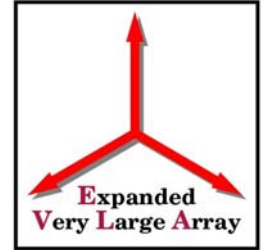


EVLA Front-End CDR

Cryogenic & Vacuum Systems



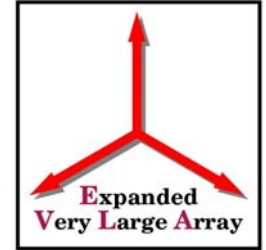
Cryogenics & Vacuum Systems Overview



- EVLA Required Cryogenics and Vacuum System Upgrades
 - Design Parameters
 - Gas flow system
 - Vacuum system
 - Hardware
 - Compressors
 - Drivers



EVLA Upgrades

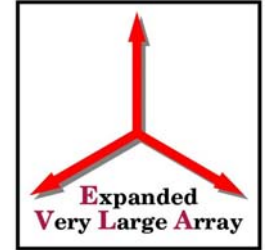


- EVLA upgrades to the receiver system include:
 - S-Band (New)
 - Ka-Band (New)
 - C-Band (relocated out of the “A” rack)
 - Ku-Band (relocated out of the “A” rack)

The impact is, a higher gas flow rate and a higher volume vacuum requirement.



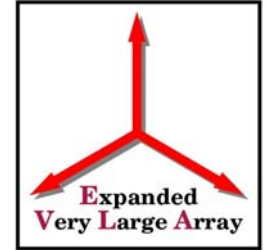
Gas Flow System Design Parameters



- Three Types of Coldheads used in system
 - Type 1020 Coldhead: 28 scfm
 - Type 350 Coldhead: 17 scfm
 - Type 22 Coldhead: 9 scfm



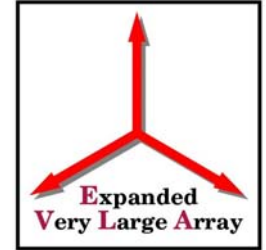
Gas Flow System Design Parameters



- EVLA gas flow requirements dictated that a third helium compressor be installed.
 - Compressor A circuit requires 43 scfm
 - S(350), Ku(350), Q(22)
 - Compressor B circuit requires 43 scfm
 - X(22), K(350), Ka(350)
 - Compressor C circuit requires 45 scfm
 - L(1020), C(350)

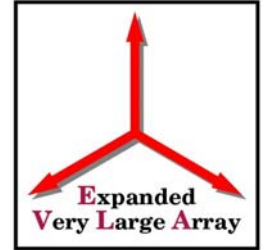


Helium Compressors





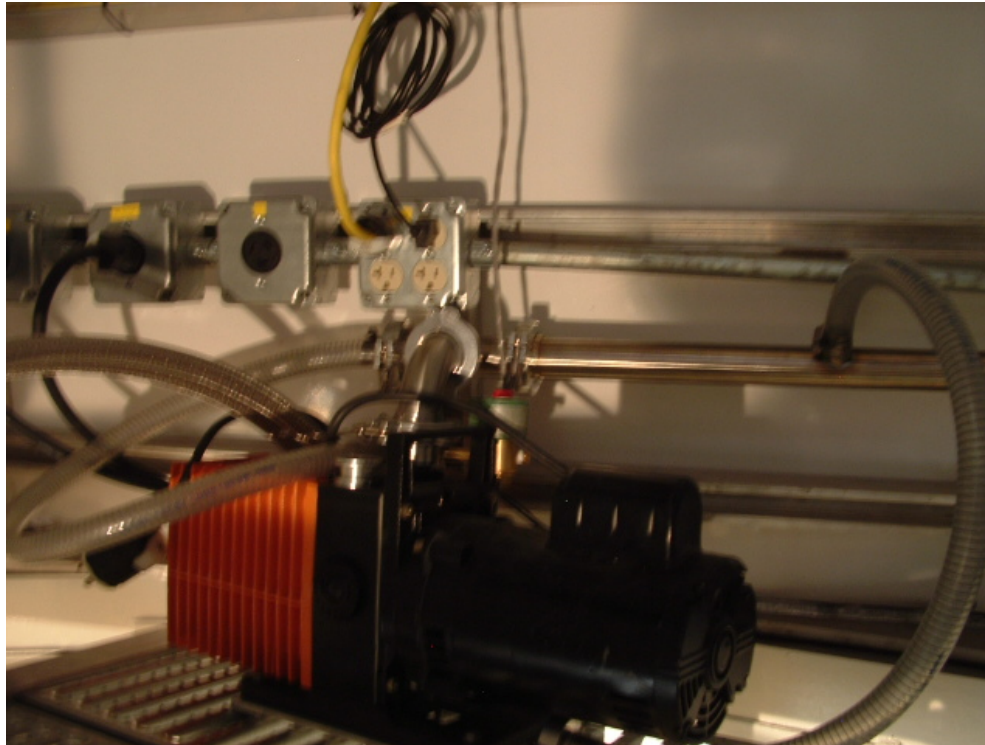
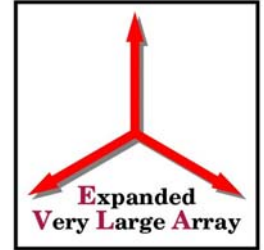
Vacuum System Design Parameters



- EVLA vacuum requirements resulted in the smaller of the two VLA pumps being replaced with a larger unit.
 - Vacuum Pump A circuit
 - X, C, S, Ku
 - Vacuum Pump B circuit
 - Ka, K, Q, L



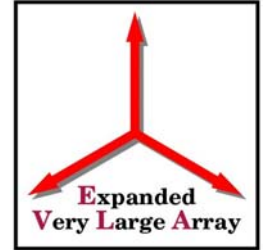
Vacuum System Pump



Controlled by the card cage



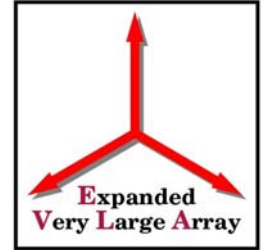
Hardware Compressors



- **Compressor modifications justification:**
 - CTI discontinued the 3 HP piston type compressor.
 - Refurbished CTI 1020R compressors are \$11,500 each.
 - CTI 1020R compressors were rated at 51 scfm, but had a higher gas discharge temperature than NRAO compressors
 - NRAO modified and built a compatible compressor at a cost of \$4600, which is rated at 48scfm.



Hardware Drivers

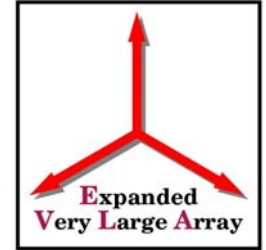


- Coldhead Drivers
 - New Scott-T boxes
 - Designed, tested and installed
 - Designed to work with the new receiver card cages
 - Not compatible with the old style card cage
 - Each Scott-T will drive up to 4 coldheads
 - Interim
 - Used the old style coldhead drivers until new card cages are installed



Hardware

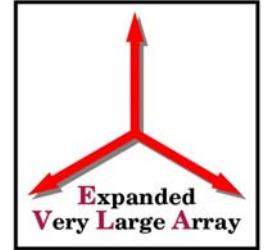
Coldhead Drivers



New Scott-T Boxes



Summary



-
- Discussed the additional Helium gas flow need for EVLA, that resulted in the addition of a third circuit.
 - Discussed the new Scott-T coldhead drivers.
 - Discussed cost savings related 1020R compressor modifications.
 - 87% of Cryo budget has been expended to date;
 - Purchased 104 model 350 coldheads
 - Purchased 30 Helium compressors
 - Remaining budget is sufficient to cover ancillary hardware.