

**STATUS OF
LOGISTICS SYSTEMS DEVELOPMENT
(VALIS)**

by

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INTRODUCTION

The U. S. Arctic Research Policy Act seeks not only to improve logistics planning and support, but also to improve sharing and dissemination of data and information. Logistics support, whether it be for science or industry, depends on a variety of information products which, if not readily and reliably available, can cause serious and costly delays.

We continually rely on numerous separate data or experiential information sources. We should work toward the development of more effective logistics coordination systems. PICO, in cooperation with the University of Alaska faculty and private industry, has been acquiring the basic building blocks for the development of a value-added logistics information system.

The concept of a value added logistics information system began in 1989 as a result of a workshop on "New Technological Developments in Support of Arctic Research", (J. J. Kelley, ed.) sponsored by the American Association for the Advancement of Science and Arctic Research Consortium of the United States.

A need for a "clearing house" for Arctic information was voiced. A clear need for an Arctic information system was made where users could share information with each other.

STATUS OF VALIS

The idea of a value added logistics information system (VALIS) was planned in three stages. The first stage — Phase I is centered on a system-wide logistics management program. This phase was completed in 1993 under the direction of Scott Jackson and Shawn Abshear at PICO. This program is versatile and can be applied to a wide variety of logistics needs whether they be for scientific research or private sector needs.

The second stage — Phase II expands on the information content of Phase I and is conceived as an Arctic Information Center for world-wide information access (AIC). AIC will be a computer-based "warehouse" of information accessed electronically by Internet or other on-line services. Phase II can be tailored to the specific information needs of the client.

The third stage of development — Phase III represents the value added part of VALIS. An appropriate Knowledge Based System (KBS), a branch of Artificial Intelligence (AI) technology, will be integrated into the mainstream of VALIS. This strategy will lead

to a total systems approach to KBS, making it an integral part of VALIS instead of a stand-alone application.

RECOMMENDATIONS

We must continue to ~~see~~^{seek} support for the development of a "clearing house" for Arctic information to include Knowledge Based (AI) logistics information and management systems.

A mechanism must be provided whereby all federal agencies can gain convenient access to the "clearing house".

Once a "clearing house" is established, a support must be provided for maintenance and updating the system.

There should be a policy to promote the transfer of a Knowledge Based (AI) logistics and management technology developed for federal Arctic programs, for use by states, local communities, and the private sector.

Finally, we must seek innovative new ways to refurbish a continually decaying inventory of information through a total systems approach to management.

STATUS OF LOGISTICS SYSTEMS DEVELOPMENT (VALIS)

○ INTRODUCTION

○ STATUS OF VALIS

- Phase 1 — Completion of System-wide Logistics Management Project
- Phase 2 — Development of Arctic Information Center for World-wide Information Access
- Phase 3 — Incorporation of Knowledge Based Expert Systems

○ RECOMMENDATIONS

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August 1994

- The Arctic Research Policy Act seeks not only to improve logistics planning and support, but also to improve sharing and dissemination of data and information.
- Logistics support, whether it be for science or industry, depends on a variety of information products which, if not readily and reliably available, can cause serious and potentially costly delays.
- We continually rely on numerous separate data or experiential information sources. We should work toward the development of more effective logistics coordination systems.
- PICO, in cooperation with the University of Alaska faculty and private industry, has been acquiring the basic building blocks for the development of a value-added logistics information system.

What is VALIS?

- Active information system where users can share information with each other.
- Assists user who has an unresolved issue concerning Arctic logistics. He or she can ask a question to VALIS; if VALIS can't respond, a staff member will research the question and return response.
- Provides terrain and historical weather trends.
- Provides the user with assistance in researching permit issues.

Why is VALIS a needed concept?

- To streamline logistics operations in the Arctic environment.
- To have one central clearing house to reduce unneeded and wasted expense of funding.
- To provide fast response, and a flexible logistics information and management system for the Arctic.

DEVELOPMENT OF VALIS

- 1989** *Workshop on New Technological Development in Support of Arctic Research* (J. Kelley, ed.; AAAS and ARCUS).
"The single thread that ran through nearly every speaker's remarks was the quest for more information . . . on new technology, logistics assets . . ." - Richard T. Porter.
"The central office for logistics coordination, or clearing house, is the most pressing need (recommendation on logistics needs)." - Juan G. Roederer.
- 1990**
to
Present School of Engineering in collaboration with PICO conducts research on logistics management system needs (Professors Bennet, Hulse, Koushki, and Kelley and Scott Jackson, PICO).
- 1992**
to
Present Development of the VALIS system at PICO
- Scott Jackson, Logistics Manager, PICO; Project Manager, VALIS.
 - Shawn Abshear, Systems Administrator and Software Specialist.
- 1993** Complete Phase I
- Future** Develop Phase II and III:
- Add Senior Programmer
 - Add Information Specialist(s)
 - Collaborate with School of Engineering (Prof. Bennett) and School of Management (Prof. Kandampully and Hoffman) and private sector
 - Involve expert system (AI) consultants
 - Collaborate with users

STATUS OF VALIS: A Value Added Logistics Information System

- VALIS is a 3-phased project. The objective of the VALIS project is to provide a knowledge based value added logistics information and management system.
- VALIS will enable users world-wide to extract data about a particular location or project requirement. It will assist the user in identifying permits, personnel, equipment, facilities, vendors, supplies, services, and costs associated with their projects.
- VALIS will also provide terrain information, weather information, and current and past research activity.
- The VALIS system is designed to be updated and adaptable to the needs of government, academic institutions, and industry.

STATUS OF VALIS

PHASE I:

SYSTEM-WIDE LOGISTICS MANAGEMENT PROJECT

- This phase of the development of VALIS is complete and on-line for use by the National Science Foundation supported management of the Polar Ice Coring Office (PICO) at the University of Alaska Fairbanks.

Phase I:

- Purchasing System
- Cargo Information System
- Passenger Information System
- Personnel Information System
- Inventory Management System
- Medical Information System
- Electronic Rolodex
- Permitting Management System

STATUS OF VALIS

PHASE II:

DEVELOPMENT OF AN ARCTIC INFORMATION CENTER (AIC) FOR WORLD-WIDE INFORMATION ACCESS

- The AIC is a computer-based information "warehouse" accessed electronically via Internet or other on-line services. The AIC is an expansion of the currently operational Phase I of VALIS at PICO.

The system will divide the Arctic into informational regions. The regions will be subdivided for specific information needs of the client.

- Phase II VALIS will be to provide specific services to the users such as GIS information, social issues, etc.
- The present status of development of Phase II is:
 - Three year development plan including
 - Information Research
 - Design and Implementation
 - Development of New Software
 - Upgrade and Expand Computer System

STATUS OF VALIS

PHASE III:

INCORPORATION OF KNOWLEDGE BASED SYSTEMS

During the past decade, the *Knowledge Based Systems* (KBS) branch of Artificial Intelligence (AI) has matured considerably. Many small and medium sized prototype systems have been successfully developed and implemented.

An objective of Phase III of VALIS is the integration of an appropriate KBS into the mainstream of the VALIS computing environment. This strategy will lead to a total systems approach to KBS, making it an integral part of VALIS instead of a stand alone application.

- Planning for Phase III will be guided by American National Standards Institute (ANSI)/American Institute of Aeronautics and Astronautics (AIAA) guidelines (G-031-1992) using the DoD-Std 2167A software life cycle model.
- These guidelines will serve as a starting point for software development and allow VALIS to conform to DoD standards.

PHASE III

The general purpose of software development life cycle models is to introduce discipline into the development process, to reduce risk, and to lead to better end products and management of the development process.

- Several basic phases for development of a KBS program are:
 - Problem conceptualization/definition
 - System design
 - System development
 - Testing and integration
 - Maintenance and enhancement
- The amount of emphasis or effort given each phase and the controls associated with the execution of work combine to define a life cycle model.
- The present status of development of Phase III is:
 - Informal discussions within PICO and UAF School of Engineering and School of Management.
 - Acquisition of guidelines.
 - Development of a proposal for a logistics workshop to discuss integration of KB (AI) systems into logistics information systems.

PHASE III

THERE IS A NEED TO DEVELOP A FULL UNDERSTANDING OF AND REQUIREMENTS FOR KBS COMPONENTS.

- Because of the complexity and difficulty in prediction of interactions greater emphasis needs to be put on testing and verification of KBS throughout their life cycle.
 - REQUIREMENTS (preliminary)
 - Ascertain that we know all the pieces needed.
 - ASSESS
 - Requirements for completeness
 - KB completeness
 - Product performance
 - Enhancement needs
 - Interface completeness
 - Risk identification
 - EVALUATE
 - Product prototype
 - Target environment design
 - Integration plan
 - Updated operational concept
 - Requirements for knowledge set
 - Implementation plan

RECOMMENDATIONS

- Continue to support the development of a "clearing house" for Arctic information to include knowledge based (AI) logistics information and management systems.
- Provide a mechanism whereby all federal agencies can gain convenient access to the "clearing house".
- Provide a mechanism to support the maintenance and updating of the Value Added Logistics Information System.
- Encourage and promote the transfer of a knowledge based (AI) technology developed for federal Arctic programs for use by states, local communities, and the private sector.

Finally,

We must seek innovative new ways to refurbish a continually decaying inventory of information through a total systems approach to management.