NetOpsII Meeting
Cal-Tech, Pasadena, CA
27-28 Feb 2008

Purpose: To discuss issues within the Regional Seismic Networks (RSN) related to hardware, sensors, vaults, power, the ANSS depot, and communications. See attached agenda.

ASL Personnel Attending: Neil Ziegelman and Kyle Persefield

NetOps II Attendees: See attached attendee list

General Discussion:

Overall I believe this meeting was very productive. A great deal was discussed and Neil and I learned a great amount. I'm just amazed at how many stations are supported by the regional networks, by how small the workforce is, and how they get by on a shoestring budget. I was somewhat surprised by how many analog stations continue to be supported.

I will somewhat limit this trip report to those items Neil and I think have a direct bearing on what we do at the Albuquerque Seismic Lab or of concern to the ANSS Regional Depot. As it is, this will be a longer than usual trip report.

Existing Instrumentation: What's Working, What's Not

STS-2's - Some networks have been experiencing problems with STS-2's. It appears that just the East component gets noisy over time.
Action Item: How widespread is this? What's ASL's experience?

Guralps -There was considerable alarm that Digital Technologies Associates (DTA, Bruce Pauly) were no longer associated with Guralp. Some people knew and some people didn't. Alarm bells went off. We need to find out more about the dissolution of this relationship. Is it just rumor? How do we buy Guralps now? Is Guralp in trouble? How is the Guralp facility in Titusville and AFTAC going to affect the networks?
Action Item: Establish ASL repair facility for Guralps

Manufacturer Documentation - It seems from this discussion that all documentation from all of our seismic manufacturers is poor. There must be a way to pressure the manufacturers to provide better documentation.

Trilliums - All would like to hear more about everyone's Trillium experience. Can Bob Hutt weigh in on this? Trilliums sound promising so far.
Action Item: When Bob publishes, send out to attendees.

Digital Data Acquisition Systems: We did not learn of anything negative regarding the Q330's or the Reftek 130's except for perhaps the learning curve on these items. Those wanting to use Q330's would like training.

NetQuakes Sensor - The prototype we saw had an aluminum baseplate. People wanted to know if this plate was isolated from ground and many expressed concern about this baseplate corroding. Is this design finalized?

Action Item: Contact the group working or manufacturer on the NetQuake system and see if they can answer these concerns.

Grounding and Lightning Protection: Grounding and lightning protection was briefly touch on by me, but we really did not go into great depth. Simply stated, grounding and lightning protection works. I did get some feedback and questions from a number of attendees.
Action Item: Make up a typical grounding scheme drawing and provide sources for grounding and lightning protection equipment and devices.

ASL Equipment Depot:

The Depot topic generated at great deal of interest. I emphasized that our beginning is small and humble, but that we anticipated significant growth. I said that though we are open, we still had a way to go in developing practices and procedures for testing equipment and have ask the members if they had developed anything that could help us , we would appreciate them forwarding us a copy of their procedures.

We tried hard to anticipate questions prior to the meeting and had prepared a FAQ sheet hoping to answer as many questions as possible, but we were surprised that we missed some. The Depot discussion produced some very good questions.

a. Can the Depot provide a loaner piece of equipment while a non-USGS asset is being repaired with the host network's funds?
b. Some networks want the same piece of equipment back that they sent in for repair. They don't want a swap. Is the Depot going to force a swap?
c. In the standard Depot equipment list, was the CMG-5T-D a typo? This unit has integral digitizer. Did we mean just CMG-5T?
d. Will network operators have access to the Depot equipment database? I think what they are wanting is to be able to see what is on the shelf, where their equipment is in the repair cycle, and to see failure history rates. Would this be a USGS IT security issue? Gary Gyure thinks it's possible to have a web page fed from a database query to show current status/location.
e. Can non-USGS assets be run through the depot (database only exercise?) just to establish failure statistics?
f. Can the depot do equipment training? Can we invite manufacturers to the depot to train classes?
g. There is a great deal of concern in the RSN's that their workforce is graying rapidly. In fact, two addendees will be retiring soon. Unfortunately, with the lean workforce of today, knowledge is not being passed onto the next generation of young field engineers. Can the Depot develop an Intern like program?
h. Can the depot provide loaner field engineers? Can we provide a labor surge capability? How closely can ASL and PASSCAL become "Married", to meet certain RSN contingencies? Hummm? Very interesting. The workforces are totally lean in the RSN's.
i. Yes! The RSN's want the Depot to have the capability to repair Guralps. Though everyone would like to use STS-2's, the reality is that they just can afford them. The Guralps are cheaper.
j. Can a network borrow from the Depot in order to test and learn about a piece of equipment they may be considering using in the future?

k. Getting a Wiki, and/or creating a private forum for the RSN's at the depot. Who will pay to set up and to logically manage the information stored there? Is a group E-mail sufficient enough? With the USGS IT security rules as tough as they are, is this a function for the Depot? Should this be farmed out to a RSN partner?
l. Can the Depot buy and loan out gyroscopes, other suitable integrated orientation sensors to the RSN's for seismic sensor orientation?
m. Does the Depot have any experience in rotational sensors?
n. Can ASL host the next NetOps meeting? I think everyone would like to see the facilities and have some hands-on activities and demonstrations for the next meeting. This would help to break up the monotony of sitting in a chair listening to speakers and watching slides.

Action Item: Answer as many of the above questions and generate a revised Depot FAQ list and E-mail out to the attendees.

Vaults and Station Power: There are a great number of similar vaults out there. Mark Meremonte presented his small fiberglass tank vault that is a custom fabricated fiberglass design with integral glass plate that costs around $600. Other similar small tank designs us the ENPAC hazardous waste drums, corrugated HDPE pipe (like the TA vault), corrugated steel culvert pipe or the PVC waste drain pipe. Each had their merits. I think there is a blend of simplicity and cost involved with the different choices. I think it is what each of the RSN's can afford rather than trying to standardize.

It seems that some set their sensors directly on concrete, some on tiles, and some on glass plates for isolation. Should glass plates be standardized?

I believe it was Dr. Mehmet Celebi who expressed concerns about the lack of re-bar or wire mesh in any of the vault designs. He says very directly and to the point that these vaults will crack and fail. He suggested reinforcing the concrete if we intend to have a vault that lasts. I have to agree. The CERI vaults are reinforced, but the McMillan vaults are not. The McMillan vaults have approximately 3-4 yards of concrete.

Station power is generally commercial AC rectified by a charger of some type and other stations have small photovoltaic solar panel arrays. I did not get the impression that anyone had any particular problems with site power. Nothing about which charge controllers worked and lasted the longest. Nothing about any battery charger that was better than another.

Central Processing Power and Infrastructure:

John McMillan presented a PointPoint slide show and gave out a handout on the do's and don'ts on selecting back-up generators and UPS systems. At ASL we are going through this process to replace the DCC generator. We will pass on this information to Mark Sharratt for his consideration.

We heard some good horror stories when some networks changed or upgraded equipment. When some outfits enlarged there capacity, they failed to consider additional load to re-charge the UPS batteries from generator, they failed to consider having air conditioning for critical equipment on generator (high load), failed to consider additional heat load to a room when enlarging the UPS. These are good examples of things we need to avoid. Others included the type of fuel. Some found there is a lot of environmental concerns and hoops to jump through when installing fuel tanks.

Communications:

Pat McChesney presented and provided a handout on what Line-Of-Sight (LOS) is and what is not, when using radios. Just because you can see the other end with a pair of binoculars, doesn't mean you will have a successful radio link. This is because of the Fresnel zone. I won't go into detail here but I will scan the handout and make it available. Pat also talked about multi-path and other types of interference.

Greg Steiner talked about his experience in doing radio surveys and he mentioned how useful some of the Digital Elevation Maps (DEMS) and how other map tools are useful in determining the lay-of-the-land.

Not everyone can afford RF spectrum analyzers, but if used correctly and with Pat's formula, one can fairly accurately determine if a radio link will work.

Pat brought up a good question. With all of the bandwidth being freed up because of the switch to HDTV, Pat wonders if someone could lobby the FCC and Homeland Security to set aside some bandwidth specifically for the seismic community. I would not know where to begin his process, but maybe it has some merit.

Bob Busby talked about how the TA was successfully using cellular modems (Airlink Raven X), and how Verizon was good to work with and how their billing was excellent. They are less successful using AT&T. Busby also mentioned one annoying habit; the cell phone carriers don't really have a mechanism to tell you when they take a tower down, move towers, or change their equipment to another tower. There is a periodic need to re-point antennas.

Tours of Caltech and USGS NSMP Network Facilities:

The tours allowed Neil and I to see what our partners have. I think we were surprised at how small and cramped the shops were. Again, the small shops and small workforce, illustrate how difficult life out in the RSN's are. How do they get it done? I feel a bit blessed that we have the facilities we have at ASL.

Remote Nodes and Resets/Case Studies in Continuity of Operations

I've lumped these two agenda items together. Remotes Nodes and Continuity of Operations is all about redundancy in data paths. No one wants all of their "eggs-in-one-basket". I think that the west coast networks have done a great deal in having different data paths. A loss of one data path does not take down a data center, the loss of a data center means that that other data centers or nodes can pick up the slack.

At ASL, I don't think redundant data paths are as critical as it is to the west coast, but is interesting to see to what lengths they've been able to go to secure data paths.

At the stations, means of remote resets have been established and they are not unlike some of the ways we do it at ASL. They use simple timers for automatic resets and devices like our I-Boot. I don't think anyone is too interested in the expense of a Falcon or Phoenix Contact like device.

Inventory and State of Health Monitoring Tools/IP Connectivity Troubleshooting Tools and Hardware:

I've lumped these agenda items together as well.

For inventory, I think I stressed that the success of the Depot depends on a good database and that we would be using the PASSCAL version of their database. The INV inventory was discussed but I have to say I did not get a good feel for who was using it.

For status-of-health and monitoring tools, I came away with the feeling that this was geared more towards monitoring the communications. This is especially true of the analog stations. That is about all you can monitor with an analog station. I did note that the SeisNetWatch does incorporate the SOH stream from digital stations that have the Q330 for example.

There are a number of SOH, communications status and other tools that were mentioned at the workshop. I don't know if anyone at ASL has explored or looked at the capability of this software.

Some of the tools mentioned are: SeisNetWatch, BigBrother, Cacti, Trouble Ticket Express, Bugzilla, Track, Gap List, WaveViewer, Swarm, Heli-2-Go, Jiggle, Ethereal, and WireSharp.

We did not get any demonstrations of this software, it was mentioned with a description of it's function. Much of it is freeware and maybe we should investigate whether or not some of this would work for us at ASL.

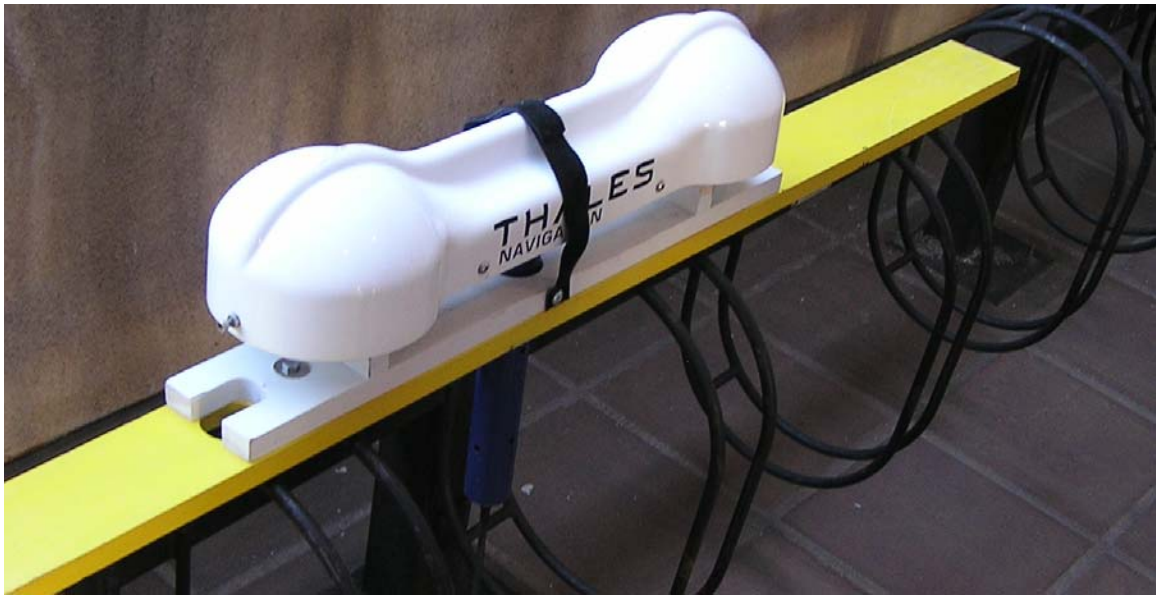
Sensor Orientation:

Accurate sensor orientation is an apparent problem throughout all of the networks. It seems that since Goran Ekstrom (Columbia University) reported on sensor orientation problems, the networks have been working to devise better ways of orienting sensors. I think is fair to say that most balk at the cost of the Transportable Array's $71k Octans FOG Gyroscope or the $6k-8k cost of a theodolite. John McMillan presented the prototype orientation jig for the STS-2 that utilizes the solar position sun tables. I think most are favorably impressed with this simple low cost solution. Most of the solutions we saw involve the sun (or other celestial object) and differential GPS. None of the devices we saw addresses the problem of mines, tunnels, caves or other situations where a good view of the sky was not available. It was suggested that the Regional Depot come up with a gyro or other lower cost solution for these "no-sky" situations. I think at a minimum, the Regional Depot/ASL can share our designs and procedures for whatever we develop for the GSN.

Kyle Persefield
Field Engineer
ASL/USGS Contractor
Honeywell HTSI

Neil Ziegelman
Field Engineer
ASL/USGS Contractor
Honeywell HTSI

NetOps II Attendees February 27-28, 2008



Caltech's Thales Marine Differential GPS Antennas for Sensor Orientation

Mark Meremonte's LightWeight Pre-Fab Fiberglass
Shallow Vault With Integral Glass Plate

NetOpsII Agenda
February 27-28, 2008

Wednesday Feb 27		
08:00-09:00		Registration
09:00-09:30	Introduction o Overview of ANSS o NetOpsI o Introductions (15 s each, firm!)	Biasi/Withers
09:30-10:30	Existing Instrumentation: What's Working, What's Not	Simmons
10:30-10:45		*Break*
10:45-11:30	Discussion of ASL Equipment Depot and New Instrumentation Desires and Concerns o New Q330 with usb removable media	Persefield/Zeigelman
11:30-13:00		*Lunch*
13:00-13:45	Vaults and Station Power o emphasis on RSN and urban strongmo o solar and backup power o Seismometer packing (sand, fiberglass insulation, etc)	Steiner
13:45-14:30	Central Processing power and infrastructure.	McMillan
14:30-15:30		*Break around Posters and Displays*
15:30-17:00	Communication o Attenuation and path effects o Line loss and antenna gain o FCC bandwidth reallocation o Licensed vs unlicensed	McChesney/Steiner
17:00		*Adjourn*
17:15-18:30		Tours of Caltech and USGS network facilities

NetOpsII Agenda
February 27-28, 2008

Thursday Feb 28		
08:00-10:00	Communication, cont. o Spreadspectrum o 900MHz, 2.4GHz, and 5.8GHz o VSAT o Cell	Koesterer
10:00-10:15		*Break*
10:15-10:45	Remote Nodes and Resets	Jensen
10:45-11:30	Inventory and State of Health monitoring tools o SNW o INV	Stickney
11:30-13:00		*Lunch*
13:00-14:00	IP connectivity troubleshooting tools and hardware.	Meremonte
14:00-15:00	Training o New skills and technologies o New people o Maintenance of institutional knowledge	McGoldrick
15:00-15:15		*Break*
15:15-16:15	Case studies in Continuity of Operations	Croker
16:15-17:00	Concluding remarks, recommendations to ANSS management	Biasi/Withers
17:00		*adjourn*

NetOps II Attendees

0	As of 2/29/2008				
1	Arnie Acosta	USGS NSMP	acosta@usgs.gov	Pasadena office	
2	Jim Agnew	Cal Div Water Resources	jagnew@water.ca.gov	Seismologist, Earthquake Engineering Section, Civil Maintenance Branch, Dept. of Water Resources, 1416 9th St., Room 204-10 Sacramento, CA 95814	(916) 653-6150
3	Edna Anjal	USGS Pasadena NSMP	anjal@usgs.gov		
4	Rayo Bhadha	CalTech	rayo@gps.caltech.edu		626-395-2407
5	Glenn Biasi	U. Nevada Reno	glenn@seismo.unr.edu		775 784 4576
6	Michael Burgy	ATWC tech	michael.burgy@noaa.gov	Senior Electronics Technician, West Coast/Alaska Tsunami Warning Center	907 745-4212
7	Robert Busby	IRIS	busby@iris.edu	EarthScope USArray Transportable Array Manager	508-801-7628
8	Dr. Mehmet Celebi	NSMP, Menlo Park	celebi@usgs.gov	Manager, Structural Monitoring, Acting Manager, NSMP Network Operations, USGS (MS977), 345 Middlefield Rd., Menlo Park, Ca. 94025	650-329-5623
9	Ray Clayton	Battelle PNNL	ray.clayton@pnl.gov	Environmental Characterization and Risk Assessment Group, Northwest National Laboratory Richland, WA 99354	509-371-7251
10	Robert Clayton	BYU-Idaho	ClaytonR@byui.edu	ANSS "Ricks College" network	
11	Gary Cone	USGS Pasadena	gary@gps.caltech.edu		626-583-7820
12	Andy Cowell	Calif Dept. Water Resources	acowell@water.ca.gov	Electronics tech	
13	John Contino	Lamont	jcontino@ldeo.columbia.edu		
14	Dave Croker	USGS Menlo Park	croker@usgs.gov		(650) 329-4697
15	Jim Cullen	PGE	mci2@comcast.net		707-762-6279
16	Bill Curtis	USGS Pasadena	bcurtis@gps.caltech.edu		626-583-7819
17	Alberto Devora	CalTech	alberto@gps.caltech.edu		626-395-2676
18	Bethaney Dukellis	PNSN – UW	bethad2@ess.washington.edu		206-543-8276, 206-419-9714 Cell
19	Nathan Edwards	U. Nevada Reno	nathan@seismo.unr.edu		
20	Steve Estes	AEIC	estes@gi.alaska.edu		
21	Mitchell Gold	Lamont	goldm@ldeo.columbia.edu		
22	Richard Godbee	Virginia Tech	rwg@vt.edu	4044 Derring Hall, Blacksburg, VA 24061	808 554-4265
23	Roger Gernold	PTWC/NOAA,	Roger.Gernold@noaa.gov		
24	Tammy Graff	AEIC	fstlg8@uaf.edu		
25	Karl Hagel	PNSN	karl@ess.washington.edu	UW Earth and Space Sciences, Johnson Hall room 70, Box 351310, 4000 15th Ave. NE , Seattle, WA 98195-1310	206-543-6843
26	Mike Hagerty	Boston College	hagertmb@bc.edu	Manager, New England Seismic Network,Weston Observatory	617.552.8337
27	Roger Hansen	AEIC	roger@giseis.alaska.edu		
28	Ken Honma	HVO	khonma@usgs.gov		
29	Gray Jensen	USGS Menlo Park	gjensen@usgs.gov	345 Middlefield Rd. MS 977, Menlo Park, CA 94025	650-329-4729
30	David Johnson	CalTech	david@gps.caltech.edu		626-395-6915
31	Won-Young Kim	Lamont/LCSN	wykim@ldeo.columbia.edu		
32	Charles Koesterer	USGS Pasadena	chuck@usgs.gov	U.S. Geological Survey, Earthquake Hazards Team, 525 S. Wilson Ave., Pasadena, CA 91106	(626)583-7813
33	Stuart Koyanagi	PTWC/NOAA	Stuart.Koyanagi@noaa.gov		
34	Scott Lydeen	USGS Pasadena	scotty@gps.caltech.edu		626-583-7820
35	Juan Lugo	PRSN	juan@midas.uprm.edu		(787)833-8433
36	Pat McChesney	PNSN	pmc@ess.washington.edu		
37	Chris McGoldrick	CERI Memphis	gmcgldrc@memphis.edu	Center for Earthquake Research and Information (CERI), University of Memphis, Memphis, TN 38152;	

38	Jonathan McIntyre	Univ. of KY	Jonathan.McIntyre@uky.edu	228 Mining and Mineral Resources Building, Geologic Hazards Section, Kentucky Geological Survey, University of Kentucky, Lexington, Kentucky 40506-0107	(859)257-5500 x 129
39	John McMillan	USGS Golden	mcmillan@usgs.gov		
40	Bill Meiser	CERI Memphis	wmeiser@memphis.edu		
41	Mark Meremonte	USGS Golden and ASL	meremonte@usgs.gov		
42	David Parke	CDWR	parke@water.ca.gov	See Agnew	
43	John Parker	CERI Memphis	jhparkr1@memphis.edu		
44	Kyle Persefield	ASL/USGS ANSS Depot	kpersefield@usgs.gov	USGS Contractor, Field Engineer	505-846-7597
45	Brian Shiro	PTWC/NOAA	brian.shiro@noaa.gov		
46	Lynn Simmons	PNSN USGS contractor	lynn@ess.washington.edu	U.S. Geological Survey Contractor, PNSN, Dept. of Earth and Space Sciences, Univ. of WA, Johnson Hall 070, Box 351310, Seattle, WA 98195	206-543-9024
47	John Sandru	AEIC	john.sandru@gmail.com		907-474-1151
48	Greg Steiner	CERI Memphis	gsteiner@memphis.edu		
49	Mike Stickney	Montana BM&G	mstickney@mtech.edu	Earthquake Studies Office, Montana Bureau of Mines and Geology, Montana Tech of the University of Montana, 1300 W Park St, Butte, MT 59701	(406) 496-4332
50	David Sutton	USGS Pasadena	dsutton@gps.caltech.edu		
51	John Torrisi	U. Nevada Reno	torrisi@seismo.unr.edu		
52	Dave Drobeck	Univ of Utah	drobeck@seis.utah.edu	University of Utah, 705 WBB, 135 S 1460 E, Salt Lake City, UT 84112	801-581-3150
53	Jon Rusho	Univ of Utah	jon@seis.utah.edu	University of Utah, 705 WBB, 135 S 1460 E, Salt Lake City, UT 84112	801-585-5523
54	Mike Watkins	CalTech	watkins@gps.caltech.edu		626-395-2597
55	Ken Whipp	Univ of Utah	whipp@seis.utah.edu	University of Utah, 705 WBB, 135 S 1460 E, Salt Lake City, UT 84112	435-262-0047
56	Austin Wilson	U. Nevada Reno	austin@seismo.unr.edu		
57	Dave Wilson	HVO (okubo)	dwilson@usgs.gov		
58	Mitch Withers	CERI Memphis	mwithers@memphis.edu		
59	Bob Wurth	St Louis University	rwurth@eas.slu.edu		
60	Neil Ziegelman	ASL/USGS ANSS Depot	nziegelman@usgs.gov	USGS Contractor, Field Engineer	505-853-6314

UNR and UUSS hijacked by Wells earthquake