

**1997 FDSN Meeting  
August 24 & 27, 1997  
IASPEI General Assembly  
Thessaloniki, Greece**

**First FDSN Meeting  
August 24, 1997**

The meeting was called to order at 18:05 by Chairman Jean Paul Montagner. The agenda (Appendix A) was approved with two additions. The Data Exchange Working Group was tasked with dealing with FDSN software at this meeting. Additionally under Agenda Item 9, reports for Intermagnet will be given by Montagner and the GPS report will be given by Hanka.

The minutes of the 1996 FDSN meeting in the Hague were approved and are attached as Appendix B.

### **Chairman's Report (Appendix H)**

Chairman Montagner presented his report. He indicated the FDSN was founded with three principles in mind. These are

1. the coordination of data exchange
2. station siting
3. format standardization

Broadband regional networks are now abundant and we need to think about the coordination between regional networks and global networks.

In the area of nuclear monitoring, Montagner indicated that the GSE of the UN Conference on Disarmament and the FDSN had exchanged letters and agreed to coordinate activities with the FDSN and the IMS.

Montagner reminded us of the instrumentation workshop that has been convened by Jon Berger, UCSD on Tuesday, August 25, 1997.

In the area of data exchange and the use of FDSN data, there is a real need to coordinate software development within the FDSN. The Working Group on Data Exchange was asked to discuss this at their meeting.

Montagner said that it is appropriate to think of the future of the FDSN and it might be a good idea to have a more formal organization with a budget. This concept would be addressed by the executive committee.

### **Nominations Committee**

Every four years there is a new executive committee and therefore a nominating committee was appointed. The nominating committee selected consisted of Montagner, Giardini, and Engdahl. They will make their recommendations at the final FDSN meeting on August 27.

### **Member Reports --- (Underlined Countries have a report attached in Appendix C)**

- Australia. C-1 (Bernard Dost for David Denham) . A map of Australian stations was shown. Dost indicated that data from the Australian stations are available via an autoDRM at [autodrm@ausseis.gov.au](mailto:autodrm@ausseis.gov.au).
- China. C-2 (Chen Yun Tai) The CDSN began in 1986. A major upgrade began in 1992 with

stations HIA, BJT, and XAN upgraded to GSN standards. At the present time nineeight stations have been upgraded. China is committed to participate in GSETT3. BJT and HIA are alpha stations for the International Monitoring System (IMS). In 1996, the State Seismological Bureau (SSB) of China initiated a project to upgrade the China Network to a total of 50 stations.

- Canada. C-3 (Peter Basham) The CNSN is operated by the Geological Survey of Canada. It consists of 22 broadband sites, 4 are equipped with STS1 seismometers and 18 are equipped with CMG3 seismometers. Mould Bay (MBC) was closed in June 1997 after having been installed in 1961. Canada contributes data from 9 stations to the FDSN data center. John Adams is now the head of the CNSN effort within the GSC.
- Czech Republic Network. C-4 (Jan Zednik) The Czech National Seismic Network consists of 9 BB stations, one of which is analogue. Four of these stations make their data available via autoDRM.
- GEOFON. C-5 (Winfried Hanka) GEOFON is now running 45 stations. Roughly half of these stations are permanent stations and half are long term temporary deployments. Since the last FDSN meeting the following stations have been installed:; SWSan Fernando Spain, Turkey (jointly with MEDNET), Israel, Estonia, Portugal. Next installations are scheduled for SE, Cartagena Spain, Poland and NWSt. Petersburg Russia. On a global basis GEOFON has installed two joint stations with IRISSJF in Greenland with IRIS, and Chile with IRIS, Indonesia, and Antarctica with German Polar Research Institute. For temporary deployments tThey use Quanterra 4100 data loggers where there is adequate power and REFTEKs if power is limited. They have found the REFTEKs to be reliable if you don't touch them. The extension of the data center is far behind original plansthe acquisition.
- GEOSCOPE. C-6 (Genevieve Roult) Since the last FDSN meeting, GEOSCOPE has installed one station, SPB in Brazil. They intend to install two more stations in the coming year, one in Russia and one in Martinique. They have begun movingmoved the GEOSCOPE portion of the FDSN Station Book to the GEOSCOPE data center. They are now doing the noise estimates and these are consistent with the FDSN station book. They produced four new CD-ROMs during last year. All data is on-line through 1996. 10 of the GEOSCOPE stations are recording VBB data at 20 samples per second.
- GRSN. No report was given by the GRSN/Grafenberg group.
- IRIS. C-7 (David Simpson) The total number of GSN stations is now 102. 60 of these stations are auxiliary stations for the CTBT/IMS. IRIS also has the IRIS PASSCAL program but many of these installations are for more than 12 month periods. IRIS is starting the 3rd five-year program with the NSF. The focus of the IRIS GSN is moving toward installation of island sites.
- USNSN. No one was present from the USNSN but Tim Ahern gave a brief update. He reported that the data from the USNSN have started flowing to the IRIS DMC for distribution. The USNSN experienced a satellite outage in the past year that resulted in the entire network being down on the order of one month.
- MEDNET. (Domenico Giardini) The major news was that Italy plans a major upgrade of broadband stations in Italy.
- Pacific 21 (formerly POSEIDON). C-8 (Seiji Tsuboi) Pacific 21 consists of three major projects. Project FREESIA is a major deployment of broadband instruments in Japan, the second project is the PLUME project and the third project is the Ocean Hemisphere Project (OHP). There is a separate report from Pacific 21.

- Taiwan. C-9 (Dr. Yeh) Taiwan is the newest member of the FDSN. They have installed the BATS (Broadband Array infor Taiwan for Seismology) in Taiwan and it is operated by the Academia Sinica in Taipei. The network consists of 9 Quanterra data loggers. Two of these are recording STS1 seismometers and 7 are recording STS2 data streams.
- India. C-10 (Dr. Bhattacharya) from the India Meteorological Department. They have 50 stations using Quanterra Q680 and STS2 sensors. They are using the data for focal mechanisms. They only began using broadband data in 1997. Much of the network is telemetered to New Delhi by VSAT with backup by standard telephone lines. Data are available upon request through New Delhi.
- Romania. This report was given by Vasile Marza. He reported that Romania operates one GEOFON station.
- Brazil. C-11 (Vasile Marza) The seismological efforts reported upon are centered in Brasilia. There are GSN and GTSN stations operating in Brazil. BDFB is an IMS station. They anticipate eventually having 10 broadband stations. There are other organizations in Brazil that operate stations, including Sao Paulo that operates Quanterra dataloggers with CMG3 sensors.
- Switzerland. (Domenico Giardini) It was reported that there will be 6 broadband stations in Switzerland and the data will be available from ETH. They anticipate that the broadband network will be installed before the end of 1999.
- ORFEUS. C-12 (Bernard Dost). ORFEUS deals primarily with European Broadband Stations with most stations being in France and Germany. The ORFEUS Data Center provides access to event data of magnitude 5.5 and larger from European stations. They have produced a total of 11 CD-ROMs covering the years 1988-1991. They have data on-line from 1990-1992 and all SPYDER® data are available from 1992 until present. Stations HGN and WIT are generating continuous data.
- IRIS DMC. C-13 (Tim Ahern) The IRIS DMC continues to archive data from all FDSN networks. It has developed the Portable DCC software to assist network operators in applying quality control of their data and reformatting the data to SEED. PDCC is being used by FDSN members Japan and Taiwan. The IRIS DMC has produced the SEED volumes for the production of the FDSN CD-ROMs and forwarded these data to the USGS. The DMC has also produced the FDSN Station Book and the SEED format manual. Ahern indicated that much of the FDSN information would be on a CD-ROM produced and distributed by IRIS at the Fall AGU meeting. The attached report summarizes the current FDSN holdings at the DMC. There is approximately 1 terabyte of dual sorted data at the DMC from (non IRIS) FDSN sources. The DMC serviced more than 1000 requests from users requesting FDSN data in 1996 and serviced more than 2000 requests to users outside the United States in 1996 and 1997.

### **Committee on Membership**

Bob Engdahl summarized the current status of the FDSN Terms of Reference. Bernard Dost will coordinate comments and present revised Terms of Reference at the second FDSN meeting. Anyone interested should direct their comments to Bernard.

### **Meeting Times of Working Groups**

Engdahl suggested not having a WG on station siting this year as all members had previously submitted updated station lists. A report from WG-I on Station Siting will be included.

Working Group II will meet at 14:30 on August 26, 1997 and should also discuss the role of regional networks and the FDSN on collection and distribution of data.

Jon Berger will be asked to give a short summary of the Instrumentation session.

The first meeting of the FDSN was adjourned at 20:30.

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## **Second FDSN Meeting August 27, 1997**

The second meeting of the FDSN was called to order at 14:45 by Chairman Montagner.

A brief network report for Saudi Arabia was given by Ogie Kuraica of Kinematics. Basically this network will consist of 32 stations using STS-2 sensors. They are interested in data sharing. The network is being used for hazard mitigation.

### **Membership**

There was discussion about potential new members for the FDSN. The following countries were identified as countries operating more than one VBB station within their national borders. The FDSN secretary was instructed to write these countries and ask them if they would join the FDSN. If these countries agree, then they will be members without further action from the FDSN. The countries identified include Brazil, Romania, India, Switzerland, Saudi Arabia, Greece, Israel, Turkey, Poland, and Denmark.

### **Working Group Reports.**

The current FDSN station lists and maps are attached as Appendix D.

Bernard Dost presented the report of the Working Group II on data exchange. There were two new blockettes approved, the version of SEED will remain at 2.3.

It was decided to shift the production of the individual FARM volumes to the member networks. Various networks will send the algorithm they are using to Dost and then work will begin on finalizing the FDSN FARM algorithm.

netDC (Networked Data Centers) was discussed in detail. It was decided to continue the test through 1997, then evaluate it and, if appropriate, propagate it throughout the FDSN.

The autoDRM was discussed. It was decided that the FDSN would like to add SEED using ftp push or email. GEOSCOPE expressed interest in developing this.

SPYDER® was discussed. The WILBER interface developed by IRIS seems compelling. It is desirable to encourage a common interface for accessing SPYDER® data.

There is a need to boost the production rate of the FDSN CD-ROMs to catch up to the current time.

The issue of software coordination was discussed. WG-II on Data Exchange recommends that WG-III on instrumentation be disbanded and a new WG-III on Software be created. The new WG-III would coordinate the development of software related to the FDSN.

The previous Working Group III on Instrumentation report was not provided by Berger. Montagner summarized the session, . He indicated that there were interesting projects on the Martian Project, Ocean Bottom Observatories, a discussion of new telecommunications, GPS and a huge vibrator for seismic sources. The following summary of the workshop was provided at a later date by Jon Berger:

Over the past two decades two major changes in instrumental seismology – the replacement of analog with digital recording and the dramatic increase in the bandwidth and dynamic range of

seismometers have occurred. This workshop discussed the emerging technologies that are likely to have a similar impact on instrumental seismology. Areas of discussion included: (1) the instrumentation of the ocean floor; (2) the integration of seismic and non-seismic sensors and their data – geodetic, magnetic, meteorological, infrasonic, hydroacoustic, and others; (3) advances in seismometry; and (4) telecommunications for global real-time data collection.

It was decided that the WG-I on Station Siting would now be tasked with instrumentation issues as well as station siting. Bob Engdahl will continue chairing WG-I.

WG-II will continue to deal with Data Exchange, Data Centers and Data formats. Bernard Dost will continue to chair WG-II.

WG-III was established to coordinate and define software development within the FDSN. Tim Ahern will chair the new WG-III on software. He will organize its membership via email.

There was considerable discussion about the Terms of Reference. Changes were made to the Terms of Reference, a vote was taken and the changes were approved unanimously. The Terms of Reference, as modified, are attached as Appendix E.

### **Report by Peter Basham on the International Monitoring System (App. F)**

The CTBT was signed by 147 countries. He have a summary of CTBT terminology and structure of the CTBT Office (CTBTO).

The GSE is now officially dissolved. The role of the GSE is now in Working Group B, chaired by Ola Dahlman. The GSE experiment will continue to operate through 1998 with data going to the PIDC in Arlington, VA.

For a station to become part of the IMS, the data must go to Vienna not the PIDC. The IMS organization will pay for the operations and communications of all Primary stations and arrays. Only communication costs will be paid for Auxiliary stations.

Basham described the organization of the verification system and identified key personnel. Basham then described the general structure of the IMS. There will be 320 individual stations connected by VSAT to Vienna. In the IMS, there are currently

- 35 primary seismic stations
- 54 auxiliary seismic stations
- 4 hydroacoustic stations
- 5 infrasound
- 23 radionuclide

There will be a T1 line from Arlington, VA to Vienna. The Vienna IDC will be operational by late 1998. The total cost is \$200 million. The budget for 1997 is \$28 million and the budget for 1998 is \$60 million.

Hanka raised the issue that IMS use of FDSN stations places demands upon the FDSN. Basham indicated that the host country controls the stations. The country may choose to work with the FDSN to operate the in-country stations. Hanka and Montagner both expressed concern about the lack of coordination between the IMS and FDSN. Dost and Ahern recommend FDSN networks should write letters to host countries. Astiz indicated that FDSN members have already dealt with countries just to get equipment into the country.

Basham indicated that the hope of the IMS is that in the future it can function with only primary stations and not use auxiliary stations.

Many other questions ensued. There was very great interest and discussion about the IMS.

## **Reports from Other Organizations**

### **ION (Montagner) (see Appendices G1)**

A brief report of ION was presented by Montagner. He indicated the close association of ION and the FDSN. There was a workshop in 1995 in Marseilles. Montagner briefly described the current status of ION. The goal of ION is to install about 20 stations in the oceans.

### **INTERMAGNET (Montagner) (see Appendices G2)**

Montagner showed the Intermagnet station planning map. He then summarized the data centers holding the data. He stressed the similarities between Intermagnet and the FDSN.

### **OHP (Tsuboi)**

Tsuboi gave a report on the OHP. These are combined seismic, GPS, EM, and gravitational observatories. ERI will distribute the data as well as send FDSN data to the IRIS DMC. He showed a variety of maps giving locations of various networks. He indicated that there will be a symposium in November in Japan.

### **GPS (Hanka)**

The governing group is the International GPS Service (IGS). He gave a summary of the objectives of the IGS and how the IGS is organized and how it functions. GEOFON will try to colocate seismic stations with GPS sites.

## **FDSN Products**

Ahern gave a summary of the FDSN Station Book. He indicated that the new noise study is done. Tar files will be sent to each of the FDSN networks for future maintenance. IRIS will mirror other WWW sites and periodically issue CD-ROMs. The first CD-ROM will be distributed at the AGU meeting in San Francisco this fall. The members agreed that information like the network contact will be optional.

## **Report of the Nominating Committee**

The nominating committee for the FDSN Executive Committee consisting of Engdahl, Montagner, and Giardini put forth the following slate of candidates.

- Chair Fukao Japan
- Vice Chair Hanka Germany
- members Campos Chile
- Roullet France
- Secretary Ahern USA

Montagner asked if there were any other nominations. There were none. The above slate was voted upon and approved unanimously. Bob Engdahl remains the IASPEI representative to the FDSN and continues to serve on the FDSN Executive Committee.

## **Next annual meeting**

It was proposed that the next annual meeting should be before the 1998 Fall AGU meeting. It

was suggested that the meeting be in Seattle at the IRIS DMC, home of the FDSN Data Center. It will be held on Friday and Saturday before the AGU. It was noted that there are frequent and inexpensive flights from Seattle to San Francisco so the logistics should be simple.

Meeting adjourned at 17:30.

Tim Ahern  
FDSN Secretary

List of Attendees  
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23 attendees

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List of Attendees  
Second FDSN meeting  
August 27, 1997

20 attendees

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