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ANALYSIS OF IIP DATA PROCESSING REQUIREMENTS

Annex L of Cost and Operational Effectiveness Analysis for Selected International Ice Patrol Mission Alternatives

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FINAL REPORT

MAY 1995

Prepared for:

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and

U.S. Department Of Transportation
United States Coast Guard
Office of Engineering, Logistics, and Development
Washington, DC 20593-0001

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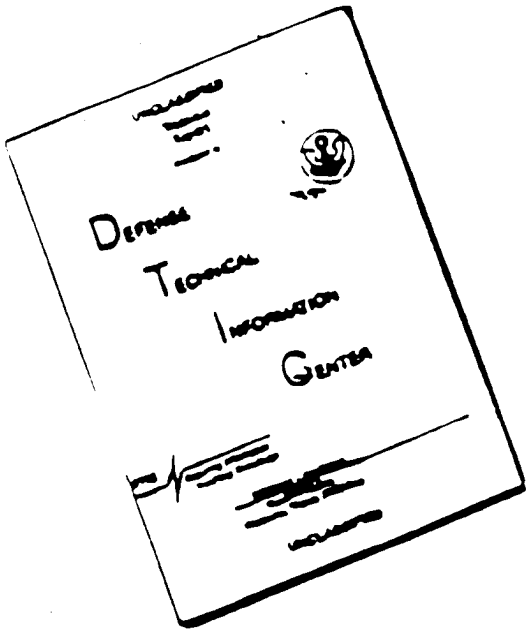

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16. Abstract

This report is Interim Report Volume 12 for the Cost and Operational Effectiveness Analysis for Ice Patrol Mission Analysis Study. The International Ice Patrol uses a set of integrated models with interactive analysis to evaluate reported iceberg sighting information and estimate the current positions of all known icebergs that may impact North Atlantic shipping. The objective of this model is to provide timely, accurate, and relevant information to the mariner regarding the location of icebergs. The models rely on environmental and sighting data that is first acquired, and then processed to provide ice bulletins and charts on a regular basis. The IIP has a continuing need for improved data acquisition and information processing capability. Substantial improvements can be made in the accuracy and timeliness of iceberg position information by means of an automated data acquisition system. The approved Airborne Tactical Work Station, modified to meet Commander, IIP's performance requirements, will satisfy this need. In order to maintain a capability to satisfy current processing requirements and simultaneously satisfy future requirements, it is recommended that the Canadian Ice Services Integrated System be installed. The RCP estimates the FY 1997 cost to be $322,000 and the FY 1998 costs to be $12,000. These costs cover, equipment, software, and system training.

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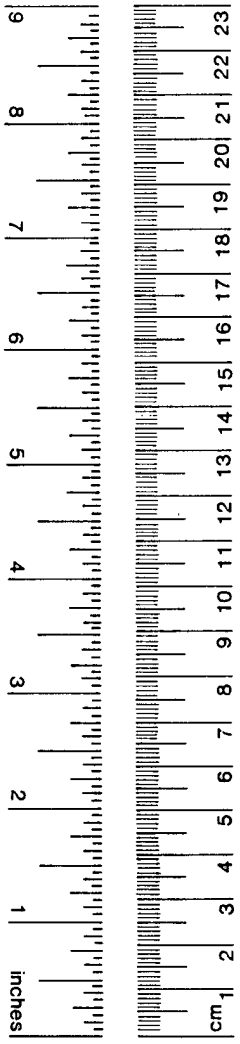
METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
in	inches	* 2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (WEIGHT)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (EXACT)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly).



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (WEIGHT)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	0.125	cups	c
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
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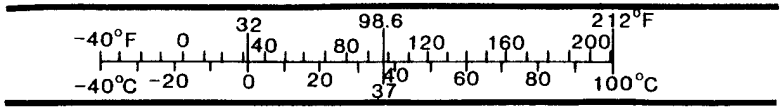
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



ANALYSIS OF IIP DATA PROCESSING REQUIREMENTS

ABSTRACT

The International Ice Patrol uses a set of integrated models with interactive analysis to evaluate reported iceberg sighting information and estimate the current positions of all known icebergs that may impact North Atlantic shipping. The objective of this model is to provide timely, accurate, and relevant information to the mariner regarding the location of icebergs. The models rely on environmental and sighting data that is first acquired, and then processed to provide ice bulletins and charts on a regular basis. The IIP has a continuing need for improved data acquisition and information processing capability. Substantial improvements can be made in the accuracy and timeliness of iceberg position information by means of an automated data acquisition system. The approved Airborne Tactical Work Station, modified to meet Commander, IIP's performance requirements, will satisfy this need. In order to maintain a capability to satisfy current processing requirements and simultaneously satisfy future requirements, it is recommended that the Canadian Ice Services Integrated System be installed. The RCP estimates the FY 1997 cost to be $322,000 and the FY 1998 costs to be $12,000. These costs cover, equipment, software, and system training.

INTRODUCTION

Objective.

The essential nature of the IIP mission is collecting, processing, and disseminating information. The selected modeling alternatives for Phase II of the Cost and Operational Effectiveness Analysis included a general comparison/evaluation of the existing INTERGRAPH system and the Canadian ISIS system being developed. The purpose of this report is to review the data processing requirements and examine the need for an improved system.

Background.

The scope of the data collection, data processing, and information dissemination functions of the IIP is illustrated in Figure 1. Within this context, are included various approaches for acquiring sighting and environmental data with requisite levels of accuracy and precision. It also includes selected methods for processing that data and exercising any models.

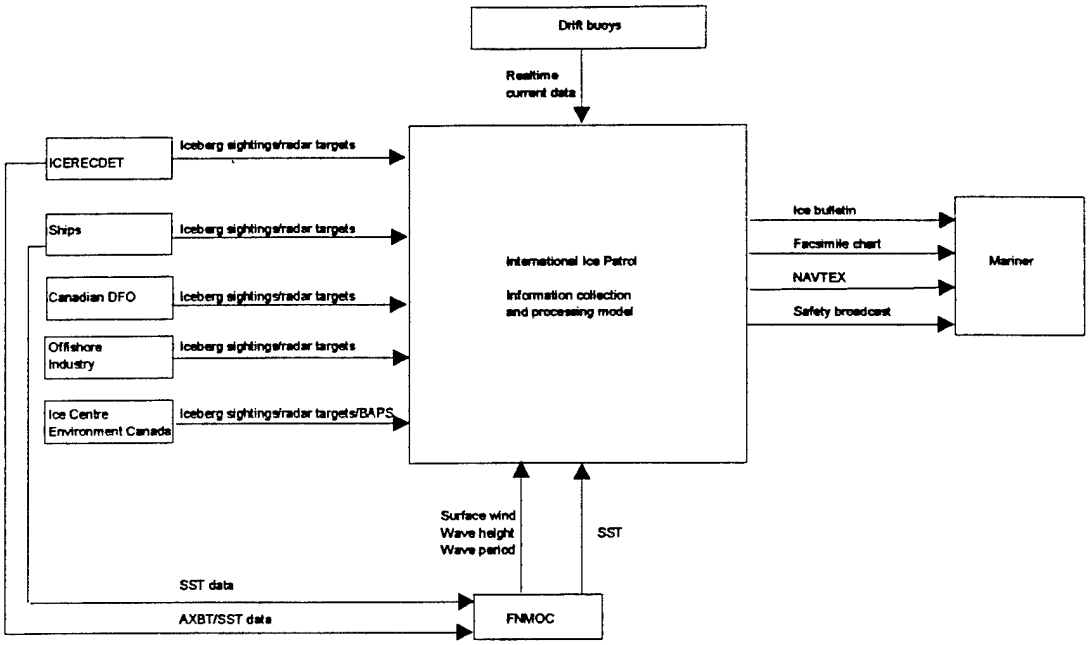


Figure 1. IIP Information Processing Context Model.

Model system input data is obtained from a number of sources in various forms that require different levels of processing. The data processing elements are illustrated in Figure 2.

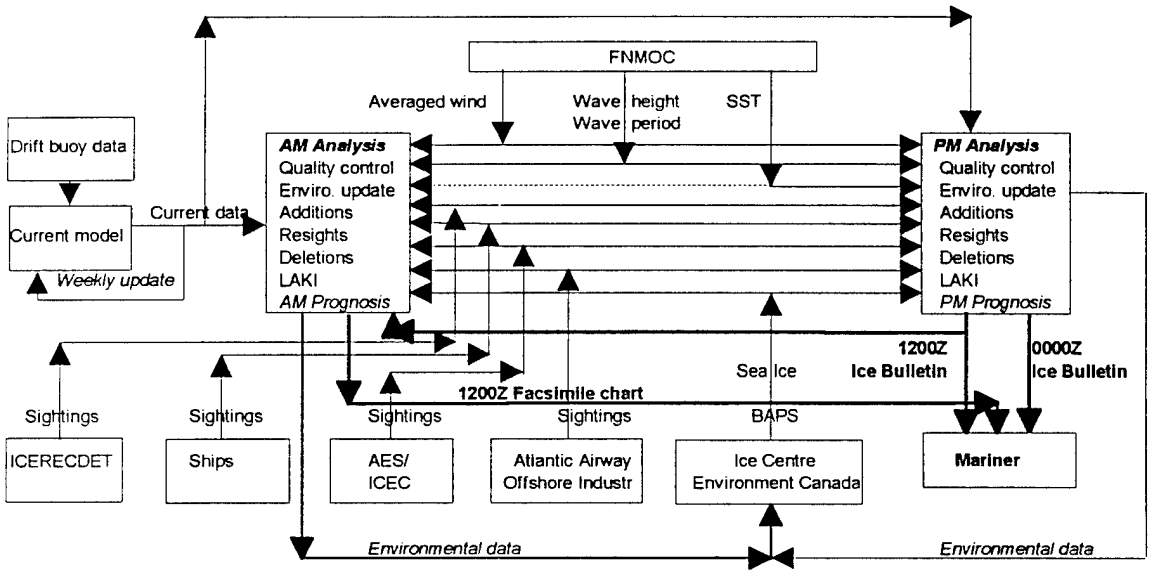


Figure 2. IIP Data and Information Process Chart.

The data acquisition and processing requirements are described in detail in Armacost et al. (1994) and summarized in the following section.

DATA ACQUISITION AND PROCESSING REQUIREMENTS

Data Acquisition.

Environmental Data.

The primary source of environmental data is the U.S. Navy Fleet Numerical Meteorology and Oceanography Center (FNMOC). IIP receives surface wind, wave height, and wave period data twice a day and sea surface temperature (SST) data once each day. These data are received in digital form via INTERNET. In addition, real time current data from IIP deployed drift buoys is incorporated on a regular basis to temporarily modify the (geostrophic) Labrador Current data file. IIP receives daily buoy positions from Service ARGOS and computes the drift on a weekly basis. The "real time" current estimates modify the geostrophic currents for a two week period following their collection. The surface wind, iceberg position, estimated iceberg size, real time current, and geostrophic current are used in the iceberg drift model. A separate iceberg deterioration model uses the iceberg position, iceberg size, SST, and wave height and period data. The effective operation of IIP requires that these environmental data be received in a timely fashion with high accuracy and reliability.

Iceberg Position and Classification Data.

The IIP effectively captures available data on iceberg and radar target sightings from other organizations as well as from IIP Ice Reconnaissance Detachment flights. All iceberg sighting data received from Ice Centre Environment Canada (ICEC), including BAPS data, AES surveillance, Atlantic Airways surveillance, and ship sighting reports submitted to ICEC, are transmitted to IIP in digital form via INTERNET. Ship sighting reports submitted directly to IIP must be coded in order to be used in the iceberg Data Management and Prediction System (DMPS). Because of the importance of high quality information along the Limits of All Known Ice (LAKI), the IIP Ice Reconnaissance Detachment (ICERECDET) conducts bi-weekly surveillance flights from St. John's, Newfoundland that concentrate on providing information on icebergs and radar targets in the area defining the LAKI. The most labor intensive aspect of data acquisition is sighting data obtained on ICERECDET flights. The approximate positions of iceberg/radar target sightings are transferred from the SLAR dry film to a message format that is sent as a digital file to IIP. The sighting positions are estimated from the INS position of the aircraft. Error sources include INS error, that varies as the flight progresses, and the estimation error in transcribing from the dry film. Because the iceberg drift model is very sensitive to iceberg positions, it is imperative that the data acquisition process minimize the chances of errors in position.

Current Data Processing.

Current data processing only requires a capability for handling manual or digital data. No georeferenced images are received and no processing capability exists at IIP to analyze such images. Incoming messages are processed for quality assurance using separate PCs before transferring the files to the DMPS. The DMPS is installed on an INTERGRAPH modified VAX computer system that was initially developed for ICEC. DMPS was procured in FY-91/92 based on software developed by the Canadian AES in the mid-1980s. IIP began full use of this system in the 1993 season. The system is very functional but processing times are relatively slow and delays are encountered when processing large files. The existing system uses a geographic base map on which various data files can be overlayed for comparison and analysis purposes. Iceberg information such as location, size, shape, melt state, and track is displayed graphically using symbols and colors.

Because of quality assurance requirements, all incoming data files must be reviewed before they are accepted for use in the system. Under the existing product structure for ice bulletins and the ice chart, there is an approximate work window of 2-3 hours for accomplishing the data check, data entry, and processing. At best, processing time is linear with the number of icebergs and targets in the system. The system should be designed to handle a maximum load of approximately 1500 icebergs and radar targets. With the existing software, data processing is interactive and requires the operator to evaluate each reported sighting to determine whether it is a new sighting or a resighting of an existing system entry (iceberg or radar target). In the existing practice, some new sightings (typically above a certain latitude) are never entered because of the lack of available processing time. The processing system must be able to respond quickly enough to permit all sightings to be reviewed and entered as appropriate.

Future Data Processing.

The data processing requirements described above assume that the system including data requirements and models will continue without change. It is expected that there are additional demands for future. These fall into three categories: digital iceberg position analysis, digital satellite image processing, and model expansion.

If the Coast Guard continues to conduct ICERECDET surveillance flights, the Coast Guard will be required to replace the technologically obsolescent AN/APS-135 SLAR radar. Current plans call for replacing the existing dry film imaging system in the SLAR with a digital recording capability. The resulting digital files will be available for further processing and postflight analysis. If the Coast Guard should contract the surveillance function, it is likely that a requirement would be generated to provide digital image files for analysis. The IIP should have the capability to conduct such analyses. It is not anticipated that there will be a requirement for a real time downlink from ICERECDET or contracted surveillance aircraft.

At present, the IIP does not utilize satellite imagery in achieving its mission. In 1995, the National Ice Center will provide available iceberg information from its National Technical Means Data capability. At some point, satellite imagery may be provided. ICEC currently makes extensive use of satellite imagery for its ice analysis in support of transportation in ice infested waters. In 1995, the expected launch of the Canadian RADARSAT SAR satellite will provide daily images that have potential for identifying some icebergs. If these development prove feasible, the IIP should have the capability to utilize them and be able to process digital satellite images.

SYSTEM ALTERNATIVES

In Phase I of this study, a number of data acquisition and data processing alternatives were identified. It was determined that the Phase II COEA should focus on an automated data acquisition system and an evaluation of the Canadian Ice Services Integrated System (ISIS).

Automated Data Acquisition.

Much of the existing data acquisition is already automated. All of the environmental data except for the real time currents is provided by other agencies in digital files. Similarly, most of the iceberg and radar target sighting data is provided in digital form. Sighting reports received directly from ships must be entered by the IIP, but there is virtually no technical fix immediately available for this problem. The one area where automation assistance is required is with regard to recording sighting information on the Coast Guard ICERECDET flights. As indicated above, the sighting positions are extracted manually from the SLAR dry film that is gridded. The grids are based on inertial navigation system (INS) input. Elsewhere, it has been determined that initial positional accuracy of icebergs is a key element in providing reliable information to the mariner. Both the INS and the transfer process are significant sources of potential error. In 1995, hand held GPS systems are being used to refresh the onboard INS system at each turn leg in the search to reduce positional uncertainty of the grid lines on the SLAR dry film. The manual extraction process remains. In addition to the potential inaccuracies, this is a time consuming process. This is followed by the preparation of a digital file for input into the IIP models.

Atlantic Airways flies surveillance flights for ICEC. They have developed an Airborne Data Acquisition & Management System (ADAM) that automates the tasks associated with airborne data collection. The ADAM system is a real time data acquisition and management system that graphically displays spatially distributed objects on a Mercator projection chart. Aircraft position information and object position information obtained by digitally processing radar displays are integrated on a real time display. The ADAM system provides iceberg charts and prepares digital files in MANICE format.

Commandant (G-EAE) has developed a similar system for Marine Environmental Protection activities and has a prototype system operating on a 486 portable computer. The prototype accepts navigational input, including GPS data, and object data entered by the operator. Because other Coast Guard operating programs have similar requirements of being able to locate georeferenced objects on a graphical projection, Commandant has authorized the development of an Airborne Tactical Work Station that will be installed on Coast Guard aircraft and be available for the IIP. It is anticipated that the system will function with either an analog or digital processor, although it is expected that all of the radars will have a digital processing functionality. Commander, IIP has developed a set of performance requirements for the Airborne Tactical Work Station, a copy of which are enclosed in Appendix I. Included is a specification for being able to send real time messages. This is a performance requirement on the system to be able to complete the analysis and generate a *message* within the specified time that is ready to be sent to IIP. The 5 minute requirement may be excessive in comparison with the existing system where the message is sent after the flight has been completed. Note that the specification does not require real time transmission of a digital image file. It is assumed that GPS navigational information will be available on a continuous basis.

Meeting the IIP requirements will demand additional software development that will not be easily used in other programs. The obvious difference is the development of ice messages in MANICE format (specification 8). Another area is the sensor fusion problem (specification 6), particularly when non-radar information is to be incorporated. The sensor fusion algorithm may be able to aid in target classification (iceberg or ship) as well. The third area is modification of search patterns to "maximize the reconnaissance" (specification 2). This specification requires the development of an algorithm to operationalize "maximize the reconnaissance" for available sensors and selected target type. For example, target return is enhanced by taking advantage of the surface wind. This requires that the system obtain/accept surface wind data and that an appropriate algorithm be developed to develop an optimal search plan for specified objectives.

Given that the development decision has been made with respect to automated data acquisition, further examination of alternatives (e.g., ADAM) is not necessary.

Data Processing Systems.

INTERGRAPH System.

The existing INTERGRAPH system functions relatively well for current data processing requirements. One deficiency is the slow processing times, particularly when there are a large number of targets on plot. Another processing limitation is the inability to do any parallel processing. This becomes important when environmental and other input data is being input to the system. The PASCAL code that links the FORTRAN models to the INTERGRAH modules makes local modification of the system difficult. To date, any modifications have been completed by ICEC for use in BAPS and ported to DMPS. A major advantage of the existing system is the parallel operation with ICEC.

Most of the enhancements to the existing system have been developed and funded by ICEC with no cost to IIP. Continued use of the INTERGRAPH system will preclude the use of remotely sensed images for direct analysis. The INTERGRAPH system will not support analysis of digital radar files and processing of digital satellite imagery.

Although the system functionality is generally satisfactory, system reliability is an emerging problem. There were seven hard disk failures in 1994 that disabled the system and required IIP to use PC-based models to generate the products. This latter approach is much more labor intensive and limits the ability to complete a good resight analysis. It is becoming more difficult to find vendors who are capable and willing to provide system maintenance.

Upgrading the current system will require identifying commercial off the shelf hardware and selecting a contractor to convert the 90,000 lines of FOTRAN code to a new system. Commander, IIP has conducted a Benefit/Cost study of these alternatives, along with converting to the Canadian ISIS system as discussed below. The Benefit/Cost study is included in Appendix II. The study recommends that the system be converted to the ISIS system. The current review strongly supports that recommendation.

ISIS System.

The ICEC has a current project to develop an Ice Services Integrated System (ISIS) that will facilitate processing of multiple images. A conceptual overview of the project is included in Appendix B of Armacost (1994). The proposed system will fully integrate the satellite image processing, SAR/SLAR aircraft imagery, and all environmental data on a geocoded/ georeferenced basis. ICEC will standardize on HP 9000 workstations for this system. Under their development plan, BAPS (DMPS) will be integrated into the system by the end of 1996. Implementation of such a system at IIP would provide a capability for using remotely sensed images. If images from RADARSAT would be effective in identifying icebergs, such a capability would be required. Actual use of such images would impact the personnel qualifications and training requirements and create a new analysis infrastructure.

The use of HP 9000 workstations will provide increased processing capability that will facilitate expansion of existing models and also permit more rapid processing of the data and models. A change to the ISIS system will ensure that the future requirements for IIP ill be met. The complete cost analysis of this alternative along with the other two is included in Appendix II. A draft of the Resource Change Proposal (RCP) seeking funding support for this proposal is included in Appendix III. The RCP doses not include any outyear funding for maintenance and periodic upgrades. It is not know whether such support exists in the AFC-30 base for the existing system. An important qualitative aspect of this alternative is that it maintains complete interoperability with ICEC.

SUMMARY AND CONCLUSIONS

The IIP has a continuing need for improved data acquisition and information processing capability. Substantial improvements can be made in the accuracy and timeliness of iceberg position information by means of an automated data acquisition system. The approved Airborne Tactical Work Station, modified to meet Commander, IIP's performance requirements, will satisfy this need. In order to maintain a capability to satisfy current processing requirements and simultaneously satisfy future requirements, it is recommended that the Canadian ISIS system be installed. The RCP estimates the FY 1997 cost to be $322,000 and the FY 1998 costs to be $12,000. These costs cover, equipment, software, and system training.

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Armacost, R. L., 1994, *Interim Report--Volume 2: Identification of Alternatives for Phase II Cost and Operational Effectiveness Analysis*, EER Systems Corporation, November.

Armacost, R. L., Jacob, R. F., Kollmeyer, R. C., and Super, A. D., 1994, *Interim Report--Volume 1: Analysis of Current Operations of the International Ice Patrol*, EER Systems Corporation, November.

Appendix I: Airborne Tactical Workstation Requirements

The enclosed letter from Commander, International Ice Patrol provides a description of the IIP performance requirements for an automated data acquisition device.

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U.S. Department of Transportation
United States Coast Guard

Commander
International Ice Patrol

1082 Shennecossett Road
Groton, CT 06340-6095
Staff Symbol:
Phone: (203) 441-2630

13200
17 November 1994

From: Commander, International Ice Patrol
To: Commandant (G-NIO)
Via: Commander, Coast Guard Atlantic Area (Aoo)

Subj: IIP AIRBORNE TACTICAL WORKSTATION REQUIREMENTS

1. International Ice Patrol (IIP) has a need for an airborne tactical workstation to integrate all aspects of IIP's ice reconnaissance and data handling. These include preflight planning, real-time sensor display and analysis, and message report preparation. Currently, all of the above tasks are done by hand. For example, all sensor data (presently two different radars and visual) are individually logged by hand, then manually analyzed, encoded into iceberg message format, and finally typed into a laptop computer for transmission to the Ice Patrol Operations Center. Extensive human manipulation of sensor data lends itself to increased chances for transcription errors and is an ineffective use of time. Any computer-aided system that processes any of these tasks would be a big improvement for IIP's mission. The specifications needed in an Airborne Tactical Workstation to meet the International Ice Patrol mission are forwarded in enclosure (1).

2. I am aware that other programs have needs similar to IIP's to manage sensor information remotely collected by Coast Guard aircraft, and work is currently underway on a number of fronts to investigate various types of tactical workstations to meet these needs. As the Coast Guard converges on a system to tackle this problem servicewide, it's important that the requirements of all programs are known. Enclosure (1) lists the specifications that would sufficiently meet the needs of IIP.

3. The technology seems to be out there and available off the shelf to serve our needs. With keen anticipation, my staff and I will keep tabs on all developments in this regard and continue to advise you of any that appear to show promise.

R. TUXHORN

Encl: (1) Ice Patrol Tactical Airborne Workstation Specifications

Copy: CG R&DC (SSB/Ocean Prediction System Project)
CG R&DC (SSB/HC-130 Sensor Integration Workstation Project)
CG R&DC (ISB/OIS Project)
COMDT (G-OTT/G-MEP/G-OLE/G-EAE/G-OAV)

Ice Patrol Airborne Tactical Workstation Specifications

1. Display the tactical iceberg information on the workstation screen (current iceberg positions and limits of all known ice) over which one could do iceberg reconnaissance planning with standard search patterns (see attachment 1).

2. Modify the standard search patterns to maximize the reconnaissance (see attachment 2).

3. Display AN/APS-135 and AN/APS-137 targets on the workstation screen.

4. Input other sensor data into the system (visual, FLIR, photographic and/or video camera, etc.).

5. Display sensor information on the screen as analyzed icons, (i.e., convert the radar return to an iceberg icon (with size and shape notation), radar target icon, or ship icon, as appropriate) (see attachment 3).

6. Correlate targets seen by multiple sensors.

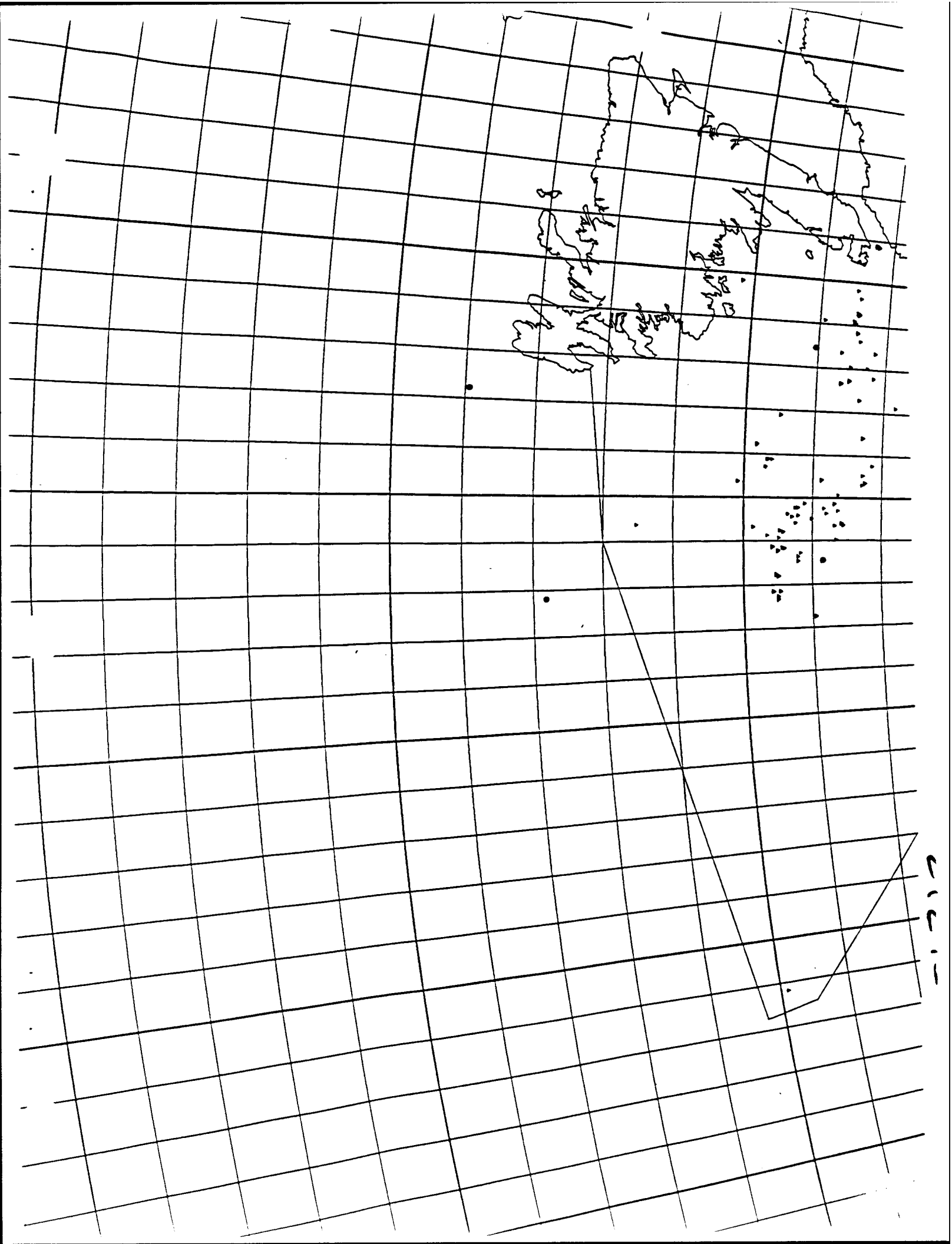
7. Accept GPS navigation information to display the actual flight track flown.

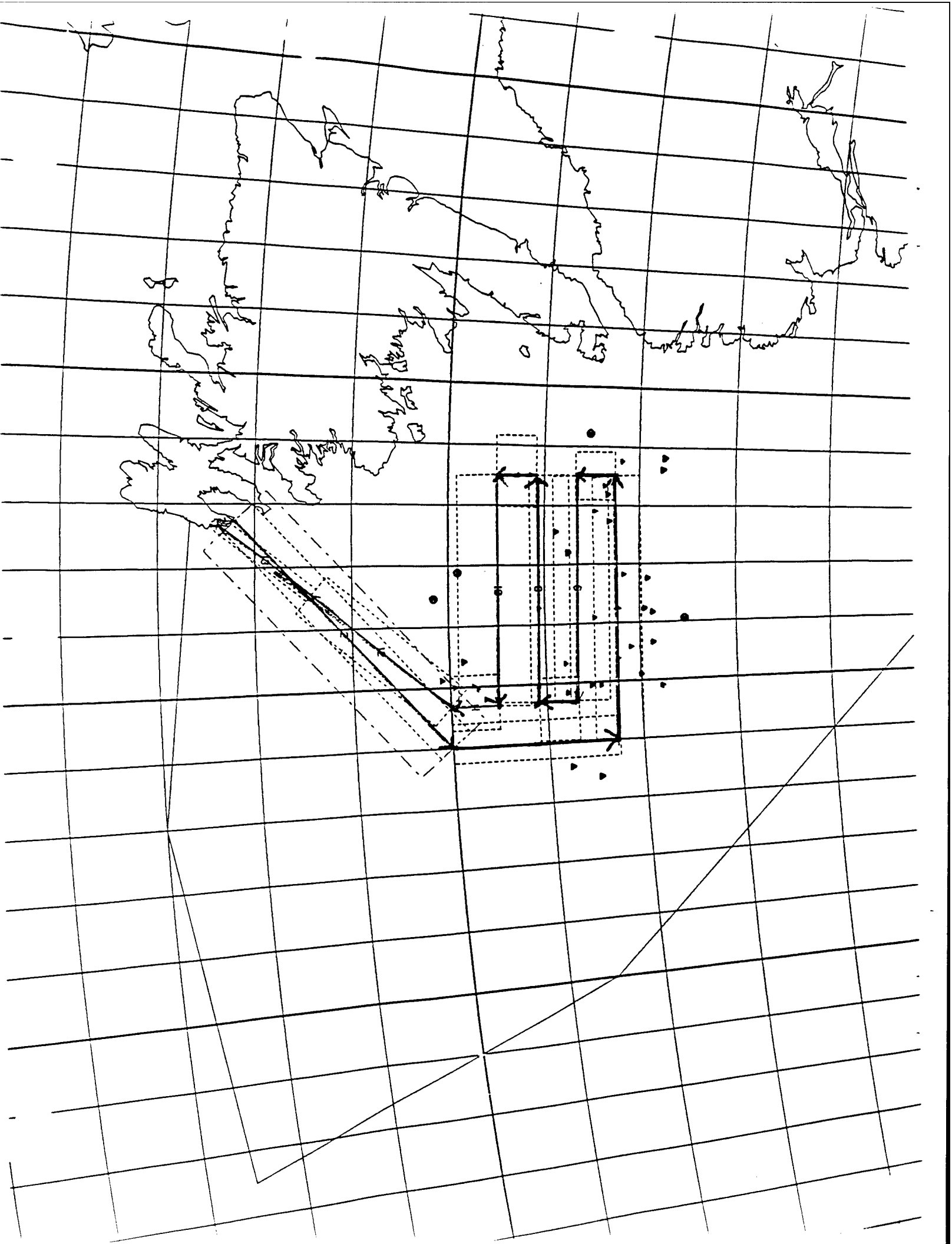
8. Convert the flight track and analyzed tactical picture to an ASCII formatted iceberg message file (see attachment 4).

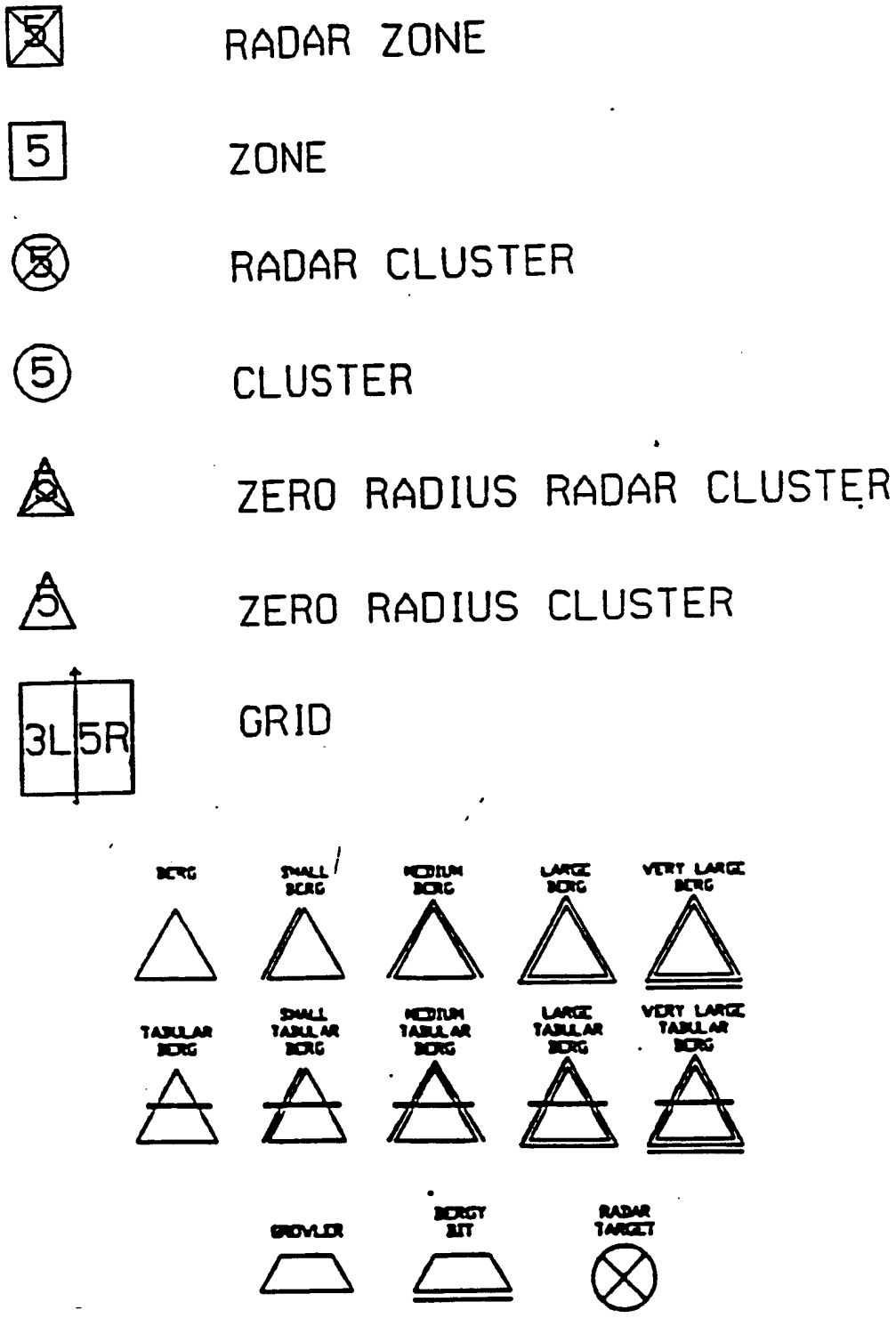
9. Send and receive real-time (5 minutes) operational messages (data and/or text) to the IIP operations center.

Attachments:
(1) Tactical Iceberg plot
(2) Flight track and iceberg positions from IIP flight
(3) Iceberg plotting symbols
(4) Iceberg message example

Enclosure (1)







Iceberg Observation Symbols

Figure 4-2

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00000
CY"  71222 1XXXX 2XXXX 3XXXX 4XXXX
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74650 04812 Z1321 10060 21510 32727 43402
74625 04729 Z1328 10060 20000 32727 4XXXX
74611 04636 Z1337 10060 21515 32727 43402
74614 04634 Z1347 10060 21515 32727 43402
74619 04632 Z1349 10060 21515 30000 43402
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REMARKS
CORRECTED COPY.
LAST LEG WAS SHORTENED DUE TO UNEXPECTED FUEL USAGE.
SLAR AND FLAR WORKED WELL.
1 AXBT DROPPED.  BUOY 2606 DROPPED AT 4700N 4721W.
GOOD DEPLOYMENT.
Report made on 06-24-1994 20:27:33
 TOTAL ICEBERGS                          3
 TOTAL BERGY BITS AND GROWLERS           0
 TOTAL RADAR TARGETS                     1
 PERCENTAGE OF TRACK WHICH IS VISUAL    17
 PERCENTAGE OF TRACK WHICH IS RADAR     63
END
```

Appendix II: Benefit/Cost Analysis for DMPS II Procurement

The enclosed Benefit/Cost Analysis by Commander, International Ice Patrol provides a comparative financial and performance analysis of maintaining the exiting system, changing to the ISIS system, and developing a new system to function as an over system model.

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BENEFIT COST ANALYSIS

DMPS II PROCUREMENT

SUMMARY:

International Ice Patrol's (IIP) uses an iceberg Data Management and Prediction System (DMPS) to predict iceberg drift and deterioration, prepare ice warnings for transatlantic shipping, and integrate new sighting data with icebergs being modeled. This system is nearing the end of its useful life, and technology refreshment is not an option due to the linkages between the application programs and the present INTERGRAPH platform. It is estimated that the system will not be maintainable after FY99.

Three alternatives are investigated in this analysis:

1. **STATUS QUO** - Continued use of the present DMPS until it is no longer maintainable, followed by transition to the limited capability PC backup model. Costs associated with this alternative are associated with the increased work load on system management personnel as the system ages, and increased work load for the IIP watch due to the limited capability of the PC model.
Benefit/Cost ratio is 0.38, with no payback period.

2. **PROCURE ISEC SYSTEM** - Procure a replacement DMPS system developed by Ice Services Environment Canada (ISEC). This alternative migrates present DMPS functionality using Commercial off-the-shelf software (COTS) integrated with fourth-generation language. This system adds image processing capability, and preserves the mission-required interoperability with ISEC.
Benefit/Cost ratio = 2.12, 4.6 year payback period.
THIS IS THE RECOMMENDED ALTERNATIVE.

3. **NEW START - USCG DEVELOPMENT** - Develop a replacement system using USCG development. Benefits are similar to Alternative 2, but at higher costs.
Benefit/Cost ratio = 1.15, 8.7 year payback period.

Points of Contact:

Program Manager	Mr. Larry Jendro G-NIO-3 7-1457
International Ice Patrol	LCDR Bruce Viekman 203-441-2633

COMPARATIVE BENEFIT-COST ANALYSIS SUMMARY

	ALT 1*	ALT 2	ALT 3
Total Acquisition Constant Dollar Benefits (Life Cycle)	$334,000	$2,250,000	$1,285,000
Total Acquisition Constant Dollar Costs (Life Cycle)	$1,179,080	$1,024,100	$1,638,100
Total Acquisition Present Value Benefits (Life Cycle)	$330,215	$1,779,000	$1,638,100
Total Acquisition Present Value Costs (Life Cycle)	- $875,258	- $841,149	- $1,429,603
Net Present Value (PV Benefits - PV Costs)	= -$545,043	= $937,911	= $208,497
Benefit-Cost Ratio (%) (PV Benefits) / (PV Costs)	38% (0.38)	212% (2.12)	115% (1.15)
Payback Period (Year in which payback occurs)	None	4.6 years	8.7 years

NOTE: There may be more than three alternatives, in which case the number of columns in the Comparative Benefit-Cost Analysis Summary will change.

* Alternative 1 is the status quo.

ALTERNATIVE 1 - STATUS QUO

Benefit Summary:

Benefit is cost avoidance, as this alternative has no capital outlay requirements for DMPS replacement.

Cost Summary:

1) FIP Equipment, Software: Upgrades to the PC model to incorporate iceberg deterioration, INTERNET router capability.

2) FIP Support Services:
FY0-2: Increased time required by government personnel to keep existing DMPS running
FY2-8: Increased time required by IIP watch to generate products without sufficient ADP support.

Intangible Impacts:

1) PC model will have limits on the number of icebergs tracked. This will result in a higher probability of IIP products being in error, with increased risk of mission failure.

2) Error Rates: PC model lacks graphical iceberg resight capability, and relies on alphanumeric editing of iceberg positions. IIP currently integrates over 50 iceberg sightings per day. System would revert sighting integration to archaic means which were "plagued by errors"

3) Morale severely declines as ADP resources become inadequate to perform assigned mission with DMPS obsolescence.

Sensitivity Analysis: Not performed.

BENEFIT SUMMARY - ALTERNATIVE 1 - STATUS QUO

	FY0	FY1	FY2	FY3	FY4	FY5
Cost Avoidance - no capital requirements for DMPS replacement	322000	12000	0	0	0	0
CONSTANT DOLLAR BENEFITS	322000	12000	0	0	0	0
PRESENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
PRESENT VALUE BENEFIT =	322000	11215.2	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIF TOTAL
Cost Avoidance - no capital requirements for DMPS replacement	0	0	0	0	0	0 334000
CONSTANT DOLLAR BENEFITS	0	0	0	0	0	334000
PRESENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
PRESENT VALUE BENEFIT =	0	0	0	0	0	333215.2

EQUIPMENT COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
IPMENT PURCHASE			14000			
IPMENT LEASE						
E PREPARATION AND USE						
PPING						
INING						
JMENTATION						
TALLATION						
EPTANCE TESTING						
ER FIP EQUIPMENT COSTS						
STANT DOLLAR COST	0	0	14000	0	0	0
SENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
SENT VALUE COST =	0	0	12227.6	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
IPMENT PURCHASE						14000
IPMENT LEASE						0
E PREPARATION AND USE						0
PPING						0
INING						0
UMENTATION						0
TALLATION						0
EPTANCE TESTING						0
ER FIP EQUIPMENT COSTS						0
STANT DOLLAR COST	0	0	0	0	0	14000
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	0	0	0	0	0	12227.6

- -

SOFTWARE COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
TWARE PURCHASE			7000			
TWARE LEASE AND LICENSING/UPGRADE FEES						
PPING						
UMENTATION						
TALLATION						
INING						
EPTANCE TESTING						
ER FIP SOFTWARE COSTS						
STANT DOLLAR COST	0	0	7000	0	0	0
SENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
SENT VALUE COST =	0	0	6113.8	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
TWARE PURCHASE						7000
TWARE LEASE AND						0
LICENSING/UPGRADE FEES						0
PPING						0
UMENTATION						0
TALLATION						0
INING						0
EPTANCE TESTING						0
ER FIP SOFTWARE COSTS						0
STANT DOLLAR COST	0	0	0	0	0	7000
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	0	0	0	0	0	6113.8

:RVICES COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
ER SERVICES						
ERVICES						
:R TELEPHONE						
4AIL						
ONE						
FIP SERVICES COSTS						
!T DOLLAR COST	0	0	0	0	0	0
: VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
: VALUE COST =	0	0	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
ER SERVICES						0
ERVICES						0
AR TELEPHONE						0
MAIL						0
ONE						0
FIP SERVICES COSTS						0
NT DOLLAR COST	0	0	0	0	0	0
T VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
T VALUE COST	0	0	0	0	0	0

- -

PPORT SERVICES (INCL. FIP MAINTENANCE) COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
MENT PERSONNEL	64800	71280	88000	88000	88000	88000
MENT CONSUMABLES						
.CTOR STUDIES						
.CTOR SYSTEM DESIGN						
.CTOR CODING						
) TESTING			50000			50000
.CTOR SYSTEMS						
:RATIONS						
.SSESSMENT						
.RE MAINTENANCE	30000	30000	30000	4000	4000	4000
.RE MAINTENANCE				1000	1000	1000
FIP SUPPORT SERVICES						
.NT DOLLAR COST	94800	101280	168000	93000	93000	143000
!T VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
!T VALUE COST =	94800	94656.28	146731.2	75915.9	70949.7	101959

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
'MENT PERSONNEL	88000	88000	88000	88000	88000	928080
MENT CONSUMABLES						0
CTOR STUDIES						0
CTOR SYSTEM DESIGN						0
.CTOR CODING						0
TESTING						100000
CTOR SYSTEMS						0
RATIONS						0
SSESSMENT						0
RE MAINTENANCE	4000	4000	4000	4000	4000	122000
RE MAINTENANCE	1000	1000	1000	1000	1000	8000
FIP SUPPORT SERVICES						0
NT DOLLAR COST	93000	93000	93000	93000	93000	1158080
T VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
T VALUE COST	61975.2	57920.4	54135.3	50592	47281.2	856916.1

I-FIP COST ANALYSIS WORKSHEET

I-FIP COSTS	FY0	FY1	FY2	FY3	FY4	FY5
VEL						
PORT STAFF						
INING CURRICULUM						
DEVELOPMENT						
ER NON-FIP COSTS						
STANT DOLLAR COST	0	0	0	0	0	0
SENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
SENT DOLLAR COST	0	0	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
EL						0
ORT STAFF						0
NING CURRICULUM						0
EVELOPMENT						0
ER NON-FIP COSTS						0
STANT DOLLAR COST						0
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	0	0	0	0	0	0

STANT DOLLAR COST SUMMARY

	FY0	FY1	FY2	FY3	FY4	FY5
EQUIPMENT	0	0	14000	0	0	0
SOFTWARE	0	0	7000	0	0	0
SERVICES	0	0	0	0	0	0
SUPPORT SERVICES	94800	101280	168000	93000	93000	143000
AL FIP RESOURCE COSTS	94800	101280	189000	93000	93000	143000
AL NON-FIP COSTS	0	0	0	0	0	0
AL CONSTANT DOLLAR COST	94800	101280	189000	93000	93000	143000

	FY6	FY7	FY8	FY9	FY10	SYSTEM LIFE TOTAL
EQUIPMENT	0	0	0	0	0	14000
SOFTWARE	0	0	0	0	0	7000
SERVICES	0	0	0	0	0	0
SUPPORT SERVICES	93000	93000	93000	93000	93000	1158080
AL FIP RESOURCE COSTS	93000	93000	93000	93000	93000	1179080
AL NON-FIP COSTS	0	0	0	0	0	0
AL CONSTANT DOLLAR COST	93000	93000	93000	93000	93000	1179080

SENT VALUE COST SUMMARY

	FY0	FY1	FY2	FY3	FY4	FY5
EQUIPMENT	0	0	12227.6	0	0	0
SOFTWARE	0	0	6113.8	0	0	0
SERVICES	0	0	0	0	0	0
SUPPORT SERVICES	94800	94656.28	146731.2	75915.9	70949.7	101959
AL FIP RESOURCE COSTS	94800	94656.28	165072.6	75915.9	70949.7	101959
AL NON-FIP COSTS	0	0	0	0	0	0
AL PRESENT VALUE COST	94800	94656.28	165072.6	75915.9	70949.7	101959

	FY6	FY7	FY8	FY9	FY10	SYSTEM LIFE TOTAL
EQUIPMENT	0	0	0	0	0	12227.6
SOFTWARE	0	0	0	0	0	6113.8
SERVICES	0	0	0	0	0	0
SUPPORT SERVICES	61975.2	57920.4	54135.3	50592	47281.2	856916.1
AL FIP RESOURCE COSTS	61975.2	57920.4	54135.3	50592	47281.2	875257.5
AL NON-FIP COSTS	0	0	0	0	0	0
AL PRESENT VALUE COST	61975.2	57920.4	54135.3	50592	47281.2	875257.5

ALTERNATIVE 2 - PROCURE ISEC SYSTEM

THIS IS THE RECOMMENDED ALTERNATIVE

Benefit Summary:

- Cost Avoidance: Alternative uses system developed by Ice Services Environment Canada (ISEC), avoiding the cost of developing a new system.

- Radar Satellite Use: ISEC will begin using data from a space-borne Synthetic Aperture Radar for sea ice 12/95. System characteristics should permit identification of large icebergs. This will allow decreased aircraft use on surveys designed to assess iceberg conditions 'upstream' of the ice limits.

- Digital SLAR: The AN/APS-135 Side Looking Airborne Radar (SLAR) on the HC-130 will undergo a digital processing upgrade funded in FY-96 budget. Image processing tools will allow postflight review of digital data and image enhancement, allowing more complete flight results.

- Faster processor: The DMPS CPU is a microVAX II computer rated at 1 mips. ISEC runs their system on a 100 mips HP-9000 machine. Therefore model run times will decrease, products will be generated more quickly, saving an estimated 30% watch work load. Costs estimated using 1995 Standard Personnel Costs.

Cost Summary:

1) FIP Equipment, Software: Procure hardware and COTS for system. 4GL integration provided free of charge by ISEC.

2) FIP Support Services: Costs for GS-11 Computer Specialist are less than alternative 1 due to less demands for system maintenance, more time for analyst functions.

Sensitivity Analysis: Not performed. Risk is low due to development and testing performed by ISEC. IIP will be involved in this testing during 4th quarter, FY95.

Conversion Requirements: Although IIP needs are largely incorporated into the ISEC system, applications for IIP specific products may be required. Contractor coding allows for these improvements.

Assuring against obsolescence: System design uses COTS which is not machine specific (e.g., ORACLE, Arc/INFO). Technical refreshment is therefore possible.

BENEFIT SUMMARY - ALTERNATIVE 2 - PROCURE ISEC SYSTEM

	FY0	FY1	FY2	FY3	FY4	FY5
Cost Avoidance- Development costs for system/softwar	375000	440000				
Utilize Radar Satellite to reduce flight hours		60000	120000	120000	120000	120000
Utilize digital SLAR for increase flight efficiency		5000	10000	10000	10000	10000
Decr. watch workload by increased processor speed		8000	8000	8000	8000	8000
Reduced system admin overhead by maint reduction		12000	12000	12000	12000	12000
CONSTANT DOLLAR BENEFITS	375000	525000	150000	150000	150000	150000
PRESENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
PRESENT VALUE BENEFIT =	375000	490665	131010	122445	114435	106950

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LI TOTAL
Cost Avoidance-Development						815000
Utilize Radar Satellite						0
to reduce flight hours	120000	120000	120000	120000	120000	1140000
Utilize digital SLAR for						0
increase flight efficien	10000	10000	10000	10000	10000	95000
Decr. watch workload by						0
increased processor spee	8000	8000	8000	8000	8000	80000
Reduced system admin overhead						0
by maint reduction	12000	12000	12000	12000	12000	120000
CONSTANT DOLLAR BENEFITS	150000	150000	150000	150000	150000	2250000
PRESENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
PRESENT VALUE BENEFIT =	99960	93420	87315	81600	76260	1779060

EQUIPMENT COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
PMENT PURCHASE	116200					
PMENT LEASE						
: PREPARATION AND USE	8800					
PING						
NING	8000		1500		1500	
MENTATION						
ALLATION						
PTANCE TESTING	3000					
R FIP EQUIPMENT COSTS						
TANT DOLLAR COST	136000	0	1500	0	1500	0
ENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
ENT VALUE COST =	136000	0	1310.1	0	1144.35	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
PMENT PURCHASE						116200
PMENT LEASE						0
PREPARATION AND USE						8800
PING						0
NING	1500		1500		1500	15500
MENTATION						0
ALLATION						0
PTANCE TESTING						3000
R FIP EQUIPMENT COSTS						0
TANT DOLLAR COST	1500	0	1500	0	1500	143500
ENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
ENT VALUE COST	999.6	0	873.15	0	762.6	141089.8

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SOFTWARE COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
ARE PURCHASE	4400					
ARE LEASE AND CENSING/UPGRADE FEES	119800					
ING						
ENTATION						
LLATION						
ING		12000				
ANCE TESTING	10000					
FIP SOFTWARE COSTS						
ANT DOLLAR COST	134200	12000	0	0	0	0
NT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
NT VALUE COST =	134200	11215.2	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
ARE PURCHASE						4400
ARE LEASE AND						0
CENSING/UPGRADE FEES						119800
ING						0
ENTATION						0
LLATION						0
ING						12000
ANCE TESTING						10000
FIP SOFTWARE COSTS						0
ANT DOLLAR COST	0	0	0	0	0	146200
NT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
NT VALUE COST	0	0	0	0	0	145415.2

SERVICES COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
PUTER SERVICES						
A SERVICES						
LULAR TELEPHONE						
CE MAIL						
EPHONE						
ER FIP SERVICES(INTERNET	3000	3000	3000	3000	3000	3000
STANT DOLLAR COST	3000	3000	3000	3000	3000	3000
SENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
SENT VALUE COST =	3000	2803.8	2620.2	2448.9	2288.7	2139

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
PUTER SERVICES						0
A SERVICES						0
LULAR TELEPHONE						0
CE MAIL						0
EPHONE						0
ER FIP SERVICES(INTERNET	3000	3000	3000	3000	3000	33000
STANT DOLLAR COST	3000	3000	3000	3000	3000	33000
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	1999.2	1868.4	1746.3	1632	1525.2	24071.7

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SUPPORT SERVICES (INCL. FIP MAINTENANCE) COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
ERNMENT PERSONNEL	42400	32400	32400	32400	32400	32400
ERNMENT CONSUMABLES						
TRACTOR STUDIES						
TRACTOR SYSTEM DESIGN						
RACTOR CODING						
ND TESTING	65000					
RACTOR SYSTEMS						
PERATIONS						
ASSESSMENT						
WARE MAINTENANCE	20000	15000	15000	15000	15000	15000
WARE MAINTENANCE		10000	10000	10000	10000	10000
R FIP SUPPORT SERVICES						
TANT DOLLAR COST	127400	57400	57400	57400	57400	57400
ENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
ENT VALUE COST =	127400	53646.04	50133.16	46855.62	43790.46	40926.2

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
RNMENT PERSONNEL	32400	32400	32400	32400	32400	366400
RNMENT CONSUMABLES						0
RACTOR STUDIES						0
RACTOR SYSTEM DESIGN						0
RACTOR CODING						0
ID TESTING						65000
ACTOR SYSTEMS						0
ERATIONS						0
ASSESSMENT						0
WARE MAINTENANCE	15000	15000	15000	15000	15000	170000
WARE MAINTENANCE	10000	10000	10000	10000	10000	100000
R FIP SUPPORT SERVICES						0
TANT DOLLAR COST	57400	57400	57400	57400	57400	701400
ENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
ENT VALUE COST	38251.36	35748.72	33412.54	31225.6	29182.16	530571.8

IP COST ANALYSIS WORKSHEET

IP COSTS	FY0	FY1	FY2	FY3	FY4	FY5
L						
RT STAFF						
ING CURRICULUM						
VELOPMENT						
NON-FIP COSTS						
ANT DOLLAR COST	0	0	0	0	0	0
NT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
NT DOLLAR COST	0	0	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
L						0
RT STAFF						0
ING CURRICULUM						0
VELOPMENT						0
NON-FIP COSTS						0
ANT DOLLAR COST						0
NT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
NT VALUE COST	0	0	0	0	0	0

ANT DOLLAR COST SUMMARY

	FY0	FY1	FY2	FY3	FY4	FY5
QUIPMENT	136000	0	1500	0	1500	0
OFTWARE	134200	12000	0	0	0	0
ERVICES	3000	3000	3000	3000	3000	3000
UPPORT SERVICES	127400	57400	57400	57400	57400	57400
FIP RESOURCE COSTS	400600	72400	61900	60400	61900	60400
NON-FIP COSTS	0	0	0	0	0	0
CONSTANT DOLLAR COST	400600	72400	61900	60400	61900	60400

	FY6	FY7	FY8	FY9	FY10	SYSTEM LIFE TOTAL
QUIPMENT	1500	0	1500	0	1500	143500
OFTWARE	0	0	0	0	0	146200
ERVICES	3000	3000	3000	3000	3000	33000
UPPORT SERVICES	57400	57400	57400	57400	57400	701400
FIP RESOURCE COSTS	61900	60400	61900	60400	61900	1024100
NON-FIP COSTS	0	0	0	0	0	0
CONSTANT DOLLAR COST	61900	60400	61900	60400	61900	1024100

T VALUE COST SUMMARY

	FY0	FY1	FY2	FY3	FY4	FY5
)UIPMENT	136000	0	1310.1	0	1144.35	0
)FTWARE	134200	11215.2	0	0	0	0
:RVICES	3000	2803.8	2620.2	2448.9	2288.7	2139
'PPORT SERVICES	127400	53646.04	50133.16	46855.62	43790.46	40926.2
FIP RESOURCE COSTS	400600	67665.04	54063.46	49304.52	47223.51	43065.2
NON-FIP COSTS	0	0	0	0	0	0
PRESENT VALUE COST	400600	67665.04	54063.46	49304.52	47223.51	43065.2

	FY6	FY7	FY8	FY9	FY10	SYSTEM LIFE TOTAL
UIPMENT	999.6	0	873.15	0	762.6	141089.8
FTWARE	0	0	0	0	0	145415.2
RVICES	1999.2	1868.4	1746.3	1632	1525.2	24071.7
PPORT SERVICES	38251.36	35748.72	33412.54	31225.6	29182.16	530571.8
FIP RESOURCE COSTS	41250.16	37617.12	36031.99	32857.6	31469.96	841148.5
NON-FIP COSTS	0	0	0	0	0	0
PRESENT VALUE COST	41250.16	37617.12	36031.99	32857.6	31469.96	841148.5

ALTERNATIVE 3 - NEW START - USCG DEVELOPMENT

Benefit Summary:

Benefits for this alternative are similar to those for alternative 2, excluding cost avoidance benefits cited for alternative 2.

Cost Summary:

1) FIP Equipment, Software: Procure hardware and COTS for system. Hardware, COTS costs determined through ISEC experience.

2) FIP Support Services: Contractor costs determined through analogy with ISEC experience in developing their new system. The ISEC system contains functions not required in the IIP version. The costs estimated are therefore less than those already borne by ISEC. Contractor costs calculated using interviews with Research and Development Center personnel.

Sensitivity Analysis: Not performed. Risk is high due to need for IIP staff/USCG to define specifications for contractor and probable need for iteration of specifications and changes as development/coding progress.

Conversion: Present DMPS contains 90,000 lines of FORTRAN-77 iceberg drift code and PASCAL system integration code. These are linked to INTERGRAPH specific utilities.

	FY0	FY1	FY2	FY3	FY4	FY5
Utilize Radar Satellite to reduce flight hours			60000	120000	120000	120000
Utilize digital SLAR for increase flight efficiency			5000	10000	10000	10000
Decr. watch workload by increased processor speed			8000	8000	8000	8000
Reduced system admin overhead by maint reduction			12000	12000	12000	12000
CONSTANT DOLLAR BENEFITS	0	0	85000	150000	150000	150000
PRESENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
PRESENT VALUE BENEFIT =	0	0	74239	122445	114435	106950

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LI TOTAL
Utilize Radar Satellite to reduce flight hours	120000	120000	120000	120000	120000	1020000
Utilize digital SLAR for increase flight efficien	10000	10000	10000	10000	10000	0 85000
Decr. watch workload by increased processor spee	8000	8000	8000	8000	8000	0 72000
Reduced system admin overhead by maint reduction	12000	12000	12000	12000	12000	0 108000
						0
CONSTANT DOLLAR BENEFITS	150000	150000	150000	150000	150000	1285000
PRESENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
PRESENT VALUE BENEFIT =	99960	93420	87315	81600	76260	856624

SERVICES COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
PUTER SERVICES						
A SERVICES						
LULAR TELEPHONE						
E MAIL						
PHONE						
ER FIP SERVICES(INTERNET	3000	3000	3000	3000	3000	3000
TANT DOLLAR COST	3000	3000	3000	3000	3000	3000
ENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
ENT VALUE COST =	3000	2803.8	2620.2	2448.9	2288.7	2139

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
PUTER SERVICES						0
A SERVICES						0
LULAR TELEPHONE						0
E MAIL						0
PHONE						0
ER FIP SERVICES(INTERNET	3000	3000	3000	3000	3000	33000
STANT DOLLAR COST	3000	3000	3000	3000	3000	33000
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	1999.2	1868.4	1746.3	1632	1525.2	24071.7

- -

SUPPORT SERVICES (INCL. FIP MAINTENANCE) COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
ERNMENT PERSONNEL	85000	50000	32400	32400	32400	32400
ERNMENT CONSUMABLES						
TRACTOR STUDIES	10000					
TRACTOR SYSTEM DESIGN	100000	50000				
TRACTOR CODING						
AND TESTING	150000	300000				
TRACTOR SYSTEMS						
OPERATIONS						
K ASSESSMENT	10000					
DWARE MAINTENANCE	20000	15000	15000	15000	15000	15000
TWARE MAINTENANCE		10000	10000	10000	10000	10000
ER FIP SUPPORT SERVICES						
STANT DOLLAR COST	375000	425000	57400	57400	57400	57400
SENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
SENT VALUE COST =	375000	397205	50133.16	46855.62	43790.46	40926.2

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
ERNMENT PERSONNEL	32400	32400	32400	32400	32400	426600
ERNMENT CONSUMABLES						0
TRACTOR STUDIES						10000
TRACTOR SYSTEM DESIGN						150000
TRACTOR CODING						0
AND TESTING						450000
TRACTOR SYSTEMS						0
OPERATIONS						0
K ASSESSMENT						10000
DWARE MAINTENANCE	15000	15000	15000	15000	15000	170000
TWARE MAINTENANCE	10000	10000	10000	10000	10000	100000
ER FIP SUPPORT SERVICES						0
STANT DOLLAR COST	57400	57400	57400	57400	57400	1316600
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	38251.36	35748.72	33412.54	31225.6	29182.16	1121730.

EQUIPMENT COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
MENT PURCHASE	116200					
MENT LEASE						
PREPARATION AND USE	8800					
ING						
ING		20000	1500		1500	
NTATION						
LATION						
TANCE TESTING	5000					
FIP EQUIPMENT COSTS						
NT DOLLAR COST	130000	20000	1500	0	1500	0
T VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
T VALUE COST =	130000	18692	1310.1	0	1144.35	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
ENT PURCHASE						116200
ENT LEASE						0
REPARATION AND USE						8800
NG						0
NG	1500		1500		1500	27500
NTATION						0
LATION						0
TANCE TESTING						5000
FIP EQUIPMENT COSTS						0
NT DOLLAR COST	1500	0	1500	0	1500	157500
NT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
NT VALUE COST	999.6	0	873.15	0	762.6	153781.8

- -

OFTWARE COST ANALYSIS WORKSHEET

	FY0	FY1	FY2	FY3	FY4	FY5
ARE PURCHASE	16000					
ARE LEASE AND						
CENSING/UPGRADE FEES	100000					
ING						
ENTATION		N/C				
LLATION						
ING		N/C				
TANCE TESTING		15000				
FIP SOFTWARE COSTS						
ANT DOLLAR COST	116000	15000	0	0	0	0
NT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
NT VALUE COST =	116000	14019	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
ARE PURCHASE						16000
ARE LEASE AND						0
CENSING/UPGRADE FEES						100000
ING						0
ENTATION						0
LLATION						0
ING						0
TANCE TESTING						15000
FIP SOFTWARE COSTS						0
ANT DOLLAR COST	0	0	0	0	0	131000
NT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
NT VALUE COST	0	0	0	0	0	130019

N-FIP COST ANALYSIS WORKSHEET

N-FIP COSTS	FY0	FY1	FY2	FY3	FY4	FY5
AVEL						
PPORT STAFF						
AINING CURRICULUM DEVELOPMENT						
ER NON-FIP COSTS						
STANT DOLLAR COST	0	0	0	0	0	0
SENT VALUE FACTOR	X 1.0000	X 0.9346	X 0.8734	X 0.8163	X 0.7629	X 0.7130
SENT DOLLAR COST	0	0	0	0	0	0

	FY 6	FY 7	FY 8	FY 9	FY 10	SYSTEM LIFE TOTAL
VEL						0
PORT STAFF						0
INING CURRICULUM DEVELOPMENT						0
ER NON-FIP COSTS						0
STANT DOLLAR COST						0
SENT VALUE FACTOR	X 0.6664	X 0.6228	X 0.5821	X 0.5440	X 0.5084	
SENT VALUE COST	0	0	0	0	0	0

STANT DOLLAR COST SUMMARY

	FY0	FY1	FY2	FY3	FY4	FY5
EQUIPMENT	130000	20000	1500	0	1500	0
SOFTWARE	116000	15000	0	0	0	0
SERVICES	3000	3000	3000	3000	3000	3000
SUPPORT SERVICES	375000	425000	57400	57400	57400	57400
AL FIP RESOURCE COSTS	624000	463000	61900	60400	61900	60400
AL NON-FIP COSTS	0	0	0	0	0	0
AL CONSTANT DOLLAR COST	624000	463000	61900	60400	61900	60400

	FY6	FY7	FY8	FY9	FY10	SYSTEM LIFE TOTAL
EQUIPMENT	1500	0	1500	0	1500	157500
SOFTWARE	0	0	0	0	0	131000
SERVICES	3000	3000	3000	3000	3000	33000
SUPPORT SERVICES	57400	57400	57400	57400	57400	1316600
AL FIP RESOURCE COSTS	61900	60400	61900	60400	61900	1638100
AL NON-FIP COSTS	0	0	0	0	0	0
AL CONSTANT DOLLAR COST	61900	60400	61900	60400	61900	1638100

SENT VALUE COST SUMMARY

	FY0	FY1	FY2	FY3	FY4	FY5
EQUIPMENT	130000	18692	1310.1	0	1144.35	0
SOFTWARE	116000	14019	0	0	0	0
SERVICES	3000	2803.8	2620.2	2448.9	2288.7	2139
SUPPORT SERVICES	375000	397205	50133.16	46855.62	43790.46	40926.2
AL FIP RESOURCE COSTS	624000	432719.8	54063.46	49304.52	47223.51	43065.2
AL NON-FIP COSTS	0	0	0	0	0	0
AL PRESENT VALUE COST	624000	432719.8	54063.46	49304.52	47223.51	43065.2

	FY6	FY7	FY8	FY9	FY10	SYSTEM LIFE TOTAL
EQUIPMENT	999.6	0	873.15	0	762.6	153781.8
SOFTWARE	0	0	0	0	0	130019
SERVICES	1999.2	1868.4	1746.3	1632	1525.2	24071.7
SUPPORT SERVICES	38251.36	35748.72	33412.54	31225.6	29182.16	1121730.
AL FIP RESOURCE COSTS	41250.16	37617.12	36031.99	32857.6	31469.96	1429603.
AL NON-FIP COSTS	0	0	0	0	0	0
AL PRESENT VALUE COST	41250.16	37617.12	36031.99	32857.6	31469.96	1429603.

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IRM RCP SUMMARY DATA WORKSHEET

This document must be completed for each IRM system AC&I RCP submitted for the FY 1997 budget. It provides information to supplement the RCP form which is essential for prioritizing IRM investments. WHERE A WRITTEN STATEMENT IS REQUIRED, BE BRIEF. ANSWERS MUST BE LIMITED TO THE SPACE PROVIDED.

1. RCP Number: _____

   RCP Title: DMPS II PROCUREMENT

2. Indicate new initiative or upgrade/replacement: Upgrade/replacement

3. Indicate the appropriate funding levels for this system:

Systems Planning:	- 0 -
Requirements Definition:	- 0 -
Design:	- 0 -
Development:	$ 40K
Test and Evaluation:	$ 10K
Implementation (include training costs):	$ 20K
Annual Operations and Maintenance Costs:	$ 30K

4. The following information relates to project risk.

   A. Schedule Risk. Show completion date (month/year) for key milestones (actual or planned):

1. Requirements analysis:	01/90, updated 04/95
2. Alternatives analysis:	09/95
3. Benefit/Cost analysis:	09/95
4. Contract award:	07/97

Briefly describe scope of contract:

Replacement of International Ice Patrol (IIP) iceberg Data Management and Prediction System (DMPS) using system/software developed by Environment Canada Ice Services (ISEC).

5. Date system operational or project complete: Dec 1997

B. Cost Risk. Show cost estimates for key system components and briefly describe basis for the estimate.

1. Hardware:

Hardware based on GSA pricing for HP-9000 server ($64.5K), printers ($13.7), system admin X-Term ($4.2K). Open market for 90MHz dual monitor pentium PC clients (2 @ 16.9K), UPS. Total hardware $125.0K.

2. Software:

Commercial Off-the-shelf software (COTS) pricing total $124.2K. COTS integration, encapsulation of IIP iceberg drift code, iceberg utility 4GL software provided free-of-charge by ISEC. $65K for any custom software required for IIP product generation.

3. Telecommunications:

Data transmission between IIP and ISEC by existing INTERNET gateway at CG R&DC (Host command). Funded in IIP base.

4. System Support:

System maintenance within $30.1K in IIP base. Support through assigned IIP GS-11 computer specialist, ISEC team. $20.0K for COTS, hardware, operating system training.

C. Technical Risk. Briefly answer the following questions:

1. Status of Integrated Logistics Support Plan (ILSP).

   - Assigned IIP GS-11 Computer Specialist able to maintain system, act as COTR for maintenance contract, handle minor software problems/improvements following system training.
   - Funding for maintenance contract, consumables in IIP base.
   - System improvements conducted in concert with ISEC, configuration control established between two organizations.

2. Describe the hardware and software which is envisioned for the system.

   Hardware: UNIX server with UNIX or Windows NT clients. Hardware needs set by COTS used in ISEC system. Software: COTS integrated by ISEC using 4GL, encapsulates IIP drift model, encapsulates & expands on present DMPS functionality.

3. Describe how the proposed system complies with the Coast Guard's technical architecture for IRM, COMDTINST P5230.45 series.

   Proposal moves IIP system from platform-specific software and outdated hardware to client/server approach using COTS integrated with contractor developed fourth generation language. System optimizes interoperability with ISEC, IIP's partner in iceberg reporting and operations.

D. Organizational Risk. Briefly describe any organization changes envisioned or changes in the way people will do their jobs when system is implemented.

   Implementation preserves current DMPS function, continues ability to utilize all iceberg data received by IIP. Upgrade provides necessary tools for use of emerging satellite sensors, enhancement of digital data from FY96 HC-130 APS-135 upgrade. System will allow post flight review of reconnaissance results at IIP OPCEN, easing flight reporting requirments.

E. Risk of Not Doing This Project: Why is this system important for the Coast Guard to fund now?

   DMPS hardware will be 10 years old in FY99, not maintainable. Status quo alternative requires increased maintenance, ups system admin requirments, ups down time. After FY99 ADP function transitions to limited

capability PC models requiring 50% increase in watch workload. Funding in FY97 allows use of ISEC developed software, avoids system failure, decreases watch workload, adds capability to fully use new sensor data.

4. The following information relates to impact on the members of the Coast Guard.

A. Does this system require new skills to operate and support, or is it an improvement to an existing system?

Proposal is an improvement to existing system. New skills are required in system admin and image processing software. Funds included for commercial training courses for both needs. Technical expertise for both aspects present in existing IIP staff.

B. Identify which HQ offices, districts, area, MLCs or types of field commands will use this system.

System meets a unique requirement for International Ice Patrol (Atlantic Area unit) operations.

C. How will this system impact the quality of work life?

System decreases watch workload by saving product generation time. Reduces post-flight analysis time for deployed ICERECDET personnel with tools for radar data review at IIP opcen. Use of emerging satellite sensors will save up to 5 flights during season, decreasing deployment time.

5. The following questions relate to mission effectiveness.

A. Internal Customer Service. How does this system improve service to an internal Coast Guard customer? Should be expressed in terms of timeliness, availability or quality. Quantify the improvement, if possible. Do not express in dollar terms, but improvements might be the same as some benefits contained in the benefit/cost analysis.

System will allow use of emerging satellite sensors to locate large icebergs in the center of IIP oparea. This will save on aircraft sorties now used for interior surveys, estimated at 5 per year or $112.5K.

Faster processor allows implementation of revised modelling strategy indicated by ongoing IIP mission analysis.

B. Service to the Public. How does this system improve service to the public. Express in terms such as timeliness, in dollar terms, but improvements might be

the same as some benefits contained in the benefit/cost analysis.

IIP products used by trans-atlantic shipping for routing and avoidance of iceberg danger. OCEANroutes, Inc. estimates that IIP products save mariners $2500 per voyage. Improved processor/system will allow more rapid integration of sighting data into products, increasing product quality/timeliness.

6. The following questions relate to strategic alignment.

A. What Coast Guard products/services identified in the Jumbo SIRMP Business Model does the system support?

B. What Coast Guard processes identified in the Jumbo SIRMP Business Model does the system support?

C. What Headquarters Offices have assisted with the planning of this system?

G-NIO (Program Manager), G-NP (IRM staff), G-TA

D. Is the system identified in COMDTPUB P5230.46 (Coast Guard 5 Year IRM Plan)?

Yes - Page 190. Replacement/upgrade identified in FY96, funds requested in FY97 to align with ISEC system development.

E. Identify how this system will improve the way the Coast Guard does business and the degree (i.e., incremental, drastic).

Incremental improvement to existing system. Upgrade will allow full use of sensor upgrades, decrease product generation time and watch burden. Use of satellite sensors will save flight hours. Upgrade allows continued interoperability with Ice Services Environment Canada.

7. The following areas relate to project benefit-cost impacts.

A. Summarize benefits that result from this project.

Desired alternative 1) avoids cost for CG development of a replacement system, 2) allow full utilization of emerging satellite sensors and radar digital upgrades, 3) reduces system administration overhead. Present DMPS system does not allow technology refreshment, as all software is linked to INTERGRAPH hardware. Proposed system allows refreshment as it is based on integrated COTS.

B. Summarize the costs that result from this project.

Procurement of system, software, integration, installation, initial training:	$334.0K
Life cycle maintenance, Computer Specialist (existing GS-11) position costs:	$690.1K

C. Benefit/Cost Ratio: 2.12

Appendix III: Resource Change Proposal for DMPS II Procurement

The enclosed draft Resource Change Proposal developed by Commander, International Ice Patrol and Commandant (G-NIO) provides a description and justification for the procurement of the ISIS system.

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As of 3/10

RESOURCE CHANGE PROPOSAL - SUMMARY

Greg FJ
LT H
G-NIO LT T

RCP Number - Title: 3XX - DMPS II Procurement

2. RCP Summary Info:

a. Program:

b. Has this RCP (or one closely related) been submitted in the last 3 years? N
- if Yes, give old RCP number and fiscal year:

c. Is the request related to an AC&I project? N
- if Yes, indicate project name:

d. Is this an MBS related item? N
- if Yes, MBS item number:

e. Point of Contact: Mr. Larry Jendro, G-NIO-3 7-1457

3. Resource Change Summary for FY 1997:

Alt	Qtr Code	FTP Mil	FTP Civ	Full-year Pers $$	Full-year O&M $$	O&M Exit/Start-up Costs
A	4	00	00	000	$322K	$000

4. RCP Objective:

To obtain funding to replace the iceberg Data Management and Prediction System (DMPS) computer system utilized by International Ice Patrol (IIP), which has reached the end of its useful life. DMPS is IIP's primary tool for prediction of iceberg drift and deterioration, preparation of ice warnings for transatlantic shipping, and integration of new sighting data with icebergs being modeled. IIP exchanges data daily with the Canadian Atmosphere and Environment Service Ice Centre (AES) - DMPS embodies integral part of interoperability requirement for free flow of information between IIP and AES.

5. Description of Requirement:

DMPS was procured in FY-91/92 based on software developed by the Canadian AES in the mid-80s. CG saved $1M system development costs, but late-80s vintage hardware has reached the end of its useful life - hard disk failures increasing (7 in 1994), severely impacting mission effectiveness. Few maintenance vendors exist for aging hardware. Replacement allows migration to new system developed by AES based on commercial, off-the-shelf software which maintains/ expands DMPS functionality. Updated hardware will speed up product generation, add image processing capability for future digital aircraft/satellite radar data.

6. Criteria:

Procurement of client/server hardware and system based on commercial software with AES integration maintains interoperability between IIP and AES. Updated hardware decreases down time, increases available maintenance vendors. IIP is involved in AES system development, joint test/validation scheduled for Jun 95. This Option presents lowest risk. Other options and primary disadvantages: 1) Migrate current BAPS functionality to new platform - requires conversion of 90K lines of code, data bases, graphics interfaces. 2) New Start - estimated cost $1M based on AES experience, high contracting risk.

7. Program Performance Impacts:

This RCP will allow IIP to continue using all available data to produce products and Continued interoperability with AES. Ongoing Mission Analysis indicates future expansion to IIP modelling methods which would require increased processor capacity. Planned system meets this future need. Denial forces continued use of old hardware, increased downtime and maintenance costs, increased reliance on backup/limited capability PC drift model, increased risk of mission failure with fewer tracked icebergs. 8.6% of IIP broadcasts need correction due to iceberg sightings outside broadcast limits - rate would increase with fewer modeled targets.

8. Base Information and Funding History:

Existing DMPS system was procured using AFC-30 funds as follows:

ITEM	FY	COST (Thousands)
HARDWARE	91	$171.5
SOFTWARE MODS	92	$127.2
TOTAL		$298.7

Maintenance: $30.1K annually, included in IIP base (added in FY-92).

Personnel: GS-0334-11 Computer Specialist established by PAA 1234-89 for DMPS system support. Personnel change by offsetting resources.

RESOURCE CHANGE PROPOSAL - ALTERNATIVE ANALYSIS - A

1. RCP Title - Number: 3XX - DMPS II Procurement

2. Description: Procure client/server hardware and AES integrated system based on off-the-shelf software. System will retain and expand DMPS functionality with updated hardware, faster processor.

3. Budget Year Resources Required:

Alt	Qtr Code	FTP Mil	FTP Civ	Pers $$	O&M $$	O&M Exit/Start-up Costs
A	4	0	0	0	$322K	0

4. Outyear Resources Required:

	FTP Mil	FTP Civ	O&M $$
FY98	0	0	$12K

5. Quantitative and Qualitative Benefits: This alternative uses new hardware and off-the-shelf software integrated by AES to move DMPS functionality to new, maintainable platform. AES system is based on HP-9000 server with PC clients, integrates IIP iceberg drift code with ORACLE DBMS, Arc/INFO Geographic Info System, ERDAS Imagine image processing software. Incorporates DMPS functionality. Alternative avoids new system integration project, maintains interoperability and data exchange capability. AES is spending over 18 person-years in system integration work. IIP products require 6 daily ice drift forecasts - present system requires 45 min. each. New system will decrease model run time by factor of nearly 100, allow rapid integration of new sighting data into products. Ongoing Mission Analysis indicates future expansion to IIP modelling methods which would require increased processor capacity. Planned system meets this future need. IIP primary radar (HC-130 based APS-135 SLAR) moving to digital data recording in FY96 AC&I. Image processing capability will allow postflight review, enhancement of data, and allow IIP to use satellite data as new sensors (i.e., Canadian RADARSAT) become available.

6. Basis of Cost Estimates: Budget year costs based on configuration required to run AES system. GSA prices used as appropriate, commerical software licenses, installation, initial system/software training for IIP GS-11. Outyear costs are for applications training for system administrator. Maintenance funded by DMPS system funds presently in IIP base.

7. Impact on CG People, Support Activities and Other Programs:

- Training: Hardware & comm'l software trng for IIP GS-11.
- IRM: Increase maintainability, add capability for future sensors.
- Housing/Personnel Support: None
- Other: None

OE/EC&R/RT RCP RESOURCE BREAKDOWN

RCP NO. 3XX BUDGET YEAR: 97

TITLE: DMPS II Procurement

PROGRAM: G-NIO POC: Mr. Larry Jendro EXT: 7-1457

RESOURCES - Operating Costs ($000) (round to nearest Tenth)

AFC	Recurring	One Time	Subtotal	
01				
08				
20				
30	0	314.0	314.0	
30E				
40				
41				
42				
43				
44				
45				
46				
54				
56		8.0	8.0	
57				
EC&R				
RT				
Subtotal	0.0	322.0	322.0	322.0 TOTAL

PERSONNEL RESOURCES

ATU	OPFAC	OPMOD	Alpha Grade	OBC Enl Quals OCC Series	QTY

OE/EC&R/RT RCP RESOURCE BREAKDOWN

RCP NO. 3XX BUDGET YEAR: 98

TITLE: DMPS II Procurement

PROGRAM: G-NIO POC: Mr. Larry Jendro EXT: 7-1457

RESOURCES - Operating Costs ($000) (round to nearest Tenth)

AFC	Recurring	One Time	Subtotal	
01				
08				
20				
30				
30E				
40				
41				
42				
43				
44				
45				
46				
54				
56		12.0	12.0	
57				
EC&R				
RT				
Subtotal	0.0	12.0	12.0	12.0 TOTAL

PERSONNEL RESOURCES

ATU	OPFAC	OPMOD	Alpha Grade	OBC Enl Quals OCC Series	QTY

OE PPA RESOURCE BREAKDOWN FOR AFC-4X, AFC-30, AFC-54 AND AFC-56

RCP NO. 3XX BUDGET YEAR: 97

TITLE: DMPS II Procurement

PROGRAM: G-NIO POC: Mr. Larry Jendro EXT: 7-1457

[AFC-4X, AFC-30, AFC-54 and AFC-56 Costs/Savings ($000)]

	Recurring	Line One Time	Subtotal
PPA II (AFC-4X)			
II. DEPOT-LEVEL MAINTENANCE AND REPAIR:			
A. Aeronautical Maintenance (41)			
B. Electronics Maintenance (42)			
C. Civil Engineering and Shore Facility Maintenance (43)			
D. Vessel Maintenance (45)			
PPA III (AFC-30)			
III.A. AREA OPERATIONS AND SUPPORT:			
1. AREA Offices		314.0	314.0
2. MLC's			
3.a. WAGB Polar Icebreakers			
3.b. WHEC cutters			
3.c. WMEC cutters			
4. Communication Stations			
III.B. DISTRICT OPERATIONS AND SUPPORT:			
1. District Offices			
2. Groups, Bases, Stations, ANT's, miscellaneous District shore units			
3. Combined Group/Air Stations			
4. Air Stations			
5. Marine Safety Offices			
6. Long Range Electronic Navigational Aids			
7. District Cutters			
8. VTS			
III.C. AMMUNITION/SMALL ARMS (AFC-54)			

RCP NO. 3XX BUDGET YEAR: 97

	Recurring	One Time	Line Subtotal
PPA IV (AFC-30/56)			
IV. RECRUITING AND TRAINING SUPPORT:			
A. Recruiting			
B. Training Centers			
C. Coast Guard Academy			
D. Professional Training/ Education (AFC-56)		8.0	8.0
PPA V (AFC-30)			
V.A. HEADQUARTERS UNITS:			
1. Supply Centers			
2. Finance Center			
3. Military Pay & Personnel Center			
4. Activities Europe			
5. Coast Guard Yard			
6. Strike Teams			
7. National Pollution Funds Center			
8. COMDAC Support Facility			
9. Air Station Washington			
10. Operations Systems Center			
11. TISCOM			
12. Navigation Center			
13. Intel Coordination Center			
14. Electronics Engineering Center			
15. Coast Guard Institute			
16. Research and Development Center			
17. Military Personnel Center			
V.B. HEADQUARTERS AND SERVICEWIDE CENTRALIZED BILL PAYING:			
1. Headquarters Offices			
2.a. Postal Cost			
2.b. FTS 2000			
2.c. Fed Employment Compensation			
2.d. Unemployment Compensation			
Column Totals (include prior page subtotals)		322.0	322.0

OE PPA RESOURCE BREAKDOWN FOR AFC-4X, AFC-30, AFC-54 AND AFC-56

RCP NO. 3XX BUDGET YEAR: 98

TITLE: DMPS II Procurement

PROGRAM: G-NIO POC: Mr. Larry Jendro EXT: 7-1457

[AFC-4X, AFC-30, AFC-54 and AFC-56 Costs/Savings ($000)]

	Recurring	Line One Time	Subtotal
PPA II (AFC-4X)			
II. DEPOT-LEVEL MAINTENANCE AND REPAIR:			
A. Aeronautical Maintenance (41)			
B. Electronics Maintenance (42)			
C. Civil Engineering and Shore Facility Maintenance (43)			
D. Vessel Maintenance (45)			
PPA III (AFC-30)			
III.A. AREA OPERATIONS AND SUPPORT:			
1. AREA Offices			
2. MLC's			
3.a. WAGB Polar Icebreakers			
3.b. WHEC cutters			
3.c. WMEC cutters			
4. Communication Stations			
III.B. DISTRICT OPERATIONS AND SUPPORT:			
1. District Offices			
2. Groups, Bases, Stations, ANT's, miscellaneous District shore units			
3. Combined Group/Air Stations			
4. Air Stations			
5. Marine Safety Offices			
6. Long Range Electronic Navigational Aids			
7. District Cutters			
8. VTS			
III.C. AMMUNITION/SMALL ARMS (AFC-54)			

RCP NO. 3XX BUDGET YEAR: 98

	Recurring	One Time	Line Subtotal
PPA IV (AFC-30/56)			
IV. RECRUITING AND TRAINING SUPPORT:			
A. Recruiting			
B. Training Centers			
C. Coast Guard Academy			
D. Professional Training/ Education (AFC-56)		12.0	12.0
PPA V (AFC-30)			
V.A. HEADQUARTERS UNITS:			
1. Supply Centers			
2. Finance Center			
3. Military Pay & Personnel Center			
4. Activities Europe			
5. Coast Guard Yard			
6. Strike Teams			
7. National Pollution Funds Center			
8. COMDAC Support Facility			
9. Air Station Washington			
10. Operations Systems Center			
11. TISCOM			
12. Navigation Center			
13. Intel Coordination Center			
14. Electronics Engineering Center			
15. Coast Guard Institute			
16. Research and Development Center			
17. Military Personnel Center			
V.B. HEADQUARTERS AND SERVICEWIDE CENTRALIZED BILL PAYING:			
1. Headquarters Offices			
2.a. Postal Cost			
2.b. FTS 2000			
2.c. Fed Employment Compensation			
2.d. Unemployment Compensation			
Column Totals (include prior page subtotals)		12.0	12.0

ESTIMATED COST BY OBJECT CLASS
(for Alternative A only)
O&M Costs ($000) ONLY ... NO Personnel Costs

RCP 3XX DMPS II PROCUREMENT

Object Class	Item	Qty	Unit Cost	Total Cost
31.0	Computing Hardware			
	HP-9000 Server	1	$64.5	$64.5
	Pentium PC Clients	2	$16.9	$33.8
	System Admin X-Terminal	1	$4.2	$4.2
	Printers			$13.7
	Power Supplies, Misc.			$8.8
31.0	Software			
	Comm'l Licenses			$119.8
	Client Software			$4.4
25.2	Customized Software			$65.0
25.2	Commercial Vendor Trng Tuition			$13.2
21.0	Travel to training courses			$6.6
	Total O&M Costs.....			**$334.0**

16.2

DMPS II Procurement $334,000

This replacement computer system for International Ice Patrol (IIP) will allow migration from mid-80s technology, allow continued interoperability with the Canadian Atmosphere and Environment Service, and add capability for integration of future digital aircraft/satellite radar data. IIP monitors and broadcasts the iceberg danger to transatlantic shipping under the provisions of the Safety of Life at Sea Convention, 1974, and 46USC738a-d.

Base/Request ($000)

	FTP		FTE		Pers.	Operations &	Total
	Mil	Civ	Mil	Civ	Funds	Maint. Funds	Funds
FY 1995							
Base	14	2	14	2	$0	$229	$229
FY 1996							
Base	14	2	14	2	$0	$233	$233
FY 1997							
Request	14	2	14	2	$0	$559	$559
FY 1998							
Request	14	2	14	2	$0	$253	$253

[Retyped text of original faint dot matrix print]

RCP Objective:

REPLACEMENT OF the Iceberg Data Management and Prediction System (DMPS) at its end-of-useful-life. DMPS is now the International Ice Patrol's (IIP)'s primary tool for prediction of iceberg drift and deterioration, preparation of ice warnings for transatlantic shipping, and integration of new sighting data with icebergs being modeled. The avoidance of increased hardware failures coupled with decreased field maintenance vendors will result in decreased maintenance costs. IIP exchanges data with the Canadian Atmosphere and Environment Service Ice Centre (AES). IIP will soon lose its software support partner when AES shifts to a new system in FY-96. This replacement insures vendor software support for IIP operations. DMPS presently embodies an integral part of an inter-operability requirement for free flow of information between IIP and AES. This IIP/AES inter-operability will be significantly advanced as IIP installs more capable and compatible computer hardware.

From: LCDR B Viekman
To: L.Jendro/G-NIO
Copies: G.Wright
Attach:
Subject: DMPS I Maintainability

Larry: Suggest following words in RCP Para 5.

After "(7 in 1994)" add "IIP forced to freeze operating system/support software - vendor support no longer exists. System failures severly impact mission capability. Few maintenance vendors available for FY-96 re-compete of hardware service contract."

Para 7, line 6 change to read "increased downtime and hardware maintenance costs, no system software support ..."

Background:

We can't say the system can't be maintained. We have received flyers from vendors offering their services. No data is available on costs of future hardware support. However, maintenance can be difficult without software support. While it is true that the operating system has worked for 3+ years, hardware problems are sometimes difficult to diagnose without software knowledge/support. This is qualitative arguments, but T types should be knowledgable as to the impact of a frozen operating system.