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CONFERENCE ON DISARMAMENT

PROGRESS REPORT TO THE CONFERENCE ON DISARMAMENT ON THE
TWENTY-SIXTH SESSION OF THE AD HOC GROUP OF SCIENTIFIC
EXPERTS TO CONSIDER INTERNATIONAL CO-OPERATIVE MEASURES
TO DETECT AND IDENTIFY SEISMIC EVENTS

1. The Ad Hoc Group of Scientific Experts to Consider International Co-operative Measures to Detect and Identify Seismic Events, initially established in pursuance of the decision taken by the Conference of the Committee on Disarmament on 22 July 1976, held its twenty-sixth formal session from 25 July-5 August 1988 in the Palais des Nations, Geneva, under the Chairmanship of Dr. Ola Dahlman of Sweden. This was the eighteenth session of the Group convened under its new mandate by the decision of the Committee on Disarmament at its 48th meeting on 7 August 1979.
2. The Ad Hoc Group continues to be open to all member States of the Conference on Disarmament, as well as upon request to non-member States. Accordingly, scientific experts and representatives of the following member States of the Conference on Disarmament participated in the session: Argentina, Australia, Belgium, Bulgaria, Canada, China, Czechoslovakia, Egypt, German Democratic Republic, Germany, Federal Republic of, Hungary, Italy, Japan, Netherlands, Sweden, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland and United States of America.
3. At their request and on the basis of previous invitations by the Committee on Disarmament, scientific experts and representatives from the following non-member States of the Conference on Disarmament participated in the session: Austria, Denmark, Finland, New Zealand, Norway and Spain.
4. Under the current mandate of the Ad Hoc Group, information on national investigations related to the work of the Group has been presented by experts from Australia, Austria, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Egypt, Finland, German Democratic Republic, Germany, Federal Republic of, Hungary, India, Indonesia, Islamic Republic of Iran, Italy, Japan, Netherlands, New Zealand, Norway, Peru, Poland, Romania, Sweden, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland and United States of America.

5. The Group reviewed a draft of its Fifth Report to the Conference on Disarmament, describing initial concepts for a modern international seismic data exchange system based on the expeditious exchange of waveform (Level II) and parameter (Level I) data and the processing of such data at International Data Centres (IDCs).

6. The Ad Hoc Group envisages submitting its Fifth Report to the Conference on Disarmament following the Group's next session.

7. In accordance with the decision taken at the twenty-second session and approved by the Conference on Disarmament to conduct a large-scale experiment, the Group continued its discussions on plans for such an undertaking, to be called the Group of Scientific Experts Second Technical Test (GSETT-2).

The Group confirmed that the main focus of attention will be on the exchange of seismic waveform segments (Level II data) and the analysis of those data at experimental international data centres (EIDCs).

This experiment, which will also cover signal parameters (Level I data), will be conducted using accessible channels of communication, including the WMO/Global Telecommunications System (GTS) and satellite transmission where possible.

The principal purpose of GSETT-2 should be the testing of methods and procedures developed by the Ad Hoc Group to expeditiously extract and transmit the data from stations to EIDCs, to process them at EIDCs and to transmit the results back to participants.

8. The Ad Hoc Group reaffirmed the advisability of a stage-by-stage approach in order to test proposed initial concepts for the envisaged system.

The Group agreed to start GSETT-2 on the basis of this stage-by-stage approach, as outlined in a planning document presented by the Co-ordinator (GSE/Coordinator/4/Rev.1), annexed to this progress report.

Results of these start-up activities will be reviewed at the Group's next two sessions.

With these activities, the first phase of GSETT-2 has commenced. It is now anticipated that, if all of the appropriate facilities and procedures can be put in place, the second phase of GSETT-2 will begin in late 1989 in preparation for the full-scale phase to be conducted in 1990.

9. The Ad Hoc Group asked the Co-ordinator to work out basic instructions for the second and third phases of GSETT-2 and present these to the Group at the next session. Results of the tests during the first phase will be taken into account in developing the final instructions.

10. The Ad Hoc Group suggests that its next session, subject to approval by the Conference on Disarmament, should be convened from 6-17 March 1989 in Geneva.

ANNEX

GSE/COORDINATOR/4/Rev.1

START-UP TESTS FOR GSETT-2

One outcome of the discussions of GSETT-2 on 29 July 1988 was a general agreement that it would be valuable to begin some of the start-up tests as soon as possible. The intent of these tests would be to actually implement procedures advocated by the Ad hoc Group, but never formally tested, in such a manner that participants would be as well-prepared as possible for the full-scale phase of GSETT-2. A number of countries indicated that they would participate in a number of specific start-up tests, as given below.

1. Seismograph Stations and Networks

Until a reasonably detailed specification of the "CD-station" is developed, little can be done in this area except for the provision of descriptions of those stations which will be used for GSETT-2. These descriptions, and the stations themselves, will naturally change with time, but it would seem useful to maintain as complete a description as possible of the stations which each country would plan to use during the full-scale test.

Action Item: Canada will produce, and mail to all members of the Group by 30 November, a detailed description of the stations it intends to provide during the test. This will then serve as a template for similar descriptions from other countries, provided in a standardized manner. The description will include location, geology, noise characteristics, response, etc. As the CD-station specifications are developed, it will also indicate to what extent the station provided does or does not comply with those specifications. If the description relates to a planned, rather than existing, facility, a timetable for the implementation will be provided.

2. National Data Centres (NDCs)

(a) Parameters and waveforms are to be provided for each "detected" signal. Multilateral experiments with event detection algorithms would lead to a common understanding of the term "detected".

Action Item: The "Murdock-Hutt" detector as developed by the United States Geological Survey for the Seismic Research Observatories is familiar to many members of the Group. Canada will obtain and distribute a full description of, and code (on tape) for, this algorithm, and distribute it to interested members of the Group. Each participant will implement this code and compare the results with those of the signal detector (if any) currently employed. Each country will report on experience at the next meeting of the Group. The following countries have indicated that they will take part in this study:

Australia, Bulgaria, Denmark, Finland, German Democratic Republic, Federal Republic of Germany, Hungary, Japan, New Zealand, Norway, USSR, United Kingdom.

(b) Three-component processing, and the use of its results in event association and location, has been advocated by the Group, but there has been no agreement on the method(s) to be employed and the associated errors.

Action Item: Norway will distribute a full description of, and code (on tape) for, the algorithm which it has described in a series of working papers. Each participant will implement this code and compare the results with those of the three-component processor (if any) currently employed. Each country will report on experience at the next meeting of the Group. The following countries have indicated that they will take part in this study:

Australia, Belgium, Bulgaria, Canada, Czechoslovakia, Finland, German Democratic Republic, Federal Republic of Germany, Hungary, Italy, Japan, Norway, Spain, USSR, United Kingdom.

(c) Automatic Parameter Extraction

Those countries with experience in this area (several used such techniques during the 1984 GSETT) are urged to provide the Group with details of the methods employed.

3. Communications (General)

It was agreed that the Sourcebook for Waveform Exchange (CRP 167) will continue to be an extremely valuable source of information on exchange techniques, data formats, and national facilities for data exchange. The United States agreed to continue to maintain and update the Sourcebook.

The SEED (Standard for the Exchange of Earthquake Data) format, which accommodates binary as well as character representation of data, will be described in the Sourcebook. Australia will provide all members of the Group with computer code for the data compression techniques it has described in national working papers, in order that these may be widely tested.

4. Communications (WMO/GTS)

Procedures have not yet been developed for the use of the WMO/GTS for waveform data exchange. GSE/USSR/39 contains some proposals and the Soviet Union will elaborate upon these in order that they may be tested as soon as possible.

In order to help it assess the possible impact of waveform data exchange upon the GTS, the WMO will be sending a questionnaire to those countries planning to use the GTS, concerning the connection between the NDC and the national GTS centre. The WMO will also ask some countries to carry out tests prior to the WMO sub-commission meeting to be held in February 1989. Dr. Suyehiro (Japan) will monitor these activities and report at the next session.

5. Communications (Other Means)

The Group has recommended the use of X.400 protocols (Electronic mail) for data exchange via the international packet-switched data network, but has

no experience in its use. Canada, the Federal Republic of Germany, New Zealand and Norway will carry out some tests, and Dr. Mykkeltveit (Norway) will monitor these and report at the next session.

6. International Data Centres (IDCs)

All four IDC countries have now implemented the Automatic Association (AA) program used in the 1984 GSETT. Australia and the Soviet Union will implement and test the Interactive Analysis (IA) program prepared and demonstrated to the Group by Sweden. All four countries expressed a willingness to assist in the preparation of a waveform data base to test interactive waveform analysis.

Action Item: In order to establish a waveform data base, all countries are asked to extract level I parameters for 1-3 December 1988 and send them, together with the corresponding waveform data, to Australia by the end of 1988. Australia will send all participants, within one month, a set of instructions for this activity (formats, etc). It is hoped that the considerable advance notice provided will permit maximum participation.

Action Item: Realizing that the participation in the above activity may not be optimal for parameter data analysis (AA and IA), Canada will select a portion of the GSETT data base and mail it to the four IDC countries by 30 October 1988. The IDC countries will send the results of the analysis (AA only; and after IA) back to Canada, which will report on the results at the next session. This will only test those procedures applied prior to the reconciliation process, and excluding waveform data analysis.

Each IDC country was asked to summarize the current state of their facilities, and the results were as follows:

Australia: Although this is difficult to assess because the functions and data volumes have not yet been specified, believe already have enough hardware in place. Will implement and test IA.

Sweden: Ready to participate in any co-operative developments amongst IDCs. Will assist other IDCs to implement the IA program, which can be expanded to accommodate waveform analysis.

USSR: Hardware has been specified in GSE/USSR/39. Can start testing using WMO/GTS within 2-3 months. Have tested AA; will implement and test IA.

United States of America: Will be ready for warm-up test by October 1989, as specified in GSE/Coordinator/1, and will follow other schedules in that paper. Will compare Swedish IA with United States software.