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International Council for the  
Exploration of the Sea

C.M.1984/C:35  
Hydrography Committee  
Ref. MEQC and Biological  
Oceanography Committees

STUDY GROUP REPORT: SPECIFIC TERMS OF REFERENCE FOR  
A NEW WORKING GROUP ON THE APPLICATION OF AEROSPACE  
REMOTE SENSING IN HYDROBIOLOGICAL MONITORING

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## 1. Introduction

The previous Working Group on Aerospace Remote Sensing, disbanded in 1981, was formed under the following terms-of-reference:

### C. Res. 1976/2:16

An interdisciplinary Working Group on Remote Sensing should be formed, composed of experts in both the techniques of remote sensing and their application, with the following terms-of-reference:

- (a) To follow the developments of the ongoing programmes in remote sensing of the marine environment.
- (b) To review the applicability to oceanography and fisheries of data and data products available from remote sensing.

The United States Delegation should be invited to select the Chairman of the Group.

The first Chairman was H. Bullis (USA) and he was succeeded by J. Apel (USA) per C. Res. 1978/2:22 as follows:

### C. Res. 1978/2:22

- (a) Mr. J. Apel should be the new Chairman of the Working Group on Aerospace Remote sensing
- (b) Member countries should be asked to nominate marine biologists (including fisheries scientists) and pollution experts for membership of the working group
- (c) A meeting of the working group should be held for 2-3 days in Europe during the summer of 1979 to review results from SEASAT-A and NIMBUS-G CZCS, preferably in conjunction with meetings of these user groups.

At the 1979 ICES Statutory Meeting the Working Group reported on an Aerospace Remote Sensing Meeting (C.M. 1979/C:29) held at Valbonne, France in June 1979. At the same ICES Statutory Meeting the following resolution was approved.

### C. Res. 1979/2:15

- (f) A 2-day meeting of of the Working Group on Aerospace Remote Sensing should be held in spring or early summer 1980, preferably in conjunction with EURASEP, to review the incoming results of particular interest to ICES.

The Working Group met again in May 1980 in Venice, Italy in conjunction with the COSPAR-SCOR-IUCRM Symposium on Oceanography from Space and in addition to reporting on the Symposium, the Group discussed several items including the organization of a mini-symposium on remote sensing for October 1980 (C.M. 1980/C:40).

At the 1980 ICES Statutory Meeting, the following resolution was approved:

C. Res. 1980/2:11

- (e) The Working Group on Aerospace Remote Sensing should meet for two days immediately after the scientific sessions of the 1981 Statutory Meeting in order to summarize the discussions at the mini-symposium and in the appropriate committees, and to outline future applications of remote sensing to different fields of marine research.

In 1981 at the ICES Statutory Meeting, a mini-symposium on remote sensing was held at Woods Hole, Massachusetts, USA. Following that meeting, the Working Group was disbanded in order to establish new terms-of-reference as follows:

4th Session, Woods Hole, 13 October, at 8:30 a.m.

All members were present. The President took part in the meeting. The General Secretary, assisted by the Council's professional officers, attended.

Agenda, Item 9 Working Groups to be Dissolved, and New Groups to be Set Up

It was further recommended to disband the present Aerospace Remote Sensing Working Group, at the same time asking the Chairmen of the Hydrography, Biological Oceanography, and Marine Environmental Quality committees and the Chairman of the Working Group to consider new and specific terms-of-reference for a new group that may be established next year.

In 1982, discussions took place between the chairmen of their committees regarding how to proceed on the remote sensing issue. The general feeling was that one should be careful that technical problems not dominate the activities of the working group that ultimately should be formed. The Hydrography Committee reported the following:

"The possible new Aerospace Remote Sensing Working Group should consider the application for the ICES as a whole, and therefore, it appeared logical to think of one or two multidisciplinary projects which it might be suitable to execute under or with the help of this group. The Chairman stated that he did not believe that already now such projects should be initiated. In the discussions

between the Chairmen some possibilities were brought forward. He felt strongly that at this moment it would be better to ask a small study group to investigate these different possibilities and to report at the next statutory meeting."

At the 1983 ICES Statutory Meeting, C. Res 1983/2:34 was approved. It reads as follows:

"It was decided that: In order to formulate specific terms of reference for a new working group on the Application of Aerospace Remote Sensing in Hydrobiological Monitoring, a study group (Chairman: Dr. J. Thomas, USA) should be formed, under the Biological, Oceanography, Marine Environmental Quality, and Hydrography committees. The study group should formulate specific terms of reference on the possible applications of remotely sensed data, particularly on temperature and colour-bands, in support of hydrobiological surveys and studies of the marine environment. The group should work by correspondence and report to the relevant committees at the 1984 statutory meeting."

In accordance with C. Res. 1983/2:34, a study group was formed. The chairman was notified 22 November 1983 by the General Secretary. Individual members were appointed 30 January through 5 March 1984.

All activity of the Study Group was performed through correspondence (see Section 2) beginning 11 April with a letter from the chairman requesting input to specific terms-of-reference for a new working group on the Application of Aerospace Remote Sensing in Hydrobiological Monitoring. Additionally, the letter contained a number of documents and statements regarding the terms-of-reference of the previous working group and the disbanding of that group in 1981 (see Section 3, Appendix). Responses to the 11 April letter were received from Højerslev, Pepper, Plevin, and Yentsch. A second letter (14 June) was sent to the Study Group asking for comments to a possible set of terms-of-reference generated from the responding letters and original documents sent out on 11 April. Comments were received from Plevin, Vanjushin, McKone, Sundby, Højerslev, Yentsch, and Pepper. A third letter (27 July) was sent to the Study Group, again raising the issue of why the previous working group was disbanded, again stressing the job we were to accomplish (C. Res. 1983/2:34) and finally, requesting comment concerning the proposed terms-of-reference, envisioned work plan, and overall content of final report. Comments to this letter have been received from Plevin and Vanjushin.

The genesis of the terms-of-reference and work plan are contained in the original correspondence in Section 2 of this report. Section 3, Appendix contains all documents referred to in the correspondence.

## 2. Recommendations

The Ad Hoc Study Group believes that a new working group on the Application of Aerospace Remote Sensing in Hydrobiological Monitoring should be formed to foster international cooperation and communication within the ICES Member States such that problems and diverse technologies in remote sensing are brought together for the purpose of solving major problems of interest to the ICES Member States. We believe that the new working group should search for new or newly applied and improved applications of remote sensing to fishery/oceanography problems and relay these to the Member States through the Council. Finally, we believe that the new working group should actively encourage the use of remote sensing when applicable, and seek solutions to problems regarding the use of remote sensing (funding, availability, etc.).

### 2.1 Terms-of-Reference

On this basis, the terms-of-reference for a new working group on the Application of Aerospace Remote Sensing in Hydrobiological Monitoring are:

- a. To monitor developments in remote sensing of the marine environment.
- b. To provide information on remote sensing applications, availability of data, and new developments to Member States and ICES application groups.
- c. To identify and where appropriate execute practical projects aimed at:
  - developing and demonstrating applications to fisheries (including oceanography and marine environmental quality relevant to fisheries)
  - increasing the understanding of remotely sensed data
- d. To evaluate the methods whereby remotely sensed data can be intergrated with other data types, and to assess the increased value brought by remote sensing to the resulting information.
- e. To advise Council on major issues in remote sensing where an ICES policy is needed.

### 2.2 Plan of Work

The Ad Hoc Study Group envisions that the above terms-of-reference would call for the following plan of work for a new working group:

- (i) Prepare state-of-the-art report, making extensive use of reports already in existence, on aerospace remote sensing addressing both techniques and applications.

- (ii) Send a summary of this report emphasizing potential applications to appropriate ICES working groups requesting comments and specifically practical suggestions on where and how remote sensing methods can be applied in their areas of interest.
- (iii) Carry out an assessment on the availability of remotely sensed data (past and present) and its suitability for ICES-led projects.
- (iv) On the basis of (i), (ii), and (iii) prepared two parallel development activities:
  - multidisciplinary projects to demonstrate applications with participation by members from other working groups
  - technique-related projects aimed at increasing the performance and value of the remotely sensed data (e.g., atmospheric corrections for CZCS, SST skin effect, chlorophyll extraction algorithms)
- (v) Carry out, in conjunction with the user groups associated with (iv) an evaluation of the requirements for the integration of remotely sensed data with other available data sets, the technical solutions needed to achieve integration, and the value added by the remotely sensed data.
- (vi) Provide progress reports to the appropriate higher level ICES committees emphasizing the bridge building approach adopted by the working group in linking the technology with the users.
- (vii) Provide recommendations to ICES Council on issues where a clear ICES position needs to be adopted (e.g., CZCS replacement, ESA proposed Ocean Colour Monitor).

The business of the new working group should be conducted through both correspondence and regularly scheduled meetings supported by ICES.

APPENDIX

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