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(出國類別：經濟部聯合技術協助訓練實習)

地理資訊系統在國土資訊自然環境資料庫之應用

服務機關：經濟部資訊中心

出國人 職 稱：約聘系統分析師

姓 名：李月霞

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主辦機關:

經濟部

聯絡人/電話:

/

出國人員:

李月霞 經濟部 資訊中心 約聘系統分析師

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內容摘要: 本計畫之目的為藉由參觀訪問美國之地理資訊相關機關、學校與政府機構,從實地觀摩實習地理資訊系統之先進技術與規劃方法及各單位實際應用成果,提供本部資訊中心作為推動挑戰二〇〇八國家發展計畫之一,國土資訊系統九大資料庫分組中自然環境基本資料庫分組之業務推動工作之參考。本次參訪行程為期十五天,全程總計參訪四單位,包含參加美國地理資訊大廠 ESRI 之國際使用者研討會、參訪美國奧岡州立大學氣象 PRISM 專家系統及作物專家系統、參訪美國農業部之作物專家系統及美國加州 Martinez CONTRA COSTA 地區之公共工程及防洪局多項地理資訊應用系統。在本計畫執行過程中,本人要感謝 DR. BAOLIN WU, DR. CHRISTOPHER DALY, MR. DALTON HOBBS, DR. DAVID B. HANNAWAY, MS. JESSIE LIN, MS. PEGGY YU, 盧美雅小姐, 周鎮坤先生及張耿賓先生之協助,使此行順利圓滿,收穫良多,特致謝忱。

本文電子檔已上傳至出國報告資訊網

摘要

本計畫之目的為藉由參觀訪問美國之地理資訊相關機關、學校與政府機構，從實地觀摩實習地理資訊系統之先進技術與規劃方法及各單位實際應用成果，提供本部資訊中心作為推動挑戰二〇〇八國家發展計畫之一，國土資訊系統九大資料庫分組中自然環境基本資料庫分組之業務推動工作之參考。

本次參訪行程為期十五天，全程總計參訪四單位，包含參加美國地理資訊大廠 ESRI 之國際使用者研討會、參訪美國奧岡州立大學氣象 PRISM 專家系統及作物專家系統、參訪美國農業部之作物專家系統及美國加州 Martinez CONTRA COSTA 地區之工務局及防洪局多項地理資訊應用系統。

在本計畫執行過程中，本人要感謝 DR. BAOLIN WU, DR. CHRISTOPHER DALY, MR. DALTON HOBBS, DR. DAVID B. HANNAWAY, MS. JESSIE LIN, MS. PEGGY YU, 盧美雅小姐，周鎮坤先生及張耿賓先生之協助，使此行順利圓滿，收穫良多，特致謝忱。

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壹、目的

本部負責國土資訊系統九大資料庫分組之自然環境基本資料庫分組之招集與業務推動，本分組共用性資料庫包含土壤、地質、地形、氣象、水文及水資源等六類資料。自一九九〇年開始十幾年來已具初步成果，今年開始要進入另一個新的中程計畫，此刻需要以新的思維與資訊，輔佐此重要工程之規劃。

本計畫之目的為藉由參觀訪問美國之地理資訊相關機關、學校與政府機構，從實地觀摩實習地理資訊系統之先進技術與規劃方法及各單位實際應用成果，提供本部資訊中心作為推動挑戰二〇〇八國家發展計畫之一，國土資訊系統九大資料庫分組中自然環境基本資料庫分組之業務推動工作之參考。

本次參訪行程為期十五天，全程總計參訪四單位，包含參加美國地理資訊大廠 ESRI 之國際使用者研討會、參訪美國奧岡州立大學氣象及作物專家系統、參訪美國農業部之作物專家系統及美國加州 Martinez CONTRA COSTA 地區之工務局及防洪局多項地理資訊應用系統。

貳、過程

一、 於民國 91 年 7 月 8 日至同年 7 月 12 日參加美國地理資訊大廠 ESRI 在聖地牙哥舉辦之公元二 00 二年國際使用者研討會。

此次研討會有分別來自世界各國近一萬二千人參加。因為人數眾多，所以選在十分寬敞的聖地牙哥國際會議中心舉辦，根據前輩回憶所述；當年一九八六年之使用者研討會約五，六百人參加，相較於最近幾年如今年，參與人數不斷增加而應用範圍亦繼續擴大。

研討會全程計五天分別舉辦近千場次互動式主題發表與討論，會場設置攤位供來自各地之地理資訊相關廠商產品展示，各單位含民間公司、政府部門、各級學校甚至學生之成果展示，一應俱全，其中互動式研討會因多場次同時進行，因此大會亦提供研討會內容光片供與會者會後參考。

本人在五天會議期中從四十一個不同分類近千場次之研討會中，選擇其中十八場次參加，例如：

在 Business, Banking, and Insurance 類別中 A Map for Mom (& Pop), Biz Data Technologies, International Business、在 Climate and Weather 類別中 Climate and Weather I.、在 Geography Network 類別中 Building Applications on the Geography

Network 等等。相關詳細內容請參閱 2002 年國際使用者研討會

所提供之網際網路資料內容----->

<http://gis.esri.com/library/userconf/proc02/index.html>



2002 年國際使用者研討會會場 - 聖地牙哥國際會議中心



成果展示會場一景



參加人員活動一景

二、 於民國 91 年 7 月 14 日至同年 7 月 15 日參觀訪問美國奧勒岡州立大學開發建置之氣象專家系統 PRISM 及作物專家系統。由奧勒岡州立大學氣象研究中心 DR. CHRISTOPHER DALY 領導的研究團隊建置一個氣象的專家系統 PRISM (Parameter-elevation Regressions on Independent Slopes Model)，可以產生相關的氣象圖層供大眾使用。

此次行程另外亦參觀由 DR. DAVID B. HANNAWAY 所領導的全球牧草資訊系統(A Multi-language ALFALA Information System)，提供多語環境，廣納相同專業的專家意見，提供美國、中國及東南亞各國使用之網際網路資訊系統，摘要資料參考附錄之三，資料來源：美國奧勒岡州立大學 DR. DAVID B. HANNAWAY。

另外再參觀美國農業部 (USDA) 以奧勒岡州內為範圍之土地利用與大地景觀的研究系統。其中分別以五年，十年，五十年等短期到中長期為基礎，希望在各項政策及相關配合措施努力下，讓奧勒岡的自然景觀與森林面積達到越來越好的結果。



奧勒岡州立大學



參訪行程之一 (Dr. Hannaway 左) 參訪行程之二 (Dr. Daly)

三、 於民國 91 年 7 月 16 日參觀訪問美國農業部建置之農作物專家系統，提供農民作為作物適栽之參考。

此一行程為參觀美國農業部奧勒岡州在波特蘭辦公部門，奧勒岡州的農業生產活動十分蓬勃，相對於農業在該州十分重要，目前為美國農業部奧勒岡州對台負責人員 MR. HOBBS 特別介紹目前提供農民使用之作物專家系統，農民可以依據選擇之作物種類查詢各項有用資訊，幫助農民在作物生產上有效的規劃。

四、 於民國 91 年 7 月 17 日至 7 月 22 日參觀訪問美國加州 Martinez CONTRA COSTA 郡之工務局及防洪局之地理資訊系統。

在 7 月 17 日參觀 GIS 系統之軟體、硬體、資料結構、資料蒐集等設施。

在 7 月 18 日參觀現有工程用 GIS 應用系統、基本圖、排水、水文、土地利用、洪害及地形圖層等。

在 7 月 19 日參觀未來之 GIS 應用系統之規劃及自動化工程規劃、設計與核准。參觀消防、衛生及警察部門之 GIS 應用系統。

在 7 月 22 日示範目前數化圖層作業、GIS 道路規劃及水道水溝設計。



美國加州 Martinez CONTRA COSTA 郡之工務局及防洪局



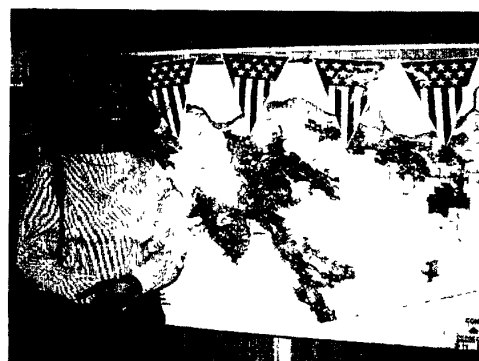
GIS 主管簡報 GIS 應用系統



示範 GPS 衛星定位系統
定位資料誤差在 30 公分內



示範自動雨量計及其操作



應用地理資訊系統一景

參、心得

一、由於業務規劃，本人負責承辦此一國土資訊系統之工作。透過這次經濟部聯合技術協助訓練實習計畫的執行，加強個人在地理資訊系統（Geography Information System）專業領域之知識與經驗。由於美國幅員廣大在地理資訊系統之應用亦遍及各地，其中有許多值得我國借鏡學習的地方。惟本計畫之時程關係，特別選擇參加軟體大廠之國際使用者成果發表及研討會，循此可以在一定的時間內，廣泛了解各國及各領域之使用經驗，從經驗分享中學習。會後再利用時間針對近千個成果發表資料詳加研讀參考，部分系統可提供現有管理資訊系統參考。此次在使用者研討會場中，遇到多位與會之專家學者如愛達華大學教授 DR.KANG-TSUNG CHANG，夏威夷大學教授 DR. MICHAEL F. PARKE 及聖地牙哥州立大學助理教授 DR. MING-HSIANG TSOU 等並討論有關海洋、國土及教育等問題，雖然大多數與會者均在個人專業領域上已經很有成就，仍然不斷虛心學習，真是百尺竿頭更進一步，個人深為感動。另在使用者成果展示現場中除了各單位之應用成果外，更看到一些屬於美國國內中小學校同學的作品，針對不同的主題如我所認識的地球等主題，均有深入的探討與認識，讓人深深覺得

自然環境之向下紮根的工作，越早進行則越是踏實。

- 二、 這次行程之相關系統將提供本分組水文及水資源工作小組參考。從加州政府的 GIS 推動過程來看，以 CONTRA COSTA 郡的使用經驗為例，早在一九七〇年開始使用電腦並規劃業務電腦化，繼而在一九七五年開始先由工務部門將建物工程圖逐一數化建檔，並於一九七九年應用於各部門日常業務，在一九八七年 GIS 開始出現時，逐漸整合成地理資訊系統，以此系統為核心推廣使用。目前計有六十七個應用系統（如附錄之四，資料來源：美國 CONTRA COSTA 郡），提供防洪、救災、消防、警政、衛生及教育等部門使用。

地理資料的蒐集，需要跨部門協同辦理，每一筆資料的正確性與否關係著系統成敗。此次現場使用衛星定位系統，其定位點之誤差可以在 30 公分以內。也參觀了氣象雨量蒐集的系統，當天加州天氣試晴空萬里，沒有雨量，因此特別以人工方式測試，了解雨量計的操作過程，從雨量計的維修，資料的蒐集，資料的檢誤，及資料的供應與管理均由同一位人員負責，工作變得相對有效率。資料蒐集如此，系統建置亦是如此，該局主要主政人員 DR. BAOLIN WU 個人棄而不捨，以高度專業與毅力，建置一套整合性的地理資訊系統，提供各部門使用，甚至後代

子孫仍然可以使用，其影響真的深遠。

三、 這次行程之專家系統將提供本分組氣象、土壤及地形工作小組參考。近年來美國大眾對氣象資訊的需要求越來越強烈，因為它影響的層面越來越廣，但受限於幅員廣大所收集樣點資料相對稀少，對於氣象相關圖層的提供，由奧勒岡州立大學氣象研究中心 DR. CHRISTOPHER DALY 領導的研究團隊特別研究一套名為「地理空間氣候學」(geospatial climatology) 的專家知識庫系統，利用地形地貌的氣候模型與地理學的特色之間的關係，建置一個氣象的專家系統 PRISM (Parameter-elevation Regressions on Independent Slopes Model)，利用參數的選擇，並經過特定的統計迴規程式運算及氣象專家的最後判識，可以產生相關的氣象圖層供大眾使用，摘要資料參考附錄之二，資料來源：美國奧勒岡州立大學氣象研究中心 DR. CHRISTOPHER DALY 等。

四、 在會場中展示的數位地球 (Digital Earth) 系統，看到美國這個科學化深度的國度中，自然環境科學亦蓬勃發展，此種對地球的永續經營而兼具人文關懷的做法，與數位環境的充分結合後，提供很好的示範。從數位地球系統功能中，我們可以看到整個地球，並逐漸探視更小的區域以顯示區域內的圖層，再一

直探視下去，最後可以很清楚的看到自己的家，給人們一種與天地同在的連結感。

肆、建議

- 一、我國國土資訊系推動小組自 1990 年成立以來，十幾年來不論在資料生產、專案規劃、系統建置、技術研發、教育推廣及法令訂定均已稍具成果。這些國土資訊系統之建置主要經費絕大部分使用在生產資料上，然而因為種種原因卻有大部分資料沒有被使用，如航照、衛星影像或各單位自行建置之資料，未能廣泛使用，這是一件十分可惜的事。今後在挑戰二〇〇八國家發展計畫，建議結合目前已經十分成熟的大環境，如電腦、網路、網際網路、測量資料以及地理資訊軟體，共同整合應用，讓目前已經建置完成的土壤、地質、氣象等寶貴的資料，落實在各階層充分被使用，以顯示其價值。
- 二、地理資訊系統在國土資訊上之應用外，建議使用目前國土資訊完成之圖層。結合現行之管理資訊決策系統，加上空間資料或使用系統軟體功能，產生相對之空間資料。整合管理資訊與我們熟識的周遭環境資訊，提供決策者或社會大眾一個自然生動，而且直接易懂的管理參考資訊系統。

三、為達成上述的工作，建議廣泛教育使用者，例如在中小學開始加入 GIS 相關課程、在大學資訊學門中，增加 GIS 的教學課程，尤其我國資訊軟體人力，若能再給于這些專業人員相關空間資訊教育的補強，即可成為 GIS 推動的超強團隊，再廣泛參考先進國家之應用，應可在短期內快數縮短國內之 GIS 數位落差。共同建立一個良性、互動、互惠的國土資訊共享環境。

伍、附錄

- 一、 公元二〇〇二年國際使用者研討會資料網站
- 二、 氣象的專家系統 PRISM 摘要資料
- 三、 全球牧草資訊系統資料
- 四、 美國加州 Martinez CONTRA COSTA 地區 GIS 資料

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2002 User Conference Proceedings

The ESRI User Conference Proceedings is a compilation of professional abstracts and papers presented at the 22nd Annual ESRI International User Conference, July 8 - 12, 2002. Our users contributed a fundamental part to the conference by submitting and presenting papers on a diverse collection of GIS applications. The proceedings promote GIS application by stimulating users to share their experiences and knowledge.

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A Knowledge-Based Approach to
the Statistical Mapping of Climate

by

Christopher Daly, Wayne P. Gibson, and George H. Taylor

Oregon State University

Corvallis, Oregon

Gregory L. Johnson and Phillip Pasteris

USDA-NRCS National Water and Climate Center

Portland, Oregon

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Corresponding author's address:

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—

Christopher Daly

Spatial Climate Analysis Service

Department of Geosciences

Phone: (541) 737-2531

316 Strand Agricultural Hall

Fax: (541) 737-5710

Oregon State University

Email: daly@coas.oregonstate.edu

Corvallis, OR 97331-2209

Abstract

The demand for spatial climate data in digital form has risen dramatically in recent years. In response to this need, a variety of statistical techniques have been used to facilitate the production of GIS-compatible climate maps. However, observational data are often too sparse and unrepresentative to directly support the creation of high-quality climate maps and data sets that truly represent the current state of knowledge. An effective approach is to use the wealth of expert knowledge on the spatial patterns of climate and their relationships with geographic features, termed "geospatial climatology," to help enhance, control, and parameterize a statistical technique. Described here is a dynamic knowledge-based framework that allows for the effective accumulation, application, and refinement of climatic knowledge, as expressed in a statistical regression model known as PRISM (Parameter-elevation Regressions on Independent Slopes Model). The ultimate goal is to develop an expert system capable of reproducing the process a knowledgeable climatologist would use to create high-quality climate maps, with the added benefits of consistency and repeatability. However, knowledge must first be accumulated and evaluated through an ongoing process of model application; development of knowledge prototypes, parameters, and parameter settings; testing; evaluation; and modification. This paper describes the current state of a knowledge-based framework for climate mapping, and presents specific algorithms from PRISM to demonstrate how this framework is applied and refined to accommodate difficult climate mapping situations. A weighted climate-elevation regression function acknowledges the dominant influence of elevation on climate. Climate stations are assigned weights that account for other climatically important factors besides elevation. Aspect and topographic exposure, which affect climate at a variety of scales, from hill slope to windward

and leeward sides of mountain ranges, are simulated by dividing the terrain into topographic facets. A coastal proximity measure is used to account for sharp climatic gradients near coastlines. A two-layer model structure divides the atmosphere into a lower boundary layer and an upper free atmosphere layer, allowing the simulation of temperature inversions, as well as mid-slope precipitation maxima. The effectiveness of various terrain configurations at producing orographic precipitation enhancement is also estimated. Climate mapping examples are presented.

Keywords: Climate map, Knowledge-based system, Expert system, Climate interpolation, Spatial climate, Climate data sets, Precipitation, Temperature, GIS, PRISM, Geospatial climatology

DEVELOPING A MULTI-LANGUAGE ALFALFA INFORMATION SYSTEM

Développement d'un Système d'Information Multilingue sur
苜蓿信息系统



Description

The Alfalfa Information System is a collaborative project to create a web-based, multi-language, comprehensive knowledge resource for alfalfa (*Medicago sativa* L.).

Rationale

Alfalfa is the world's most important crop for feeding livestock. Information needs exist in all countries where alfalfa is grown. Collaboration on this project will reduce duplicate efforts and improve information quality, leading to more economically sustainable alfalfa production systems.

Core Developers

David Hassenway - Iowa Central, Audubon, Iowa
Paul Weiss, Al Lou, Ruanan - Rochester, Degrass
Yosh Nagata - University of Minnesota
Elaine Newack - University of Nebraska

Regional Review Team

Mike Levy - University of Wyoming, Steve Griffl - U.C. Davis
Neal Martin - USDA, ARS, Dale Linderborg - University of Wisconsin (North Central)
Sud Ramamirthu - University of Vermont, Les Waugh - University of Maryland (Northwest)
Ray Dierksen - Montana State University, Tom Griggs - Utah State University (Northwest)
John Caded - Oklahoma State University, Gary August - Auburn State University (South Central)
Lynn Olson - University of Tennessee, Larry Luedtke - University of Arkansas (Southeast)
Mike Ostrom - University of Arizona, Dan Pritchett - U.C. Davis (Southwest)

Sponsors

Oregon State University, USDA-ADFC Grant
Alfalfa Industries, Cooperative University and Agency (various)

PRC Cooperators:

HU Yongjun - HANFU, China
ZHANG Yuta, LI Xiaojian - Chinese Academy of Agricultural Sciences

Goal

To increase efficiency and effectiveness of:

- Systems Developers (alfalfa experts worldwide)
- Information Providers (government and industry outreach and education specialists)
- All Interested Learners (alfalfa producers, marketers, users and students, etc.)

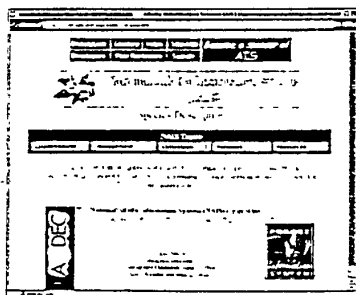
Guiding Principles

Design must be:

1. Functional, fast, beautiful, and provide multiple routes to the same information to accommodate all learning styles.
2. Multi-language system to engage scientists and users worldwide.

Process

1. Initial prototyping.

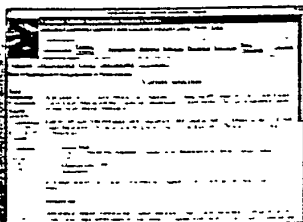


2. Proposal development and enlisting cooperators.
3. Comprehensive design.

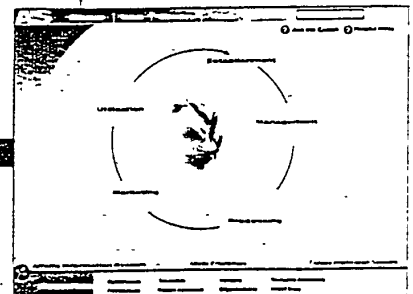
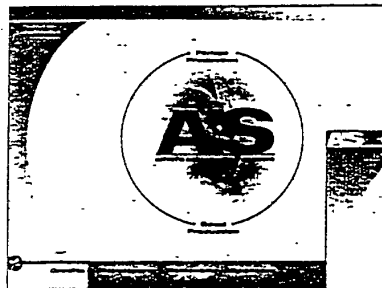
Establishment	Management	Processing	Marketing	Utilization
1. Soil Preparation	1. Fertilization	1. Swathing/Cond.	1. Quality Testing	1. Livestock
2. Seed Preparation	2. Irrigation	2. Feeding	2. Statistics	2. Wildlife
3. Planting	3. Pest Control	3. Baling	3. Strategies	3. Quality Testing
4. Initial Mng.	4. Harvesting	4. Curing/Pelleting	4. Buyers/Sellers	4. Animal Health
		5. Densifying	5. Future	5. Human Health
		6. Other		6. Other

FIRST LEVEL
SECOND LEVEL
THIRD LEVEL

4. Iterative designing.



5. Functional prototype development.



6. Initial content entry including English, Chinese, and French text.
7. Continued content entry.
8. Testing and revision of all aspects.
9. CD-ROM development.
10. Announcing availability of products.

Summary

The AIS represents a new approach:

- A new type of product (comprehensive "knowledge base").
- A new way of working (global collaboration).
- A new way of funding (public, private, multi-agency, multi-nation)

URL: <http://forages.orst.edu/IS/AIS/>



Data Layer Availability

Please Prioritize the Following GIS Data Layers for Eventual Funding
(IGNORE HIGHLIGHTED LAYERS)

CW=COUNTYWIDE, PS-PUBLIC SAFETY, CD= COMMUNITY DEVELOPMENT, PWD= PUBLIC WORKS, AO= ASSESSOR OFFICE, HHS= HEALTH HUMAN SERVICES, HSD= HEALTH SERVICES, CCF- CON FIRE, SO-SHERIFF OFFICE, CAO=COUNTY ADMINISTRATOR OFFICE

P	#	Data Set Name	Available	In	User	Owner	Avail. From	% Complete
	1	Aerial locations (towers)	NO	NO	SO	SO	SO	0
	2	Areas of Benefit	NO	YES	PWD	PWD	PWD	25
	3	BART station locations	NO	NO	CD/PS	CD	MTC/CCTA	COMPLETE
	4	BART surface rail	NO	NO	CD/PS	CD	MTC/CCTA	COMPLETE
	5	Base Map Grid N27 &	YES	YES	CW	PWD	PWD	COMPLETE
	6	Catch basins	NO	YES	PWD	PWD	PWD	15
	7	Census Blocks FED	YES	NO	CW	CD	CD	COMPLETE
	8	Census Tracts FED	YES	NO	CW	CD	CD	COMPLETE
	9	Census Blocks County	NO	YES	CW	CD	CD	5
	10	Census Tracts County	NO	YES	CW	CD	CD	5
	11	Child Care Centers	YES	YES	PS/HHS	HHS	HHS	20
	12	City limits	YES	YES	CW	CD	CD	90
	13	Container Routes	NO	NO	PS	PWD/CD	ABAG	0
	14	Contour Lines	YES	NO	CW	CD	TRA'S	COMPLETE
	15	County Boundary	YES	YES	CW	CD	TRA'S	COMPLETE
	16	Culverts	NO	YES	PWD	PWD	PWD	70
	17	Dam & Levee Locations	NO	NO	PS/PWD	CD	SOES	10
	18	Digital Orthophoto	YES	NO	CW	PWD	VENDOR-	COMPLETE
	19	EBMUD Jurisdiction	YES	NO	CD/PWD	PWD	EBMUD	COMPLETE
	20	EBRParks Jurisdiction	YES	NO	CD/PWD	PWD	EBRPD	COMPLETE
	21	FEMA Flood plans	YES	YES	PS/PWD	CD	PWD	COMPLETE
	22	Fire Districts	NO	NO	CCF/PS	CD	TRA's	70
	23	Fire Hydrants	NO	YES	CCF	CCF	Cities	25
	24	Fire Stations	NO	NO	CCF/PS	CCF	HSD	5
	25	Freeways with on and	NO	NO	PWD	CCF	MTC	5
	26	General Plan Areas	NO	YES	CW	CD	CD	95
	27	Habitat - RES	NO	YES	PW/CD	TBD	PWD/CD	?
	28	Harbors	NO	NO	PS	CD	ABAG	5
	29	Hazardous Materials	NO	YES	PS/HHS	PWD	EHSO	70
	30	Hospital and Medical	NO	YES	PS/HHS	TBD	SO/HSD	25
	31	Inlets	NO	YES	PWD	PWD	PWD	10
	32	Liquefaction Zones	NO	NO	SO	HS	SOES/ABAG	0
	33	Manhole locations	NO	YES	PWD	PWD	PWD	10
	34	Meteorological data	NO	NO	SO	PWD	NOAAH	5
	35	Open Space	NO	YES	CW	CD	CD	80
	36	Parcel Boundary	YES	YES	CW	PWD/AO	PWD	IN TRANSITION
	37	Parks	NO	YES	CW	CD	TRA's	70
	38	Public Buildings &	NO	NO	CW	HSD	HSD	50
	39	Rail lines	NO	NO	CW	CD	MTC	25
	40	Retirement Homes	COMPLETE	ON GOING	PS/HHS	HHS	HHS	5
	41	School districts	NO	NO	PS/ES	HHS	TRA's	0
	42	School locations, Higher	NO	NO	PS/ES	HHS	TRA's	5
	43	School locations, K -	NO	NO	PS/ES	HHS	TRA's	5
	44	Shelter Sites	NO	NO	SO	SO	Red Cross	5
	45	Sheriff Districts	NO	YES	SO	SO	TRA's	25
	46	Sign Inventory	NO	NO	PWD	PWD	PWD	5
	47	Soil composition by	NO	NO	PWD	PWD	USGS	5
	48	Special District Bounds	NO	YES	CW	CD	TRA's	10
	49	Storm Sewer Lines	NO	YES	PWD	PWD	PWD	80
	50	Streams	NO	NO	CW	CD/PWD	CD/PWD	0
	51	Street Lights	NO	YES	PWD	PWD	PWD	20

CW=COUNTYWIDE, PS-PUBLIC SAFETY, CD= COMMUNITY DEVELOPMENT, PWD= PUBLIC WORKS, AO= ASSESSOR OFFICE, HHS= HEALTH HUMAN SERVICES, HSD= HEALTH SERVICES, CCF- CON FIRE, SO-SHERIFF OFFICE, CAO=COUNTY ADMINISTRATOR OFFICE

P	#	Data Set Name	Available	In Development	User	Owner	Avail From	% Complete
	52	Streets Centerline	YES	YES	CW	PWD	PWD	80
	53	Streets Right of Way	YES	NO	CW	PWD	PWD	80
	54	Supervisor Districts	YES	YES	CW	CD	TRA's	5
	55	Survey Control Network	NO	NO	CW	PWD	PWD	60
	56	Trails & Paths	NO	BIKES	CD	CD	CD	0
	57	Transmission pathways	NO	NO	DOIT/SO	DOIT	NOT	0
	58	Underground storage tank	NO	NO	PS/EHSD	EHSD	NOT	10
	59	Uni-Community Boundaries	In Process	N/A	CW	CD	TRA's	50
	60	Urban Limit Line	NO	YES	CW	CD	CD	70
	61	Vegetation	NO	NO	PWD	PWD	State/CCWD	0
	62	Water Bodies Contra	YES	YES	CW	PWD	PWD	90
	63	Watersheds & Sub	NO	YES	PWD	PWD	PWD	60
	64	Wetlands	NO	YES	PW/CD	PWD	PW/CD	5
	65	Wildland Fire Jurisdiction	NO	NO	CCF	CCF	State	60
	66	Zip Codes	NO	NO	CW	CD	GDT CUP	COMPLETE
	67	Zoning-UN INCORP	NO	YES	CW	CD	CD	?



Many County departments have committed to supporting a Countywide GIS Initiative. In addition to the financing commitment each department has made we would like to also recognize additional ongoing contributions of the following departments. The County's current GIS has grown to the level it is because of the team efforts of the following departments:

Community Development Department (*Steering Committee*): Data layer development - zoning, general plan, bike lanes & trails. Vacant Lands inventory, Cost sharing on software and services, product and data evaluations. Welfare to Work, 65/35 Open Space, underutilized lands analysis.

Public Works Department (*Steering Committee*): Data layer development - parcels, air photos, street centerline, topography. Countywide GIS Coordination, Cost sharing on software and services - coordination on joint purchases. Product evaluation and research. Areas of Benefit, 65/35 Open Space, Tax rate Areas, Land use, Mapping Study and analysis.

Assessor (*Steering Committee*): Development of data including scanned Assessor Maps and floor plans. GIS based appraisal system research. Mapping Study, Tax Rate Areas analysis. Identify issues with County Parcel base and addresses, provides coordination for Parcel Layer Development.

Sheriff (*Steering Committee*): Data layer development - Centerline for Dispatch, response zones, shelter locations. GIS based emergency management systems research, Crime Analysis, Incident Analysis. Provided toward cooperation for countywide centerline and shared data resources.

Fire (*Steering Committee*): Automated Run Books, GIS based Dispatch options research. Identify issues with County Parcel base and addresses. Provided support with address validation, Working toward cooperation for countywide centerline and shared data resources

Agriculture (*Management support for GIS*): Layer development - Weed Population, At Risk habitat. Cost sharing - on Plotters and GPS data collectors Product evaluation research. Coordination with DVC on training and Student GIS Research Projects.

Health Services Department: Data layer development - Hazardous Materials Locations, response zones, hospitals, schools.

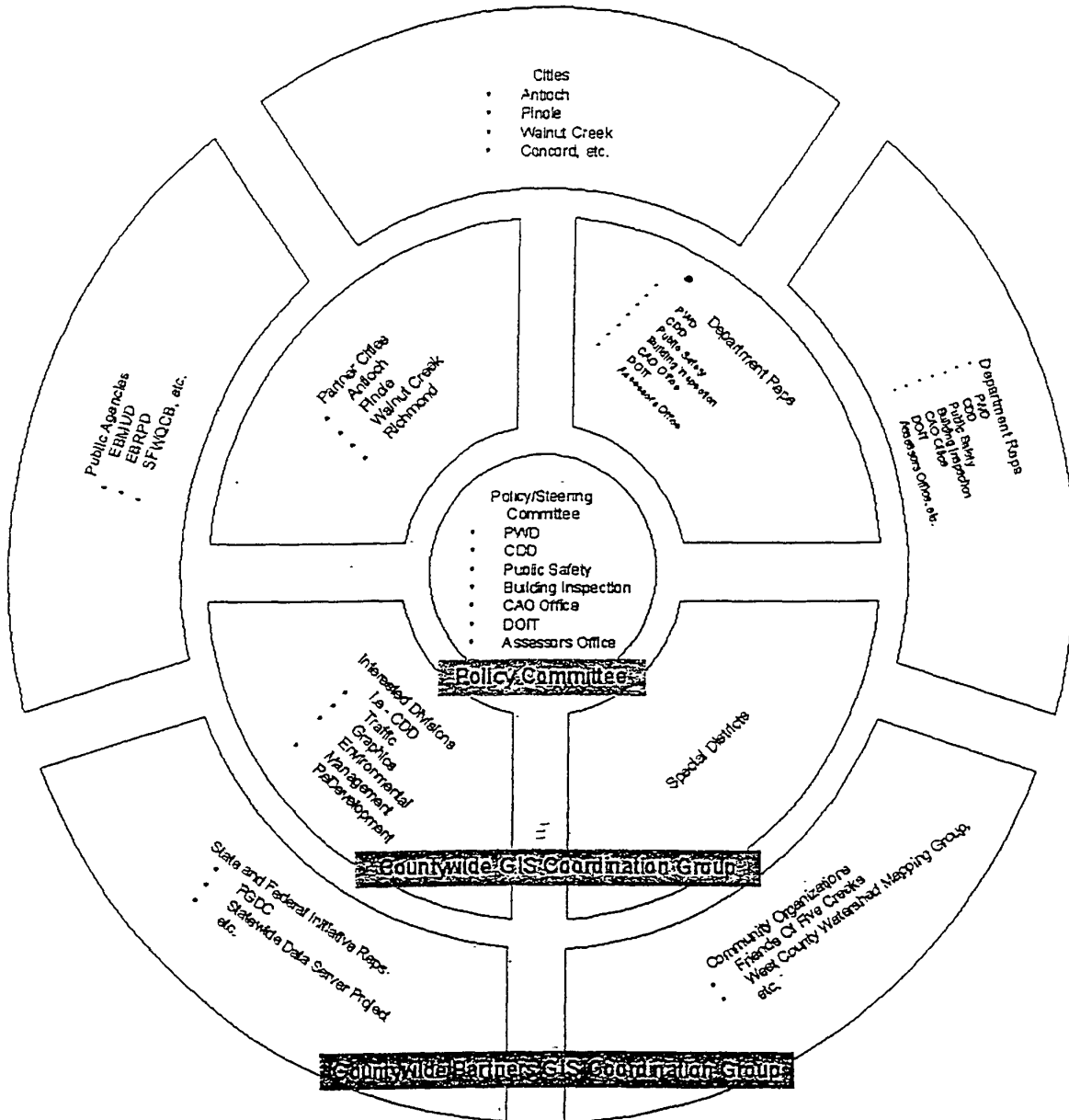
Building Inspection (*Steering Committee*): Management Support for GIS.

Employment and Human Services Department (*Steering Committee*): Welfare to Work research. Management Support for GIS.

Department of Information Technology (*Steering Committee*): Product evaluations, Enterprise GIS Systems research. Needs Assessment staff. Management and Marketing Support for GIS. Funding coordination lead.

County Administrator's Office (*Steering Committee Chair*): Needs Assessment staff. Management and Marketing Support for GIS. Funding support.

Contra Costa County GIS Coordination Diagram



Countywide Geographic Information Systems (GIS)

Computer mapping technology provides a solution to inefficiencies inherent in traditional mapping and data management methods. The technology also makes possible activities which are difficult or impossible with traditional methods.

Examples of GIS applications include the following:

1. LAW & JUSTICE

Application: Analysis of Domestic Violence-Related Statistics

Return on Investment: Improved deployment of resources

2. FIRE

Application: In-Vehicle Response System

Return on Investment: Improved response time

3. PUBLIC

Application: Access to County Data from Internet

Return on Investment: Increased public access to community information and reduced staff time .

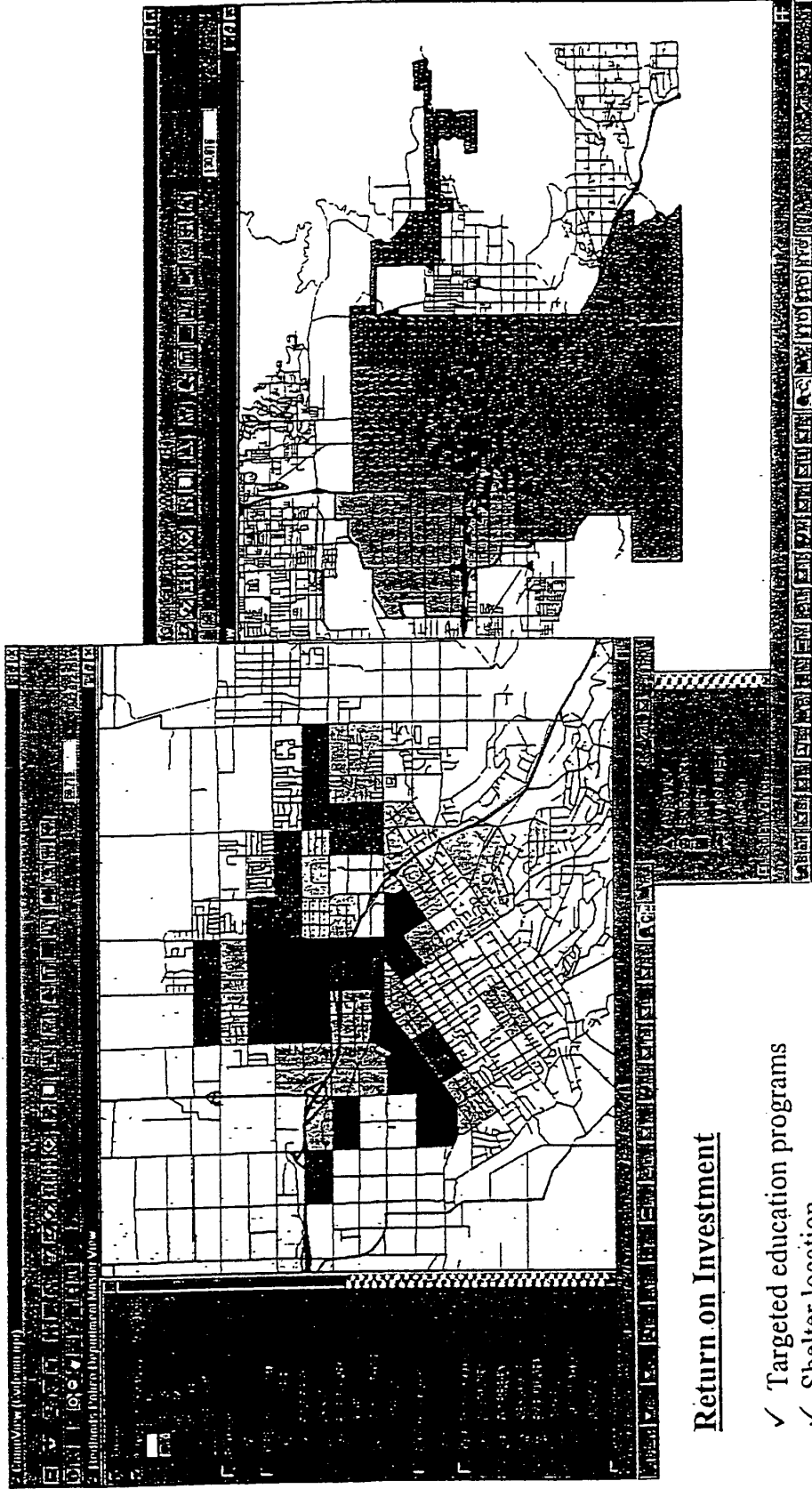
4. COMMUNITY DEVELOPMENT

Application: Land Use Planning & Growth Management

Return on Investment: Greater utilization of land-based resources

LAW - Analysis of Crime Statistics – DOMESTIC VIOLENCE

GIS can be used to analyze call responses for child and spousal abuse calls, return calls to a residence, and many other crime-related statistics:

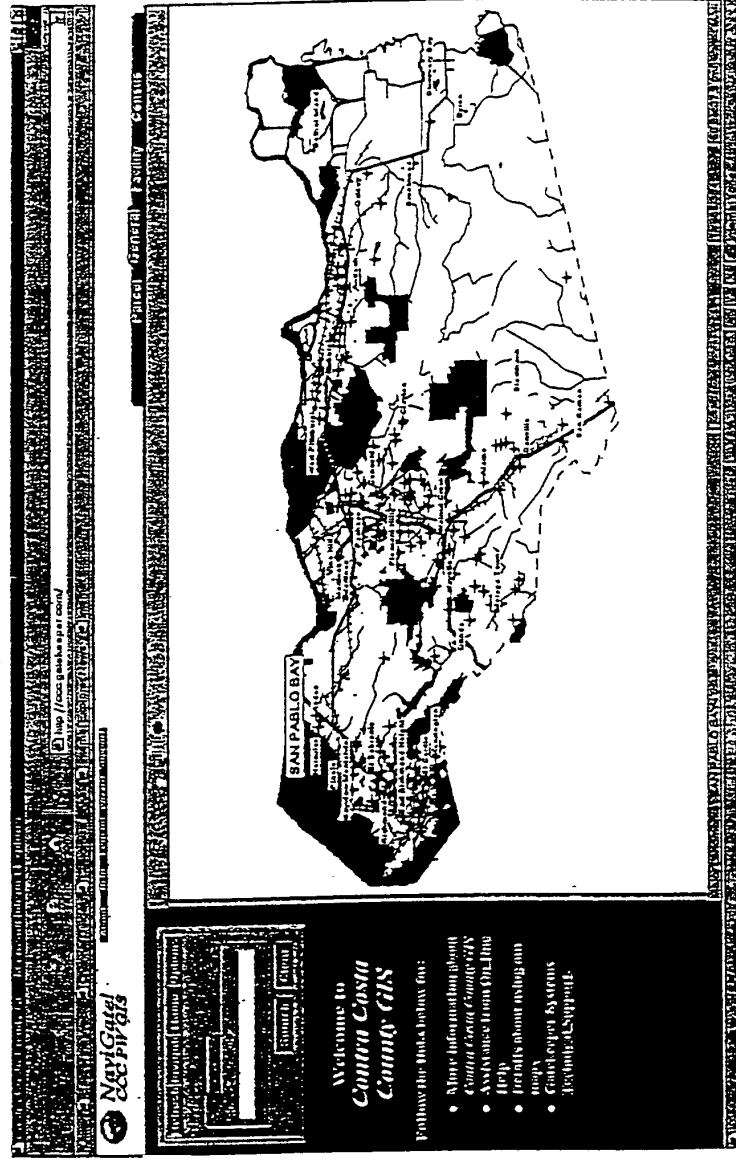


Return on Investment

- ✓ Targeted education programs
- ✓ Shelter location
- ✓ Pocket identification
- ✓ Expenditure justification

Access to County Data from the WEB

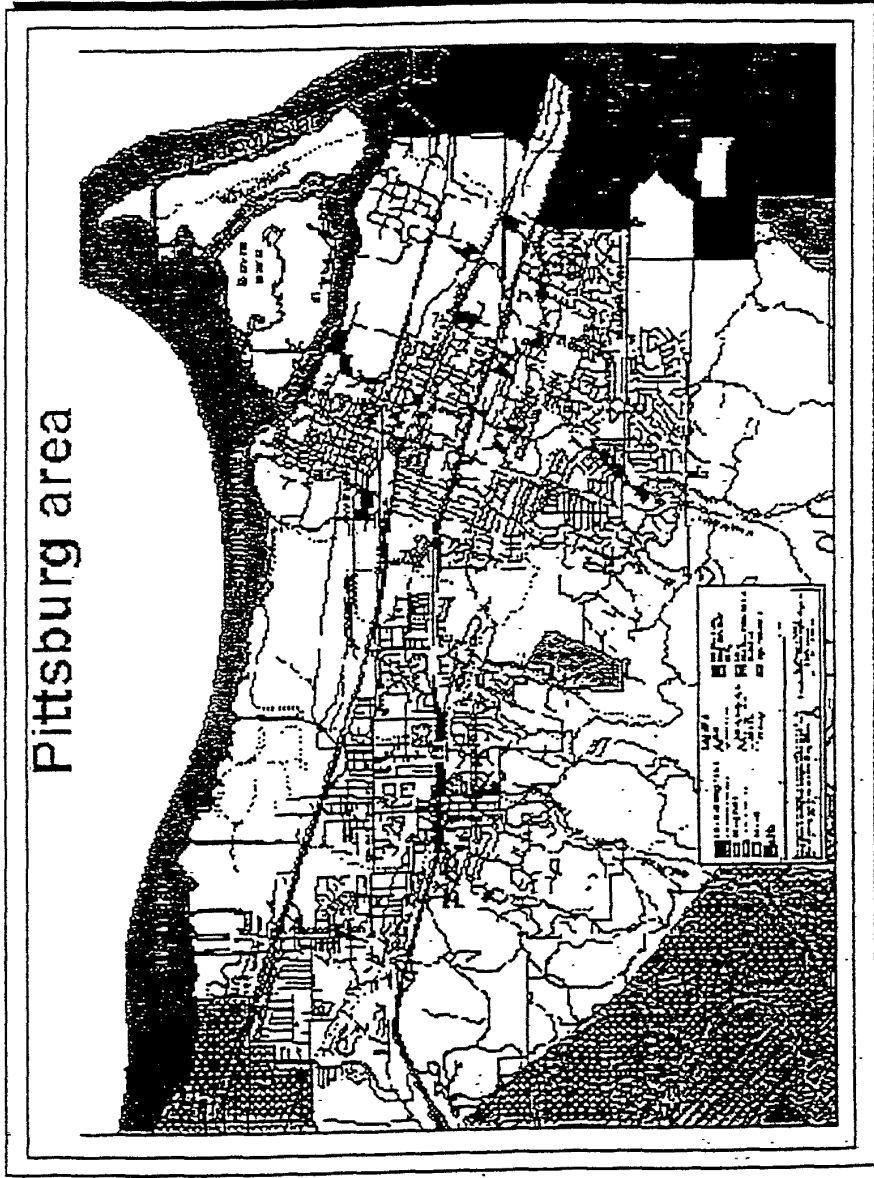
The Public will use GIS to access parcel-based information from the Web. Questions they may ask are: What is my zoning? What schools are near my new parcel? What Supervisorial District am I in?



Return on Investment

- ✓ Public Access to Public Information
- ✓ Better Community Relations
- ✓ Reduced Staff Time for Research

COMMUNITY DEVELOPMENT – Open Space – GROWTH MANAGEMENT



Return on Investment

- ✓ Better management of growth
- ✓ Better practices in land use planning
- ✓ Justification for industrial or affordable housing recruitment

Applications

Please Review the Following Applications for Year 2001-2002 Funding

Recommended for 2001-2002

Parcel Boundary Feature (PBF) Management System

- Update new parcel boundary features utilizing CAD, GIS and LIS access
- Perform Parcels Splits, Merges, ownership change, address assignment, and apn assignment
- Track and maintain parcel history
- Generate PBF GIS Layer and maintain the Link to LIS
- Provide Coordinate Geometry Based PBF input for better tie to County Survey Network
- Provide standard PBF layer for MapBook application and production

Approximate cost for development: \$200,000 for 3 years

Web Flood Zone Application



- Look up flood zone information for properties by address or parcel number
- Zoom in/out or pan maps
- Determine if properties are inside the 100 year FEMA floodplain
- Link to Scanned FIRM Maps
- Print 8 1/2"x11" reference maps
- View pictures of properties in floodplains
- E-mail questions to Flood Plain Coordinator

Approximate cost for development:
\$35,000

Web Public Parcel Information System (update to current site)



- Obtain basic information on parcels
- View Recorded Map, Deed, and air photo
- Locate and map any parcel in reference to city and county boundary, display centerlines, contours, zoning, parks, etc.
- Allow Buffer of parcels and creation of notification list in Word and Excel format.
- Provide basic Ad hoc query function
- Provide printing template for 8 1/2"x11" printing
- Host Site on County Servers
- Manage in-house development

Approximate cost for development:
\$80,000

Automated MapBook



- Allow Departments to produce custom mapbooks from County GIS data server
- Replace Thomas Brothers/Save \$\$\$
- Display Information on pages applicable to business needs
- Generate street index pages
- Print changes as needed

Approximate cost for implementation:
\$30,000 (SO,Fire,AO,PWD,BI)

Web Voter Information Express



- Find out your polling location
- Find your representatives for County Supervisors, State Senate, State House, National Congressional, School Board, and Judicial districts
- Find contact information for current representatives
- Find date of next election

Approximate cost for implementation:
\$30,000

GIS Real Estate System (extension of Parcel Information System)



- Look up tax information by owner name, address, parcel number, or map page
- View property maps with building outlines and other map layer options
- Zoom in/out or pan maps
- Login Capability for Brokers
- Update County Property Sales Database
- Query for property between price ranges
- Find street intersections
- Shade parcels by land use type
- Shade parcels by zoning type
- Shade property sales by deed year
- Label parcels by sales price, house number, or parcel number
- Display aerial photography
- Measure distances on the map
- Obtain detailed driving directions
- Link to deeds and recorded plat maps

Approximate cost for implementation:
\$30,000 (many functions same as Parcel System)

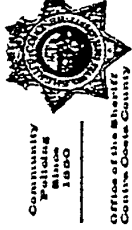
Applications

Please Review the Following Additional Applications for Funding Review

Optional for 2001-2002

Citizen Information Map

- Perform searches for specific government buildings, services, or departments
- Display the following map districts: municipalities, voter precincts, Congressional districts, judicial districts, State Senate districts, State House districts, sheriff districts, Fire districts, City boundaries, City Council districts, and County Board of Supervisor districts
- Display the following map locations: polling locations, recycling centers, schools, churches, libraries, shelters, community centers, police stations, fire stations, MEDIC stations, hospitals, park facilities, city halls, government buildings, greenways, etc.
- Perform searches for a specific address or facility
- Find facilities or services near an address
- Identify specific features displayed on the map



Community Crime Mapping System

- Plot the location of reported incidents on a map
- Search data for different time frames
- Retrieve information regarding individual incidents that are displayed on the map
- Perform a .5 or 1 mile search around a particular location to find out what has been reported in the neighborhood

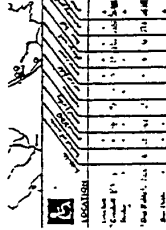
GIS Jump Station

- Link Page to all other GIS pages
- Future site for data download
- Identify status of data availability
- Identify Contacts for data
- Link to technical support



Park Information System

- Look up county park information by name
- Make reservations online
- Create a map to a location
- Identify surrounding areas of interest



Rainfall Application

- View rainfall maps by date
 - Perform queries on rainfall data
 - Identify rainfall gauges
 - Zoom in/out or pan maps
 - Link to WeatherBug Application
- <http://ww2.weatherbug.com/AHS/default.asp?cid=9>



Water Shed Atlas

- Look up watershed information by name
- View current projects
- Zoom in/out or pan maps
- Identify watershed Forum contact for watershed
- Select notification addresses by watershed
- View drainage infrastructure affecting watershed

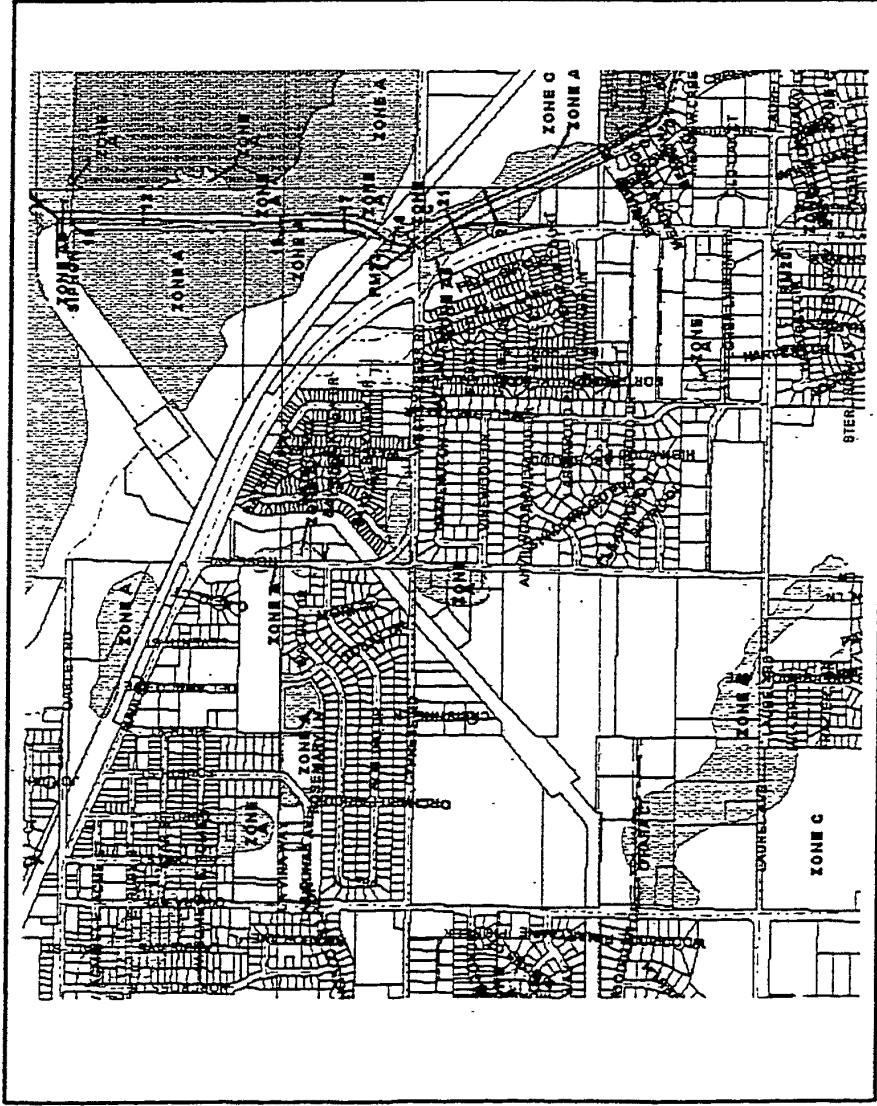


Applications

Please Review the Following Applications for long Term Funding

Application	Format	Department Lead	Description
Address Validation Tool	Desktop	AO	Tool to validate address to postal standards and fix errors in address
Address Assignment Tool	Desktop	Fire/SO	Address range assignment for street centerlines and geofile management
Board of Elections GIS	Intranet	Recorder	Application to analyze precincts/results
Assessment Appeal Application	Internet	AO	Online forms tied to portion of Appraisal system to appeal assessment
Digital Submittal System	Internet	PWD/AO	Facilitate loading data into GIS from contractors and cities
Animal License Renewal	Internet	Animal Services	Locate unlicensed animals and citations, facilitate online licensing
Park Information System	Internet	PWD	Facilitate public information and reservations at county parks
Front Counter Permit System	Internet	BI	Request for building permits, status of permits, inspections, and policy info
Front Counter Information Request	Internet	PWD	Request for engineering review, appeals, as built, and survey info
GIS Jump Station	Internet	PWD	Link to all county GIS sites and data resources
Vacant Lands Inventory	Internet	CD	Location of vacant and underutilized lands for focused development, incentives, etc
Welfare to Work	Internet	CD	Location of work in relation to travelways
Bike Plan Information	Internet	CD	Order bike plans, select and plan route, get laws and other information, detour info
Missing Fee Calculator	Desktop	PWD	Internal application to validate collection of AOB, TRA, and other fees
Call Before You Dig	Internet	PWD	Tie to other program sites from SCE, PGE, PacBell
Roadway Projects Status Map	Internet	PWD	Online map tied to maintenance management showing where capital improvement projects are scheduled to coordinate work and provide alternatives information to the public

Oakley Area Floodplains



- Street Names (TEXT)
- Streets
- FEMA Lines
- FEMA Annotation (TEXT)
- fema_bound
- 1-400 Ortho Grid
- Basemap Grid
- Easements and Waterlines (DXF_LAYER)
- 26
- 32
- 37
- 38
- 40
- PATTERN_CLASS
- Antioch Water
- FEMA Floodplains (COLOR)