



Federation of Digital Broad-Band Seismograph Networks

# The IMS Network and the International Federation Of Digital Seismograph Networks,(FDSN): A Long and Winding Road

*Gerardo Suárez and Florian Haslinger*

International Federation of Digital Seismograph Network



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### **Content:**

- What is the FDSN, by the way?
- The Beginning of a Collaborative Effort
- Where to in the future?



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## **The FDSN: Origins**

- Founded in 1985 to bring together digital broad-band seismic networks.
- Support national institutions and seismic networks moving into the broad-band seismic technology
- Coordinate the location of new seismic stations to avoid duplications and promote global distribution



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### **The FDSN: Goals**

- Encourage data exchange
- Promotes the installation of seismic stations. There are about 2000 broad band sites; now over 200 in real time (backbone stations)
- Promote a variable network geometry approach: local, regional, national, worldwide scales
- Promote the deployment of ocean bottom seismometers

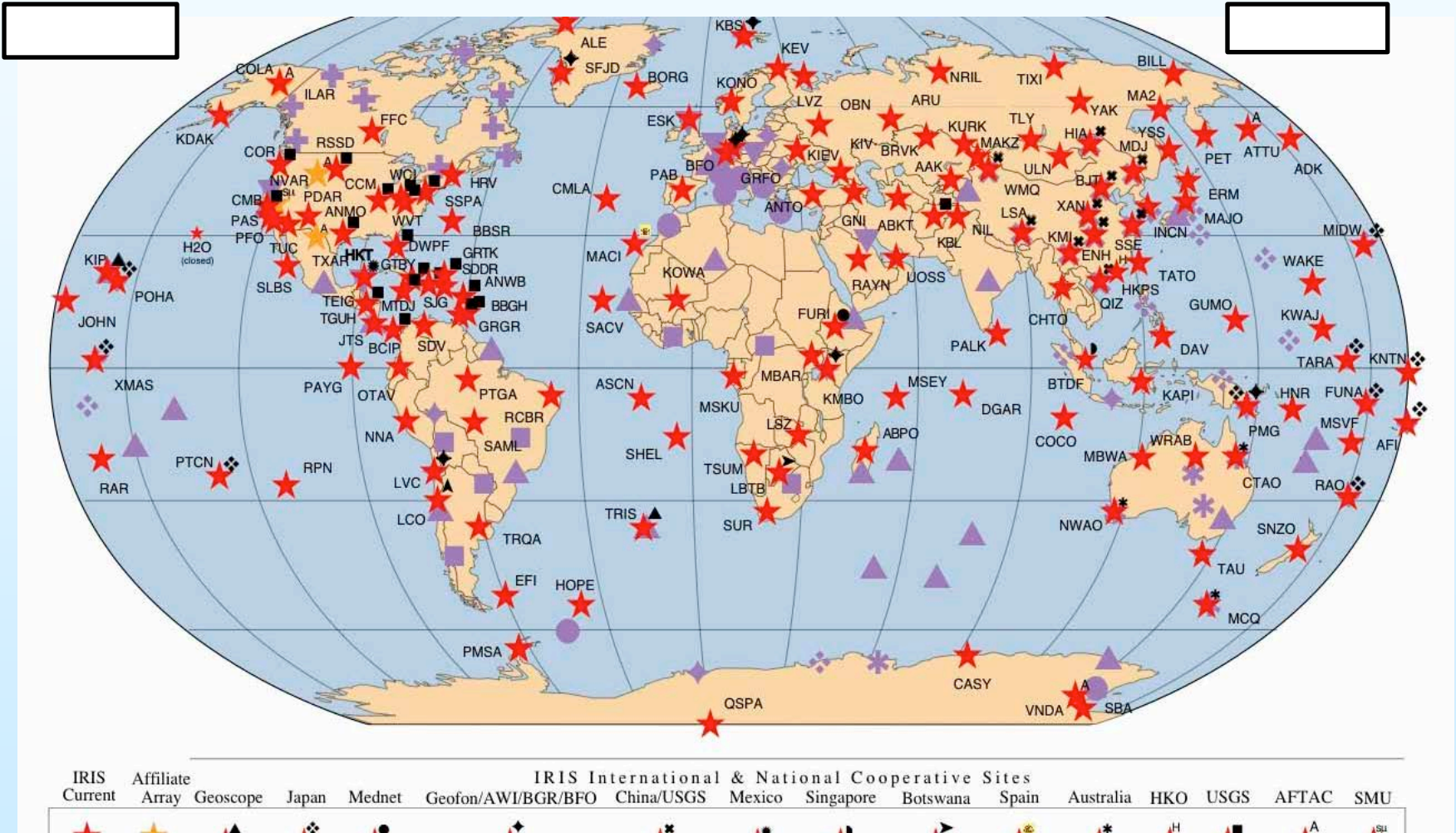


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## **The FDSN: A Unique Organization**

- FDSN does not have inter-governmental status
- Has no budget
- No permanent staff
- Operated by support offered by member institutions
- 85 Institutions in 58 countries

# Real Time Stations (Backbone)



# The IRIS/FDSN Archive

## ❖ Archive

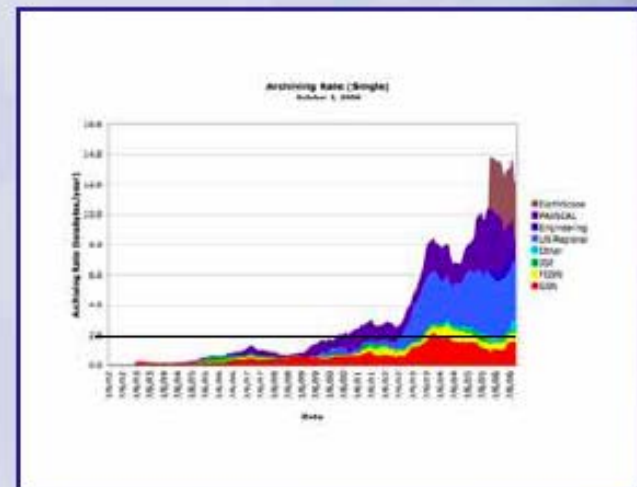
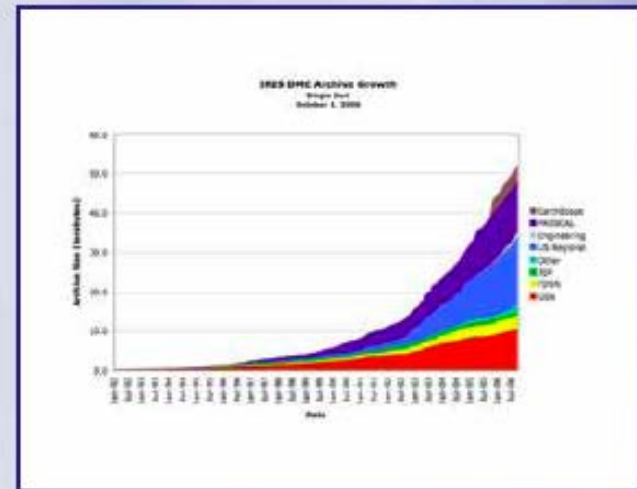
❖ 51 terabytes

❖ >16 terabytes  
GSN/FDSN data

## ❖ Archiving Rate

❖ 14 terabytes/year

❖ ~2 terabytes/year  
GSN/FDSN data

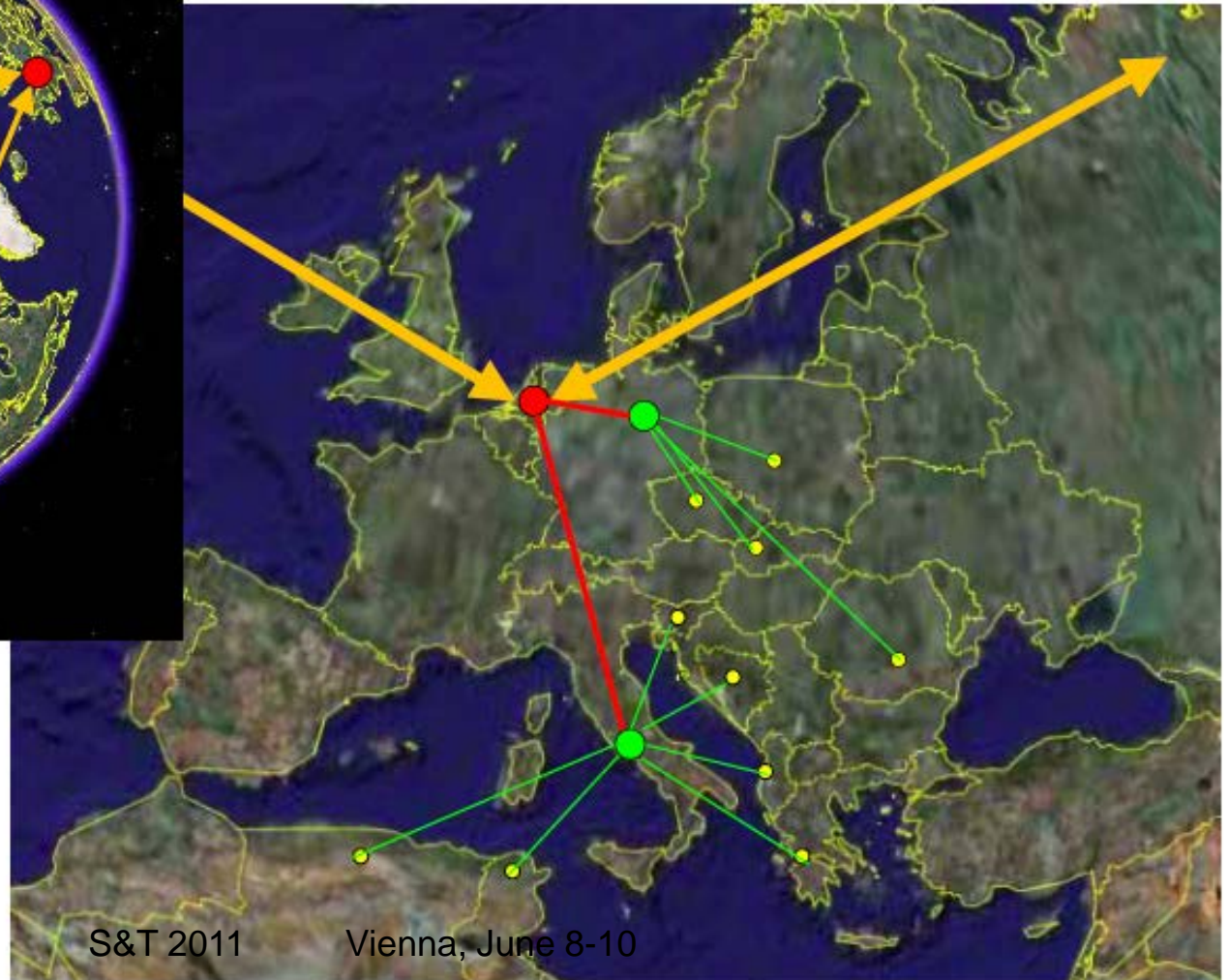






# Data Management

## Global Hierarchical Net.DC



S&T 2011

Vienna, June 8-10

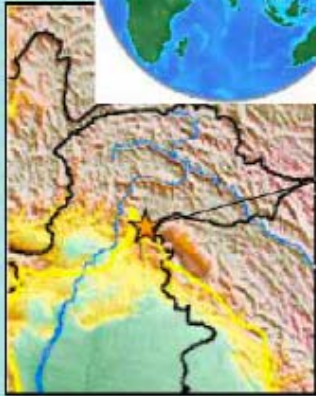
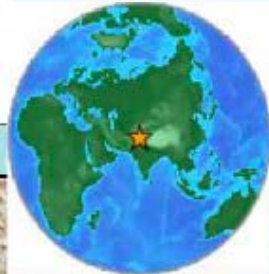


## Data Distribution Performance Goals

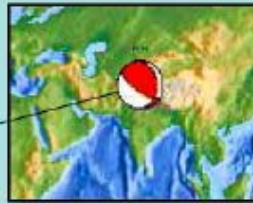
- Free and Open Access to Data via Internet
- Real-time Data Availability without Delay or Restriction
- Continuous & Complete Archive
- Quality Control
- High data return



# Benefits of Data Sharing



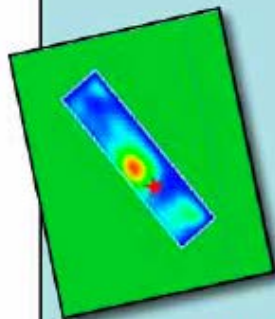
**Magnitude & Epicenter**



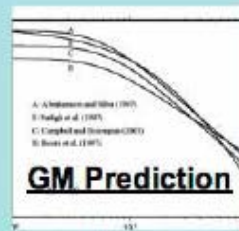
**Faulting Mechanism**



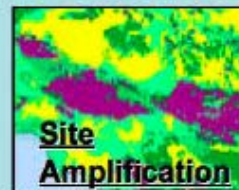
**Aftershocks --> Dimensions**



**Fault Slip Model**

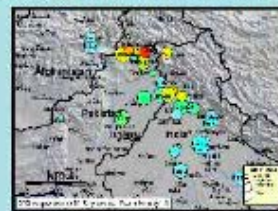


**GM Prediction**

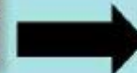


**Site Amplification**

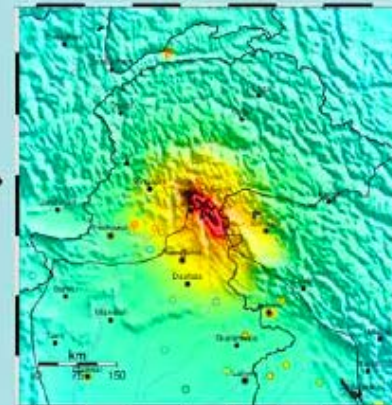
**Reported Intensities**



**Recorded Ground Motion Amplitudes**



**ShakeMap**





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## **Challenges of IMS and FDSN in the Early Years:**



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- Ensure Dual Use: Scientific and IMS



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## **Challenges of IMS and FDSN in the Early Years:**

- Ensure Dual Use: Scientific and IMS
- Guarantee Independent Operation
- Authentication and IMS Format
- Training Operators to Troubleshoot both System





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## **Mutual Benefits of this Relationship:**



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- Small Investment for the IMS
- Improved Operator Qualifications
- IMS Modernized Equipment at some Sites
- Reliable Communications for some FDSN Stations



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## **Future Benefits and Challenges:**

- Improve Operational Efficiency and Sustainability
- Collaborate in the Development of Local Seismological Expertise
- Support establishment of NDCs



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# Sharing IMS Data?

*This was the question in the initial years*



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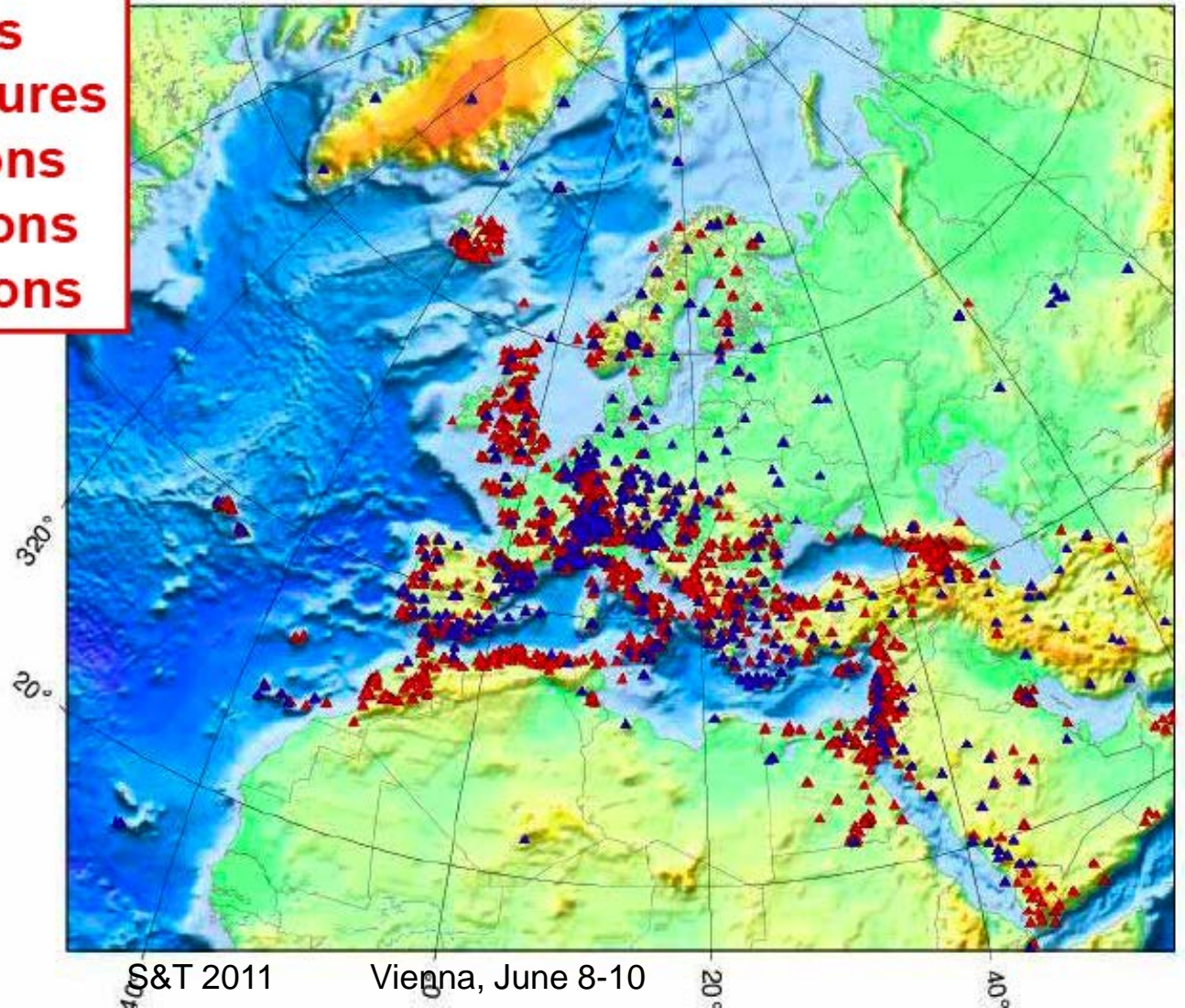
***THE TIDE HAS CHANGED!***







**46 countries**  
**150 infrastructures**  
**800 BB stations**  
**1800 SP stations**  
**3000 SM stations**





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## Two-Way Exchange of Data:

- Develop improved event discrimination methods making use of unprecedented density of high quality stations



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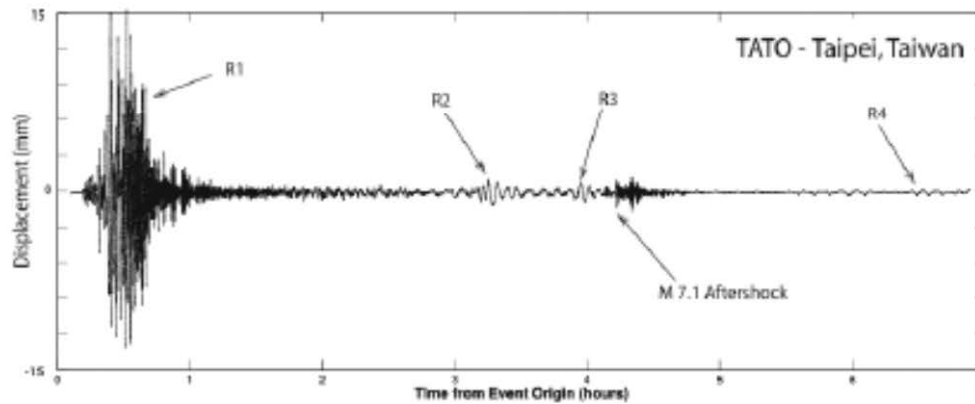
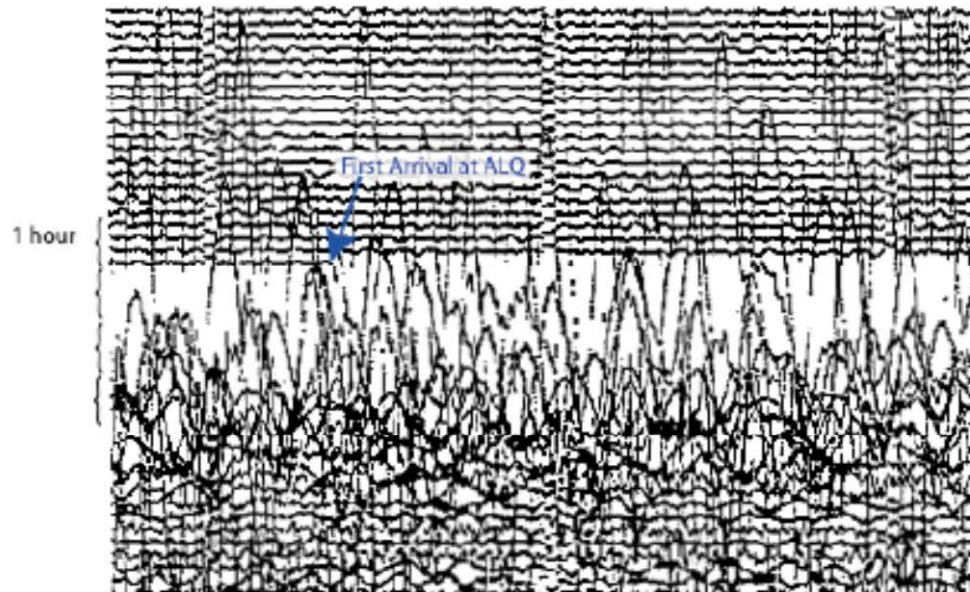
## **Two-Way Exchange of Data:**

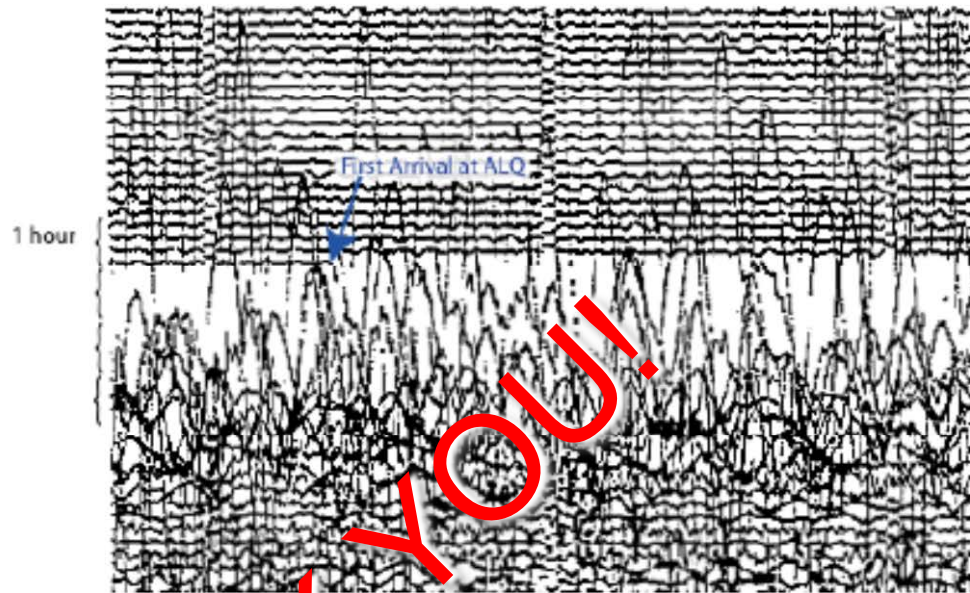
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- Allow independent validation of IMS products



## Two-Way Exchange of Data:

- Develop improved event discrimination methods making use of unprecedented density of high quality stations
- Allow independent validation of IMS products
- Common *web-based* tools for data exchange for use with NDC-in-a-box (for example)





THANK YOU!

