PERSPECTIVES ON LOGISTICS SUPPORT IN THE ARCTIC

by

John J. Kelley

Testimony presented to the
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and
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INTRODUCTION

Polar research in the last century was seen mostly as an adventure. Science, of course, was vigorously pursued, but a major objective was discovery of new lands. Logistics support depended on the best information and experience of the day. Poor information could very well lead to tragedy.

Polar exploration increasingly utilized modern technologies which eventually made it possible to conduct research in just about any geographic area. Polar research flourished steadily to the present time. Over the past half century we have gained a great amount of knowledge about the polar regions. Rather than give cause for a decrease in research activities, it became apparent that we were just beginning to understand the role of the polar regions in the global system.

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Because of the complexity of many of the scientific questions being asked today, primarily addressed to global change, greater emphasis is being placed on interdisciplinary studies. Because of the circumpolar nature of the problems being addressed, greater international cooperation has to be brought to bear on them, and international cooperation in logistics support and information transfer will become increasingly important if not essential.

U.S. Arctic research has a history of fragmentation, driven at least in part by budget adjustments, lack of strong interagency coordination, and shifting national priorities [1, p. 40]. The effect on logistics coordination and information transfer has been similarly fragmented and uncoordinated.

As we progress into the 1990's, we are increasingly aware of requests for new funding for high-cost science programs, including the polar regions. The science budget, adjusted for inflation, is not much larger than it was in the late 1960's. Yet, the cost of science support is escalating. The cost of providing support in the Arctic also continues to escalate.

A workshop [1] was convened in 1989, sponsored by the Arctic Division of the American Association for the Advancement of Science (AAAS) and the Arctic Research Consortium of the United States (ARCUS). This workshop addressed concerns of the U.S. Interagency Arctic Logistics Working Group under the Interagency Arctic Research Policy Committee (IARPG). Comments from workshop participants [1] emphasized that there was a need for improved communication in the Arctic. There was a strong appeal for improvements in the exchange of information on current logistic capabilities in the U.S. and globally and whether we can realistically assess future operational requirements and plan accordingly. All remarks seemed to incorporate a common plea for the provision of an adequate and timely information base related to just about every facet of logistics support and technology.

Staging areas and logistics support facilities, including vessels, continue to be points of national concern and discussion. Funding, again, becomes the common denominator as to what will or will not be feasible or capable of implementation in a reasonable length of time.

Two dominant themes emerged from this workshop which have emerged in subsequent discussions:

- There continues to be a desire (need) for a logistics "clearinghouse" for more effective arctic research support coordination.
- There is a need for an effective arctic information network.

Research support in the Arctic is likely to be individual investigators who do not need, or even welcome, much assistance or interference from a central coordinator to large multidisciplinary programs which could benefit from a central coordination and information network. With regard to the former, investigators who are highly motivated and committed to work in the Arctic will probably find a way to do so despite a lack of modern conveniences and technologies or interference by a central authority.

One benefit to be derived from an effective research support and information exchange program is an increased ability to complete plans for field programs in a cost-effective and timely manner. The Arctic Research Policy Act also recognizes a need to improve logistics planning and support and improvement in the sharing and dissemination of 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 problems and potentially costly delays. Past practice has relied on separate data or experiential information sources. Therefore, we should work toward the development of more effective logistics coordination systems.

FACILITIES

Ownership of facilities by the federal government, or any other agency, institution or group, may not be the best course of action. Ownership may fill a short-term need, but create a long-term problem as missions change and usage of the facility shifts elsewhere.

An example of a federal facility caught by a shift in interest in the local region was the evolution of the U.S. Navy, Office of Naval Research (USN/ONR) Arctic Research Laboratory (NARL). The NARL evolved from a small biological station incorporated in a Naval Petroleum Reserve (PET-4) contractor camp. When the PET-4 project left the area, the U.S. Air Force took over the base to support the construction of the DEW line. The NARL slowly grew with a major increase in growth resulting from the activities in the Arctic associated with the International Geophysical Year (IGY).

By the late 1960's a major construction program at the NARL was nearly complete and the NARL had acquired a large amount of real estate and structures. By 1974, its end was ordered by the Navy with transfer to the private sector commencing in 1980.

This facility was supported by a government agency (U.S. Navy) and lacked the ability and flexibility of a private industry to respond to a change in interest. Lacking this flexibility, the NARL was locked into a cycle of demand shrinking with rising costs.

Once transfer was effectively made to the new owner, the UIC/NARL, Inc., a Native village corporation, it was able to support a wide variety of customers in the Barrow, Alaska, area.

Other regions of the U.S. arctic have somewhat similar sources of support, such as at Prudhoe Bay, which are available for the provision of scientific support.

It may be necessary for an agency to develop its own research site or facility, but it is also possible to minimize costs by contracting as much of the support for the facility with an established supplier in the private sector.

COORDINATION

Coordination of logistics services for federal projects through a single center would appear to be advantageous. This would also apply to information services. Single-point logistics coordination is presently practiced through the U.S. Antarctic Research Program (USARP), but may not be the most effective model for single point-of-contact coordination in the Arctic.

The Polar Continental Shelf Project is another model which has been effective in Canada. It relies heavily on local services combined with fixed bases. It also reaches out across agency lines to provide a central source for information and logistics coordination.

INFORMATION SYSTEMS

The products of new technologies have included rapid improvement in handling large amounts of information rapidly. The need for the acquisition of information does not rest only with the procurement of goods and services. The need is far greater, including environmental considerations, cost analyses, permits, planning and many other layers of information bases. Solution to this need is not a trivial one. to be a truly valuable information source, it must be able to be effectively upgraded and be interactive.

Therefore, three questions emerge which relate to:

- What should the U.S. do about improving the arctic logistics information base?
- What constitutes the development of a "clearinghouse" for arctic support. and information?
- What product(s) should be stocked in the clearinghouse?

One approach to these questions is the development of a logistics information system (LIS) capable of being frequently updated, and that its value be enhanced by the addition of an expert systems approach to yield a value-added Logistics Information System. Such a system should be capable of expansion to multiple users and tasks. The Polar Ice Coring Office (PICO) at the University of Alaska Fairbanks (UAF), in cooperation with UAF faculty and private industry, has been acquiring the basic building blocks for the development of a value-added logistics information system (VALIS). This action commenced in 1990 as a result of the New Technological Developments in Support of Arctic Research [1] and a need to provide rapid response for PICO's logistics requirements.

A series of studies were made at the UAF to examine a variety of approaches to logistics systems and management principles [2,3,4,5]. The Value Added Logistics System (VALIS) under development at PICO is designed specifically for PICO's needs. It does have the capability for expansion to multiple users. VALIS will enable users to input data for a particular location and project requirements. VALIS will then assist the user to identify permits, personnel, equipment, facilities, supplies and services required. It could also provide terrain and historical weather trends. After these resources are identified, it will assist the user in identifying a realistic budget and timeline for the project and other decision-making related services.

Progress to date related to the development of VALIS is related to:

Phase 1: Project Management

Personnel Management

Vendor Information/Management

Transportation/Shipping Management

Inventory control

All of these elements of the program are specifically related to PICO's logistics management needs.

Phases 2 and 3 are related to the establishment of an external users network, information systems management and the inclusion of expert systems. Commencement of these phases will be relegated to later years in the development of the program.

FUTURE ACTION

There is a need to continue discussions on the most effective way to develop a central office ("clearinghouse") for logistics and information coordination. Such discussions should include the operating agent of the "clearinghouse" and how to ensure that the agent will remain objective and independent of other arctic-related federal agencies or organizations. How will the data base be made available to all users, both small and large projects? How can we develop a central office which can speak with one national voice in the coordination and exchange of information with our Arctic neighbors?

The mission of the central office should rest upon a "knowledge base." What we need is a logistics supermarket where information products are part of a network.

The ultimate aim of a logistics information system should be to offer added value by integrating the user's request with fresh or new information, thus enhancing the decision-making process.

The injection of expert-systems into an interlinked logistics network should eventually cut costs, improve response times and allow agencies, institutions and individuals to share in a common information base. It will be relatively inexpensive to generate limited, special-purpose user-friendly logistics information and coordination systems. However, the creation of an expert system on the scale required for the operation of an effective "clearinghouse" would be a serious commitment involving considerable preparatory time and expense. The first step is to decide what should constitute the goals and objectives of the "clearinghouse" service. The more difficult next step will be to implement it.

Finally, at the very least, we must seek innovative new ways to refurbish a continually decaying inventory of information to generate new knowledge useful to the Arctic research and development community.

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PERSPECTIVES ON LOGISTICS SUPPORT IN THE ARCTIC

- HISTORICAL PERSPECTIVE
- AN APPROACH TO COORDINATION
- IMPROVING THE LOGISTICS INFORMATION BASE
- FUTURE ACTION!

CP 92-6
#1 OF 9

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SCIENTISTS WHO ARE HIGHLY MOTIVATED AND COMMITTED TO WORK IN THE ARCTIC WILL PROBABLY FIND A WAY TO DO SO DESPITE A LACK OF MODERN CONVENIENCES AND TECHNOLOGIES.

CP 92-6
#2 OF 9

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- 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 University of Alaska faculty and private industry, has been acquiring the basic building blocks for the development of a value-added logistics information system.

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NAVAL ARCTIC RESEARCH LABORATORY: AN EXAMPLE OF SHIFT IN INTEREST

1. The NARL evolved from a small component of a Navy-operated contractor camp in 1947 to the housekeeper of a large base 33 years later.
2. It was supported by a government agency and lacked the ability and flexibility of a private industry to respond to changing markets.
3. Science interests gradually change or evolve. Interest shifts to other areas.
4. NARL was locked into the cycle of costs rising to subsidize shrinking demand or demand shrinking as prices rise.
5. The NARL further evolved into a multipurpose facility (UIC/NARL, Inc.) through the 1980s to support the needs of a wide variety of customers in the Barrow, Alaska, area.
6. Individual scientists and scientific programs have access to support from the UIC/NARL or local businesses and agencies in the Barrow community.
7. Other regions of the U.S. Arctic have sources of support (e.g., Prudhoe Bay) which can be contracted to service science projects.

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CANADIAN POLAR CONTINENTAL SHELF PROJECT MODEL AND U.S. ANTARCTIC RESEARCH PROGRAM: APPLICATION TO U.S. NEEDS IN THE ARCTIC

1. The Canadian Polar Continental Shelf Project has several innovative procedures which could be implemented into today's U.S. Arctic logistics support market.
2. Coordinate all logistics in one region of the world through a single office to minimize logistical costs for all projects; this is presently being done in Antarctica through the U.S. Antarctic Research Program and should be considered elsewhere as appropriate.
3. Flexible forward operations basing would allow the logistics contractor to meet the science needs in an area; but when the emphasis shifts to another area, country or continent, then this logistics basing can also be moved more effectively.
4. Contract logistics services within an area to retain the flexibility to relocate as science dictates instead of buying equipment and structures that prove inflexible in supporting changing science needs.
5. Adopt the Polar Continental Shelf Model (or a variant) to provide a central source for logistics information in the Arctic and to aid in the coordination of federal arctic research programs.

CP 92-6
#5 OF 9

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- What should the U.S. do about improving the arctic logistics information base?
- What constitutes the development of a "clearinghouse" for arctic information?
- What products should be stocked in the "clearinghouse"?

We believe that one response to these questions is

- ★ the development of a logistics information system (LIS) capable of being frequently updated, and
- ★ that its value be enhanced by the addition of an expert systems approach to yield a Value Added Logistics Information System (VALIS).

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VALUE-ADDED LOGISTICS INFORMATION SYSTEM

(VALIS)

What is VALIS?

VALIS is an information system that serves many purposes:

- Provides current listing of vendors who provide personnel, parts, services, and equipment.
- provides PICO with the ability to manage projects from beginning to end. This includes budget preparation, preparing purchase order requests, and tracking an item from the time it is purchased until it arrives to the user.
- Manages personnel movements and locations at all times.
- Maintains a current inventory of all PICO equipment, location and the funds that made the purchase.
- Provides cost savings communication to remote areas.
- Provides information on airstrips, access routes, remote camps and locations, and remote camp construction in the Arctic.
- Provides information to users who conduct research in the Arctic on vendors who provide facilities, services, and supplies.
- Active information system where user 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 coordinate efforts of several agencies who have common goals.
- To provide mobile, responsive and flexible logistics in the Arctic.

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The process of implementing the Value Added Logistics Information System will take place in three phases:

Phase I (Present . . . .)

Project management

Personnel management

Vendor management

Transportation and shipping management

Inventory management

Phase II (Projected 1993/1994. . . .)

Establish external users network

Information system management

Phase III (Projected 1994 . . . .)

Expert system

VALIS will enable users to input data for a particular location and project requirements. VALIS will then assist the user to identify permits, personnel, equipment, facilities, supplies, and services required. It could also provide terrain and historical weather trends. After these resources are identified, it will assist the user in developing a realistic budget and timeline for the project and other decision-making related services.

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WHERE TO NOW?

- Continue discussions on the most effective way to develop a **central office ("clearinghouse") for logistics support and information coordination.**
  - ★ What "agent" should operate such a clearinghouse and coordinate logistics support for federal arctic research programs?
  - ★ How do we ensure that the "agent" remain objective and independent of other arctic-related federal agencies or organizations?
  - ★ How do we make the information base available to all users whether that user is the graduate student just starting out or the manager of the large multidisciplinary program?
  - ★ How do we develop a central office which can speak with one national voice in the coordination and exchange of information with our arctic neighbors?
  - ★ How do we pay for all of this?
- The mission of the **central office** should rest upon a "knowledge base." What we need is a logistics supermarket where information products are part of a network.
- The ultimate aim of the logistics information system should be to offer added value by integrating the user's request with fresh or new information, thus enhancing the decision-making process.
- The injection of expert-systems into an interlinked logistics network should cut costs, improve response times and allow agencies, institutions, and individuals to share in a common information base capable of being updated on a timely basis.

And, finally, at the very least,

- We must seek innovative new ways to refurbish a continually decaying inventory of information to generate new knowledge useful to the research and development community.

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