3-7-00

Date: Tue, 07 Mar 2000 17:45:40 -0500
From: Anthony Kerr <akerr@NRAO.EDU>
Subject: 4 K cryogenics after Cochrane's departure

John,

Here is the more detailed memo you requested on the 4 K cryogenics situation.

Jack Cochrane's departure will leave NRAO with no expertise in fabrication and repair of JT valves, helium heat exchangers, hydrogen thermal switches and JT compressors. There will be no one to service 4 K JT refrigerators and compressors, and no one to make new ones.

Even with the closing of the 12-m telescope, 4 K cryogenic systems will still be required in Tucson, the CDL, and soon in Socorro if we are to meet our commitments to ALMA. Existing equipment must be maintained and repaired, and a number of new 4 K test systems will be needed.

Possible solutions:

() Hire an experienced cryogenics engineer to be located in:

- () Tucson—several 4 K systems
- () CDL—several 4 K systems
- () Green Bank—no 4 K but might get bolometer array!
- () Socorro -- 4 K systems soon with ALMA evaluation telescopes.

() Train an existing engineer to be responsible for 4 K equipment. In Charlottesville, Neil Horner or Kirk Crady could do this work with appropriate training. Possibly someone in Tucson would be appropriate.

() Try to rely on scavenging components from 12-m receivers for ALMA development. However, there are probably not enough 4 K telescope refrigerators to supply both spare parts and components for essential new systems.

() Contract with some company to maintain our equipment and to build new components as needed. As our requirements are intermittent and for small quantities, this option will not be attractive to a commercial organization, will probably be very expensive, and is likely to be very unsatisfactory.

() Wait for RAL to produce ALMA refrigerators. This would require modification of existing test sets to accommodate the new ALMA refrigerators—a major task. It is likely that the ALMA refrigerators will be poorly suited for laboratory operation—e.g., they may have insufficient cooling power to cool a laboratory test dewar with its minimal thermal design in a reasonable time. Also note: ALMA refrigerators will run on 50 Hz power.

- Tony.