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Abstract of the Issues Raised

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Site Selection and Testing

- Investigations into the correlation between measured 225 GHz opacity and radiosonde data need to be pursued. If this correlation is sound, then a large number of potential MMA sites can be evaluated from historical data having a timebase of decades.
- High-altitude sites which provide the best high-frequency atmospheric transparency are favored. What constitutes an 'acceptable' site at, say, 460 GHz?
- Very high-altitude, Southern Hemisphere sites should be 'looked at' using extant radiosonde data.
- Total-power fluctuations of the sky brightness temperature need to be measured and compared with interferometer phases to investigate Smoot's suggestion that one can infer radio 'seeing' from the fluctuations.

Array Configuration

- What is the minimum number of array configurations that will permit us to realize most of our scientific objectives? Can we make this minimum number equal to one (i.e., fixed antennas)?
- Is there a role for fixed 'outrigger' antennas, allowing us to achieve the highest resolution, but without the u-v coverage that would be necessary for full imaging capability?
- We need to pay specific attention to the interaction between possible configurations and possible sites, owing to topographic limitations. This may also affect the number of array elements.

Antennas/Telescope Optics

- What is the antenna cost and how does that cost scale with diameter when proper account is taken of all the factors involving precision operation (especially pointing)?
- What are the cost/performance trade-offs associated with an unblocked aperture? Can the mirror supports (particularly the subreflector legs) be made sufficiently rigid? Can we sky-chop? Are the polarization characteristics of an unblocked aperture a limitation in the resulting images?
- What effect does a Q-band (9-mm) capability have on the telescope design and on the telescope optics?

- How do we obtain total-power measurements? How do we under-illuminate? How do we obtain simultaneous observations in two bands that are separated by a factor of two or more in frequency?
- The Central Element question needs further investigation along the lines outlined in the Working Group Report.

MMA Frequencies

- The widest possible frequency coverage is a primary design emphasis. The 2-mm window should not be ignored; indeed at a high site the atmospheric transparency may be lower at 2 mm than at 3 mm, because O_2 remains a problem at 3 mm.
- The potential of the enormously broadband quasi-optical SIS mixers is such as to eliminate the need to identify observing 'bands'. Moreover, if successful, the number of MMA receivers is reduced markedly and the maintenance load eased commensurately. Is this technology realizable? What is likely in 5–10 years time? What are the performance trade-offs relative to narrow-band waveguide mixers?
- The receivers should incorporate DSB mixers, with the sidebands separable in the correlator.
- Simultaneous observations in two (perhaps) widely-spaced frequency bands are needed if we are to obtain a self-cal solution from a strong line in one band that we can use to correct the phases in the other band.
- What is the cost of extending array capabilities to higher frequencies (460 GHz)?

Correlator

- Flexibility is the central emphasis.
- Observers would like to split and analyze both sidebands in the correlator. Within the IF passband of each sideband one would like to place several spectral windows and to have independent control over the central (IF) frequency and the frequency resolution of each of these windows. The BIMA correlator is a model that should be scrutinized.
- How does the correlator cost/complexity combination scale with such flexibility? Does this cost then have implications on the number of array elements?

Mosaicing

- The need to mosaic places severe constraints on the performance of the array.
- How reliable must telescope pointing be in order to accommodate mosaicing? How do pointing errors degrade the mosaiced image?
- If the sidelobe levels of the primary response patterns of the individual antennas are high, what deleterious effects on the images will result?

- Does the need for high dynamic-range mosaiced images drive us necessarily to unblocked antenna apertures?

The Advisory Committee

- The Advisory Committee is taking on too many roles. It would be better to have one, or more, technical advisory committees that would focus on specific design questions and, in addition, broaden the Science Workshop so that the MMA can be evaluated as a scientific instrument. Meetings of the Science Workshop should include optical and infrared astronomers, theoreticians, and others who might benefit from the MMA, as observers or otherwise.
- Greater emphasis should be placed on making the community aware of the project and, of course, on listening to their ideas.