

DATA TOOLS

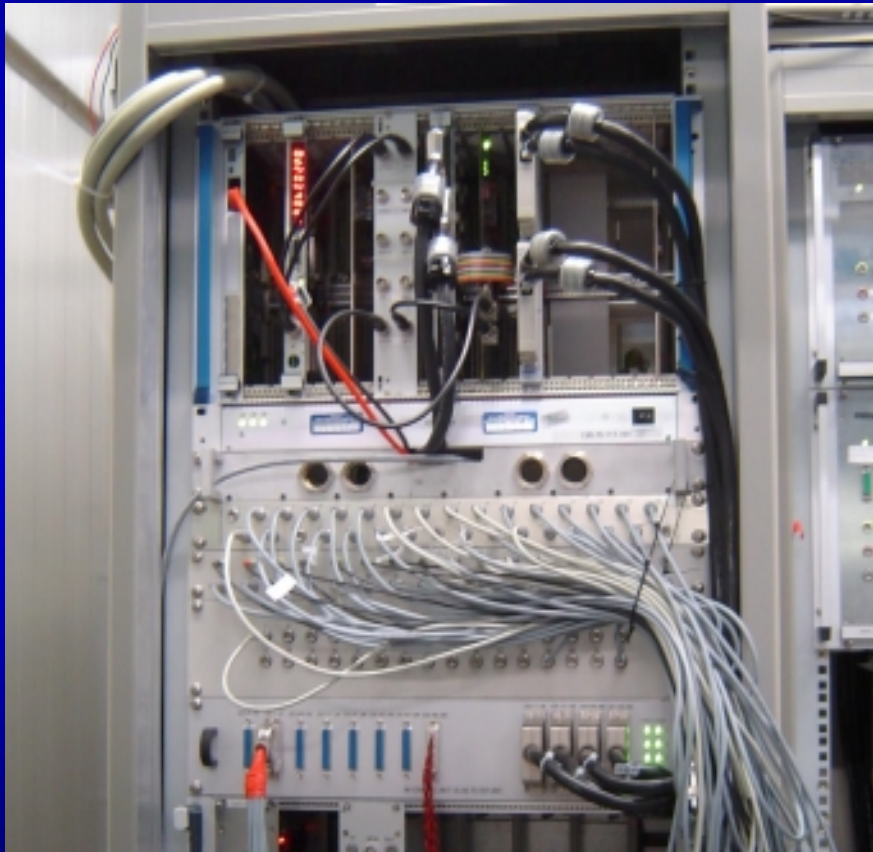
„how can data exchange work?“



Max-Planck-Institut für Gravitationsphysik
(Albert-Einstein-Institut)

Universität Hannover 

Data acquisition



fast

- 24-bit ADC interface:
32 + (2*) 16 channels
up to 16kSample/sec

slow

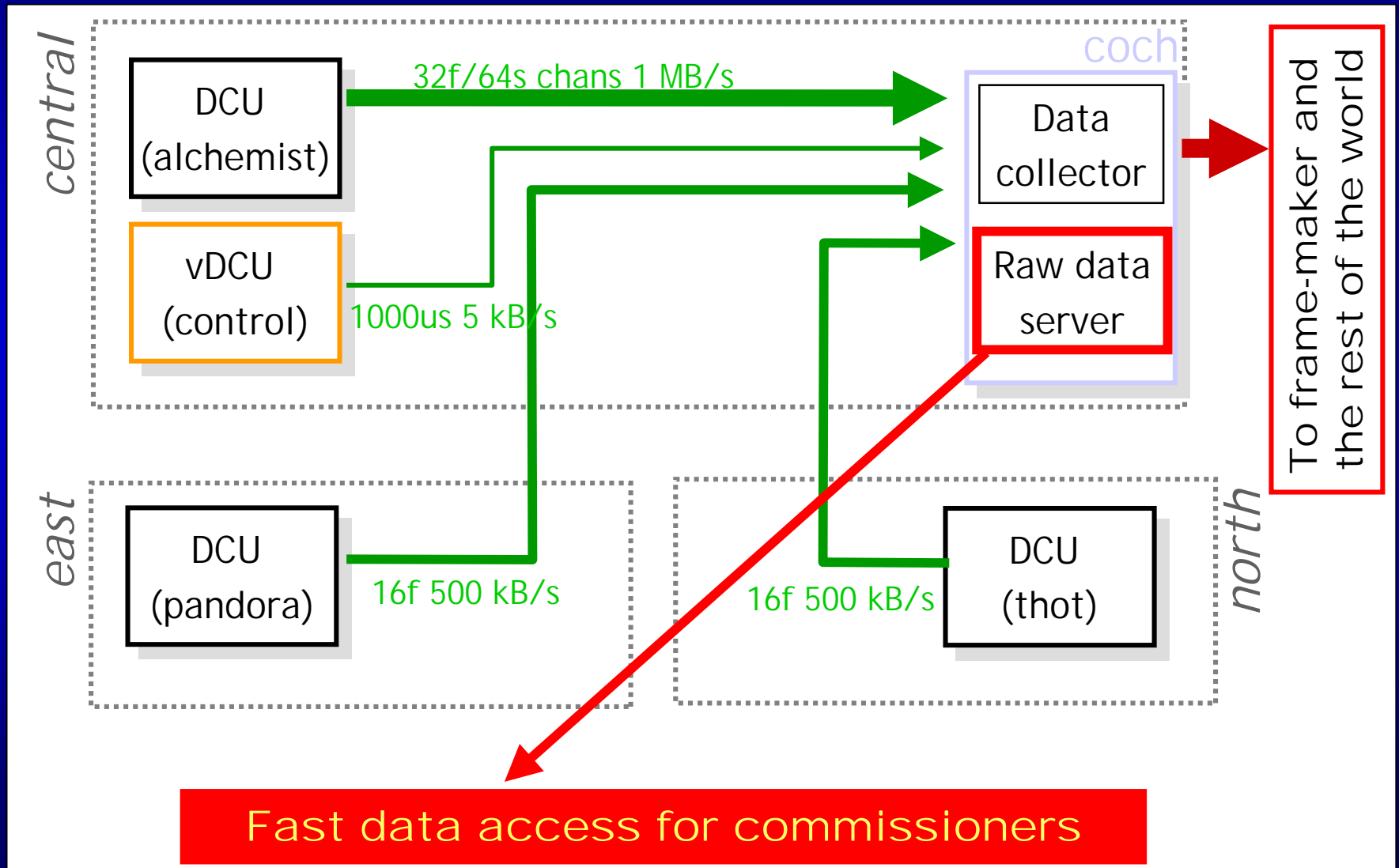
- 12-bit ADC interface:
64 channels
with 512 Sample/s

control

- LabView system acquires
~ 1000 channels @ ~1Hz

⇒ **ca . 60 GB/day**

Data collection





File formats

- Raw data files (1 second duration)
 - $fs \leq 16384$ Hz

20 days of data

- Frame files (1 minute duration)
 - $fs \leq 16384$ Hz
 - 60 frames per file, one second per frame
 - All channels in one file

*20 days (Han)
100 days (Golm)*

- Hour trends files (1 hour duration)
 - $fs = 1$ Hz
 - Min, max, av

1 year of data

- Day trend files (1 day duration)
 - $fs = 1/60$ Hz
 - Min, max, av

1 year of data



DAQS web interface

- Informations about the current DAQS setup
- Channel configuration (sampling, filters)

Authentication not required - Unknown user connected from 136.75.117.237 Current UTC Time: 2004-09-16 09:38:34

Current DAQS Configuration

BASS status at 2004-09-16 09:38:04 (UTC) - 7790027200PGs

DCU	ADC	Channel	Last modified (UTC)	Bus	Signal	Sampling		LPP	Gain (dB)	Calibration		Created By	Comment
						Rate (Hz)	Resolution (bits)			Out	Unit		
alchamal	ICE - 32 (ch-0000)	1	2004-09-23 10:24:40	Ds	01_L3C_MSC_FF_F_HP	1024	18	N	0	N/A	0.000	alchamal@desy.de	Connected through whitening filter in shower. See labbook page 1380. Through alternative patch panel A3.
alchamal	PCG - 32 (ch-0001)	2	2004-09-14 20:27:10	Ds	01_L3C_MSC_FF_F_HP-4sig	512	18	N	0	N/A	N/A	alchamal@desy.de	
alchamal	ICE - 32 (ch-0002)	3	2004-09-10 14:43:14	Ds	VOID_CHANDEL0000	512	18	N	0	N/A	N/A	alchamal@desy.de	Not really scope
alchamal	ICE - 32 (ch-0003)	4	2004-09-26 10:40:20	Ds	01_MSC_BAQS_TimingChA-B-C	1024	18	N	0	N/A	N/A	alchamal@desy.de	Connected through channel 32 of MC patch panel.
alchamal	PCG - 32 (ch-0004)	5	2004-09-05 09:28:08	Ds								alchamal@desy.de	
alchamal	ICE - 32 (ch-0005)	6	2004-09-03 15:40:50	Ds	01_L3C_MSC_FF_PC-MS0	1024	18	N	0	N/A	0.000	alchamal@desy.de	Connected directly from PPC module in DAQs (I see 24-bit signal, MMR over slip ground)
alchamal	PCG - 32 (ch-0006)	7	2004-09-10 14:28:12	Ds								alchamal@desy.de	
alchamal	ICE - 32 (ch-0007)	8	2004-09-23 15:25:10	Ds	01_L3C_MSC_FF_Q_HP	1024	18	N	0	N/A	0.000	alchamal@desy.de	Connected through whitening filter in shower.
alchamal	PCG - 32 (ch-0008)	9	2004-09-03 15:21:24	Ds	01_L3C_MSC_FF-MCE-HMW	4096	18	Y	0	N/A	0.000	alchamal@desy.de	Train 2 depending on board MMR shower module
alchamal	ICE - 32 (ch-0009)	10	2004-09-26 14:31:19	Ds	01_L3C_MSC_FF	8192	18	Y	0	N/A	0.000	alchamal@desy.de	Testing
alchamal	ICE - 32 (ch-0010)	11	2004-09-03 12:42:00	Ds	01_L3C_PWR_B+M	9192	18	Y	0	N/A	N/A	alchamal@desy.de	Used for amplitude noise projections.
alchamal	PCG - 32 (ch-0011)	12	2004-09-26 12:22:29	Ds	01_L3C_MSC_V05	8192	18	Y	0	N/A	0.000	alchamal@desy.de	For noise projections. Through MC patch panel 12. No external (to module) whitening applied.
alchamal	ICE - 32 (ch-0012)	13	2004-09-21 00:41:40	Ds	01_L3C_MSC_FF-MCE-MDN	1024	18	N	0	N/A	0.000	alchamal@desy.de	Used for noise projections
alchamal	PCG - 32 (ch-0013)	14	2004-09-07 11:23:10	Ds	01_PSL_SL_PRR-AMP-L-OUTLFP	8192	18	Y	0	N/A	0.000	alchamal@desy.de	Whitened output from POSTAB DOLP slave. Used for noise projections.
alchamal	ICE - 32 (ch-0014)	15	2004-09-07 16:29:40	Ds	01_PSL_SL_PRR-AMP-L2-INLFP	1024	18	N	0	N/A	N/A	alchamal@desy.de	Needs signal apply the slop.
alchamal	ICE - 32 (ch-0015)	16	2004-09-03 15:52:47	Ds	01_L3C_MSC_V05	1024	18	N	0	N/A	0.000	alchamal@desy.de	Under test (side to dark side of board)
alchamal	PCG - 32 (ch-0016)	17	2004-09-09 14:49:23	Ds	01_L3C_MSC_FF-MCE-HV	1024	18	N	0	N/A	0.000	alchamal@desy.de	Whitened through VMMX, used for noise projections
alchamal	ICE - 32 (ch-0017)	18	2004-09-09 14:32:11	Ds	01_PEM_DCU_LH_ACQUAM	1024	18	N	0	N/A	N/A	alchamal@desy.de	located on MC boardfront
alchamal	PCG - 32 (ch-0018)	19	2004-09-09 14:40:10	Ds								alchamal@desy.de	

Navigation

- 080000 Info System - Home
- Access control
- Login
- Logout
- Detector
- LeakStatus / Statistics
- Current Detector Status
- Leakup Detector Status

DAQ System

- Current DAQS Configuration
- Leakup DAQS Configuration
- Current DCU/ADC Setup
- DAQS Design Guide

Signal

- Show Signal List
- Leakup Signal Description

Calibration

- Leakup Calibration Function
- Leakup IR Time Evolve Filter

Tools

- Time Conversion
- Interconnected Modules
- IP View

created by [Karlheinz Richter](#)

[Karlheinz Richter](#) @desy.de



GEO++ and Triana

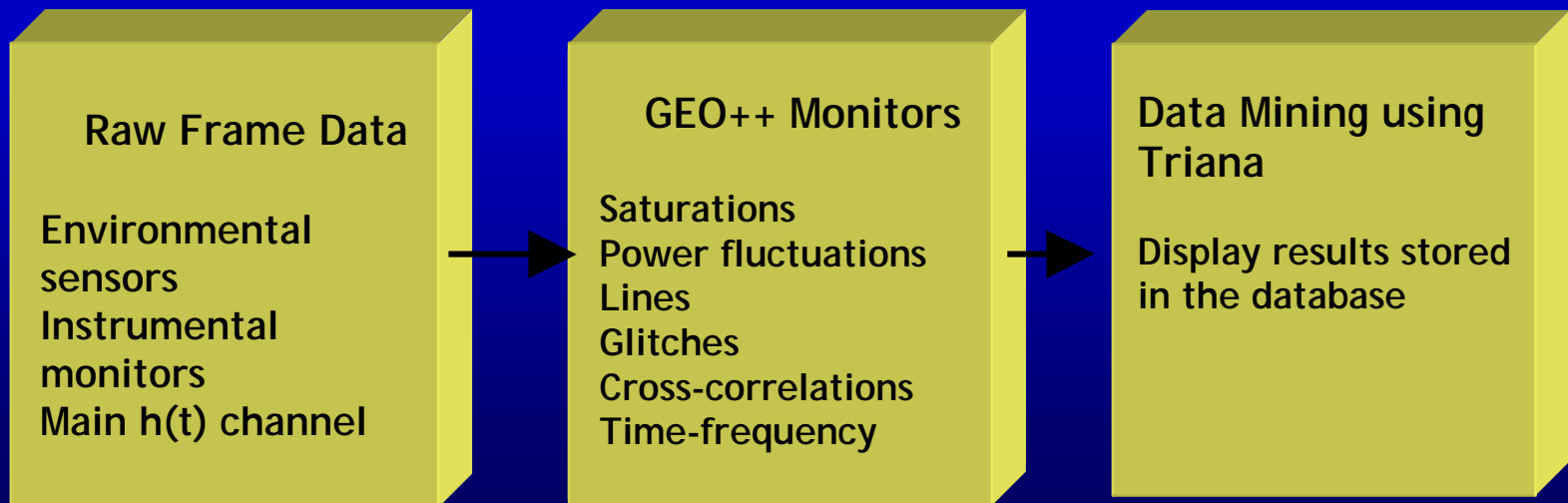
- Developed at Cardiff University



- **Idea: To get a tool that can deal with a large amount of data**

Software environment - GEO++

- Process large number of channels with many algorithms
- Store faithful summary
- Triana Tools for retrieval of results from the database





GEO++ Main Monitors

- InspiralSenseMon

- GlitchMon

- HACRMon

- LineMon

- PowerTrackerMon

- SaturationMon

- AmplitudeCouplingMon

- PhaseCouplingMon

- CoherenceMon

- BicoherenceMon

Used for ,real' data analysis

Online running monitors,
that can be used for
detector characterisation

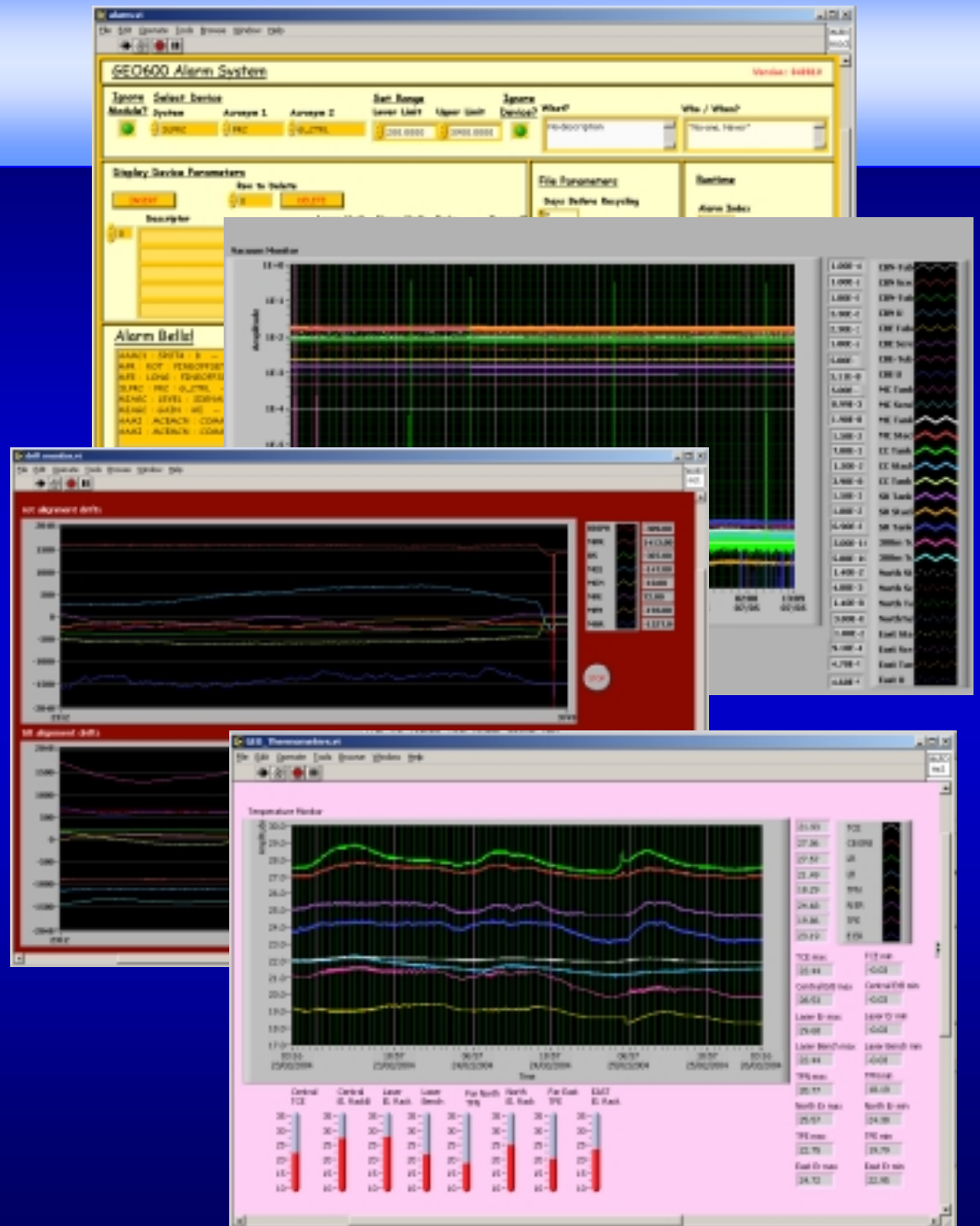
**For various reasons we do not often use GEO++ / Triana for
commissioning (?)**



Monitors

- Alarm.vi
- Vacuum.vi
- Drift.vi
- Temperature.vi

Not ,real' data tools,
but can give us
useful hints for
commissioning





Labview Oscilloscope

frameserver address: 130.75.117.159 port: 8000 server response: receiving gps second: 779554229

stop server acquiring

frequency live data generate Matlab plot

G1:LSC_MID_CAL G1:LSC_MID_EP_Q_HP
G1:LSC_MID_EP-P_HP G1:ASC_MC1_EP-B-TILT

A1 = -86.2 dBV, REF = -30 dB

T1 = 50.9 Hz, T2 = 179.9 Hz, df = 129.1 Hz
MEB = 1.5 Hz 4095 16384 16384

gain: 0.5V, 0.2V, 0.1V, 1V, 2V, 5V, -50mV, 20mV

V offset: -2, -1, 0, 1, 2, -3, -4, -5, 3, 4, 5

gnd dc ac

0v to centre norm / inv

ADC volts

channel

gain

hor scale (points): 512, 1k, 2k, 4k, 8k, 16k, 32k, 64k, 128k, 256, 128, 64, 32, 16

start: 0 centre: 2048

trig1 trig2

T1 trig pt T2 trig pt

T1 to T2 + win: 0 AND / OR

run trig single

reset trig'd

dBV/MHz dBV

reference level: -20, -30, -40, -50, -60, -70, -80, -10, 0, 10, 20, -90

dB/division: 6, 10, 20, 3, 1, -30, 40

Completed: 1 Done:

AVERAGE OK

Restart

snapshot clear

two: off, one, two flash cursors interpolate trace markers brightness

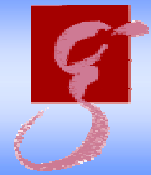
auto Y auto X cursor to trig1 cursor to trig2

Data access with Matlab

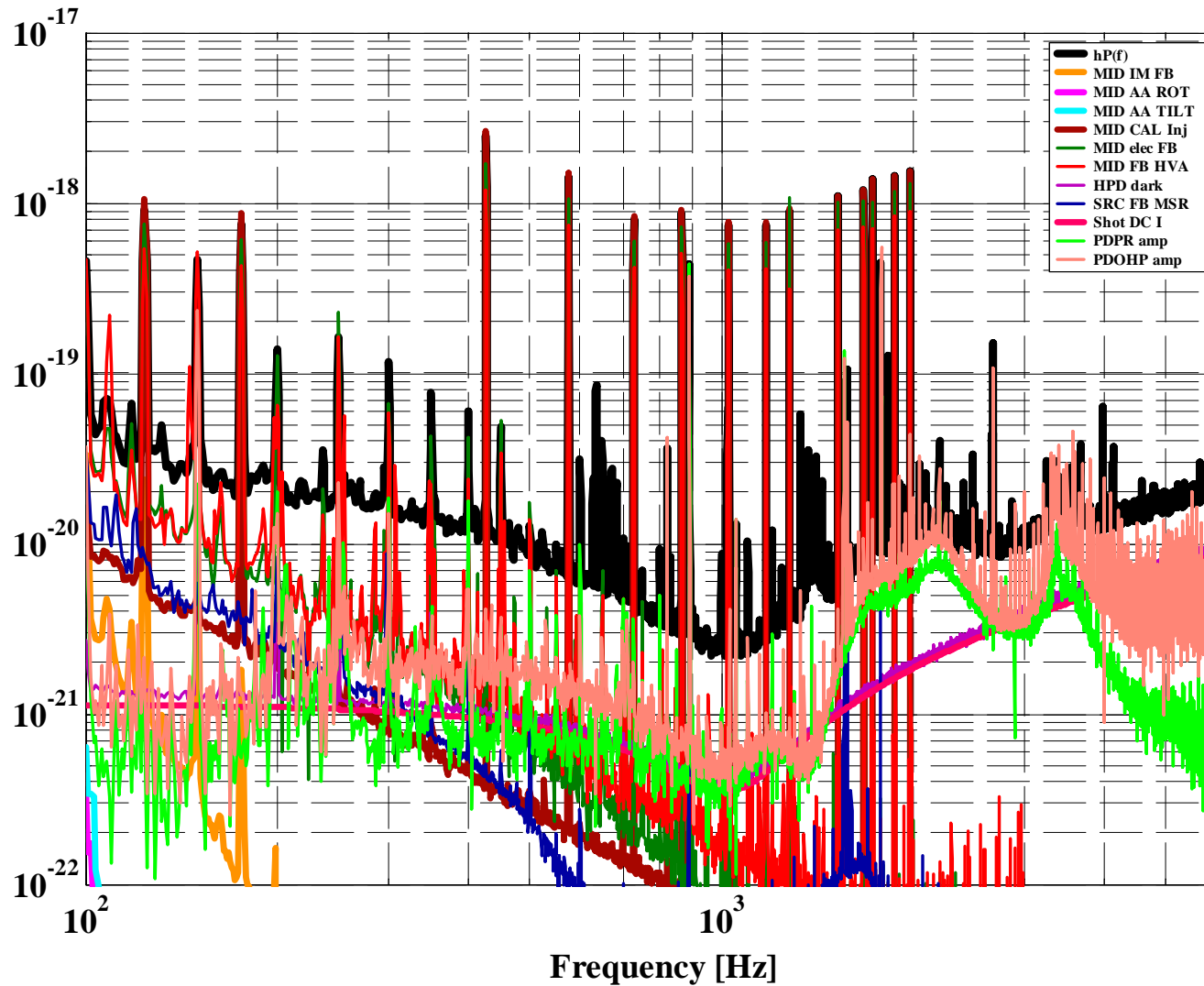
The screenshot displays the MATLAB environment with several windows open:

- Editor:** Contains MATLAB code for data acquisition and processing. Key sections include:
 - Channel definitions: `chans = {'G1:R1_TPE_STRAY', 'G1:R1_TCE_STRAY', ...}`
 - Unit and scale assignments: `units = {'V', 'V', 'V', 'V'};` and `scale = [1 1 1 1];`
 - Calibration constants: `% Pressure monitor calibration: V = S + 2*log10(P)`
 - Acquisition parameters: `starttime = ...` and `endtime = ...`
 - Channel list generation: `chans = ...`
 - Check for scale values: `if length(scale) ~> N error('you need to give a scale value for each channel');`
- Figure No. 1:** Two plots showing signal amplitude over time. The top plot is labeled "Time from 2004-09-14 08:59:47 (779187600)" and shows a signal labeled "G1:LSC_JC_VIB". The bottom plot shows a signal labeled "G1:LSC_WR_VIN". Both plots have "Amplitude (V)" on the y-axis and "Time (s)" on the x-axis.
- Workspace:** A table listing variables in the workspace:

Name	Size	Bytes	Class
data	3x7200	172800	double array
end	del	0	double array
s	del8193	65544	double array
se	del	0	double array
SPDG	del	0	double array
IMD	del	0	double array
N	del	0	double array
ans	del20	40	char array
c	del	0	double array
cal	del8193	331080	double array
calcal	del8193	65544	double array
caldata	del8193	65544	double array
caldatah	del	0	double array
calEte	del16	128	double array
chans	del3	264	cell array
ck	del	0	double array
citr	del8193	331080	double array
cp	del8193	331080	double array
- Command Window:** Shows the execution of a script, including server connection details and data retrieval commands like `getLatestTime` and `getChannelList`.

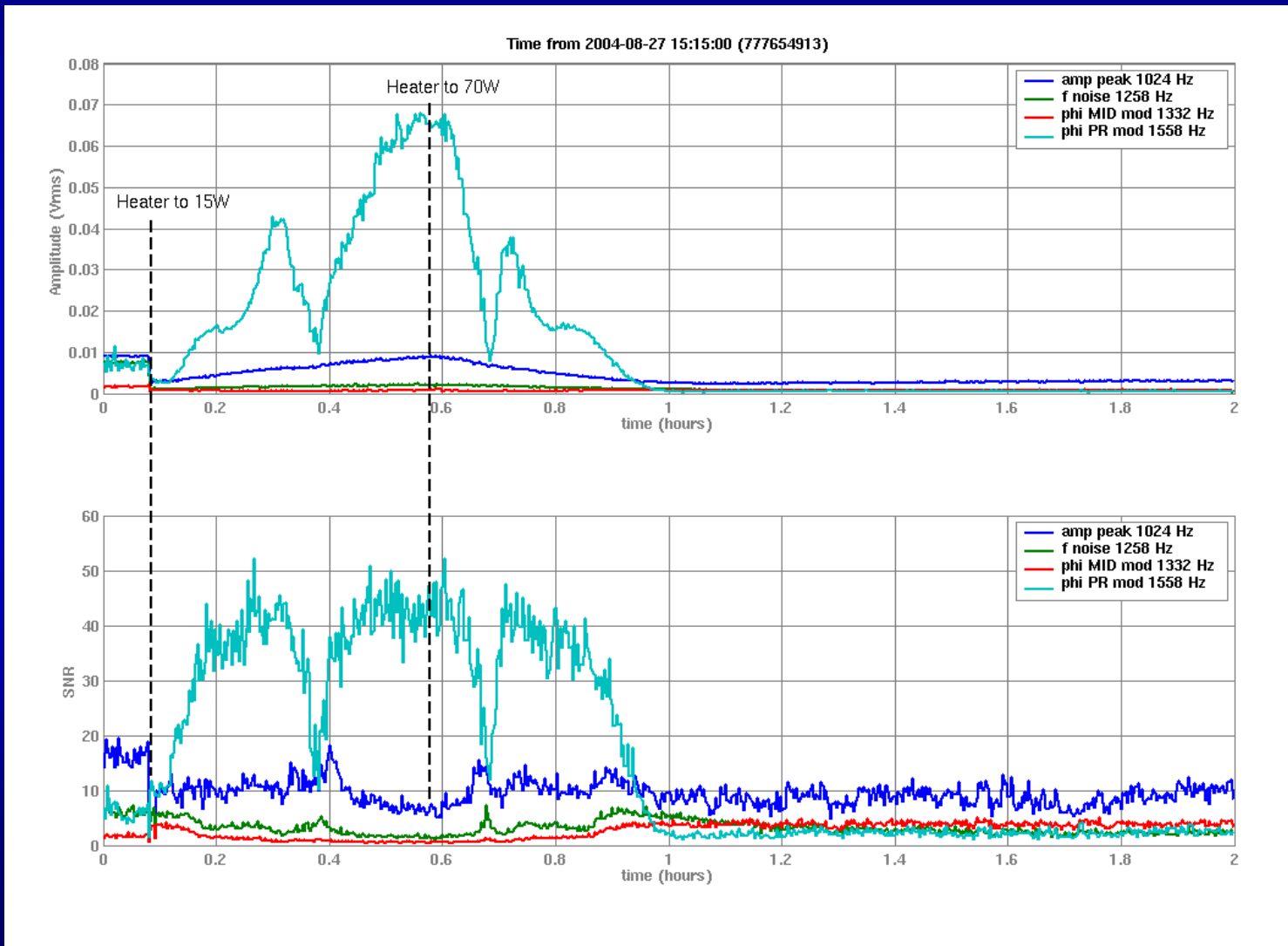


Noise projections





Tracking lines

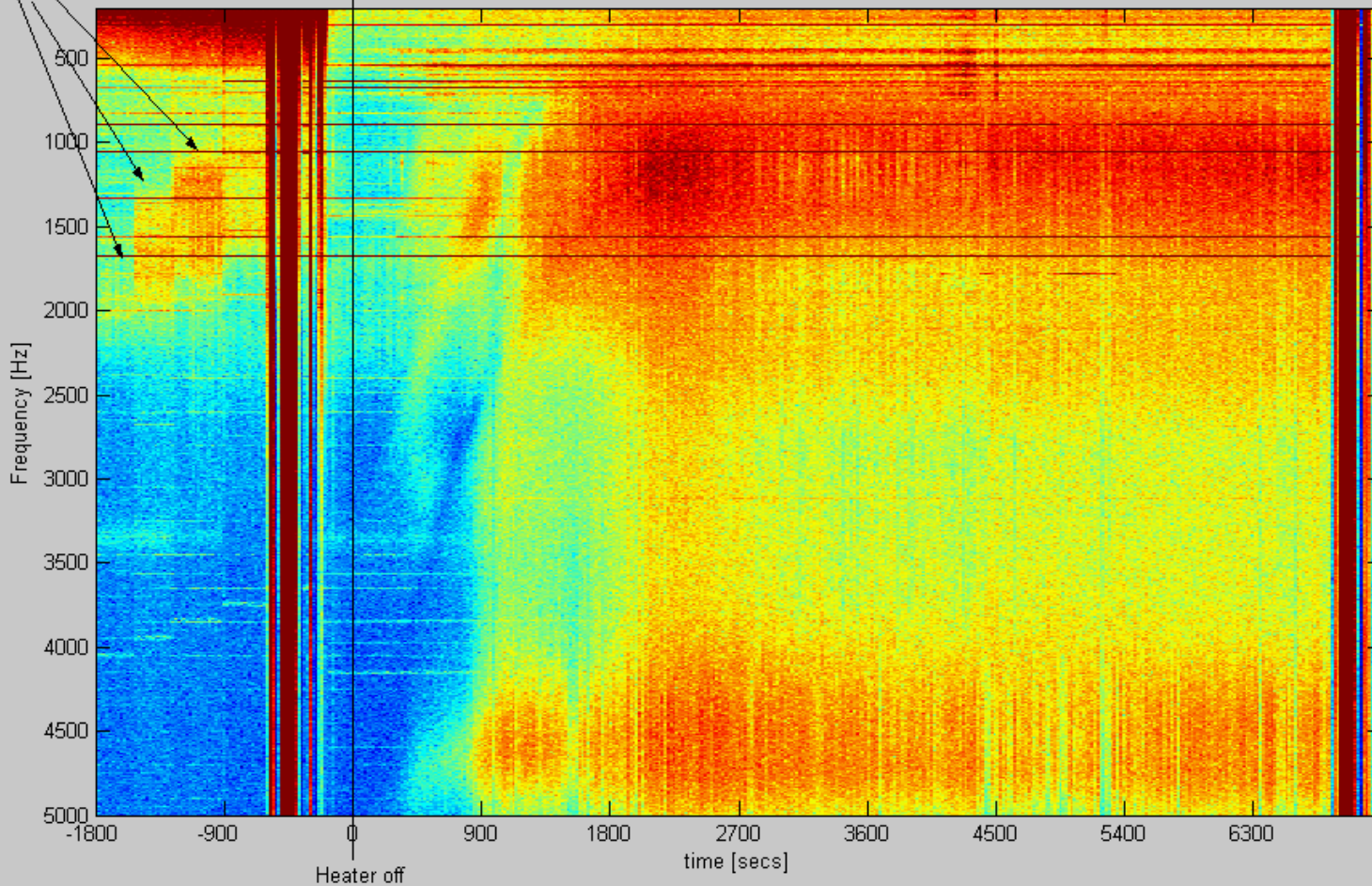




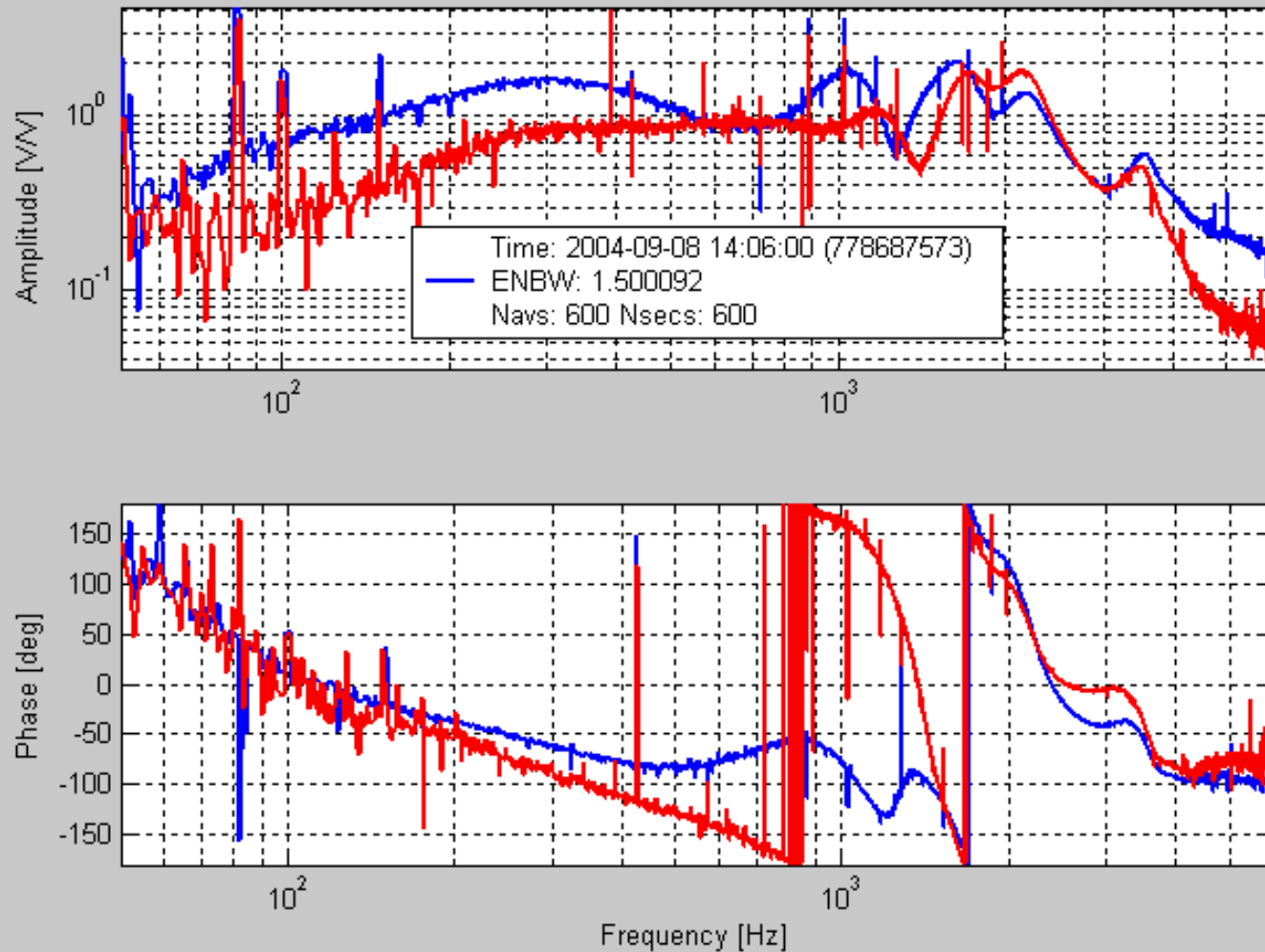
Spectrograms

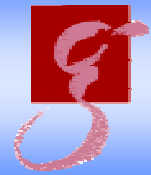
Martins tuning experiments

Start time GPS=777816013 2004-08-29 12:00:00

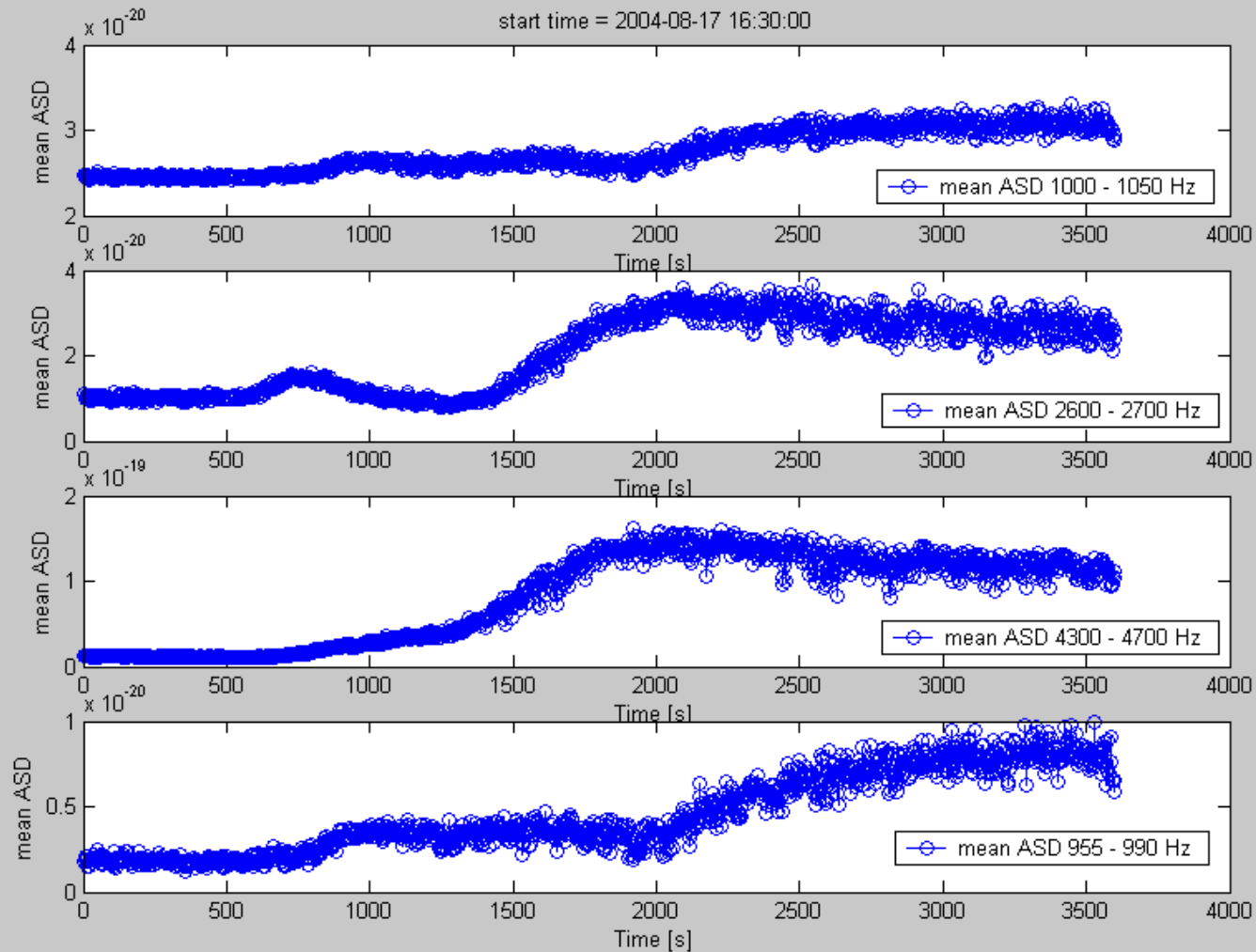


Transfer functions





Sensitivity per frequency band



General Tool: Matlab Dataviewer

Server details

frames

130.75.117.73 9000

130.75.117.73

include control channels

Query server

Time details get latest

latest time (GPS) latest time (UTC)

779956500 2004-09-23 06:34:47

start time (UTC)

2004-09-23 06:34:47 Set to latest

set start time - nsecs

Plot details

none resample

time-series grid on

Seperate markers on

Time-series settings

N secs de-trend

Channel details Get channel list

Channel list

- G1:ASC_MC1_EP-AC-ROT
- G1:ASC_MC1_EP-AC-TILT
- G1:ASC_MC1_EP-B-ROT
- G1:ASC_MC1_EP-B-TILT
- G1:ASC_MC2_EP-AC-ROT
- G1:ASC_MC2_EP-AC-TILT
- G1:ASC_MC2_EP-B-ROT

fs 512

save data write m file make plot

Matlab-compiler
=> Stand alone version



Possible data exchange (discussion)

At the moment data access for the use of commissioning seems only to be sensible, if the commissioners are personally at the site
(???)

In future maybe data access for the use of commissioning should also be possible from a different antenna site
(???)



Data access at the site

1. Use one of the computers at the site:

- Everything is in place

No problem at all

2. Use of your personal computer:

- You need to install the software on your computer
- We provide all tools (matlab-files, oscilloscope.vi)

Stand alone data viewer

- Access to raw data and frame server

No problem



Data access from outside the side (need ?)

- Only use your personal computer (???)
- You need software *Stand alone data viewer*
- We provide all tools (matlab-files, labview oscilloscope)

No problem

But now you are outside our domain and behind several firewalls!

- Probably only access to the hannover frame server available (due to our security philosophy no access to the raw data server in Ruthe)

Allow server access for your personal IP address