

Minutes of Teleconference on ALMA ATF & OSF Holography Planning

Thursday, October 19th 2006, 15:30 UTC.

Minutes by DTE, last changed 2006-11-01

Participants: Cesaro, Emerson, Glendenning, Lucas, Mangum, Marson, Murowinski, Ramirez, Seeichi, Shepherd, Sramek, Webber & Wootten

All future meetings will use the same call-in details:

From USA: 866-814-1347

Outside USA: +1-517-444-3243

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Minutes of our last (2006-10-06) meeting are at:

http://www.tuc.nrao.edu/~demerson/osfholo/mins2006-10-06_2.pdf

AGENDA.

I. Status at the ATF

II. Current Action Items

III. Schedule

IV. AOB

I, Status at the ATF

Just prior to the meeting, Jack Meadows sent the following:

Attached are 3 images of the back of the holography receiver. I verified that the correct feed (104Ghz) was installed and removed it to make sure the orientation was correct and it was correct. The feed is not obstructed or deformed. There is a piece of

mylar located at the back of the feed to keep moisture out and it is in good shape.

No absorber has been installed but I can do it tomorrow to see if this helps make better maps due to possible reflections.

Robert Ridgeway wanted me to add that the transmitter frequency is set to 104.1575.

Jack Meadows





Discussion:

Robert reported that 2 large holography maps had already been made. The first map had possible saturation problems, which might originate either in the analog electronics or at digitization or in the firmware or software.

A second map was made, after attenuation had been put in. This map could be analysed, to obtain maps of amplitude and phase, but s/n is relatively poor compared to a year ago. This is a serious limitation, because inadequate signal is seen from the edge of antenna. More signal is needed.

The illumination from the feed appears asymmetric. The most likely cause is and offset in the holography transmitter pointing.

Brian asked if the offset could result from software, but that was thought unlikely.

Jeff noted that some timing errors were evident on the maps; this needs investigation.

Robert had compared adjacent scans, and agreed there does seem to be a small offset that can be attributed to timing, at the level of a few ms. Brian would like to investigate this timing issue now – although not too serious, it could point to something that could affect us later on.

Ralph commented on the attenuation settings. The first map had just 2 dB of attenuation. before the digitizer, but for the second map this was increased to 10 dB of attenuation.

Antonio was quoted as saying the signal level should be about 20 V before digitizer. Robert commented that it is a very sudden onset of strong saturation, more likely in digital electronics, firmware or software than in analog electronics. Jeff mentioned that previously we had used an ASCII real time display of data, which would help this investigation.

Robert will check s/n from old data.

** Action Item for Robert.

Jeff commented: the peak signal on boresight had been 0.03. Peak on reference was 0.22 .

After the meeting, Robert Lucas sent the following to Ralph:

Ralph:

I checked closer the values that I read and which saturate.

- RR does not saturate and looks very stable, the value is around 1.6e8 (a few 2**27) and the rms 2.0e7.

- SS and QQ both saturate simultaneously at value around 5e8 (<

2.**29).

- when SS and QQ saturate, SR and QR also saturate ***simultaneously***, at this point they have only reached values of $-3e8$ and $-1.3e8$
- finally SQ also saturates at the same points, while just before 'saturation' are only a few $1e6$ (which is normal, S and Q are in quadrature, there should be really only noise there...).

I think it is clear that the effect is not a data conversion problem that would occur in Control where all 6 channels are treated equally. RR is unaffected while SQ which has smaller amplitude is affected. It is something that occurs on both S and Q signals, not the R signal. So I think we should look on the receiver side.

Cheers

Robert

Summary: The most pressing problems are signal-to-noise and transmitter pointing. The saturation and timing problems are important but of lower priority.

Documentation: full documentation has not yet been received from Antonio.

** Ralph does have a block diagram which he will distribute.

Dick commented that a writeup of DSP black box in rx is needed, with more detail. Darrel will contact Antonio about this.

After the meeting, Jeff Mangum sent "ATF Holography System Notes", which can now be found at:

http://www.tuc.nrao.edu/~demerson/osfholo/ATF_Holography_System_Notes.pdf

II. Current Action Items:

The main outstanding issue is documentation.

1. Antonio will provide the remaining hardware user manuals and a template of the Users' Manual.
2. Continuing AI: ICD update on temperature monitors, no later than one month before shipment of receiver #2. Some minor items from Ralph to be corrected in the next ICD issue.
3. Continuing: Holography feeds from Antonio.
4. Schedule: Rick will continue to keep updated as necessary.

III. Schedule

We had some discussion as to whether we were slightly behind, or slightly ahead of, or schedule. The consensus was that we are slightly ahead now, but of course this may change. No updates are required on the currently posted schedule, which continues to be kept available at:

<http://www.nrao.edu/~demerson/osfholo/schedule/> .

IV. New Action Items

In addition to the AI mentioned above under *Current Action Items*,

5. Robert will compare s/n of the new and old (2005) data sets.
6. The current known problems need to be fixed: signal-to-noise, transmitter pointing, receiver saturation and (lower priority) timing problems.
7. Documentation, in particular block diagrams and DSP algorithms, need to be disseminated.

Next Meeting

We will hold another teleconference on November 2nd at 16:30 UTC. Note that this revised UT maintains the same clock time from most places except Arizona, in the face of the ending of daylight savings time at the end of October.