

## HARDWARE IMPLEMENTATIONS (PARALLEL SESSION)

### A THE STATE AGENCY EXPERIENCE (EVALUATION/SELECTION OF HARDWARE FOR AUTOMATED - GEO-BASED INFORMATION SYSTEMS)

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#### Introduction

##### 1 General

Recently, there has been a marked increase in the acquisition and utilization of automated, geo-based information systems for the purpose of understanding and rationalizing the land management issues that face state governments. The increasing application of these systems is driven by the fact that the number, variety and complexity of influences on land management decisions have reached the critical point at which conventional or manual geographic information systems are no longer efficient when applied to the generation, encoding, storage, retrieval, manipulation, analysis and display of spatial information. This personal assessment is reinforced by Gates and Heil.

The use of computer technology for the capture and organization of spatial data and the use of computer-based analytical modelling techniques offer the only opportunity whereby present and future demands and expectations regarding land based planning, engineering and management activities can be met.

In the discussion to follow, the descriptors 'geographic' and 'spatial' will be used interchangeably when applied to these information systems and the descriptor 'geographic information system' will be taken to mean an automated geographic information system.

##### 2 Purpose

The purpose of the panel here assembled is to describe, albeit briefly, those procedures by which the hardware components of geographic information systems are evaluated and selected and to a lesser degree, implemented. The panelists are, at once, similar and different. They are similar because each represents any agency

of state government. They differ in the alignment of those agencies within state government —

- 1 Alaska - Research & Development/Department of Natural Resources
- 2 Colorado - Planning - Department of Local Affairs
- 3 Montana - Research & Information Systems - Department of Community Affairs
- 4 Washington - Resource Inventory - Department of Natural Resources

### 3 Representation Selection

The selection of the states, agencies and systems to be represented on the panel was by design and a restatement of that design follows. Geographically, each state is located within the area defined by the National Aeronautics & Space Administration's Western Regional Applications Program. Institutionally, each agency is a component of the government of the respective state. Technically, and in deference to the fact that this is, after all, a remote sensing conference, each of the systems has or will have the capability of utilizing remote sensor technology in general and digital imagery processing specifically. The importance of this technical consideration is underscored by Knapp.

Despite the problems, Landsat data continues to be regarded as an important data source for interface with automated geographic information systems because of its objectivity, currency, cost effectiveness, availability in digital format, availability for large areas, and potential for temporal and spatial analysis using change detection techniques.

Functionally, the system described herein are automated geographic information systems (GIS), not computer-aided manufacturing systems (CAM), or computer-assisted design and drafting systems (CADDs). With respect to these functional considerations, Orr points out that of the approximately \$ 300,000,000 worth of interactive graphics systems sold during 1979, 60% were acquired for use as CAMs and CADDs. A further constraint on the system described herein is that they are not systems based on analytical plotting machines. The latter are succinctly reviewed by Petrie and that review is recommended to those persons having an interest photogrammetrically derived digital mapping. Personally, each of the panelists has long-term training and experience in conventional or manual geographic information systems.

#### Panel Format & Constraints

## Format

Expediency and convenience of conference format have dictated that this panel on hardware be separated from the preceding panel on software. However, the inseparability of the two is demonstrated by Calkins and Tomlinson.

Hardware and software considerations play a major role in the construction of a computerized geographic information system. These two areas arise from different, but equally valid ways of viewing a digital computer: how it is made and what it does, the physical structure of the computer, hardware represents dormant capability and it can do nothing without programs, the software. However, the software is dormant as well since a program must be executed on a physical machine. The functional capability we refer to as a digital computer is neither the physical hardware nor the invisible software - rather it is the two in combination.

The Calkins and Tomlinson rationale should be extended to include the information data base and the human operators. However, this panel is constrained solely to hardware considerations.

## 2 Procedures & Approaches for System Selection

While finely drawn, the distinction between procedures for the acquisition of systems and approaches to the acquisition of systems should be noted. In the separate state discussions to follow, the former are explicit while the latter are implicit. Dangermond and Smith have addressed the latter and suggest 5 alternative approaches for acquiring geographic information systems technology.

- User-designed & developed systems
- Acquisition of software for use on existing hardware
- Purchase of turnkey software for use on existing hardware
- Purchase of turnkey software/hardware system
- Purchase of system services

The prudent potential purchaser of a geographic information system should note the differences between the procedures to be discussed and the approaches listed above and then consider the two in concert.

## 3 Sequence of Presentation

The 4 systems will be presented in alphabetical order by state as follows: Alaska, Colorado, Montana and Washington.

Of more than routine significance, is the fact that each panelist represents a state agency that has either an administrative mandate, executive order responsibility or statutory requirement that includes the spatial analysis of land management data. Each state has varying procurement regulations and budgetary restrictions that affect the acquisition of geographic information systems to carry out these directives. It is hoped that the following discussions of procedural similarities and differences and past successes and mistakes among the 4 states will be of benefit to the conference and will constitute technology transfer of the highest order.