ARCHIVE REPORT

MMA COORDINATION MEETING

July 29, 1997

SAFETY: Policies and Procedures are being developed for the safety of those visiting or working on the Chajnantor site. Peter Napier is compiling the information. The draft efforts will be reviewed and revised by one or more of the NRAO safety officiers. The information will be posted on the web. The NRAO staff will be required to be aware of and follow those procedures. Visitors not affiliated with the NRAO should be made aware of the information and advised to comply with the procedures.

MMA DESIGN AND DEVELOPMENT PROJECT

The bulk of the meeting was spent discussing what the MMA D&D project will accomplish and on what schedule this will be done. The results from the discussion will provide the basis for the next iteration of the MMA D&D budget and personnel plan.

As an aid to organizing our thinking we divide the D&D project into four phases recognizing that such a division is artificial in the sense that the project is in fact a continuum of effort, not one of discrete steps. Moreover, at its conclusion the D&D effort necessarily blends into the construction phase of the MMA; there is no clean division between one and the other and we anticipate a significant and beneficial overlap in time between the two.

Nomenclature: We refer to the four phases of the MMA D&D program as the following:

Phase 0: Single Antenna Evaluation
Phase I: First Interferometer
Phase II: Interim Interferometer
Phase III: Test Array

The timescales and tasks of these phases were discussed as described below.

PHASE 0

Phase 0 is defined by delivery of the first prototype antenna expected 1 Jan 2000. All D&D up to this point is considered preparatory to first antenna delivery.

Testing Plan:
- -Adjust surface using holography on LES9 or a beacon
- -Check mechanical performance of antenna
- -Check pointing using strongest radio sources. Discussion about the usefulness of optical pointing, no decision.
- -Check fast switching capability of servo

Hardware:
- -Prime focus holography receiver
- -Holography backend, SMT copy
- -Final MMA dewar
- -Nutator
- -Receivers at 30/90/230 GHz. Single polarization OK, better if dual polarization. Rx inserts are 12m copies.
- -IF is lowest 1 GHz of the final 4-12 GHz system.
- -M/C bus, final hardware decision
- -LO is conventional multiplied Gunn

Software:
- -Single antenna control
- -Operator interface, could be throwaway
- -Mapping program

Personnel:
- -Antenna Ops staff are the MMA Engineers/Scientists/Techs

PHASE I

Phase I begins with delivery of the second prototype antenna, approximately June 2000. No single dish astronomical tests are done with the second antenna, it is installed 20m or so from the first antenna and the two are connected as the "~~interim~~ first interferometer".

Napier: would like to get up to ~200m baseline

The purpose of Phase I is to give us the confidence to place the order for the remaining 38 antennas.

Testing Plan:
- -Measure antenna pointing and focus in interferometric mode

-Verify that we can combine fast-switching and precision pointing
-Check coherence of the interferometer
-Verify phase stability with varying solar heating, also day/night
-Check phase stability with wind speed/direction
-Measure polarization purity

Hardware:
-Receivers are both final MMA dewar with 12m inserts at 30/90/230 GHz. Single polarization OK, dual is better.
-Correlator to support one baseline, 1 GHz BW in each of two polarizations. GBT adaptation correlator.
-Final fiber optic signal transmission, 2 x 1 GHz.
-Antenna Transporter (final? Prototype?)
-LO is conventional multiplied Gunn on both antennas

Software:
-Initial interferometer capability (throwaway?)
-Fast switch capability (experiment with on-line phase cal?)
-Operator interface?
-Astronomer interface?

Personnel:
-Dedicated interferometer maintenance techs
-Initial interferometer operators are computer programmers doing software tests.

PHASE II

The interim interferometer tests, Phase I above, lasts about 12 months. We are ready to start Phase II by June 2001; we anticipate an evolution between these two phases, not a discontinuity. In particular we expect to retrofit the interim interferometer with as much of the final MMA instrumentation as it is possible to achieve at that time.

The purpose of Phase II is to give us the confidence to place the order for all the electronics contracts.

Testing Plan:
-Test observing techniques
-Evaluate the practicalities of finding reference sources for fast switching observations.

-Evaluate OTF mapping techniques in enough detail to make a decision as to whether nutators will be on all the antennas
-Evaluate interferometer coherence with photonic LO

Hardware:
-Retrofit in dewars the final MMA 30/90/230 GHz receiver inserts.
-IF is 2 x 8 GHz, final system.
-8 GHz BW total power receiver for single antenna tests (throwaway?)
-Civil works for 3 km interferometer baseline tests.
-Retrofit to final photonic LO on both antennas
-Correlator (still GBT? First quadrant of MMA?)

Software:
-Full interferometer capability for observing technique tests
-Operator interface (final?)
-Astronomer interface (any yet?)
-On-line phase cal(?)

Personnel
-Interim operators (Chilean trainees?)
-Maintenance techs (Chilean trainees?)

PHASE III

[No discussion yet]

NEXT MMA COORDINATION MEETING:
Day Changed to Wednesday (next meeting only)
August 5
1100 EDT
804 984 0622

R. L. Brown
4 August 1997