VLB ARRAY MEMO No. 366

National Radio Astronomy Observatory
Charlottesville, Virginia

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To: Site and Operations Committees

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Subject: Some Suggestions for the AOC Building

Below are a variety of suggestions for the VLBA Operations Center building. They include requirements that we could think of concerning the computer systems, especially the post processing. They also include some ideas that might make the working environment more pleasant.

COMPUTER REQUIREMENTS:

1. The AIPS television monitors need to be close to the computers driving them (25 ft(?) for the IIS in current systems). In practice, they should be in adjacent rooms or (perhaps better) on adjacent floors, one over the other.

2. Tape drives also must be near the computers.

3. There is a possibility that we might try to put a computer like a Cray in the building. It would require water cooling and a floor that can support a great weight in a small area. We should not exclude the possibility.

WORKING ENVIRONMENT:

1. Work stations (such as the main AIPS stations) should be in quiet, comfortable areas. The over-air-conditioned, noisy, machine rooms used in Charlottesville are a good example of what to avoid.

2. At least some of the tape drives and printers should be visible, but not heard, from at least some of the terminal areas. A machine room for such devices, separated from the terminal areas by a glass wall with a door is a good and frequently used solution.

3. There should be a few natural gathering places in the building to encourage interactions. The coffee area in the VAX building at the VLA is an example.

OPERATIONS:

1. The array and correlator (and eventually, the VLA) operators should have a pleasant working area that is isolated from noisy equipment but close to any equipment that they need to handle. The VLA operations area is not bad.

2. The correlator operators will need to spend a considerable amount of time mounting and dismounting telescope tapes. A possible way to keep that activity in a pleasant area while providing the cooling etc (eg. noise) needed by the drives is to build a wall flush with the front faces of the tape drives. The tapes are accessed from one side while most of the noise is kept on the

other. The Mark III processor at Bonn uses such a scheme. The tape access should probably be in the control room.

3. The operations areas for the array, the correlator, and eventually the VLA should be in the same room so that operators can help each other and keep each other company in off hours shifts.

4. The layout should allow the array operators to perform some of the functions of computer operators in their spare time as is standard practice at the VLA. In other words, the postprocessing computers should be near the operations area.

5. The telescope tape shipping area, storage area, and the operations area should be reasonably close. At a minimum, they should be on the same floor so that wheeled carts can be used to move tapes around.

6. It should be easy to reconfigure the machine rooms as technology leads to changes in the computers.

6. The building should be designed to avoid changes of level between rooms with computer floors and rooms or halls without them.

8. Perhaps many of these requirements could be met by configuring the entire ground floor (basement?) with false floors or overhead cable troughs and movable walls. Floor panels with rugs (as at the VLA) should be considered for the operations area and any other areas that contain people most of the time. User data reduction areas could be on the next floor up directly over the postprocessing computers and adjacent to a small machine room containing some tape drives and printers.

9. The tape storage area is specified to be able to store 60 days worth of tape. If the tape recording system uses the current Mk III Honeywell tape transports, we will need to store about 1800 tapes. At about 10 lbs. apiece, that is about 18000 lbs. in the tape storage room.

10. The tape storage room and the tape playback area must have some sort of humidity control, that is, humidity will have to be added to the atmosphere. In general, it will be necessary to have a clean, relatively dust free atmosphere in the tape storage and playback areas.

11. The temperature and humidity in the tape storage room and the playback area should be the same so that the tapes don't experience a change just before playback.

GENERAL:

1. Some scheme such as cable troughs in the halls or along the walls should be provided throughout the building to allow easy instalation of whatever electronic technology may come along in the future. Numerous holes through walls and floors will be needed for cables but should be designed so that they do not provide a path for a fire to spread if one should occur.

2. All offices should be wired for terminals.

3. A sheltered and secure place to park bicycles should be provided. Socorro is small enough that many people may commute by bike.

SAVINGS IF BUDGET IS LOW:

1. Consolidate library, auditorium, journal/coffee area, visitor's kitchen, canteen, and conference room to reduce total space. The total in these areas is 4300 sq ft (VLBA stand alone). It can probably be cut in half. Can we rely on Tech for an auditorium for any functions larger than colloquia?

2. There are 70 offices with 9825 sq ft. in the stand alone plan. There are a variety of ways that these numbers might be reduced including reducing the number of people who have offices, reducing the basic size of each office, using larger rooms with several occupants and less room per person (esp. visitors, post-docs etc).

3. Utilize some facilities at the VLA. Operations Memo No. 6 gives the complete stand alone plan and the combined plan. A hybrid plan where some of the NRAO facilities at the VLA (eg. cryogenics and antennas) are used while there is relatively little VLA activity in Socorro might be possible (if unpleasant). NRAO as a whole will most likely have to swallow part (maybe most) of the operations budget of the VLBA as it did for the VLA so it should make use of existing facilities where possible.

4. Pare down machine rooms, labs etc wherever possible. For example, does the business division really need the space of 4.7 normal offices just for files? The building design should allow expansion of space available for each function if the money is found later. Also, if the VLA operations move in, it should be possible to put related VLA and VLBA activities in the same or adjacent areas.

5. Operations Memo No. 6 has 24 people in Electronics for the VLBA stand alone compared to 28 for the VLA (VLA and VLBA stand alone minus VLBA stand alone). Does it really take nearly as many people to support the VLBA as the VLA despite the smaller number of antennas, the presence of the personel at the sites, and the higher reliability requirements of the VLBA? This is the area of greatest difference between the proposal and OP Memo 6. It should be considered carefully as a possible area for reductions in both the AOC size and the operations budget.

6. We should think seriously about the possibility of combining the functions of the array operators and the correlator operators. Most of the array operations will be in the form of distribution of information well ahead of time and occasional monitoring of the array performance. In fact, it is supposed to be possible to continue normal operations even if communications are lost to any given antenna for several hours. Therefore the tasks of the array operators will rarely be time critical. It also should be possible to make the tasks of the processor operator (eg mounting tapes and setting up control files) relatively free of time critical operations (some scheme should be used to avoid

stopping the correlator for tape changes or the processor will have difficulty keeping up with the observing - see VLBA Memo 214). Both jobs will probably have low average work loads. The question is, are the peak loads low enough for one person? An intermediate possibility would be to have more than one during the day and one at night.

7. An informative exercize might be to determine how NRAO might operate the VLBA with its current staff plus the 20 technicians at the sites and at least one set of operators at the AOC. Is it possible and how much would the VLBA and the existing instruments suffer? This should identify those areas where new people are absolutely necessary and those areas where the specified personel and facilities might be more comfortable than necessary in the presence of limited budgets. It might also help identify areas where careful design now would minimize the manpower needed later.