

**HE  
TERRITORIAL INFORMATION SYSTEM  
REGIONAL SERVICE  
OF  
HOUSING AND DEVELOPMENT**

Author: **Igor Bacigaluppi**  
Co-authors: **Jaime Arévalo**  
**Jaime Soto A.**  
**Oscar Cifuentes**

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**I. Historical Background 1998 - 2006**

**Regional Association of Municipalities of the learning center nascent local governments that had been institutionalized in the first part of the political transition to democracy**

The historical development of the natural growth of the use of GIS and digital mapping in the Bío Bío Region as an input to planning and land use planning stems from the Association of Municipalities of the Bío Bío Region (AMRBB) due to the need for governments to manage communal Territorial updated information for decision making. Since this problem is sought international support and links that brought financial and human resources to implement the 1st Unit of GIS planning support community is transformed over time into a strategic platform from which it is sought and the action spaces for Implementation of Community Information Systems as a tool used to collect sectoral information and make it available to municipalities through applications of GIS, this process was done with a computer as a local partner to collect, systematize and disseminate lessons.

<b>INTERNATIONAL INSTITUTIONS IN AGREEMENT WITH THE AMRBB 1998-2006</b>			
<b>N°</b>	<b>Institution</b>	<b>content</b>	<b>In put</b>
1	Social Services and German Technical Cooperation	TERRITORIAL APPROACH TO COMMUNITY PLANNING	3 German aid experts in OT
2	Development of the United Nations	ENVIRONMENTAL PLANNING AND NETWORKS Intermunicipal	2 Italian aid workers experts in environmental planning
3	GTZ	PARTICIPACIÓN CIUDADA Y MULTISECTORIAL	Fondos y capacitación en OT
4	International Council Local Environmental Initiatives	LOCAL AGENDA 21	resources and Training
5	Lincoln Institute of Land Policy	TERRITORIALCADASTRE MULTIFINALITARIO	Training
6	Transportable Integrated Geodetic Observatory	SPATIAL COORDINATES IN SURVEY	Technical Assistance

**2006 - 2007, Interaction of a regional task force from the network of players comprising the AMRBB.**

The gradual withdrawal of international cooperation, led the team that migrated to other institutions and private enterprise in the region and continue anyway human capital in the region, from their new business partnership sought to give new impetus this important initiative to support land use planning in the region of Bío Bío.

**2006-2009, new spaces for action and partnerships of the regional task force to implement corporate GIS in various institutions.**

The formation of the new international political landscape offers good possibilities to implement information technology because the Chilean state begins to take on new responsibilities to improve management processes, caused by the economic opening to new markets. What triggers a reaction from the authorities to address information needs in real time, and scientific basis for the development of the "corporate knowledge" and thus the implementation of GIS is a good area of growth.

In addition, the National Land Information System (SNIT) every day gaining strength in the regions and the regional government from requiring the construction of a regionally institutionalized management model for managing geospatial information, which is expressed in the Regional Strategy development within which one of its lines of action going in the direction of science and technology to provide the Management of Natural Hazards "from the Regional Office of Emergency multifinalidad a framework for spatial data management, scientific and captured technologically. This is possible because the region is currently in human capital and social networks to deal with matters of geospatial planning. These capabilities of the public sector and local scientific permit from different areas, articulated a powerful regional alliance that has managed to win a political-institutional and find answers to the demand for land information to make scientifically based decisions.

**II. Local institutions committed to the development of GIS as an input to regional planning.**

The institutions currently coordinating the implementation of corporate GIS come from regional areas as diverse and asymmetric, which gives it a richness to the process by integrating learning from various disciplines, in addition there is also much professionalism and commitment given by this network actors, who deliver contributions from what they do best, but yes, integrated and focused on the development of planning, management, monitoring and evaluation of investment land in the region in an environmentally sustainable development framework. All these actions are aligned and coordination between the following local, regional, national and international.

**Local Actors** -City of (Yumbel, Yungay, San Pedro, Hualpén, Los Angeles)

**Regional Actors** -Association of Municipalities - Service of Housing and Urban Development

-The Regional Emergency Office

-The National Commission on the Environment

-Geodetic Observatory TIGO

- Faculty of Geography, University of Concepción and the Regional Government

-Satellite Remote Sensing Laboratory, University of Concepción

-The Faculty of Forestry, University of Concepción.

### **National Actors**

Military Geographical Institute  
Emblems-Ministry of Housing and Urban Central.

### **International Actors**

Organization of American States, through SEDI  
The Institute of Environmental Systems Research (ESRI)  
-The European Space Agency through space INDRA (PLAN JAGUAR).  
-EUROSENSE, consultant for international Serviu under the Plan Jaguar.

All this action makes possible network of 4 regional and international seminars, plus the 1st cycle Symposium on Spatial Information Systems in order to deliver and disseminate scientific knowledge, educational and scientific development in the territorial framework of science and technology.

## **III. The contribution of the Territorial Information System in the Service of Housing and Urban Development**

The first measures of the trend towards the corporate GIS in the public sector in the region are made from the implementation of the Territorial Information System Service of Housing and Urbanization of Bío Bío by the current Director of Serviu; who takes this model territorial planning and management based on the development of GIS. Transforming this challenge into an axis of strategic management to support the modernization and decentralization of service, as well as to share and promote a philosophy of working the phrase "free access to information is the basis of democracy and good governance "which found resonance in the newly created State of Transparency Law.

### **1 Justification for implementing the SIT Serviu Bío Bío**

Currently the need to improve the generation and management of information is becoming more necessary in state institutions because of the wide variety of complex problems to solve in the planning and land management, where not only the information of a particular sector but will require much background to address a problem and determine its solution. In addition, the modernization and decentralization of government requires increasing challenges and responsibilities of the regions, this situation makes us a warning as to be as effective and timely manner to the society and the territory to which they belong. In the case of Service Housing and Construction, which has the mission to help improve the quality of life through policies MINVU, it becomes essential to strengthen a management model that meets quality standards for the world today.

### **2. End**

Improving the use of instruments and driving Serviu management processes, through the development of a participatory territorial management model business.

### **3. Problem solving**

The lack of an integrated model of territorial planning and management in real time to support decision making in various Serviu chain processes through a technology platform and multi multifinalitaria

**Purpose and objective**

**Purpose (Technical Department)**

Implement the Management Unit of Land Information, to assist in the work of the Territorial Information System on a cross into the service.

**Objective (Department Programming)**

SIT improved integration with the management of the Service, to support the achievement of its objectives and goals.

**5. Specific objectives**

- 5.1 Building a geospatial data infrastructure to improve the quality of Land Information.
- 5.2 Developing a model digital mapping, single, comprehensive and upgraded available for consultation, analysis and crossing of information.
- 5.3 Compile and develop various databases related to georeferenced cadastre in investments housing and urbanism.
- 5.4 Define a portfolio of priority areas and strategic service.
- 5.5 Strengthen coordination of the service sector, through multilateral agreements in areas of geospatial information.
- 5.6 Promote scientific and technological research in areas of land use.
- 5.7 Develop training related to GIS.
- 5.8 To promote environmentally sustainable territorial development.

**6. Legal frameworks on the development and use of Spatial Information in the planning and land management.**

6.1 The National Land Information System, according to Supreme Decree No. 28 which mandates the creation MBN Units Land Information Management in the public services of Chile, with the idea of allowing the interoperability of information among the various territorial actors a given territory.

6.2 The Regional Development Strategy of the Regional Government of the Bío Bío, promotes within its strategic guidelines to create a "Regional Center for Sustainable Regional Development" with the idea of integrating the planning, management, monitoring and evaluation of sectoral policies a single "system" which is holding a National Fund for Regional Development and one of its strategic actions is the implementation of a Regional Geodetic Network as one of its shares for the interoperability of spatial information and GIS technology.

6.3 The committee of Housing and Urban Studies MINVU central mandate the creation of regional teams for the development of the geo-statistical information, through Resolution No. 3227del free May 13 2009.

## **7. Instruments and standards for the treatment and management of geospatial information in Chile:**

Effective implementation of the SIT, it is very important to create procedures for the management of information within the organization, where in a first step can be to adapt the flows between different departments and units, then linking them to the normal work SIT. To frame procedures for the management of IT, the following tools and standards:

- 7.1 SNIT Standard (DS MBBNN No. 28), the reference system WGS 84 SIRGAS
- 7.2 IGM National Geodetic Network
- 7.3 Manual roads (roads of MOP)
- 7.4 Regional Geodetic Network MBBNN
- 7.5 National Standard MINVU
- 7.6 Article No. 24 (land cadastre) of the Organic Law of Municipalities
- 7.7 Network and permanent stations TIGO pto SIRGAS
- 7.8 is the project for construction of FNDR Geodetic Network and Regional Geodynamics SIRGAS (IGM / TIGO / Serviu / Gore), which allows an IT interoperation among various public and private actors related to planning and land management.

## **IV. Work to date under the SIT Serviu Bío Bío Recursos, competitions and national and international consultancies**

1. **December 2007** - March 2008, Application of the "Agenda for the Development and Implementation of a Land Information System to improve the administration and management of land Serviu Bio Bio, which was selected as the Best Latin American practice in the" Modernization of the Cadastre and public registry for Latin America and the Caribbean, "which resulted in a prize donation technology delivered the Organization of American States in partnership with the Institute of Environmental Systems Research ESRI USA, which gave the Serviu a leading technology platform for spatial information management (ARC GIS Server 9.1, worth U.S. \$ 60 000

Contact:

**Mike Mora**, [MMora@oas.org](mailto:MMora@oas.org)

**Jorge Duran**, [jduran@oas.org](mailto:jduran@oas.org)

**David Mulet**, [DMulet@oas.org](mailto:DMulet@oas.org)

**Ken Gorton**, [kgorton@esri.com](mailto:kgorton@esri.com)

**Diciembre 2008**, Above the platform was recently upgraded to version 9.3 with a background of M \$ 30 achieved in the Digital Agenda, which improved the prize of the OAS.

New modules added to the platform and allow management full edition of Land Information at the same time to allow their publication on the Internet, through the Arc GIS Server module. This will be a real contribution to the transparency of state functions with the public.

**Merryl Lewis**, [mlewis@esri.com](mailto:mlewis@esri.com) ESRI USA

**Patricio Sáez**, [psaez@esri-chile.com](mailto:psaez@esri-chile.com) ESRI Chile

**Mauricio Vega Burdiles**, [mvega@minvu.cl](mailto:mvega@minvu.cl) (Apoyo gestión fondos Agenda Digital)

**Marzo 2008**, Award of a "Mini-satellite remote sensing project in the Jaguar Plan promoted by the European Space Agency through Indra Espacio, for a total of 15 000 euros, these funds are international tenders for a consultancy project to define a perceptual remotely via satellite images on Fundo Nonge catchment area and its ecology.

Contacts:

**Victoriano Moreno**, [vmoreno@indra.es](mailto:vmoreno@indra.es)

**Marino Palacios**, [mpalacios@indra.es](mailto:mpalacios@indra.es)

The aim of this work is to develop a satellite-based GIS mapping, role mapping and layout with an atlas that GMES methodology to assess and monitor planning processes, how to land a virtual observatory to improve environmental management of areas adjacent to Fundo Nonguen. The consulting company that won the proposal is Eurosense [www.eurosense.com](http://www.eurosense.com) of Belgium Contact:

**Ides Bauwens**, [ides.bauwens@eurosense.com](mailto:ides.bauwens@eurosense.com)

**Joeri Van Wolvelaer**, [joeri.van.wolvelaer@eurosense.com](mailto:joeri.van.wolvelaer@eurosense.com)

**Marzo 2009**, SIT Serviu classification in the category non-referred to the XXIV International Cartographic Conference, under the "digital mapping and GIS for sustainable development of the territories", an action that validates the model of the SIT Serviu and approved by a scientific committee international experience to be exposed in public in November 2009. It also invites us to participate in the exhibition Mapping of the conference to be held in November this year at the Military Geographic Institute.

Contacto:

**Rodrigo García**, asesor ICA IGM, [rgarcia@igm.cl](mailto:rgarcia@igm.cl) IGM

## **V. Seminars, trainings and workshops developed by the SIT Serviu**

Development of national and international seminars and training sessions to promote and deliver content related to Geographic Information Systems in the region of Bio Bio, in coordination with the Association of Municipalities and Regional Government, which are:

1. SIT seminar, entitled "Information Systems and Land Cadastre
2. November 2006
3. 2. SIT workshop called "Tools for Good Governance"
4. March 2008
5. 3. SIT seminar, entitled "A contribution to social cohesion"
6. December 2008
7. 4. 1st cycle SIT Symposium on "Building Geospatial infrastructure to improve the quality of life in cities"
8. June 2009
9. Most of the exhibitors at these events are professionals and scientists worldwide recognition in subjects on Geoscience and GIS and audiences who have been led this work are employees of the world public, private and academic related to planning and land management and are linked to the work of Serviu.

## **VI. Methodology and GIS applications developed by SIT Serviu**



## **Territorial Information System Methodology**

The methodology for the development and implementation of the SIT, is focused on the model of interrelation between the cadastre and register, which is based on the collection, generation, maintenance of the "digital geo-spatial cadastre multifinalitario at large" that allows develop a process for mass registration of land information that enables fuel to keep the information databases territorial SIT.

This solution is part of the methodology agreed by the member countries of the Organization of American States to modernize the processes of registration and public land in Latin America, here is the contents of the Territorial Information Bank SIT and three examples of fully developed Georeferencing Serviu in:

### **Bank territorial information Serviu SIT (WGS 84):**

**División político Administrativa INE (1:50.000)**

**Información territorial base IGM (1:50.000)**

**Planos base centros poblados, convenio MINVU-GORE (1:5000)**

**Información censal INE (1992,2002) (1:5000 y 1:50.000)**

**Cambio de uso de suelo (MINVU-MINAGRI)**

**Cartografía municipal escala grande (1:1000 y 1:2000)**

**Orthofotos blanco y Negro DDUI MINVU ( 1:20000)**

**Orthomosaicos georreferenciados (1:4000)**

**Red de Puntos de control geodésico planos base MINVU Gore**

**Imágenes de satélite de la región Bío Bío**

**Información Territorial Gobierno Regional 2001**

**Diversos inventarios, patrimoniales, ambientales, terrenos, etc.**

### **GIS applications based on territorial land by the SIT**

Georeferencing of the Real Property Cadastre of Serviu

The first challenge of implementing the SIT Serviu was, on the recommendation of the Director of Serviu, modernize the administration of the cadastre of real estate.

The work was an institutional goal that was met by 100%, was a first step find all real estate available on the mapping in the database of the SIT, using the Arc GIS 9.1 platform.

Georeferencing of the Real Property Cadastre of the commune of Lota.

Support for the Serviu asset management, specifically in the declaration of the Council of National Monuments, and infrastructure of some sites as stated in the historic town of Lota.

The work consisted in lifting each element with GPS technology from the ground and pour the mapping information available in the databank of Serviu SIT, which is also assigned a series of databases, which finally resulted in mapping assets to manage the process of declaration.

Take the SIT is also giving support to the updating of the PRC for the declaration of Lota typical Zone, through the delivery of georeferenced information to various actors related to Lota agestión assets.



### Georeferencing of environmental cadastre in the region of Bio Bio

Under the Law No. 19 300 on the Basis of the Environment is a need for spatial information in environmental decision-making for sustainable land management and planning, and the SIT Serviu to find formulas for constructing registers and records and to develop content that can serve as environmental baseline for the regional OT. In this regard it is important to mention the contribution they will make the Jaguar Plan in coordination with the European Space Agency satellite that will provide basic information for geo-based information across the various registers and the IPT MINVU.

Also include a strategic work that is being developed from the Land Management Unit, in conjunction with the City to support the generation of green areas, on the declaration of Area Metropolitan Latency of Concepción, which promotes an action between CONAMA Bío Bío and Gore, to encourage communities to apply for a regional fund for the construction of communal parks.

### **VII. Support Technology SIT**

- 1 Arc GIS 9.3 platform licensed for geospatial data management.
2. Data Server 9.3 Arc SDE Geodatabase to manage the critical data related to a service model mapping.
3. Complete Database of geospatial SIT Serviu integrated with Arc GIS platform, developed from the interoperation of spatial information with other State institutions, the framework agreements.
4. Regarding the capabilities of the software (Hardware), the SIT has a single PC that does not have the capabilities to support the ideals Arc GIS software.
5. There is a server where we installed the license for ARC SDE for managing massive data in Geodatabase which interact with the SQL Server database engine available on the Serviu.
6. Is currently installed SERVER Arc GIS 9.3, to provide the service Serviu map or globe (like Google Earth), which undoubtedly will contribute to the publication of spatial information over the Internet
7. Ultimately provide the SIT lack of a suitable hardware. (Plot, PCS, server, etc.).
8. Geodetic Laboratory

The SIT has geotecnológico support for capturing, editing and processing of geospatial information worth M \$ 25 which allows an efficient management of land and thus update their link to the GIS mapping, the following are the teams:

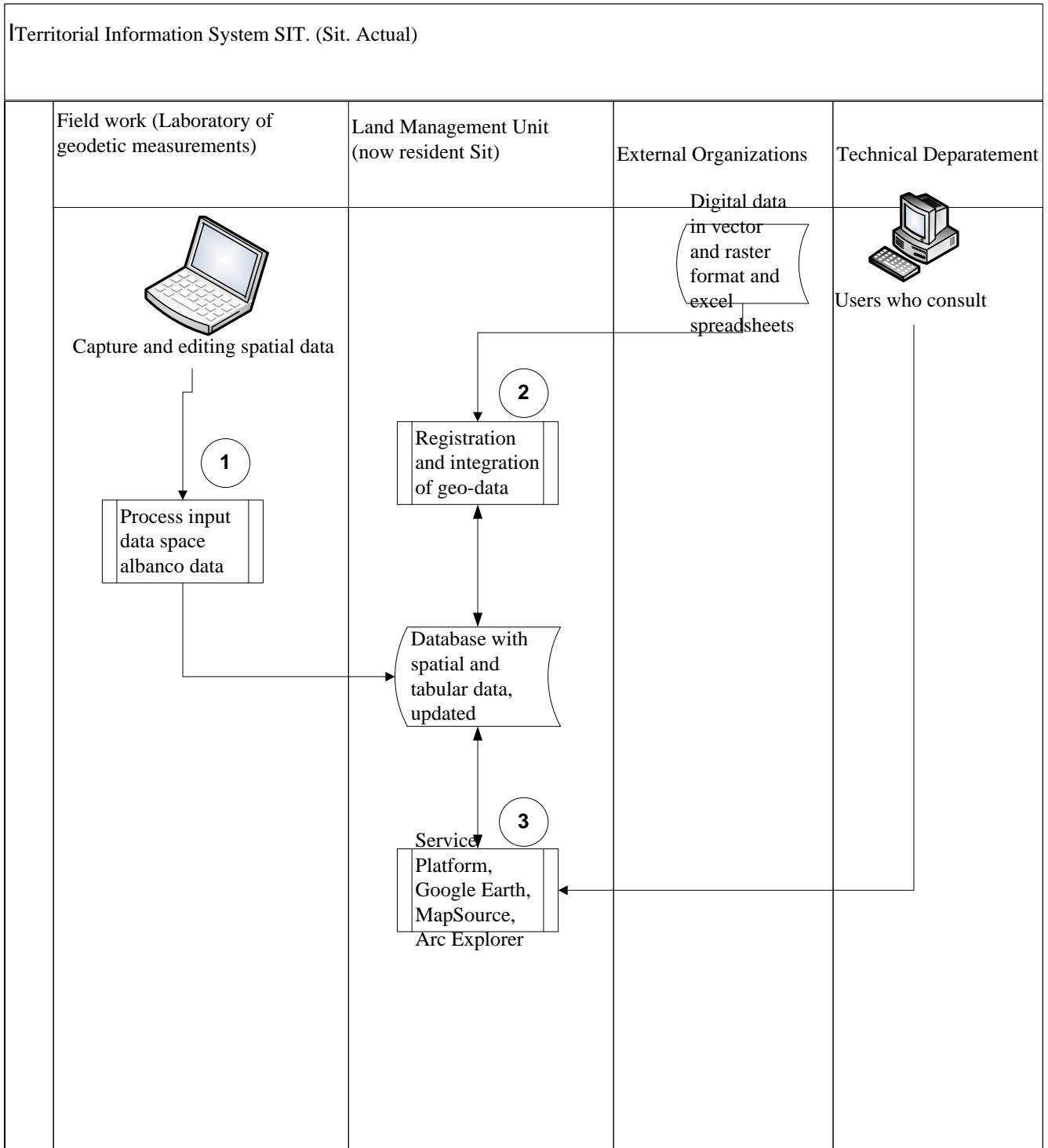
- 6 browsers Garmin 60 CSX map
- Trimble Juno 3 browsers
- 2 dual-frequency L1/L2 GPS Trimble
- 2 Trimble GPS mapping Proxh
- 1 total station Trimble 360
- Package Terrasync licenses and TGO

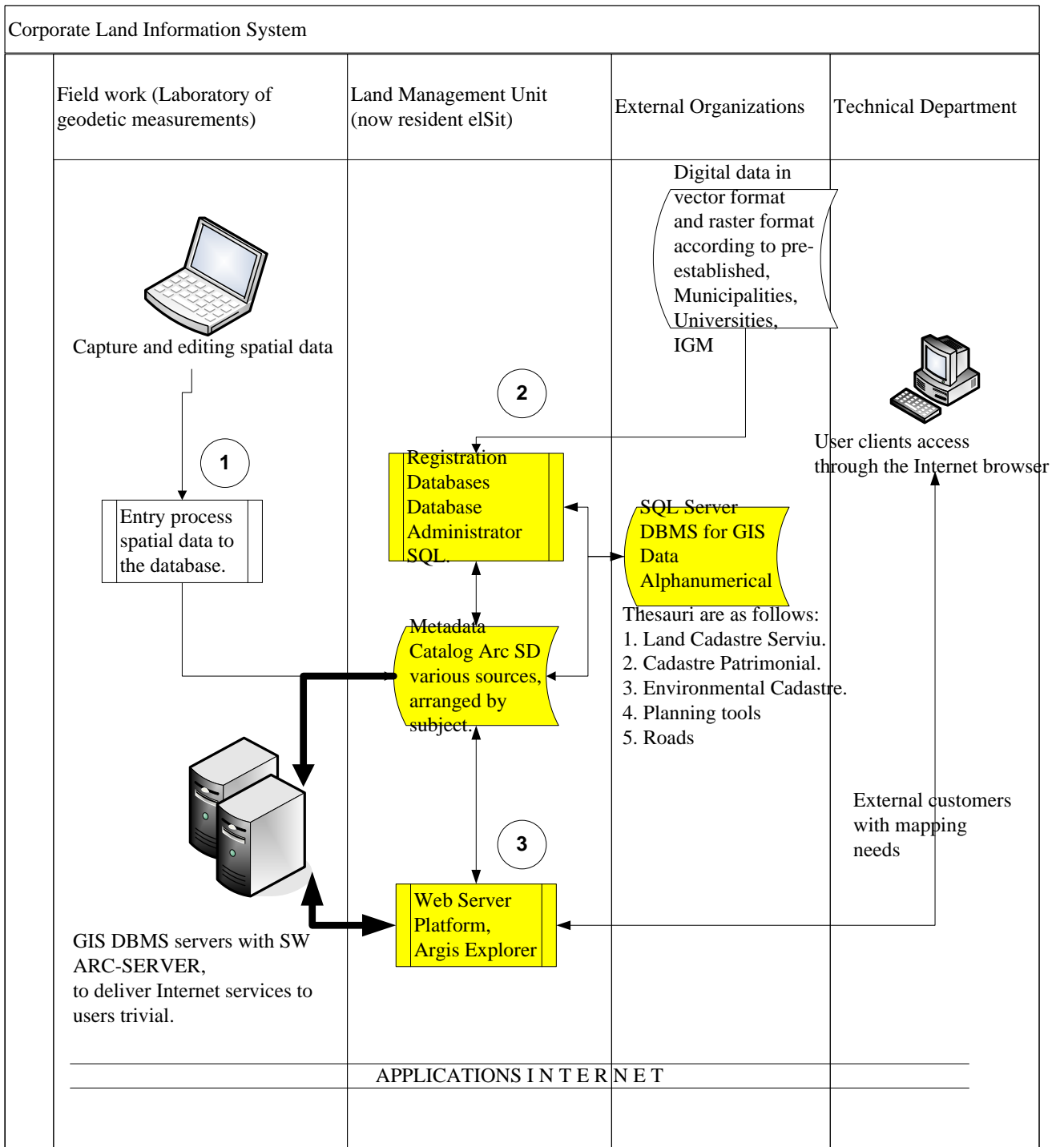
### VIII. Summary financial contributions to SIT Serviu

The following table summarizes the contributions of various kinds of resources that have enabled the development and implementation of the first phases of SIT in the Bío Bío Serviu:

<b>SUMMARY INPUTS TO SIT Serviu 2006-2009 (measured in pesos)</b>			
Organization	Input	value	Chilean Currency
OEA ESRI	Sw Arc GIS 9.1	U\$ 60.000	\$32.040.000
ESA(European space agency)	Satellite Data	EU\$ 15.000	\$11.235.000
IGM	Territorial information-based, satellite data		\$ 7.000.0000
Service Housing and Urban Development	Geodetic Laboratory		\$ 25.000.0000
Agenda Digital Chile government	Sw Arc GIS 9.3		\$ 30.000.000
Association. Municipalities / Regional Government / Ministry of Housing and Urbanismo	Land Information Bank (54 municipalities)		\$ 1.200.000.000
<b>Total\$</b>			<b>\$1.353.275.000</b>

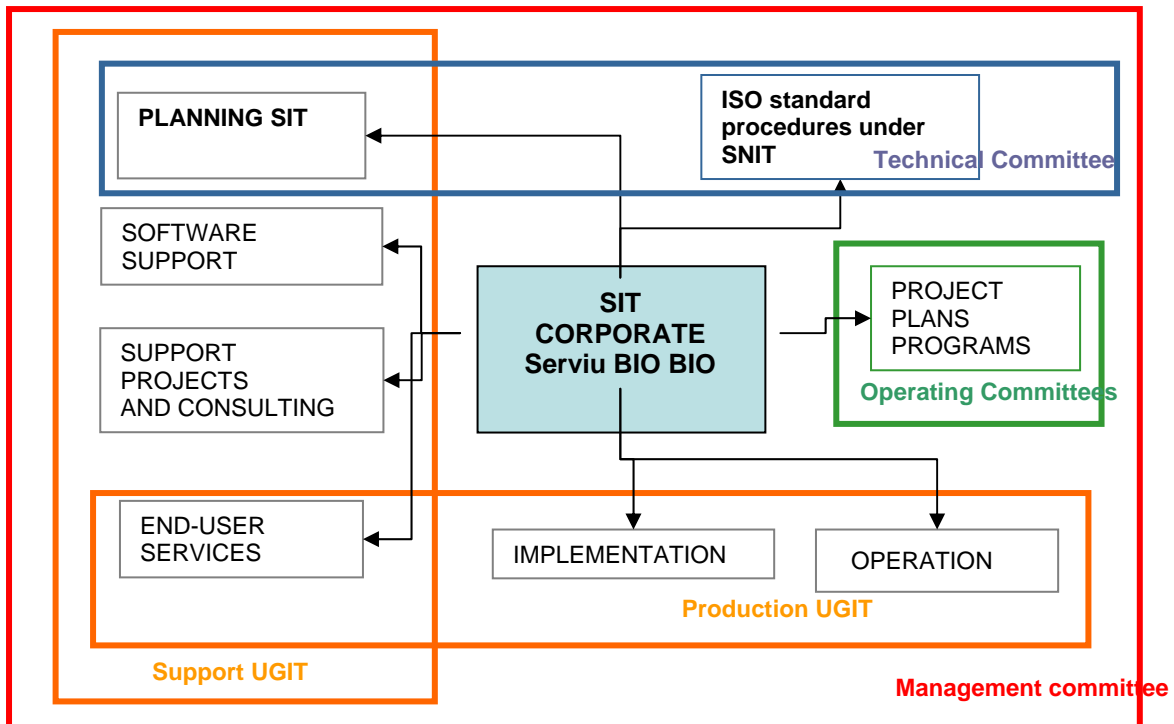
### IX. Data flow model of the SIT Serviu





### X. Corporate model of SIT

The corporate model of the SIT proposes a new way to manage information and the need for an Information Management Unit Land (UGIT)



Note: Adapted from model Geo euskadi

## XI. Conclusions

1. The SIT Serviu currently has a technology infrastructure with certain capabilities that allow information to solve problems in various areas such as: geo, consulting IT, GIS applications, etc..
2. Knowledge there is currently installed with respect to GIS technology, which has been promoted within the Serviu and regionally, where through seminars, workshops, trainings and workshops have been put on the table the goals and the practical usefulness of tool, which is needed to strengthen the tool in some way and has achieved a technological development only need to change the focus towards the understanding of the tool as a corporate model that improves the management of information and hence knowledge. Currently Serviu SIT is able to initiate a process for implementing corporate.
3. The action of SIT's work has made a difference and strengthen networks for cluster development of GIS in the region, specifically in terms of geodesy and geo matters that are vital to the management of land information quality standards.
4. Regarding handling of geospatial information or territorial SIT is supported on a Land Information Bank strengthened through inter-agency agreements, which allow modeling cartographically any sector of the region of Bío Bío.