

#39

111-NASA

17 December 1975

ADM Robert K. Keiger  
Department of the Navy  
Office of Naval Research  
Arlington, Virginia 22217

Office of the Secretary of Defense  
Chief, RDD, ESD, WHS **5 USC § 52**  
Date: 20 Jan 2014 Authority: EO 13526  
Declassify: X Deny in Full: \_\_\_\_\_  
Declassify in Part: \_\_\_\_\_  
Reason: 5 USC 552 (b)(6)  
MDR: 13-M-4638

Dear Bob:

I have attached a copy of a draft memorandum from your office, which was sent to the National Aeronautics and Space Administration, requesting an analysis of the feasibility of changing the planned SEASAT-A orbital inclination.

The orbital parameters of SEASAT-A were chosen after careful consideration of all mission objectives. One objective of special DoD interest is the collection of radar altimetry data which will determine the north and east components of the deflection of the vertical. A non-polar orbit is required to achieve this objective. However, it was also recognized that SEASAT-A would yield valuable data on sea ice coverage. Thus, the final orbit configuration was chosen to allow collection of altimetry data and as much sea ice coverage as possible. The current plans for SEASAT-A do not allow an orbital change after insertion.

I would be happy to review the requirements for sea ice coverage with you and the opportunity provided by SEASAT-A for satisfying these requirements. However, please address future issues with me or my staff so that a consensus viewpoint is formulated before its presentation to another agency.

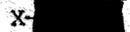
Sincerely,

Page determined to be Unclassified  
Reviewed Chief, RDD, WHS  
IAW EO 13526, Section 3.5  
Date:

JUN 20 2014

Robert A. Greenberg  
Assistant Director  
Space & Advanced Systems

Attachment

 emv/17 Dec 75  
OAD (S&AS) X-

OSD 5 U.S.C. § 552 (b)(6)

13-m-4638



DEPARTMENT OF THE NAVY  
OFFICE OF NAVAL RESEARCH  
ARLINGTON, VIRGINIA 22217

IN REPLY REFER TO  
461:RKM:mab

12 November 1975

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~~(UNCLASSIFIED UPON REMOVAL OF ENCLOSURE)~~

Dr. Martin J. Swetnick  
Director,  
Earth Observations Program  
Code ERR  
NASA Headquarters  
Washington, D. C. 20546

DECLASSIFIED IN FULL  
Authority: EO 13526  
Chief, Records & Declass Div, WHS  
Date: JUN 20 2014

Dear Dr. Swetnick:

Attached is a copy of the draft letter Navy proposes to forward to the Administrator of the National Aeronautics and Space Administration regarding the change of SEASAT-A orbit. I discussed with you the possibility of discussing this change in the program at the IARCC meeting on 4 December 1975.

I would appreciate your judgment as to whether the IARCC is the proper forum to discuss the orbit change.

Sincerely,

  
R. K. McGREGOR  
Director  
Arctic Program

Encl:

- (1) Draft Copy of Memorandum for the  
Director of NASA (~~SECRET~~)

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MEMORANDUM FOR THE ADMINISTRATOR OF THE NATIONAL AERONAUTICS AND SPACE  
ADMINISTRATION

Subj: Orbit Change for SEASAT-A; feasibility of

- Encl: (1) JCS Memo JCSM-109-073 of 15 Mar 1973  
(2) Matrix of DoD Arctic Pack-Ice Requirements March 1975  
(3) U. S. Army CRREL ltr of 16 Sep 1975  
(4) DREO Canada ltr DREO 1/0-801P64 of 23 Sep 1975  
(5) Canadian CRS ltr of 30 Sep 1975  
(6) Petroleum Industry, Beaufort Sea Environmental Program ltr  
of 26 Sep 1975  
(7) Imperial Oil Limited ltr of 9 Oct 1975  
(8) Telecon Dr. Gudmandson, Denmark and Mr. Johnson, ONR of  
26 Sep 1975

1. Enclosures (1) through (6) identify a number of validated U. S. Department of Defense, international and industrial requirements for sea ice information which can be uniquely answered by the SEASAT-A capability. The following is a synopsis of enclosures (1) through (7).
2. Enclosure (1) established the need for knowledge and extent of sea ice coverage to plan and execute polar operations.
3. Enclosure (2) validated major command requirements for sea ice coverage. Basically the requirements are:
  - (a) Concentration, age and thickness
  - (b) All weather capability
  - (c) Observations at least three times a week
  - (d) Distortion-free images
  - (e) Resolution to less than 100 meters
  - (f) Data required along entire continental shelf of the Arctic Ocean

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- (g) Data format must allow determination of geographic coordinates
4. Enclosure (3) specifies the requirements of the research community in its effort to model ice distribution, dynamics and thickness for Navy polar planning and execution and in support of national defense needs including:
- (a) All weather imagery with a high level of resolution
  - (b) Minimum time between replicate images (presently 1-2 days in SEASAT-A)
  - (c) Coverage of the entire Arctic Basin including the southern half of the Pacific gyre in the Beaufort and Chukchi Seas, East Greenland Drift Stream, Barents Sea and Northern Sea Route of the USSR
5. As noted in enclosures (4), (5), and (6) the Canadian Arctic sea ice and remote sensing communities (government and industry) are enthusiastic about receiving SEASAT-A data as far north as the North Pole. The Canadians are planning to build two digital ground stations. The first station will be installed at a remote site near St. John's Newfoundland. The second station will be provided to the Jet Propulsion Laboratory. The Canadians endorse a higher orbit in order to acquire data of sea ice coverage over the Beaufort Sea and the waters surrounding the Canadian Arctic Archipelago. They prefer coverage of the entire Arctic Basin, recognizing that the entire Arctic ice pack must be monitored in order to generate valid ice prediction models for fringe

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areas such as the Beaufort Sea.

6. Enclosures (6) and (7) specify the interest and requirements of the petroleum industry in its effort to establish, protect and complete offshore drilling operations on the continental shelf of the Beaufort Sea. It is noteworthy that prior knowledge of ice conditions may save up to \$100,000 per day in drilling costs for one company oil drilling rig alone.

7. During conversations with Dr. Gudmandson, Danish remote sensing scientist, enclosure (8), he expressed a strong need to have a higher orbit for SEASAT-A to provide coverage of Greenland and the East Greenland Current sea ice areas. However, to acquire data the receiving station must be located in northern Europe. Dr. Gudmandson has requested participation of the Governments of Iceland and Denmark to establish through NATO mechanisms a ground receiving station in Iceland.

8. The capability of SEASAT-A with the synthetic aperture radar in proper orbit can be the cornerstone upon which a major advance in our ability to apply fundamental geophysical knowledge to real operational ice problems can be built. If SEASAT-A had been operational, in the proper orbit, during the present summer and fall it might have been possible to avoid the immense costs that will be incurred by the nation as the result of many of the sea lift barge support vehicles to the North Slope of Alaska being unable to reach their destinations. The increased costs to one company alone (Atlantic

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Richfield) for re-routing supplies this year because of the ice situation are reported to be in the order of 25 million dollars. Finally, the major ground truth exercise that will occur during the period of operation of SEASAT-A is the deployment of the Nansen Drift Station. It is expected that a number of U.S. and Canadian federal agencies will participate in this project as in the case of the Arctic Ice Dynamics Joint Experiment. Denmark, Norway, Iceland and NATO will probably participate also. The drift will be from the estuary of the Lena River along the axis of the mid-Atlantic ridge, across the North Pole and into the Greenland Sea. The drift will contain as program elements extensive efforts in sea ice physics and remote sensing that could readily serve as verification programs for SEASAT-A. Should SEASAT-A orbit take it no further north than 72°, the locations of SEASAT-A imagery and the Nansen Drift will be mutually exclusive and a major research opportunity to describe this little known area of the Arctic Ocean will be lost.

9. Verbal discussions between NASA and DoD personnel have previously indicated the importance of the altimetry data which SEASAT-A is capable of providing for geoidal purposes. Such data continues to be an important DoD requirement, which could be satisfied best by ten months of data at the 72° inclination. Arctic ice coverage has been considered important for some time also as indicated by enclosure (1). The inadequacies of Arctic ice forecasting and the greatly increased expenses to the nation (industry, and federal government agencies)

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resulting from such inadequacies became very apparent during the 1975 navigation season. Drilling off the north coast of Alaska is now expected in the near future and this will intensify the need for accurate ice forecasts.

10. It is now recognized that ice forecasts for the Beaufort and Chukchi Sea will require synoptic monitoring of the entire Arctic ice pack rather than just the southern fringes of the ice pack that would be provided by a 72° orbit. For these and other reasons the Department of Defense feels that coverage of the entire Arctic ice pack (polar orbit) is highly desirable not only for national security needs but also for industrial needs, commercial shipping, navigation and offshore drilling purposes. We believe that further contacts by NASA with the U.S. Inter Agency Arctic Research Coordinating Committee (IAARCC) and with the Arctic shipping and petroleum industries will verify these needs. In view of the above this department recommends a study by your office to determine the feasibility of an orbit change to 90° inclination for SEASAT-A after the first ten months of flight duration at 72° inclination. It is also recommended that NASA discuss this matter with the entire membership of IAARC.