# Are we thinking boldly enough?

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## Abstract:

Locating the Millimeter Wave Array in Chile will guarantee a unique instrument and, thereby, attract funding. It would supplement planned or existing arrays in the northern hemisphere. Operations could mimic those of Cerro Tololo InterAmerican Observatory near La Serena. A possible site might be Cerro Morado near Cerro Tololo.

## Memo:

Listening to papers and participating in informal conversations at the recent mm- and submm-wave astronomy meeting in Granada suggested to me that our millimeter array may prove to be too conventional to win funding in tight economic times.

Too many astronomers are thinking along these same lines. Some are planning or have successfully built similar arrays. For example, the Nobeyama array consists of 5 10-m dishes and 1 45-m dish for a total collecting area of about 2000 m^2 along km baselines. This array will be useful to 1 mm. The Berkeley group hopes to have at least 6 telescopes operating as a synthesis array, over similar baselines but with admittedly a smaller total collecting area. Caltech could decide to add additional elements to its millimeter-wave interferometer. And, the IRAM instrument at Plateau de Beurre could be expanded.

Clearly, other institutions will give the proposed NRAO Millimeter-Wave Array some significant competition. And, this competition will surely be viewed as duplication by the NSF and its reviewers. At a time when both major political parties are campaigning on fiscal reform, I suspect that the label of "duplication" could prove to be fatal.

Also, and I must put this delicately, the initial ardor of university groups for the Array may cool with time as the Array becomes financially and scientifically competitive with their own projects. This ambivalence surfaced with respect to our 25-m telescope -- as it naturally should have. Why should a university group support a national array not much more powerful than what some of them already have or could have, but a lot more costly. Some of the support money for the national array will have to come from the Grants section of the NSF, and hence out of the university pockets.

And so, I argue that we should design the Array to be truly unique. Otherwise, I believe that it won't be funded.

My solution is to put the array in the southern hemisphere. Specifically, we should consider Cerro Morado in Chile, the site next to Cerro Tololo. This site is a high plateau with plenty of space, owned by AURA. It is so close to CTIO that observers and staff could use the CTIO residence halls, dining room, and support facilities. Access is easy from La Serena.

There are a number of reports regarding water vapor. (Unfortunately, some of these data were taken with the Westphal meter which saturates at 7 mm.) The data suggest precipital water vapor to average between 2 and 3 mm during non-summer months (February through December).

The most difficult problem may be staffing the operation. CTIO has experienced some difficulty in attracting and keeping support staff at their base at La Serena. This lovely community may be too serene as a long-term commitment for non-Chilean spouses.

Fortunately, I believe that the NRAO can overcome these difficulties. By rotating key employees from their USA sites to Chile for 1-2 years, and thereby guaranteeing them their old USA jobs upon their return, the NRAO could staff the operation in a manner previously unavailable to CTIO. The tax-free stay would provide substantial financial inducements to our staff to volunteer, in addition to the experience of living in a beautiful country. Chilean employees could provide the bulk of the staff, as they do at CTIO.

The concept of a rotating, temporary appointment is an old solution to staffing out-of-the-way places. For many years, MIT Lincoln Laboratory has successfully attracted some of their best engineering staff to work in the Pacific islands during the 1960s and 1970s. The tax savings paid off many mortgages of Massachusetts houses -- as well as college tuitions of dependent children.

Chilean political problems do not extend to astronomy. It is a nation populated with European immigrants, currently burdened with great unemployment due to the dependence of their economy on the mining of copper and iron ores. Both the CTIO and the ESO people tell me that Chile regards the observatories (ESO at LaSilla, Carnegie at Las Compa¤as, and CTIO at Cerro Tololo) with great pride. These observatories provide employment for technical graduates of Chilean universities, as well as favorable international visibility for Chile. To support astronomy, Chile grants diplomatic status to all foreign hires of these observatories -- together with all the privileges carried with this status.

In closing, I believe that while the millimeter array is a fine idea, it will have great difficulties being funded because, on a northern hemisphere site, it simply may not be a big enough step forward for astronomy.

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