO 19115 詮釋資料標準的格式。

### 2. 簡化地理空間詮釋資料之收集和利用(Simplifying

## Geospatial Metadata Collection and Exploitation)

詮釋資料是資料檔案最基礎的元件，在空間資料基礎建設中扮演膠合的角色。然而會有人提出質疑，為什麼在最近這波空間資料基礎建設技術的進展中，詮釋資料顯然被忽視，詮釋資料之收集和利用的技術進展很少，繁複的建置工作，讓大多數的地理空間資料的使用者及生產者不願意參與。

在本文中，探討如何簡化及半自動化詮釋資料處理程序，以改變使用者及生產者對詮釋資料的態度，並舉例支持的論點。

### 3. ISO 19115 空間詮釋資料標準與北美專屬標準之研訂 (Towards a North American Profile of the ISO 19115 World Spatial Metadata Standard)

從 1994 年起，ISO 國際組織 TC211 技術委員會開始發展空間資料標準，在 2003 年 ISO 國際組織的空間詮釋資料工作小組 (Spatial Metadata Working Group) 發布了編號 ISO 19115 詮釋資料標準。

自此，許多國家及國際標準團體開始發展與 ISO 19115 相容之詮釋資料標準，在 2003 年加拿大標準委員會 (the Canadian General Standards Board, CGSB) 與美國國家 IT 標準委員會 (the USA International Committee for Information Technology Standards, INCITS) 簽定備忘錄共同發展與 ISO 19115 相容之北美詮釋資料標準 (North American Profile)。

本文說明相關的組織、背景及目前的進展。

### (三)、空間資料基礎建設之應用

#### 1. 尼泊爾 NSDI 架構於電子化政府之演進及發展 (Nepalese NSDI Framework in the Context of e-Government)

Initiatives in Nepal)

自 2002 年起，尼泊爾政府爲了建置國家空間基礎建設 (NSDI)，開始實施國家地理資訊基礎設計畫 (the National Geographical Information Infrastructure programme, NGIIP)，NGIIP 的目標是要發展一個資料流通共享的平台，目前已經完成了先導試作的階段。

本文描述有關尼泊爾 NSDI 的重要組成元件及它的架構，包括資料架構、技術架構及組織架構。

## 2. 國際地圖組織的全球地圖測繪計畫 (Global Mapping Project By National Mapping Organizations On The Globe)

全球地圖測繪計畫是發展全球一致規格的地理資訊計畫。全球地圖資料是由 8 個圖層及 1 公里解析度之向量與網格資料所組成。全球地圖將在 5 年內更新，也可以讓我們更精確的了解全球環境的改變。包括廣泛的全球土地覆蓋資料、地表真實資料庫、強化全球地圖公共應用之國際地圖組織的全球地圖計畫最近已經開始啓動了。與區域空間資料基礎設計畫合作伙伴，加上受尊崇的國際地圖組織伙伴，對於包含弭除貧窮之全球環境保護是有必要的。

## 3. 全球地圖應用的新方向 (New Directions in Applications for the Global Map)

本報告主要是摘錄全球地圖測繪計畫可能的應用，同時尋找地理資料發展社群與未來發展基礎的利基。

全球地圖測繪計畫包含了全世界具同質性的 1:1,000,000 比例尺的數位化地圖。全球地圖國際推動委員會已於 1990 年代中期已合作協調本計畫，並發佈技術性規格。

有關地理空間資料的國際性計畫與論文數量龐大，由於

快速的技術更新與使用者需求改變，出現了類似全球地圖測繪計畫彼此間時效不同與重覆建置的風險。本報告主要說明全球地圖測繪計畫未來的應用與世界、區域、國家間等層級的任務。

#### 4. 國家空間資料倉儲的建置對全世界社會影響的探討 (Exploring Worldwide the Influence of Society on the Establishment of National Spatial Data Clearinghouse)

什麼是影響國家空間資料倉儲的建置的重要因素？為什麼有些國家會建置資料倉儲，而有些國家不會呢？在本報告中，這些問題將從社會觀點來探索。這些問題，將以變異數分析法、資料挖掘決策樹法二種方法來進行探索性與經驗性的分析。本報告開始的重點是有關 2002 年 12 月全球資料倉儲建置的狀況。有關經濟、教育、技術、環境、文化、人口統計、機構、健保、司法管轄等 9 個社會面向的屬性資料，在描述每個國家社會狀況特性。這份探討的主要發現說明了社會的 9 大面向，是國家空間資料倉儲建置的主要考慮關鍵，尤其是教育、技術、機構、健保。其結論是很多社會屬性資料扮有重要的角色。重要的屬性，例如：農業生產力、就學年齡、網際安全伺服器數量、年齡、有經驗的醫護人員。這些屬性可作為國家社會生活標準的指標。因此，一個國家在決定是否建置空間資料倉儲時，生活標準指標將扮演一個重要的角色。

#### 5. 邁向 SDI 知識庫的概念模式(Towards an Extended SDI Knowledge Base and Conceptual Framework. USA)

在空間資料架構(SDIs)上的研究報告，其學術理論尚未奠定良好基礎，因此 SDI 的實作經常被忽視。這篇報告的目的是為了提升大學教師和專業人士對於相關知識領域的瞭解，並應用於研究或發展 SDI 之中，俾使一同發展技術工具，有兩個工作群組在研究 SDI 的技術和模式，同時對於其理論與概念著力更多。在指出目前 SDI 學術理論的研究缺乏之

後，大量 SDI 的研究論文在公開領域中經常會被重新檢視，以確保他的主要效用。那些領域包括：1) 資訊架構 2) 組織間的合作與協調 3) 政府間的關係 4) 網路角色理論 (ANT) 5) 資訊系統的使用、效能及可用性 (3U)。本文於支持 SDI 研究與開發過程中指示其價值和限制。下列列出有助予 SDI 基礎概念的因素：相互支援的 SDIs，地理資訊系統(GIS)，資訊通信技術( ICT)及基礎設施；政治，社會，經濟，文化和慣例上的考量； 3 C 原則和機會的結合； 注重政府間的協調和電子化政府的產生；瞭解數據用戶網路環境，生產者和經理的環境；並且設置客戶服務中心，並且評價從 SDI 的存取和效用。綜合這個計畫的架構，雖然不包括挑戰 SDIs 技術的重要議題，但最終均是為了提升組織及使用者的願景。

#### 6. 以隱喻為基礎及社會技術為觀點的 SDI 推動成果－談印度的經驗 (A Metaphor-based Socio-technical Perspective of SDI Implementations : Some Lessons from India)

高速公路和市場是目前最受歡迎的隱喻，可用來了解空間資料基礎架構設施(SDI)，而這些隱喻並不會影響 SDI 設計的自然社會技術和實施。反之，他們強調從上而下的設計方法，作為商品的交易的集中控管和訊息中心，而使基礎建設過程中常被忽略社區功能再度被重視。這些隱喻也提示一個被忽略的 SDI 發展案例，譬如開發中國家的印度。表明這個隱喻提供一個更合適於開發中國家實施 SDI 的充分指導。從印度的案例研究，這個隱喻的關聯性和效力，在這篇報告中被證明。

#### (四)、利用地理空間技術減輕貧窮

##### 1. 地理資訊-發展計畫和管理之關鍵工具(Geo-Information: A Critical Tool for Development Planning and Management)

引用地理訊息已經對於發展計畫和管理的許多面向變得不可缺少。地理資訊的日漸重要，可由近來空間資料的獲取、管理以及發展的分析技術來佐證，例如貧困和不同的高解析影像。本報告係從世界銀行的角度探討一些成果，一家多邊的發展銀行，主要任務是有助於貧困的減輕以及在它的合夥國家穩定的經濟發展。一個重要的結論是捐贈人團體需要與它的國家對手更接近工作，私營企業和非政府間的合夥人保證對空間資料發展的投資產生最大的好處。發展和實現空間資料基礎建設應該被視為一個國家實質基礎建設計畫中不可或缺的。

## 2. 地理空間技術及標準應用於減低貧窮及其持續發展 (The Role of Geospatial Technology and Standards in Reducing Poverty and Enabling Sustainable Development)

在當今的社會經濟環境中，地理空間技術是非常重要的，凝聚共識、共同使用及永續的空間資料基礎建設是具關鍵性的；其對於城市、地區及國家之有效合作、成長及繁榮有相當的助益。當技術繼續迅速發展時，公開的標準規範完成，將使關鍵性的應用有效地發揮功能；跨部門共用系統也可克服文化、政治和人為障礙。當地理空間技術及先進的功能既令人感動又令人敬畏時，我們將更進一步推展合作及教育，讓不熟悉地理空間領域的人，知道什麼是可能的，如何利用簡單的技術，以及「next」和「after next」的技術。本報告係討論前面提到的關鍵問題和全世界的最佳的實踐案例。

## 3. 觀測地球空間訊息 Access to Earth Observations

許多全球性計畫已經建立同樣的地理空間訊息，例如一個與 GSDI 目標一致的組織。這個組織為 GEO 及 GEOSS，其設立主旨主要為幫助鑑定，並推廣使用地球觀察數據及其能力。GEOSS 的互通性協議採用-共同地理空間標準及實例-幫

助確保地球觀測以及 SDI 資源可適用於他們原住社區及外在區域。



## 參、心得

茲就本次奉派參加 GSDI 研討會之心得，本人認為參加 GSDI 協會之相關活動可獲取益處分析如：

### 一、SDI 會議有助於和受益於日益增多的全球 SDI 知識網

參加聯網並與其他的人結成伙伴成為全球 GSDI 會議的成員。自 1996 年起，SDI 領域的專家已經聚在一起分享經驗。GSDI 會員可以服務於工作小組，接受 SDI 教育訓練，以及研討 SDI 技術上和政策上之議題。GSDI 協會會員可於協會舉辦之正常全球會議和其它的活動中，獲得折扣登記。

成為 GSDI 協會的會員，不論組織或是個人均可進入 SDI 知識網，以網路基礎的入口網環境，會員能在網路中共同研究和交流心得。透過 GSDI 知識網，會員能接觸到 GSDI 委員會及其工作小組，並且 GSDI 會員間能夠建立友誼和相互砥礪。同時，GSDI 協會也提供會員進入 GSDI 資料庫管道，發表、分享以及更新文件，共同完成 GSDI 之願景。

### 二、縮小數值化的界限是全球運動的一部分

當 GSDI 協會的會員數目增加時，我們將在較好的情況下，克服在數值化過程中產生之實際影響。在空間資料基礎建設的領域中，數值化的界限不會居限在開發中的國家。透過參加 GSDI 協會的活動，全世界的個人及組織均能受益於"加乘效應"，係會員們把 SDI 之議題告知其他的人，因此 SDI 相關活動的內容，以及執行指定 SDI 相關的計畫會受關注。

### 三、促進空間資訊之國際合作與發展

GSDI 協會為會員提供一處全球舉行會議的場所，以便交流和學習。GSDI 會員，包括政府、學術界、非贏利組織、代理商以及個人會被應邀參加 GSDI 年會、研討會、計畫以及網路會議。非贏利、非政府組織對於鄰近組織跨國之任務及計畫能夠提供管理及協助。

另 GSDI 協會輔導各國 SDI 之建立及擴展，俾利於全球之資料格式相容，特別是著重於開發中國家之基礎建設，以及維護他們的建設能力。GSDI 會員鼓勵參與 GSDI 委員會，幫助發展及管理 GSDI 協會核准之項目，並且處置開發中國家參加教育及技術需要之 GSDI 資源分配的優先順序。

#### **四、幫助建立 GSDI 規範標準並參加全球 SDI 計畫**

幫助鑑定和文件證明 GSDI 最佳實例，包括技術、經濟以及政策實例。幫助全世界之政府及民間建立實際之「如何達成」的指導方針。並且，透過 GSDI 協會接洽 ISO TC211 和安排其它標準，會員可以貢獻心力於 GSDI 建議規範之標準，以及評議待決的標準文件。同時透過參加 GSDI 的工作小組能夠參加全球 SDI 計畫，例如服務登記以及入口調查的計畫，可經由 GSDI 技術工作小組協調負責。

#### **五、有益於專業人員之自我成長**

GSDI 協會為公司、代理商及個人提供很多的機會，參加工作小組、在會議上發表論文或是志願擔任委員，並能參加教育訓練、研討會及全球研究計畫。GSDI 協會提供優惠之折扣給予所有會員參加會議及展示費用，尤其對 GSDI 協會之完整會員組織減少展示費用和提供 SDI 發展之財政、軟體以及資料的贊助及獎賞。同時開發中國家的組織代表參加會議可以享有出差旅費補助。

## 肆、結論與建議

### 一、結論

內政部本次以政府機關名義派員參加國際 GSDI 協會第 9 屆年會，並於會中報告我國國土資訊系統推動過程與未發展望，普獲各會員國及與會人士重視。

雖然會中中國國家測繪局以書面抗議我國以中華民國內政部名義參加，不符合聯合國慣例，但大會採低調處理，仍然同意我方以上述名稱與會，並於開幕典禮中，由大會主席（智利國防部長）宣佈我方代表為貴賓之一。就我方代表報告之論文而言，與會人士（尤其美國代表前任理事長及美國國家地理測量局）對我政府積極投入國土資訊系統之開發，並由高層組成推動小組進行基礎建設之協調整合工作頗為肯定，會後皆期望我國能持續將推動經驗與國際社會共同分享。

### 二、建議

(一)持續定期參加 GSDI 年會及國際研討會，將我國推動空間地理資訊系統及應用成果與國際分享，俾爭取國際認同。

我國自民國 79 年即由內政部邀召相關部會組成國土資訊系統推動小組，統合協調政府資源推展相關應用，又自民國 87 年至 95 年進行二期之國土資訊系統基礎環境建置計畫，完成 30 餘項系統，有效應用於國土規劃、國土監測、國土保育、復育及防災救災規劃，並提供各級政府作為決策參考；整體推動成果足可供他國借鏡，若能擇取效益顯著之應用系統作成論文，於 GSDI 或相關國際研討會中報告，將可塑造我國良好專業形象，並利國內相關產業拓展國際市場。

(二)我國宜積極擴大參予 GSDI 協會之相關活動

GSDI 協會是結合專業人士和專家的主要組織，專注於促進國際合作以及共同研究，發展本地、國內和國際之空間資料基礎建設(SDI)，俾利資料格式相容。如此之發展將有利於國家和組織得到較好的社會、經濟及環境議題之關注。近年來，GSDI 協會成功地在全球各地舉辦年會及國際研討會，例如波昂(德國)、教堂山(美國)、坎培拉(澳洲)、開普敦(南非)、卡塔赫納(哥倫比亞)、布達佩斯(匈牙利)、班加羅爾(印度)以及開羅(埃及)，證明了協會會員日益增多之影響。

以今年(2005)年於聖地牙哥舉辦之第 9 次會員大會及研討會而言，所有幕僚行政作業由智利軍方負責辦理，並提供軍事博物館為大會場地，共有 50 餘國，2000 多人參加，會中計有 200 篇論文發表，已成為全球地理空間資訊之最大盛會。非但可以會中吸收各國推廣空資訊之政策、應用方向、產業技術及國際標準，可以藉此建立我國相關之國際網路，累積社會資本(SOCIAL CAPITAL)瞭解空間資訊之主流趨勢，同時強化國際曝光率與國民外交。

### (三)參予 GSDI 協會正式會員可改由政府輔導非政府組織為之

全球空間基礎建設協會 (GSDI ASSOCIATION)，英文全名為 GLOBAL SPATIAL DATA INFRASTRUCTURE ASSOCIATION，成立於西元 2002 年，為一個非政府 (NGO) 的全球性組織，其會員主要來自全球五十餘個已開發及開發中國家，包括美國聯邦地理資料委員會 FGDC、開放式地理資訊協會 Open GIS Consortium、環境系統研究所 ESRI 等以及各國從事地理資訊系統領域之政府、非政府組織及私人團體或感興趣之個人。該協會成立的目的是為促進各國空間資料基礎建設發展，加速地理資訊產業更新、維護、流通供應及增值應用等作業，以提昇各國政府機關行政效率及服務品質，加速地理資訊產業之發展。

內政部本次年會首次派員參加在智利聖地牙哥舉行之 GSDI 協會第 9 屆年會，並於會中報告我國推動國土資訊系統之現況與展望。會後該協會芬蘭籍會長 MR.Jarmo Ratia 表示，我國以中華民國內政部之官方名義參加該協會，遭受中國(中國國家測繪局)代表以書面提出嚴重抗議。中國方面其表示：「台灣以 Republic Of China 為國名，加入該協會成為會員，是明顯地違反聯合國決議，承認在世界上只有一個中國，而且台灣是中國的一部分，以及大多數聯合國之會員國皆支持上述決議。若台灣之專業人士以一個學術性、企業或專業組織名義參加是可以接受的，惟不能以一個國家或政府機關的名義加入」。MR.Ratia 及美方代表 Dr.Allan Stevens 乃私下建議我國內政部可改由學術等非官方機構或個人名義參與該協會，以保留台灣代表於協會中之會籍，並參予各項活動。

鑑於國際情勢，我若堅持以內政部官方名義參加 GSDI 協會，恐不易獲得大會支持，爰建議：

- 1、若 GSDI 協會堅持改以 GNO 名義參加，內政部自今（96）年起不再繳年會，另推薦我學術機構或相關非政府組織（如台灣地理資訊協會或財團法人中華電腦公司）加入該學會，俾使台灣有代表會籍存在，定期參加年會等國際地理資訊交流活動，且可增進台灣於國際之能見度。
- 2、由外交部補助參予該協會之學術機構等非政府組織相關經費（如年費、出席年會之交通費等）。
- 3、邀請該會友好主管如理事長、美國代表來台灣訪問或參加研討會，俾建立良好關係，於會中持續支持台灣。

## 伍、附件

### 附件一

#### 參加 2005 年 GSDI-9 年會及國際研討會之行程

11 月 6 日

- 09：00-10：30 研討會 1-空間技術基礎建設願景及其執行現況  
(Intergraph)
- 14：00-17：30 研討會 2-GIS：空間資訊平台應用於減低貧窮 (ESRI)
- 18：00-20：00 迎賓及開幕典禮 (GSDI-9 Conference)

11 月 7 日

- 09：00-10：30 會議 1-GSDI-9 空間資訊主題演講：減低貧窮之工具  
PS 1.1 地理資訊-發展計畫和管理之關鍵工具 (World Bank)  
PS 1.2 空間資料基礎建設：貧窮減低之架構 (ESRI)  
PS 1.3 地理空間技術及標準應用於減低貧窮及其持續發展 (Intergraph)  
PS 1.4 觀測地球 (US FGDC)  
PS 1.5 SNIT：智利之空間資料基礎建設
- 11：00-12：30 TS 5-地理資料  
TS 5.2 朝向 GSDI：就資料互操作性而言，我們在世界水準的那一位階？ (Switzerland) (USA)  
TS 6-空間資料基礎建設發展之全球願景  
TS 6.1 從波昂 1996 至聖地牙哥 2006：十年的 GSDI (Mexico)  
TS 6.2 全球空間資料基礎建設-願景和概念仍是相關的嗎？ (USA)  
TS 6.3 全球空間資料基礎建設之文化差異：大西洋學會智囊團之結論和建議 (Canada) (USA)
- 14：00-15：30 TS 12-地理資料及詮釋資料  
TS 12.1 SALB 計畫，課程學習朝向全球 SDI 之建置 (Switzerland) (Chile) (USA)

- TS 12.2 利用詮釋資料幫助整合多種來源之更新 (France)
- TS 12.3 簡化地理空間詮釋資料之收集和利用 (Spain)
- TS 12.4 有關 ISO 19115 世界空間詮釋資料標準之北美概況 (USA)

- 16 : 00-17 : 30 TS 20-全球及區域組織專門小組  
開會研商全球和區域的地理空間組織如何貢獻於世界最急迫的社會問題以及探討如何應用知識和資源朝向地址定位。

11 月 8 日

- 09 : 00-10 : 30 TS 24-國際空間資料基礎建設
- TS 24.1 根據網路服務及詮釋資料管理比較空間資料基礎建設架構 (Australia)
  - TS 24.2 台灣國土資訊系統之演進及發展 (Republic of China)
  - TS 24.3 中東北非 (MENA) 地區之城市透過公私部門合作致力於 SDI 發展促進服務之傳遞 (USA)
  - TS 24.4 尼泊爾 NSDI 架構於電子化政府之演進及發展 (Nepal)
- 11 : 00-12 : 30 TS 34-協調努力於全球測繪
- TS 34.1 國際測繪組織於地球儀上實施全球測繪計畫 (Japan)
  - TS 34.2 巴西努力於 NSDI 之法規制定 (Brazil)
  - TS 34.3 古巴參與全球測繪計畫 (Cuba)
  - TS 34.4 新方法應用於全球測繪 (Chile)
- 14 : 00-17 : 30 W1-GIS 研討會：空間資訊平台應用於減低貧窮 (ESRI)  
W3-使用者及地球觀測系統建置計畫 (GEOSS) 架構 (OGC and IEEE)

11月9日

- 09:00-10:30 TS 36-性能模式及監視  
TS 36.1 探索全球社會的影響在國家空間資料交換中心之建置上 (The Netherlands)  
TS 41-區域及空間資料基礎建設學會  
TS 41.4 製圖角色在 SDI 的架構中 (Germany)
- 11:00-12:30 TS 44-有關 SDI 社區建設之研究議題  
TS 44.1 搜尋 SDI 概念模式 (USA)  
TS 44.2 以社會技術為象徵基礎透視 SDI 的執行成果 (Norway & The Netherlands)  
TS 44.3 SDI 是特殊嗎? (The Netherlands)  
TS 44.4 開發中國家進入 NSDI 的主要變數 (The Netherlands)
- 14:00-15:30 TS 51-應用有關於水道測量技術  
TS 51.1 在 NSDI 的架構下，中國於水環境上之國家空間資料庫 (People's Republic of China)  
TS 54 - 應用有關於貧窮和測繪  
TS 54.2 貧窮地圖作為瞄準發展干涉和監控 MDGs 的一項工具 (USA)  
TS 56 - 合法和經濟工作小組開放會議  
GSDI 協會之合法和經濟工作小組探究在合法的和經濟的架構下，單一及多個國家發展空間資料基礎建設。工作小組鼓勵對話和出版刊物，關於變更之公共政策、接近合法之法律，並且探索模型以及經驗，國際間可以經由分享空間資料和技術的過程中提昇相互間之合作。



## 附件二 研討會報告論文

### The National Geographic Information System in Taiwan

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#### **Abstract**

With the rapid development of information technologies in recent years, the geographic information system (GIS) allows the government to acquire information and to play an active role with respect to policy making and service providing. Presently, GIS, nanometer technology, and biotechnology are considered the three major newly developed industries. Apparently, GIS has been developed successfully and applied extensively in the last decade.

Taiwan's public sector has been developing geographic information systems for nearly 15 years, and has launched a series of projects under the name of National Geographic Information System (NGIS) since 1990. Phase I of the NGIS data infrastructure plan was implemented in 2003; and phase II plan has been in full swing since 2004.

As indicated by the recent research findings, public sector has been the major user of geographic information over the past years, and has demanded nearly all kind of geographic information developed by the NGIS data infrastructure plan. The data used for national development plan are for purposes such as land utilization (for geographic planning), geographic conservation, disaster prevention and rescue, tourism, national health and medical services, disease prevention, and transportation development.

NGIS is substantially beneficial to public construction and public policies in a number of ways. GIS presents information completely and flexibly, and is capable of integrating the needed information for a certain purpose, thereby creating the most comprehensive information for decision-making purposes. However, geographic information has to be put together according to the needs of decision-makers, as well as the anticipated requirements of development projects. Taiwan has been developing NGIS in the last 15 years. Therefore, data developers and users really have to analyze their needs and to initiate implementation plan based upon administrative system, mental attitude, and legal requirements,

in addition to the data implementation requirements, as they carry out public policies to meet the needs of the general public.

This presentation provides the history of NGIS and the vision, goals, objectives and achievements of NGIS in Taiwan with the intention of sharing the experience in the development of geospatial data infrastructure from the central government's perspective.

## **Introduction**

Since 1977, Taiwan has been undertaking plans related to applications affecting the integrity of remote sensing and GIS technologies. At the same time, the central government continually worked with different levels of governments and certain private academic institutes to conduct relevant researches and to look for corresponding channels in local/county governments. In 1990, the central government formally established a special committee, called the National Geographic Information System Steering Committee (NGISSC), and defined its functions as determining the objectives, strategies, directions and working guidelines to propel these tasks. In the past fifteen years, the committee regularly held symposia and worked in implementing comprehensive training programs to promote these ideas to both the governmental staffs and the public. From 1998, the NGISSC has further engaged in a so-called The Geospatial Data Infrastructure of NGIS. The plan includes the establishment of the most essential digital map databases, such as topographic maps, geological maps, soil maps, address geocoding data, public pipeline locations, via tic networks, regional and urban plan maps, location of canton and developing vital application systems about auxiliary land development plan, fire-fighting dispatching scheme, census, etc.

## **Development of NGIS**

The development stages, authorized promotion organizations of the NGIS, and the achievement of the plans are described as follows.

### ***1. Initial Phrase (1990 and before)***

#### ***(1) The Beginning***

The Council of Agriculture and other agencies affiliated with the Executive Yuan proposed the concept of GIS in 1976 and 1977. GIS technologies have just begun and Taiwan was short of the needed

resources and manpower at that time. Consequently, the Council of Agriculture' s proposal was not heard; no actions were taken. In 1981, the Ministry of the Interior initiated the draft of land administration e-processing project and presented the concept of regional land information system that entailed a database to store natural data and cultural data. The database would be designed to output graphic data for land planning and economic development decision-making purposes. In 1985, the Information Center of Ministry of the Interior started the tasks related to the digitization of topography, which was similar to GIS. That' s how NGIS began.

In 1986, Council of Economic Planning and Development (CEPD), Executive Yuan, completed "Outline for the Establishment of NGIS;" the CEPD established a taskforce in cooperation with Ministry of the Interior for the promotion of NGIS. Then, Ministry of the Interior formed the "NGIS Steering Committee" and nine database groups in 1990 and took charge of the development of NGIS officially.

***(2) NGIS organizations consist of three major groups:***

The operations group (NGIS Steering committee, comprehensive operation workgroup, and related sub-groups), the data production and the collection group (9 major database workgroups), and the data standard workgroup are the three major groups. The organizational structure and its responsibilities are as follows:

***A. The operation group***

***a. The NGIS Steering Committee (led by Ministry of the Interior):***

This is a mission-oriented taskforce led by Ministry of the Interior. Board members include those from the Council of Economic Planning and Development (CEPD), Research, Development, and Evaluation Commission, Directorate General of Budget, accounting and Statistics, together with the lead agency of nine databases groups and local government agencies. The Committee convened periodically so as to keep up with the progress of promoting and to deliberating, coordinating, and integrating all matters pertaining to the development of NGIS.

***b. Comprehensive operation group (led by the Information Center of Ministry of the Interior):***

Affiliated to the NGIS Steering Committee, the

comprehensive operation group is led by the Information Center of Ministry of the Interior, and is responsible for staff operation and matters of coordination and execution of all development plans pertaining to NGIS. The group is also made up of information staff representing other cabinet ministries and local agencies. The group convenes periodically for discussing, deliberating and dealing with the matters on implementation of related projects.

***B. The Data Standard workgroup (led by Research, Development, and Evaluation Commission, Executive Yuan)***

At first, the Research, Development, and Evaluation Commission, Executive Yuan, led the data standard workgroup; however, the comprehensive operation group has taken over the role since 2000. The group is made up of the persons-in-charge of the nine major databases, and convenes periodically to discuss all matters regarding the data format standards, operation procedures, and laws related to NGIS.

***C. The data production and collection group (nine database groups):***

***a. Natural environment database workgroup (led by Information Center of Ministry of Economic Affairs):***

Comprising of government agencies responsible for water conservation, water resources, geology, mining, meteorology, agriculture, forestry, and construction, this group is chaired by the Information Center of Ministry of Economic Affairs, and convenes periodically to discuss all matters pertinent to database implementation.

***b. Natural resources and Ecological database groups (led by Council of Agriculture, Executive Yuan):***

Made up of government agencies responsible for agriculture, forestry, fishing, stock farming, remote survey, and aerial survey, this group is chaired by the Forestry Department of Council of Agriculture, Executive Yuan, and undertakes all tasks related to database planning and forestry digital database.

***c. Environment quality database group (led by Environmental Protection Administration, Executive Yuan):***

This group is chaired by the Environmental Monitoring and Data Processing Bureau affiliated to the Environmental Protection Administration, Executive Yuan, and is

responsible for setting the environment quality-monitoring facilities, collecting dynamic data, and updating the environment quality database.

**d. *Social economic database group (led by Directorate General of Budget, Accounting, and Statistics, Executive Yuan):***

This group comprised of Government Information Office, Department of Health, Council of Agriculture, Ministry of the Interior, Ministry of finance, Ministry of Education, Ministry of Economic Affairs, and Ministry of Transportation and Communications; and is chaired by the Directorate General of Budget, Accounting, and Statistics, Executive Yuan. This group is responsible for setting up the social and economic statistics database for all administrative districts.

**e. *Transportation network database group (led by the Information Center of Ministry of Transportation and Communications):***

This group is made up of the Institute of Transportation of MOTC and National Police Agency of MOI together with the government agencies responsible for railways, highways, airports, mass transit system, as well as the agencies responsible for business management, engineering, and transportation of direct cities. Chaired by the Information Center of MOTC, this group has completed the overall planning of database together with a 25,000:1 transportation network digital map for the general public.

**f. *Land information database group (led by the Land Administration Department of MOI):***

This group is made up of Land Administration of Taipei City Government, Land Administration of Kaohsiung City Government, and National Property Bureau of MOF. Chaired by the Land Administration Department of MOI, this group is responsible for initiating land standards and setting up the database of land registration, land prices, land usage, and land survey.

**g. *Regional and urban planning database group (led by the Construction & Planning Agency of MOI):***

Comprised of the Urban and Housing Development Department of CEPD, Land Administration Department of MOI, Bureau of Urban Planning affiliated to Taipei City Government, and Bureau of Public Works affiliated with the Kaohsiung City Government, this group has completed the overall

planning of database together with the regional planning data files for Taiwan area, as well as the urban planning data files for Taiwan Province, Taipei City, and Kaohsiung City.

*h. Public pipeline database groups (led by the Construction & Planning Agency, MOI):*

Made up of the Industrial Development Bureau, MOEA, Highways Administration Department, MOTC, and the government agencies responsible for telecommunications, water, electricity, gas, petroleum, and roads, this group is chaired by the Construction & Planning Administration, MOI, and has completed the overall planning for the database and joint implementation of pipeline database with the Taiwan Power Company, Chunghwa Telecom, China Petroleum Corporation, and the natural gas corporations located in Taipei, Taichung, Changhwa, and Kaohsiung as well as the local government agencies responsible for public works.

*i. Topographic database group (led by the Land Administration Department of MOI):*

Comprised of the government agencies responsible for public works and land administration together with academic experts in the field of civil engineering, survey, and remote survey, this group is chaired by the Dept of Land Administration of MOI, and has initiated the standards for "Topographic Database" .

## *2. Phase I (1990 - 2003)*

This phase concentrated on the overall planning, detailed planning, data standard system initiation, and database implementation with emphasis on the follow-up processes, after the NGIS promotion organizations were established:

### *(1) Initiation of master plans*

#### *A. To initiate "Proposal for implementation of NGIS"*

The Ministry of the Interior completed "Proposal for implementation of NGIS" in 1992, and expected to carry out the Proposal within 9 years, starting from 1994 until 2002, with a budget of NTD 6.78 billion (or US\$ 170 millions) for collecting, surveying, sorting, and creating eleven types of basic databases. The Executive Yuan had approved the Proposal and instructed the Ministry of the Interior to initiate annual working plans based upon the division of labor stated

in the Proposal and to prepare annual budgets, to be carried out by all agencies.

Unfortunately, the execution departments did not have the needed support when they drew up the budgets and worse, all staff members that undertook the day-to-day operations were part-timers. Without a fulltime staff and adequate funds, the Proposal encountered a number of difficulties and setbacks. This is why the implementation of the NGIS core data was considered top priority in the fundamental environment implementation plan.

***B. To initiate and execute “Geospatial Data Infrastructure for NGIS”***

In 1995, The GDI for NGIS phase I was initiated. This plan called for a budget of NTD 2.04 billion (or US\$ 50 millions) over a period of 6 years, and contained 8 categories of tasks, related to the implementation of basic data. National finance and the continual promotion of NGIS are included in the consideration of this plan. The data for urgent needs should be placed on top priorities and in compliance with the NGIS. This plan was approved in March 1997, and has been implemented within 6 years, started from 1998 to 2003.

***(2) Preparation for promotion***

In an effort to promote the concepts of NGIS, share the experiences, release the current development status, and facilitate the communication, the NGIS quarterly has been issued since April 1992, and has been forwarded to all government agencies, academic institutes, and private corporations free of charge. Also, NGIS training programs have been held annually since 1992 to promote the concepts of NGIS and to foster NGIS professionals, thereby facilitating the development of NGIS. To facilitate inquiries on NGIS from government agencies and the general public, the Ministry of the Interior has successfully implemented an Internet-base NGIS application system in 1997. As far as coordination and promotion are concerned, Ministry of the Interior summons the NGIS promotion taskforce meeting and the general operation group meeting periodically to foster consensus and to reach decisions via discussion, coordination, and communication, thereby facilitating the promotion of NGIS.

***(3) Achievements of GDI of NGIS (Phase1)***

***A. Completion of major tasks***

44 sub-tasks were carried out in this stage, to be divided

into 4 categories as follows:

- a. Establishment of regional and local geographic information application systems.
- b. Implementation of geographic information network flow system.
- c. Implementation of technical and operation support organizations.
- d. Seminars and manpower development.

The annual plan is modified every year and 32 items are left now.

**B. *The major application systems***

The GIS application system was developed in this stage, including nearly 80 systems of the government sector, which were exhibited in the NGIS seminar, held in 2003. These are divided into 8 categories, such as geographic name information, water resource data administration and supply system, Taiwan geological information service network, etc.

**3. *Phase II (2003 - 2007)***

This phase concentrates on the tasks outlined in phrase I regarding GDI of NGIS. A number of nature disasters took place in Taiwan recently resulting in the government being challenged on issues relating to economic construction, disaster relief, emergency response, environmental protection, water resource planning and administration, public works administration and land utilization, as well as the implementation of NGIS.

In 2002, the Executive Yuan launched the “Implementation of e-government service system” in compliance with the current economic policy outlines. It included the NGIS into “e-government’s projects” as the flagship project. In June 2002, the “Implementation of e-Government Service System” was included into the digital Taiwan project under the 6-year national development plan. Meanwhile, all groups are expected to accomplish the GDI regarding NGIS in 2003.

In an effort to accelerate the development of NGIS, enhance the usage of NGIS, and to provide the spatial decision-making information needed by the perpetual development of NGIS, it is necessary to carry on the follow-up plan of NGIS.

Following are the goals and strategies to be accomplished and adopted in this stage:

**(1) *Vision and blueprint***

This plan calls for a high-quality national geographic



information database and user-friendly information sharing environment, followed by value-added application to develop a wide array of information products derivatively, thereby enhancing full-scale business applications for both government and private sector, as well as creating a comprehensive NGIS in order to accelerate the development of geographic information industry, to develop the digital content service industry, and to upgrade the overall competitiveness worldwide.

**(2) Overall goals**

This stage concentrates on the promotion of NGIS to implement a comprehensive fundamental environment database, to expand the national geographic information application, and to integrate NGIS. This stage also entails improvement of government information environment to enhance the quality of decision making and to promote digital content service industries, thereby enhancing the competitiveness worldwide.

**(3) Primary goals**

In consideration of the overall goals, the short-term, mid-term, and long-term goals are defined as follows:

**A. Short-term goals**

- a. To expand the GDI of NGIS outlined in previous phase, and to continue developing NGIS core dataset,
- b. To assist business service departments expanding their core dataset volume, to improve information operation environment and to integrate the business application system, and to upgrade government service quality for the convenience of the general public,
- c. To plan the implementation of data sharing environment, and to upgrade the efficiency of national geographic information circulation and application, and
- d. To review the adjustment of NGIS promotion organization, and to initiate the legislative basis for NGIS.

**B. Mid-term goals**

- a. To encourage private sector to take part in the implementation and maintenance of national information and circulation service, thereby expanding private sector's participation in the implementation of national geographic information and enhancing the development of value-added service industries,
- b. To establish a nationwide geographic information system that provides an operation environment in accordance with national policy requirements, such as disaster prevention planning and emergency response, land

- utilization and planning, water resource administration, and national census survey, and
- c. To participate in the drafting of international geographic information technological standards, thereby helping Taiwan build up her capabilities in geographic information R&D.

**C. Long-term goals**

- a. To complete a nationwide geographic information database maintenance & dissemination system,
- b. To assist in developing digital content service industries and to compete for international business opportunities, thereby increasing information service revenues from the international market, and
- c. To establish a comprehensive NGIS that is linked to countries around the world, thereby enhancing the national image and competitiveness.

**4. Phase III (2007 - 2016)**

NGIS' goal for the next decade:

**(1) Planning Domain**

NGIS' planning domain consists of the core layer, the basic map data layer, data standard and supply, government applications, business GIS development, and integrated project management. Among them, the core layer and basic map data layer are in the center of the system.

**(2) Execution Strategies**

NGIS' execution tactics can be found in the following five areas:

- A. Expanding the infrastructure of NGIS
- B. Satisfying the demand of NGIS
- C. Facilitating data sharing environments
- D. Promoting the private involvement of GIS industries
- E. Strengthening the effectiveness of NGIS project

**(3) Planning Schedule and Budget**

To summarize, the NGIS in the next decade (2007-2015) will need about NTD 13.09 billion (US\$ 390.7 millions). Upon its completion, we hope the NGIS will have some major breakthroughs. It will help Taiwan meet new challenges and elbow us into the parade of advanced countries.

**Conclusion**

Since the development of the NGIS by the Taiwan government in 1990, it

has gone through two phases of geospatial data infrastructure. The current phase is heading towards better development conditions as a whole. This is true especially after 2006, when the Council for Economic Planning and Development, Executive Yuan formally established new NGIS Steering Committee and took over the original taskforce with higher administrative rank. At the same time, by incorporating the NGIS budget into the public infrastructure program, the graphic resource requirements of various national construction plans and infrastructure programs will become more clarified; the development of international GIS has gone mainstream as well. Moreover, with the impact of Google Earth on the utilization and practical aspects, the development of NGIS will become more prevalent. We look at this from the policy, organizational, technological, and implementation aspects; at the same time, to promote the next phase, the new outline shall be described.

### ***1. Policy Aspect***

From the policy aspect, the ultimate goal of NGIS is to establish an effective and efficient government. Aside from continuing to develop various types of related application systems to raise the level of efficiency and quality of public policy implementation (such as: census survey of households, national infrastructure program, selection and development of new towns and cities, selection and analysis of land to be used for major infrastructure projects, planning and management related to land policies, monitoring of environmental quality, disaster prevention and emergency response, etc.), the country should make full use of the basic information developed by NGIS and be needs-oriented. Based on the current development trends, it needs to consider the two major fronts below to meet present policy needs.

#### ***(1) To meet the need of major governance such as land planning***

The requirement items of the “Land Planning Implementation Program” include land use survey, national scenic information survey, nature disaster management, national land database, and land use monitoring. The above mentioned land utilization survey and land use monitoring are also items to be completed in the land conservation program. With regards to the disaster prevention and rescue plan, aside from its own thematic graphic resources, tangible needs have been presented by planning the

establishment of a disaster prevention database.

**(2) *Accelerate the building of fundamental NGIS data***

As for the national geographic information needed as a reference by the above-mentioned major plans, the graphic resources needed by national land planning include basic maps, cadastral map, environmental geological database, environmental quality database, and others. The fundamental information required by the disaster prevention plan, such as topographical maps, house address and location database and natural environmental database, is included in the scope of this revised NGIS plan. In this plan, the digitized topographical maps for urban plans and the construction of house address and location information all over Taiwan are scheduled to be completed in 5 years and 2 years, respectively, starting from 2006. Or when the leveling system of graphic resources comes of age, replaceable base maps may be used to speed up the establishment of house number location information.

**2. *Organizational Aspect***

To overcome the system difficulties faced by the current steering committee as well as by advanced technologies, plans have been made to establish a “NGIS Professional Steering Committee” to assist the “NGIS Steering Committee” under the Council for Economic Planning and Development, Executive Yuan. This committee will also serve as technical and administrative support for various branches of NGIS groups worldwide. At the same time, the business and academic sectors come together to draft the overall promotion policies and plans for NGIS to help in reviewing the relevant plans from different branches of government and in implementing related promotional tasks.

In addition, for the promotion of the standard system of the NGIS, the Interior has already completed an organization framework outline. At the same time, drafts of land, administrative areas, water resource, and transportation standards have been completed; this allows Taiwan to keep up with the pace of international development; work on setting the standards will be carried out in 2007.

### ***3. Technological Aspect***

Navigation remote sensing technology and GIS application are closely linked. In recent years, the development of navigation remote sensing has greatly contributed to the development of GIS. Recently, the progress made in the field of aviation photography technology, LIDAR, and others have greatly benefited the promotion of NGIS.

Consequently, the responsibility for using information technology and high resolution navigation remote sensing images widely falls on the shoulders of the agencies assigned to carry out the task of establishing fundamental graphic resources and promoting value-added utilization. In the second phase of the construction project of fundamental environment, plan items considered for 2006-2007 include how to obtain digitized integrated results for cadastral map through high precision graphic resolution, construction of national land surveying information integrated circulation system, land utilization survey plan, national scenic resources survey plan, plan for database integration for potential nature disaster and disaster rescuing facilities, establishment of geological database for major urban environments in the Taiwan area. Consequently, the agency may study how to effectively make use of these technological developments, combine them with the country's various GIS applications and come up with ways to promote and use the system; by aggressively getting involved with the second phase of the construction project of fundamental environment, it can speed up the development of NGIS.

In addition, to promote the circulation of GIS information internationally, the drafting of information standards and development of technology for the actual operation of the data warehouse or circulation platform must be constantly updated and upgraded. Some local companies have, on their own, conducted R&D to come up with better GIS software tools and technical solutions for GIS information utilization, ensuring that there are many turning points in NGIS development.

### ***4. Implementation Aspect***

The promotion agencies of NGIS are numerous and diverse, much of the work is shouldered by the nine major basic databases as well as local governments. From the results of the work verified by the annual NGIS

Program (construction project of fundamental environment), we can see that the problems faced by local governments and the ones faced by the nine major databases are vastly different. The reason lies in the nature of the business and the characteristics of the area. The problems local governments face in the implementation aspect has more to do with project presentation and application, making the budget, outsourced services, and management of the plan, technology, manpower, legislative issues and implementation aspects. Fundamental databases face the problems in terms of the positioning of their organizations, operational systems, and collaborative procedures. The steering committee faces the prospect of reorganization after 2006. However, in the implementation aspect, focus shall be on data collection, maintenance and upgrade, supply, value-added use, and others, which will be complemented by standard operating procedures and comprehensive laws and regulations to effectively carry out the latter stage of NGIS.

### 附件三 參加研討會照片



於研討會中發表「我國國土資訊系統推展計畫」論文



論文報告後與本屆理事長 MR.Harland Onsurd 及主持人等人合影



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