

**Draft Minutes
2007 FDSN Meeting
IUGG Perugia, Italy
8-11 July 2007**

**FDSN Plenary I
8 July 2007**

The FDSN Chair, Domenico Giardini, called the first plenary meeting of the 2007 meeting to order at 3:10 PM. The agenda was summarized and approved. The purpose and tasks before the FDSN working groups were mentioned.

The minutes from the last FDSN General Assembly in Santiago, Chile (2005) and the Regional Assembly in Bangkok (2006) were approved.

Chair's Report: Giardini presented a summary of the coordination of global seismology and the role that the FDSN must play within it. FDSN is the international voice for seismology. He identified the following as the most important objectives of the four years in which he served as chair of the FDSN including the importance of making data available in real time, increasing the global distribution of data, improving the regional participation in the FDSN and in the expansion of the type of data falling under the FDSN umbrella.

He summarized the FDSN and its organization as an independent non-governmental organization. It has commission status within IASPEI and it now supports variable geometries of networks at different scales. He indicated his belief that it is important for the FDSN to start promoting FDSN principles within the Ocean Bottom Seismometer (OBS) community.

As the FDSN has grown in membership it has evolved from being an organization of global networks with a primarily scientific interest to an organization with a membership of national networks with a primary monitoring interest. The FDSN is very global in its membership as well as the coverage of its stations. He showed how the density of stations in Europe, for example, has experienced a very great densification over the past period of time.

Giardini highlighted FDSN data distribution as working well with a centralized FDSN archive for the FDSN backbone stations at the IRIS DMC but with a large number of regional and national data centers networked together through common data request mechanisms. He again stressed that the goal of the FDSN is for real time data.

Giardini suggested that the FDSN should focus more on products in the future with the products being built at the major data centers and he listed a large number of possible products.

He touched on GEOSS and how it interacts with the FDSN.

Giardini summarized the FDSN structure consisting of a chair and a secretary with an executive committee currently consisting of the chairs of the five FDSN working groups. The steering committee consists of one person from each of the FDSN members. The working groups are where much of the work of the FDSN takes place. It will be suggested that the current working groups II and III will be merged within WG II and that WG III will be recast as a working group focusing on products and related tools.

The question of who represents seismology in international forums was mentioned and Giardini feels that that is one of the key roles of the FDSN. He summarized future challenges which include 1) increasing member participation, 2) improve real time data access, 3) increase backbone and improve continuous data flow from the backbone, 4) improve the data quality, 5) coordinate OBS data, 6) work with GEO and CTBTO and 7) provide the international representation for seismology.

Rainer Kind asked what station had provided the most data to the end users. If these numbers can be provided then it would be very useful information. Ahern indicated that this information is tracked and could be provided.

Storchak wanted to make sure that the absolute time is preserved as the ISC sometimes sees that the timing is very poor. It seemed that this did not apply to modern FDSN stations to any significant degree but to older networks.

Seiji Tsuboi next presented some information about the FDSN station inventory. He indicated that the most recently updated station list was now available from the FDSN web site. He requested that all networks check the list for accuracy. At the present time there are 911 existing stations with 176 of them being designated FDSN backbone stations. In addition the list shows 40 planned stations. Benson asked how many of the 911 are in an archive and it seemed no one was sure of the number. Montagner asked if any new stations would be added due to the IGY. Schweitzer indicated that he knew that some Norwegian stations would be added. Kind asked what the definition was for a backbone stations. Benson asked if station siting was less than 2000 km.

Ahern presented the report for the FDSN Archive. Great improvements in data availability from member networks to the FDSN Archive were seen in the last two years with more than half of the membership now providing data. At this time 31 networks deliver data in real time compared to 14 only two years ago. Ahern highlighted the growth in the amount of FDSN data at the FDSN archive and it now totals more than 6 terabytes of the total archive of IRIS that is roughly 60 terabytes. Of the 300,000 requested service by the IRIS DMC last year about 100,000 came from outside the US with most of those coming from FDSN member countries. Requests have been serviced from 68 countries since 1989. 16 terabytes of data were shipped last year, which is more than the 12 terabytes of new data, archived at the IRIS DMC attesting to the high utilization of data at the IRIS DMC.

New Members:

Chinese Academy of Sciences

No one from CAS was available so Ahern gave a brief summary. The CAS operates a few hundred temporary seismic instruments and deploys them in campaign style experiments. They are developing a data center and indicate that their data are and will be openly available.

Kazakhstan National Network

Inna Sokolova presented the new network report for Kazakhstan. The network report will be provided on the FDSN web site.

Montagner inquired as to what sensors were deployed in the Kazakh network. Sokolova indicated that they use CMG3, KS54000, STS1, STS2 and GS13 sensors.

Uzbekistan Network

Giardini briefly presented the Uzbekistan report. The network consists of 14 stations. The network report is included on the FDSN web site.

Kyrgyz Network

Nelya Sycheva presented the Kyrgyz network report. KNET consists of 10 stations using STS2 sensors. Sycheva showed the seismicity map of Kyrgyzstan. The report can be found on the FDSN web site.

The FDSN approved the membership of the four groups that include Chinese Academy of Sciences, Uzbekistan, Kazakhstan and Kyrgystan.

Summary of European Networks. VanEck presented a summary of network developments in Europe. In Europe there are roughly 100 observatories with 800 broadband stations. There are also about 400 portable instruments. About 200 of the stations arrive in real time. In Europe they try very hard to have real time data flow from the Virtual European Broadband Seismic Network (VEBSN).

Montagner asked about OBS stations in Europe. Benson asked what the outlook is for getting more data in real time. Willemann asked how global the QuakeML effort is. VanEck indicated that this effort would be discussed more in WG II. Report is available on the FDSN Web site.

Summary of Status in the Americas. Butler indicated that he would share the reporting with Gerardo Suarez. Butler began by describing a potential deployment of many sensors in Greenland to study the effects of global warming. He indicated that any deployment there obviously had to be an international effort.

In Puerto Rico the new developments center upon the Caribbean Tsunami Warning System. Butler presented information provided by the Canadians regarding the status of permanent and portable seismic efforts in Canada.

In the continental United States there is a large focus on EarthScope USArray stations. He mentioned the various components within USArray including the Transportable Array, the ANSS Backbone and the Flexible Array.

Butler summarized the status in the Americas with a brief mention of new GSN stations including 5 in the Caribbean network, the II station in Madagascar, and IU stations in Tarawa, Xmas, Canton Island and Kabul. 97% of the GSN is telemetered now.

Butler told the Plenary that the new OBSIP in the US has adopted the FDSN recommendation to have data from at least one station for each deployment as an open station.

Suarez completed the America's report. He showed that Venezuela has a very large network of 31 stations that are telemetered. Brazil in Sao Paulo plans to install about 20 new stations. Brasilia also operates a seismic network. In Argentina (IMPRESS) there are about 9 stations. Chile has 8 stations and they are negotiating to have a new network of about 40-50 stations. Ecuador has a volcano monitoring network and it is running well. Mexico has made very large improvements in the last 4 years. There are several new stations and they plan to add 36-38 stations in the next 1-2 years.

Status of Asian-Australian Stations

Tsuboi presented a summary of developments in Asia and the Western Pacific. He made note of the recently held GLORIA symposium where many countries from the region were present. He showed the GLORIA recommendations.

Hanka described the IOTWS and the German efforts in the Indian Ocean Region. He briefly discussed that Iran is completing their broadband system but data are not openly available. India will install several new systems. Thailand has 15 new stations and will add perhaps 25 more. Malaysia has several stations and freely distributes their data. Australia has totally open data. New Zealand is totally open. South Africa has 5 real time stations but they do not share the data widely. Indonesia has many stations and share data through bi-lateral agreements. Hanka discussed the status of GFZ stations in the Indian Ocean more fully.

Elenore Stutzmann asked about stations in Madagascar. Davis indicated there is one new IRIS IDA station now operating in Madagascar. Hanka also briefly mentioned a large GFZ network in Chile. Willemann pointed out that there are also AfricaArray stations in Tanzania.

Additional Comments

Giardini asked how people wanted to see the FDSN evolve. He asked people to consider this question.

He then tasked the various WGs as they have their meetings this week. WG I consider how to increase data availability by increasing the number of stations that contribute data to an FDSN archive. He wishes to see regional coordinators perhaps 10 people, to be appointed within a region to track the FDSN stations in that region and encourage data contribution.

WG II. The focus should be on distributed data centers. How can we merge data from IRIS, ORFEUS and JAMSTEC for instance?

WG III. Data Products and Tools. We will need to establish a room and hold a WG formation meeting. Ahern will lead this working group. The location and time of this meeting will be announced in WG I and other WG meetings.

WG IV. There will not be a WG IV meeting.

WG V. Portable Instrumentation group will be meeting. He asked this group to include OBS data in its deliberations.

Montagner asked that WG I include discussions about the STS 1 replacement. Butler indicated he will provide some information about sensor development in the WG I meeting.

Giardini then presented Gerardo Suarez and Torild Van Eck as candidates to assume the roles of FDSN chair and secretary respectively.

The Plenary Meeting ended at approximately 6PM.

FDSN Plenary II 2007 July 11

Chairman Giardini opened the second plenary at 6:10PM.

He called attention to the tsunami efforts and the presence of David Green from NOAA. The second plenary will devote appropriate time to this effort and draw from Green, Hanka and Butler.

Giardini quickly reviewed the proposed agenda for the second plenary and no modifications were made.

Working Group I report by Seiji Tsuboi.

Tsuboi indicated that WGI would try to get new and younger regional contacts for various regions of the globe. He reviewed the WGI agenda and reviewed the status of the regional coordinators. He identified 7 regions, N. America, S. America, Europe, Africa, Central Asia, Russia and Asia/Australia.

He indicated that the list servers at the FDSN Archive run by IRIS will be updated in the near future and these list servers will be used for distributing additional information from WGI.

A new column will be added to the FDSN Station spreadsheet. This will indicate the data center or centers where data from the station will be available. Also a new column called timeliness will be included with valid options of RT=Real Time, AD=Artificial Delay or TD=Technical Delay. The definition of the FDSN Backbone will be discussed within a small group of the WGI, as it is not totally clear how the backbone is defined.

Butler indicated that timeliness should be viewed from the perspective of the end user. The replacement for the STS-1 sensor was discussed with Butler providing an update of some efforts taking place within the US seismological community. The issue of Quality Control of the clock will be discussed within WGII.

The new format for the inventory is being discussed at this time, XML is being considered and a proposal will be ready by the next FDSN meeting.

Benson asked how the regional coordinators would be selected. Tsuboi said that a preliminary list was identified and he will contact the various people to see if they will serve in that capacity.

Olivieri asked which company was working on the STS-1 Electronics as mentioned by Butler. Butler indicated that it was MetroZet (<http://www.metrozet.com/>).

Working Group II Report by Bernard Dost.

Dost reviewed the agenda of working group II. WGII felt that the need to continue developments of standard interfaces to data centers was still a priority. He mentioned ArcLink, DHI and Ninja. New developments now include web services. He indicated that there is an existing link between ArcLink and DHI.

There is a need for standard XML schema within the FDSN. There is a need to get the various technical experts together to address this need.

Dost described 5 specific issues about SEED that were discussed. All proposals were accepted with minor additions in one case. The changes will be added to the SEED manual.

Real Time Data Exchange Protocol. The Tsunami effort adopted SEED format but no protocol has been accepted. SEEDlink is a defacto standard. Davis promised to send a document about other protocols. Action was to make a list of protocols and their usage.

Redistribution of Data. To have truly open access to data it should be possible for data centers to redistribute data from other centers. However a standard reporting system needs to be established to report the usage of the data. Some people just want to request data from a portal for instance.

XML Developments. Dost indicated that Hanka presented an XML summary at WGII. Several groups were willing to consider QuakeML as a good vehicle.

Station Code Naming Conventions. A brief summary of the discussion about the ISC proposed new convention was presented. The FDSN expects to remain engaged in these discussions. The basic result is that the proposed naming convention should or could have minimal impact on existing FDSN data centers. The FDSN must remain engaged in these discussions.

Wolfgang Lenhardt mentioned that XML could be used for the station inventory as well. Montagner asked if NetDC would be continued to be supported. Ahern said that IRIS would continue to support it in the future.

Working Group III by Tim Ahern.

Ahern presented the new working group on Products, Tools and Services. Ahern summarized the major points of discussion of WG III. The working group proposed a charge, identified groups that should be represented in the working group and identified some initial products and services that it might pursue.

It was decided to focus on the Power Density Function Products using the PQLX tool developed by IRIS and the USGS as an initial product. It was also felt that another product would be the ability to display station locations through OGC WMS and WFS services as well as providing information through Google Earth KML.

Giardini indicated that perhaps this group should meet more often, perhaps at the Fall AGU in San Francisco. Green indicated that these types of products could be provided to GEOSS.

Working Group IV by Jim Lyons.

Jim Lyons gave a brief summary of WGIV activities. He summarized the previous efforts that included writing letters directly to the CTBTO as well as arranging bilateral agreements between FDSN Data Centers and countries operating IMS stations/arrays. The FDSN was aware of the opening of data to Japan and the PTWC tsunami centers. Green gave a broad summary of the current status of the agreement between IOC and the CTBTO. Last August the USGS and NOAA visited Vienna and developed an MOU. The agreement is not yet signed.

Suarez provided further insight on the issue. Roughly 4 countries always object to data sharing within the CTBT. They do not want to openly send data to anywhere and the tsunami agreement is officially a “test”. IMS O&M is also done in a test mode. China and Iran do not want to operate the network. Suarez thinks the FDSN should continue to engage the CTBTO on the data exchange issue.

Working Group V by Jim Fowler.

This was the first meeting of WG V that had a sizeable attendance. Fowler identified the primary areas of interest of the group. WG V proposes to conduct a demo project that will allow members to track past and future (proposed) experiments. They hope to have this by the next FDSN meeting. They want to consider using Google Earth for display. It will start with a bounding box for proposed experiments and then continue forward with actual station locations as stations are installed.

The Pools of OBS instrumentation must be approached as well. This has started to take place. WGV also discussed the idea of developing a “best Practices” handbook.

Giardini asked who would chair WG V? Fowler responded that Alex Brisbane would continue.

GEO by Rhett Butler.

Butler summarized the current status. A report was recently completed. The FDSN Backbone has been registered as a component of GEOSS. Butler showed the various tasks of DI-02-06. Some at the meeting felt there were too many tasks included. In general a very good summary was provided.

Green wondered how deliberations of the working groups of the FDSN might help the cause of the GEO task DI-02-06. Should the tasks be rewritten to capture some of these thoughts? This discussion went back and forth many times with input from Butler and Green. No clear conclusion was reached. However it was felt that the 3rd and 5th tasks of the DI-02-06 should

be rewritten to capture some of the work of the working groups. Dost and Ahern were encouraged to add some modifications as they relate to data centers.

Tsunami Warning discussion by Hanka and Green.

Hanka gave an excellent review of the IOTWS. The FDSN is an official observer in this activity. Funds are available in this environment but the coordination is quite difficult. Hanka identified the status of many of the station deployment developments in the Indian Ocean Region.

NEAMTSW (NE Atlantic and Mediterranean Tsunami Warning System)

There is no funding for NEAMTWS. Hanka described the current status and structure for this group. There is not any centralized funding. Suarez asked what GeoFon is doing independent of discussion in the region. GeoFon moves forward on its own. Suarez asked when N. Africa countries would be brought into the process. Hanka was not sure. It is easy to agree on technical issues but politics are difficult.

Green indicated the IOC is very small and concerned about its viability. He summarized some of the activities in the Indian Ocean region. He stressed that these groups must figure out what to do to sustain themselves as well as determining what not do.

The issue of understanding what it means to be an operation system was not understood in the Indian Ocean Region. The Caribbean understood this and the Mediterranean does as well.

Giardini proposed to keep all WG chairs along with Suarez (chair) and VanEck (Secretary). The FDSN Excom will continue to be the chair, secretary and the five working group chairs. This was accepted by acclamation and Suarez became the new FDSN Chair and VanEck the new FDSN Secretary.

Suarez thanked Giardini and Ahern for their years of service. Suarez thanked FDSN members for the honor of asking him to serve as FDSN chair. Suarez indicated that he and Torild do not want to reinvent the wheel. Suarez brought up several specific issues as they relate to the FDSN moving forward.

He commented on the following things:

- Membership
 - Update the names of the institutions and the individual contacts of FDSN members.
 - Encouraged the registration of all members via the Web Page on the FDSN Web site.
 - Contact the less active members and encourage them to participate in the FDSN.
- Station List
 - Update the station list by July 2008 and update it every year after that.

- Define the category of the FDSN Backbone stations
- Update the list of all FDSN stations.
- Aim at efficient coordination with the ISC and NEIC.
- Representation
 - FDSN represents seismic network operators
 - Maintain close contact with IASPEI
 - Continue GEOSS activities
 - Continue to engage the CTBTO
 - ISC collaboration and exchange of information.
- Working Groups
 - Recruit new blood in the working groups
 - Involve regional groups where possible
 - Rejuvenate the software work of WGIII (now in WGII) and WGV, portable instruments.
- Future
 - Implement regional coordination
 - Encourage new members (Central and South America, Africa, Middle East and SE Asia)
 - New people
 - Global Coordination
- Coverage and Backbone
 - Improve Coverage
 - Use Regional Coordinators
 - OBS Coverage
- CTBT
 - Try to get primary and secondary stations to fill existing gaps
 - Two pronged approach
 - Communicate with governing bodies
 - Communicate with individual countries
- Network Products and Tools
 - Deployments of services and tools
 - New standards for data exchange and services as mentioned by WGIII.

Suarez suggested that the next FDSN meeting should be in South Africa in January 10-16, 2009 in conjunction with the IASPEI meeting in Capetown, South Africa. There was broad agreement with this meeting venue. Suarez encouraged the FDSN to join other meetings when possible and specifically mentioned IRIS and himself are planning a Central American meeting that. We should continually look for meetings of opportunity.

Suarez adjourned the meeting at 8:20.

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