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Table of Contents

| | |
|---|----|
| 0 List of Tools and Utilities | 1 |
| 1 Pointing..... | 7 |
| 2 Delays..... | 8 |
| 3 Focus | 9 |
| 4 TIPPING | 9 |
| 5 AOI..... | 9 |
| 6 SKIP & EXTEND | 12 |
| 7 Parmstool..... | 13 |
| 8 VLA Monitor Data | 14 |
| 9 Checker | 18 |
| 10 The F Display | 20 |
| 11 The D10 Display | 20 |
| 12 P10 and Plog..... | 21 |
| 13 DAT Tapes..... | 21 |
| 14 VLBI Support | 21 |
| 15 Miscellaneous, Uninvestigated, Unknown..... | 21 |
| 16 Functionality that is NOT Modcomp based..... | 25 |

Modcomp shutdown is scheduled for June 27, 2007. This memo presents a list of the tools and utilities used by the array operators, engineers and technicians for trouble shooting, maintenance, and monitoring of the VLA that are to be carried over to the EVLA Monitor and Control System after the Modcomp computers are retired.

Before proceeding, a particular note of thanks to Pat Van Buskirk, Peggy Perley, Ken Sowinski, Dave Midgett, Matt Gardiner, Doug Scott, Terry Cotter, Wayne Koski, the 15 or so people (mostly from the Electronics Division) who attended the Users Meeting on the new monitor data query interface, and others - all of whom supplied information that has gone into this memo.

0 List of Tools and Utilities

The following list attempts to exhaustively list all known tools and utilities used in the operation and maintenance of the VLA that could reasonably be considered to be a part of the monitor and control system. Undoubtedly it contains omissions, and feedback on any missing items is welcome.

Items in bold must have equivalent functionality under the EVLA Monitor and Control System. Items preceded by a question mark ("??") are unknowns, or require a policy decision, or are subject to some other, as yet unresolved, confounding factor. *Italics with bold is used to flag items that may be in particular need of attention.*

1. Pointing, Priority = 1

- a. **Pointing Solver (for reference pointing & pointing model determination)**
Status = Workable functionality exists. May need further refinement.
- b. **Ptgtmp** – used to view the results of the most recent pointing scan
Status = Equivalent functionality exists. Further feedback on the usefulness and quality of the current EVLA equivalent is needed.
- c. *Refptg/Ptgutl* – *used to locate, view, and transfer reference pointing data.*
Status = No requirements or design exists. No developer has been assigned to work on this item.

2. Delays, Priority = 1

- a. **Delay Solver** – solve for antenna delays
Status = A phase slope version of the delay solver exists and is in use.
A prototype of a delay stepping version exists, but is not yet operational.
- b. **Viewing the delay solutions**
Status = Standard Linux utilities can be used to view the delay solutions.
- c. **DELEDI** – used to review delay solutions & update the SYSxIF files.
Status = A tool for the manual update of delays exists (Parmstool).
Work on tools to automate the update of delays not yet begun.

3. Focus, Priority = 1

- a. **Focus Solver** – solve for optimal focus settings, per antenna
Status = An operational capability that will function without the Modcomp computers has not been developed.
- b. **Viewing the focus solutions**
Status – Standard Linux utilities can be used to view the focus solutions.
- c. **Updating the focus parameters.** Status = A tool for the manual update of the parameters (Parmstool) exists.

4. Tipping – opacity measurement, Priority = ? Status = The antenna movement portion of tipping has been completed, but analysis software has not yet been developed.

5. AOI (Array Operator Interface)

- a. **DISPLAYS screens** – overview and antenna subsystem screens
Priority = 1, Status = Done, but data is not available for some fields of the screens. See the table in the document body for further information.
One item requiring further attention is that the SxS, CxC, SxC data on the Baseband screen is not available.
- b. **SUMMARY screens** – at least one of the summary screens is needed
Priority = 1, Status = to be released during the 3rd week of June. See text in document body for further information.
for further information.
- c. **Commands** – *There are commands associated with each DISPLAYS screen. Not all the commands have been implemented and not all of the implemented commands have been tested.*
- d. **PTDISP screens** – Pie Town display screens
Priority = Not Needed

6. **SKIP & EXTEND** – SKIP is used to i) reconfigure electronics that did not configure correctly (SKIP 1 0), and ii) move around within an observe file, a capability that has multiple uses. EXTEND is used to extend the time on source (i.e., to extend, in time, the current scan). See text in the body of the document for further details.
Priority = ?, Status = Nothing yet under development
7. **Parmstool** – EVLA software used to update the EVLA parameters database. The EVLA parameters database serves the same purposes as the VLA system files.
Priority =1, Status = Functional prototype being evaluated
8. **VLA Monitor Data**
 - a. **Infrastructure, Priority = 1**
 - i. Specification of monitor points to be archived & their logging rates
Status = Done
 - ii. Parity error information
Status = Done
 - b. **Realtime Monitor Data**
 - i. MW – a monitor data display tailored to maintenance of the hardware used to deliver monitor data from VLA antennas. Priority =1,
Status = Done
 - ii. ? TM – realtime display cal voltages and gated total power for all antennas
Priority = ?, Status = Not currently under development
 - iii. Modlog & Mondef – modify and restore default monitor point logging rates
Priority = Not needed, Status = Capability already exist in the MIBs
 - c. **Archived Monitor Data**
 - i. TPR – “Technicians Plotting Routine”. Used to plot the same set of monitor points, for all antennas, on a weekly basis. Priority = 1
Status = Under development, functioning prototype available
 - ii. Mondat – Retrieve, list, and/or plot a user specified list of monitor points for a user specified time range. Priority =1
Status = Under Development, functioning prototype available
 - iii. Mondmp & Monfil – Mondmp is used to write the current contents of the online monitor data archive to tape. Monfil is used to write a tape made by Mondmp back to disk as a standalone monitor data archive.
Priority = Not Needed, Status = Equivalent capability exists in the monitor data archive
9. **Checker – Error/Warning Messages**
 - a. **Operator Display** – display of warnings and error conditions within the system.
Priority = 1, Status = An equivalent display has been developed and deployed.
This display is less than satisfactory, but the problem may be with the nature of the alerts rather than with the manner in which they are displayed.
 - b. **Checker Logs** – a log of the warnings & error conditions
Priority = 1, Status = Fully functional prototype available for evaluation
 - c. **PRATE equivalent** – summary of parity errors seen for monitor data and commands. Priority = 1, Status = Assigned & under development
10. **F (Fringe)** – Displays Antsol solutions for all antennas when observing a calibrator
Priority = 1, Status = Current solution may not be adequate. See body of text for further information.

11. **D10 - Display data for one baseline, for every integration**
Priority = 1, Status = Neither a design nor an implementation is currently under development
12. ? P10/Plog - When in spectral line mode, plots a spectrum from one baseline (Plog uses a log scale) *Priority = ?, Status = Not currently under development*
13. DAT tapes - A matter of policy. Will the EVLA Transition System write archive data to tape? *Priority = Not Needed, Status = Current planning does not call for archiving data to tape.*
14. **VLBI Support** *Priority = 2, Status = Not currently under development*
 - a. **VLBLOG** - records "calibration" data in realtime for VLBI observations
 - b. **VLBCOP** - transcribes the recorded data for use by the VLBA correlator
 - c. **VLBRD** - is used to examine the recorded calibration data
15. **Miscellaneous, Uninvestigated, Unknown**
 - a. **Newfetch (& OPCHK, FILCHK)** - a set of programs that extracts observe files from email and transfers them to the Modcomp computers. Extraction of the observe files from email will still be needed. OPCHK & FILCHK perform validity checks on observe files.
Priority = ?, Status = Nothing currently under development.
 - b. ? **TSYS** - forms an estimate of system temperatures from antenna based correlation coefficients
Priority = ?, Status = Not currently under development
 - c. **MTCAL & MODCAL** - used to adjust IF peculiar gain & IF peculiar phase
Priority = Not Needed, Status = Current thinking does not call for the use of peculiar gain or peculiar phase parameters in the EVLA M&C system.
 - d. **FESN & FE Calibration Data** - FESN produces a table of serial numbers for the VLA antennas front ends. A corollary to this item is access to the FE calibration data that is stored on the Modcomps.
Priority = ?, Status = Not currently under development
 - e. **LSTANT** - shows the system's idea of antenna configuration
Priority = Not Needed
 - f. **VLACOM** - a command line program that can display anything in the system
Priority = Not Needed
 - g. **DMT** - a command line program that allows finer control than AOI
Priority = Not Needed
 - h. **BLMERGE** - merges a file of baseline corrections with the system baseline file
Priority = ?, Status = Not currently under development.
A special purpose control script is needed.
Priority = ?, Status = Not currently under development.
Baseline corrections can, for now, be made manually via Parmstool. No design or implementation for automated updating of baseline corrections is currently under development.
 - i. **MIXIT** - creates IF & ROT files for LP & 4P bands
Priority = Not Needed, Status = LP band will not be supported in the EVLA M&C system.
 - j. **POLSOL** - adjusts IF files for cross-hand delay correction
Priority = ?, Status = Not currently under development. See text in document body for a description of what is needed.

- k. OBSVGR – creates observe files for Voyager tracking
Priority = Not Needed
 - l. ? the “Condon” survey mode
Priority = ?, Status = Not currently under development or planned to be developed
 - m. SNOW & SYSMELT **Priority = Not urgent, given the season, Status = Done**
 - n. ? LA1 & LA2 as logging devices – Hardcopy of source change events (LA1), Checker messages (LA1), program events (LA2), etc.
Priority = ?, Status = This item really speaks to the need for a logging system. A comprehensive logging system for the Transitions System is not currently under development.
 - o. FTPCAL – **FTPCAL is a job control procedure that is used to transfer Antsol calibration data from the Modcomps to the AOC. Actually, this item is a pointer to the larger issue of supplying data to the flux density database. See the text in the document body for further information.**
Priority = 2, Status = Not currently under development.
 - p. ? SYSTEST – LO/IF tests
Priority = ?, Status = Not currently under development
 - q. ? SYSCORRX – *special purpose observe file used to look for sampler errors*
Priority = ?, Status = Not currently under development
 - r. ? REFANT – forces a reference antenna for a subarray
Priority = ?, Status = Not currently under development
16. Functionality that is NOT Modcomp based
- a. **API (Atmospheric Phase Interferometer)**
A qualification concerning independence from the Modcomps is in order here. The API requires access to weather data. Currently, the weather data is obtained from the Modcomps. Changes must be made to support access to weather data from an alternate source, either directly from the CMP or from the monitor data archive. Priority = ?, Status = Not currently under development
 - b. Wyemon
Priority = ?, Status = The Wyemon will be replaced as VLA antennas are replaced by EVLA antennas equipped with M302/M303 modules. The software needed to support M302/M303 functionality is already developed, tested, and available.
 - c. Logging (Operator Logs)
Priority = 1, Status = The current system for creating Operator Logs should be unaffected by the shutdown of the Modcomps. Long term plans call for the eventual integration of Operator Logs into the EVLA M&C System.
 - d. Maint (mainsaver)
Priority = 1, Status = Unaffected by shutdown of the Modcomps. Long term plans may include the ability to submit a Maint work order from the Array Operator Screen &/or from the Alerts screenlet.

0.1 Summary List of Items Needing Attention

The list presented above is rather long. The list presented in this section excerpts from that list the items in need of further attention.

1. **Pointing, Priority = 1**
 - a. *Refptg/Ptgutl – used to locate, view, and transfer reference pointing data. Status = No requirements or design exists. No developer has been assigned to work on this item.*
2. **Focus, Priority = 1**
 - a. *Focus Solver – solve for optimal focus settings, per antenna Status = An operational capability that will function without the Modcomp computers has not been developed.*
3. **Tipping – opacity measurement, Priority = ? Status = The antenna movement portion of tipping has been completed, but analysis software has not yet been developed.**
4. **AOI (Array Operator Interface)**
 - a. *DISPLAYS – SxS, CxC, SxC data on the Baseband screen is not available. See document body for further information.*
 - b. *Commands – There are commands associated with each DISPLAYS screen. Not all the commands have been implemented and not all of the implemented commands have been tested.*
5. **SKIP & EXTEND – SKIP is used to i) reconfigure electronics that did not configure correctly (SKIP 1 0), and ii) move around within an observe file, a capability that has multiple uses. EXTEND is used to extend the time on source (i.e., to extend, in time, the current scan). See text in the body of the document for further details. Priority = ?, Status = Nothing yet under development**
6. **F (Fringe) – Displays Antsol solutions for all antennas when observing a calibrator Priority = 1, Status = Current solution may not be adequate. See body of text for further information.**
7. **D10 – Display data for one baseline, for every integration Priority = 1, Status = Neither a design nor an implementation is currently under development**
8. **VLBI Support Priority = 2, Status = Not currently under development**
 - a. *VLBLOG – records “calibration” data in realtime for VLBI observations*
 - b. *VLBCOP – transcribes the recorded data for use by the VLBA correlator*
 - c. *VLBRD – is used to examine the recorded calibration data*
9. **Newfetch (& OPCHK, FILCHK) – a set of programs that extracts observe files from email and transfers them to the Modcomp computers. Extraction of the observe files from email will still be needed. OPCHK & FILCHK perform validity checks on observe files. Priority = ?, Status = Nothing currently under development.**
10. **FESN & FE Calibration Data – FESN produces a table of serial numbers for the VLA antennas front ends. A corollary to this item is access to the FE calibration data that is stored on the Modcomps. Priority = ?, Status = Not currently under development**
11. **BLMERGE – merges a file of baseline corrections with the system baseline file Priority = ?, Status = Not currently under development. A special purpose control script is needed. Priority = ?, Status= Not currently under development. Baseline corrections can, for now, be made manually via Parmstool. No design or**

implementation for automated updating of baseline corrections is currently under development.

12. POLSOL – adjusts IF files for cross-hand delay correction

Priority = ?, Status = Not currently under development. See text in document body for a description of what is needed.

13. FTPCAL – FTPCAL is a job control procedure that is used to transfer Antsol calibration data from the Modcomps to the AOC. Actually, this item is a pointer to the larger issue of supplying data to the flux density database. See the text in the document body for further information.

Priority = 2, Status = Not currently under development.

14. ? SYSCORRX – special purpose observe file used to look for sampler errors

Priority = ?, Status = Not currently under development

15. API (Atmospheric Phase Interferometer)

A qualification concerning independence from the Modcomps is in order here. The API requires access to weather data. Currently, the weather data is obtained from the Modcomps. *Changes must be made to support access to weather data from an alternate source, either directly from the CMP or from the monitor data archive. Priority = ?, Status = Not currently under development*

1 Pointing

Pointing, Delays and Focus are not usually viewed as a tools or utilities, but rather as core elements of the realtime system. However, since this functionality is critical, and since delays and focus are still, to some degree, under development, and since there are utility functions associated with these areas, they will be discussed in this memo.

1.1 Pointing Solver

In the EVLA Monitor and Control System, the pointing solver is a component of Telcal. It runs during all pointing scans & produces pointing offset solutions. This component of the EVLA Monitor and Control System is “complete” in the sense that a pointing solver is in place, has been tested and verified, and it works correctly with all of the associated mechanisms needed to do reference pointing and pointing model determinations.

1.2 PTGDMP

PTGDMP is a utility used to view the pointing offsets that were produced by the most recent pointing scan. An EVLA equivalent already exists in the EVLA Operator Software. It is available via the Screens -> Telcal -> Reference Offset menu item.

1.3 Refptg/Ptgutl

Refptg, taken together with a program named Ptgutl and a utility program named Ftpscp are used by the VLA operators to locate and examine pointing offsets produced by pointing scans, and to transfer those offsets to a system from which they can be emailed to observers.

Refptg is a job control language (JCL) procedure that is run on the Modcomp Boss that provides the context for the execution of two programs. The first program run by Refptg is a program named Ptgutl (pointing utility). Ptgutl is used by the operators to locate, examine, and write (to

a temporary file) a set of pointing offsets as produced by a pointing scan. The second program run by Refptg is a program named Ftpscp. Ftpscp automates the process of transferring the temporary file written by Ptgutl to a platform (usually banshee) from which the pointing offsets can be emailed. (Email as generally understood is unavailable on the Modcomps.)

Since no one has said otherwise, it is assumed that the practice of emailing pointing offsets to observers will be continued. Therefore, this functionality must be supported under the EVLA Monitor and Control System. The requirements of this task and how it will be accomplished in the context of Linux based systems has not been investigated.

2 Delays

2.1 Delays Solver & Viewing the Delay Solutions

As with the pointing solver, the delays solver is a component of Telcal. There will be two flavors of delays solvers. The phase slope delays solver operates whenever the system is in line mode, is looking at a calibrator, and the observing mode is not equal to "D". It produces a list of delays for every working antenna (EVLA & VLA) for every IF in use. The results are written, in ASCII, to a file that is part of a Linux file system. It can be viewed using standard Linux utilities. The phase slope version of the delays solver has already been integrated into Telcal and is operational.

If the system is in line or continuum mode, is looking at a calibrator, and the observing mode is equal to "D", then a delay stepping version of the delay solver will be used. A prototype of the delay stepping version exists, but has not yet been folded into the operational version of Telcal. It is expected that the delay stepping version of the delay solver will be released as a component of the EVLA Monitor and Control System sometime over the next few weeks. Support for the "D" observing mode has either already been included in obs2script and the interim Observation Executor, or it will be included at the same time the delay stepping solver is integrated into Telcal.

2.2 DELEDI

DELEDI (and its associated job control language procedure, DELEDT) provides a means by which the delays produced by the Modcomp delays solver can be reviewed, edited, accepted, or discarded, with the option of merging the delays into the Modcomp SYSxIF files. The equivalent functionality under the EVLA M&C System would consist of software to assist the operator in the review and manipulation of delays produced by the EVLA M&C delays solver(s), followed by insertion of the results into the parameters database.

For the near term it is likely that much of the work involved in reviewing delays will be done manually, with Parmstool (see section 7 Parmstool) used to update the parameters database. Over the longer term, operator tools to assist and automate much of the work will likely be developed.

3 Focus

3.1 Focus Solver & Viewing the Focus Solutions

A test version of a focus finding module (a focus solver) was completed in March 2007. It has been included in Telcal, but is not well tested. It does work with the Modcomps, but it is not possible to control the antennas in such a manner as to allow focus to work properly without the Modcomps. *So, as of early June 2007, the Modcomp free system does not have a functional focus determination capability.*

The focus solver will key on an observing mode of "F". Support for the "F" observing mode has either already been included in obs2script and the interim Observation Executor, or it will be included at the same time the focus solver is integrated into Telcal. Focus solutions will be produced for both EVLA and VLA antennas.

As with the delays solver, the results are written, in ASCII, to a Linux file system and are viewable using the usual Linux utilities.

4 TIPPING

Tipping is a combination of systematic antenna movement with analysis/reduction software to develop a measurement of opacity that is used by the post processing software. The mechanical (antenna movement) portion of tipping has been completed for the EVLA, but the needed analysis software has not yet been developed.

5 AOI

AOI, the Array Operator Interface, is the chief means by which the VLA Operators monitor and control the array. AOI consists of a series of screens. These screens provide a wide variety of information. Some give an overview of the status of an observation, others provide the ability to monitor and control antenna subsystems, on an antenna by antenna basis, and yet others provide summary screens, for all antennas, of certain conditions or state.

The top level menu of AOI has 10 entries:

1. DISPLAYS – 24 screens. Mostly screens that display information about a given subsystem on an antenna by antenna basis. The VL & SM displays provide overviews of the state of an observation and the antennas
2. COMMANDS – provides the ability to send a single command or to resend a command continuously
3. BUILD DSP – display builder screen This screen may represent a planned capability that was never implemented.
4. SUMMARY – A set of 12 screens that present information for all VLA antennas rather than one specific antenna.
5. PRIVI – used to grant privileges to other Modcomp batch tasks. This screen may or may not represent a planned capability that was never implemented.
6. PTDISP – Pie Town displays
7. AREA – Changing the partition from which the definitions of the displays are obtained.
8. HELP – help screens

9. ALARM – an alarm clock
10. LIST – list source files

Only items 1 and 4 (DISPLAYS & SUMMARY) contain screens that require duplication under the EVLA M&C System.

5.1 AOI DISPLAYS Screens

A prioritized list of the AOI screens available under the DISPLAYS menu item has been provided by Operations, and equivalent screens that will run as part of the EVLA Monitor and Control System have been developed. For the most part, this set of screens is done. There are few problems with missing information – data that is not available via the CMP. There are a few cases where this missing information is likely to be problematic.

The table below gives a summary of the state of the AOI Display Screens. The text in the Status/Comments field refers to information displayed by the screens. Screen by screen status has not been compiled for the commands associated with each screen. *Not all of the commands have been implemented, and not all of the implemented commands have been tested.*

| Display | Operator Ranking | Status/Comments |
|-------------------------|--|--|
| VL, array display | Critical | A combined VL/SM screen has been suggested by the Operators. This screen is under development and will be released in June 2007. |
| AC, ACU display | Important | Done |
| AS, analog sum | Ranked as “not normally used” by the operators, but wanted by others | No data for the MODE and INP fields. The need for the data in these fields has not been specified. |
| BB, baseband | Critical | <i>Done, but no data is available for the BWC, SxS, CxC, SxC fields. Ray Ferraro states that the data in the XxX fields is critical to detecting failed or misadjusted samplers and some front end and LO/IF problems. Currently no resolution of this issue.</i> |
| CRY, cryogenics systems | Critical | Done |
| FE, front end | Critical | Done. Data for the Band Sel fields for the IF pairs AB & CD is missing. |
| FR, focus/rotation | Not ranked by the operators | Done |
| FL, flukes | Important | Done |
| IG, inspect global | Important | <i>The screen layout is complete, but there is no data available for any of the fields.</i> |

| | | |
|------------------------------------|-----------------------------|--|
| communications | | |
| LO, local oscillator | Critical | Done |
| L6 | Important | Done |
| L7 | Deferrable | Done |
| L17 | Deferrable | Done |
| MA, maser | Not normally used | The screen layout is complete, but no data is available for the majority of the fields. |
| ML1, master local oscillator | Minor Importance | Done. No data for the RACK TEMP field. |
| ML2, master local oscillator | Minor Importance | Done. No data for the RACK TEMP field. |
| PAA, parity errors, single antenna | Minor Importance | Done |
| PS, power supplies | Important | Done |
| RX, receivers | Not normally used | Done |
| SM | Critical | A combined VL/SM screen has been suggested by the Operators. This screen is under development and will be released in June 2007. |
| T1, T1/T2 system | Not normally used | Done |
| WE, weather | Not ranked by the operators | Done |
| WG, waveguide | Minor Importance | Done |
| WR, wrap | Minor Importance | Done. No data for the SUB field. |

5.2 AOI SUMMARY Screens

A set of 12 AOI screens is available under the SUMMARY menu item. The summary screens show a set of values for all VLA antennas, rather than for one specific antenna. These screens have not been prioritized as to frequency of use or importance by either Operations or Electronics, but it is known that the DCS Group (Monitor-Control, Wayne Koski) within the Electronics Division does use the PA (parity error) summary screen. Implementation of the PA summary screen required a bit of infrastructure to be put in place as some of the data is collected from monitor points that are software rather than hardware entities. That work is complete. Please see section 8.1.2 Parity Error Information for further information on that topic.

The 12 AOI SUMMARY screens are:

1. DWR – dewar temperatures and helium parameters

2. CAL – cal values
3. CRYO – dewar temperatures
4. FEX – X band front end
5. FRO – focus/rotation
6. LOX – X band LO parameters
7. PA – parity errors
8. SYSTMP – X band system temperature
9. TST – test display
10. RFI – RFI monitor
11. ZZZ – list the current antennas file
12. DB – debugger display (?)

Seven (7) of the 12 SUMMARY screens plus an additional summary screen (AOI_AZEL) have been implemented. The implemented screens are DWR, CAL, CRYO, FEX, FRO, LOX, and PA. Current planning is that the remainder of the SUMMARY screens will not be developed. With the exception of the AZEL screen, *the summary screens have not yet been released*. The version of the software containing the SUMMARY screens is scheduled for release sometime in the 3rd week of June 2007.

5.3 AOI Pie Town Displays (PTDISP)

Ten (10) screens are given in the menu for PTDISP. The names of the 10 screens are:

1. L6PT – L6 at Pie Town
2. JPLFE – JPL front end screen
3. CRYOX – dewar temps for X band
4. SYSTMP – system temperatures for X band
5. FEX – X band front end
6. LOX – X band LO
7. VLA – Very Large Array display (may not be functional)
8. SM – subarrays
9. FLUKE – flukes
10. ANASUM – analog sum

With the exception of only L6PT and JPLFE all of the other screens appear to duplicate the functionality of screens within either the DISPLAYS or SUMMARY sections of AOI. Feedback from individuals in Operations and the Electronics Division indicate that these screens are no longer used. They will not be duplicated in the EVLA M&C System.

6 SKIP & EXTEND

Skip, as implemented under the VLA Control System had two main purposes – 1) to move around within an observe file (Skip n mmm), and 2) to force a reconfiguration of the system (Skip n 0, where n is the subarray number), usually because one or more antennas or antenna subsystems did not setup correctly. Feedback from readers of an earlier version of this memo indicates that both capabilities or equivalent functionality are needed.

With respect to moving around within an observe file, Ray Ferraro writes, “The SYSCOREX observe file along with the SKIP function are used to command the correlator to run in its

various modes for diagnostic and testing purposes. There is no other way to do this with the new (correlator) controller. (The new correlator controller does not have the self-test mode that the old correlator controller had.) *The ability to quickly and simply command the correlator to a specific mode in the correlator room is absolutely essential for diagnostics and troubleshooting."*

Barry is not encouraging on the subject of implementing a SKIP capability that would allow movement within a control script. It would seem that, at a basic level, the manner in which control scripts are handled and in which the Observation Executor operates simply does not lend itself to implementing a command that could be used for moving around within the equivalent of an observe file. *No resolution to this problem has been suggested. No equivalent capability or practical alternative for a viable correlator diagnostic and debug procedure has been developed.*

Reconfiguring or adding an antenna to a subarray is currently rather awkward. If an EVLA antenna does not configure correctly, then the current options are – 1) discover which modules are not correctly configured and manually send the correct commands, 2) wait for a source change (not always practical, and can involve a long wait, or 3) abort and restart the control script. Similarly, if an antenna is added to a subarray, then 1 or more source changes are needed to fully configure the antenna.

For the case of reconfiguring an antenna, at least partial functionality equivalent to a SKIP n 0 appears to be possible. Barry and Ken (in emails of 13Mar2007) point to the `setHardware()` method in the `AbstractAntennaPhysical` class as a means to provide at least some portion of the functionality now supplied by SKIP n 0. However there is currently no means to access that method outside of a control script or the Executor itself. Barry has suggested that a REST interface into the `AntennaPhysical` and the `Subarray` might provide an easy way to access the `setHardware()` method while also providing the possibility of additional useful functionality.

In that same email Barry goes on to state, "Modified forms of skip (he is referring to Skip n 0) and extend would not be too hard to implement. The extend would have to specify the time to extend to, which would have to be before the start time of the source after next. The skip would not work twice in a row. I haven't thought through whether an extend followed by a skip, which the operators do use, would work"

So, it would seem that implementation of a limited form of SKIP n 0 and EXTEND might be possible. *Currently, work to provide an externally available interface to the `setHardware()` method, and to implement some form of SKIP and EXTEND is not scheduled.*

7 Parmstool

Parmstool is EVLA software. It is used to update various parameters and quantities in the EVLA parameters database. The EVLA parameters database is to the EVLA Monitor and Control System as the system files are to the VLA Control System. In late October 2006, the point was made (by Barry Clark) that the then current version of Parmstool was probably not adequate for the task of maintaining parameters for 28 antennas. An upgrade effort was begun. A functional prototype is now being evaluated. Two to four weeks has been allocated for a

round of comments on the tool. If no major problems are found during the comment period, then initial deployment will take place sometime in mid-June. Once this new version of Parmstool is deployed, neither the old version of Parmstool nor the personal utilities for parameters update that have been developed by a few users can be used.

8 VLA Monitor Data

8.1 *Infrastructure*

8.1.1 Monitor Points Archived & Logging Rates

As an expedient, when the archiving of VLA monitor data to the EVLA monitor data archive via the CMP was first enabled, the archiving rate for all monitor points was set to 5 minutes. Now, it is necessary to insure that 1) all VLA monitor points archived by the Modcomp-based VLA Control System are also archived by the EVLA Monitor & Control System, and 2) that the archiving rates used by the EVLA M&C System match those used by the VLA Control System.

The logging of VLA monitor points is defined in two source code files, CBMON and MONMAC. The monitor points logged and the logging rates have been extracted from these files, and, as of 09Mar2007, the CMP now logs the same set of VLA monitor points at the same rates as is the case for the VLA Control System.

8.1.2 Parity Error Information

Under the VLA Control System, parity error summary information is available via the AOI PA screen, the AOI PA summary screen, and is written hourly to the Checker log (section 9.2 Checker Logs). The parity error information is obtained from monitor points (multiplexor addresses 200(octal) and 201(octal), data sets 0 – 5). However, the monitor points that provide the parity information for the monitor data parity errors (multiplexor address 201(octal)) are software entities, not hardware. These software monitor points must be implemented in the EVLA M&C System if the PA screens and the Checker Log information are to be made available within the EVLA M&C System.

The implementation of the needed software data structures and code for full support of parity error information was assigned to Hichem Ben Frej. The work was completed in mid April 2007.

8.2 *Realtime Monitor Data*

8.2.1 MW

Basically, the MW program provides a means of dumping all of the monitor point values for a given DCS and DS (dataset) pair to a screen. MW operates on the realtime monitor data stream coming from the antennas, not on data in the archive. MW is considered a necessary diagnostic. A replacement will be needed and one has already been developed. As of late February 2007, the EVLA version of MW was being evaluated by users in the Electronics Division. As of mid-April 2007, the work is taken as complete.

8.2.2 TM

From trial runs of TM (\$exe tm,l32 on Monty) and from an examination of the source code, this program seems to present a display of the A/B/C/D Cal voltages and of the A/B/C/D gated total power for all antennas, in realtime. It is not currently known if this program is used, or if equivalent functionality is needed after the Modcomps are retired. A query has been sent to the FE group. Reproducing the functionality of this program under the EVLA Monitor and Control System should not be difficult.

8.2.3 Modlog & Mondef

Modlog is used to modify monitor point logging rates. Mondef is used to restore default monitor point logging rates. Under the EVLA Monitor and Control System, the archive rates of monitor point values (EVLA & VLA) are set in files that are read by the MIBs and the CMP at boot/reboot. These rates are the default rates. The defaults can be modified dynamically via a telnet connection to an EVLA MIB or a VLA DCS # (hosted by the CMP). The modified rate will be in effect until it is manually changed or until the MIB or CMP is rebooted. Further, a special logging rate can be set (as a default that will survive reboots) for the alert state of a monitor point. Special software to support the modification of monitor point logging rates should not be necessary unless there is a need to modify/restore the monitor point archiving rates for large numbers of monitor points on a repetitive basis.

8.3 *Archived Monitor Data*

8.3.1 TPR

TPR refers to the program “Technician’s Plotting Routine”. TPR runs on the Modcomp computers (usually Bacchus), and is used to produce plots of the same set of monitor points, for different time ranges. A typical use of TPR is the set of plots of 5 MHZ phase and 600 MHZ phase for all VLA antennas that is produced on a weekly basis by the LO Group. In the past, the HVAC and CRYO groups also made regular use of TPR, and the FE group has expressed a desire for a similar capability.

TPR is an integrated program – searching for the data, delivery of the data, plotting the data, and printing the plots are all integrated into TPR. Basically, once TPR has been started, pointed at a file containing a specification of the monitor points to be plotted, and given the time range to be covered by the plots it will run unattended until all plots have been produced.

There are two basic components to TPR – searching the monitor data archive for the needed monitor point values, and producing the plots. Two approaches are being taken to create functionality equivalent to that provided by TPR.

The first approach is to create a program that will run, unattended, in a “batch” mode. The concept is that this program will run as a regularly scheduled job (i.e. in Unixese, a cron job), say at 4AM every Sunday morning. At start of execution the program reads a file that contains a specification of the monitor points for which it is to conduct a search of the monitor data archive. This file is written in XML and can be edited. The program also has a time range built into it – the last week preceding the date and time at which the program begins execution. Once the program has setup all the needed search parameters, it then conducts the search of the

monitor data archive, plots the data, and prints the results at a printer that is specified within the program. A prototype of this program does exist (as of early May 2007).

Some tweaking of the prototype is needed. First, the current version of the program always searches for the same file of the same name in the same location for the specification of the monitor points of interest. A named path and file, passed to the program as a parameter, should be used, thereby allowing multiple, different specifications of sets of monitor points of interest. Another desirable enhancement would be the ability to specify some limited selection of plot characteristics for the various monitor points to be plotted. Additionally the specification of the time range and the printer should be moved from the program itself to an external file – either the same file as the one containing the monitor points or a different file. Again, multiple, different time ranges and printers should be possible. Finally, it would be quite useful if this program could be run in an “interactive” mode – explicitly and manually executed by a user, with provisions for interactive specification of the file containing the monitor points of interest, the plot characteristics, the time range and the printer.

The second approach to supplying an equivalent to the TPR functionality is to make it possible for a user to save and recall a monitor data query list created via the new monitor data query interface. This approach is described and discussed in the section 8.3.3, The New Monitor Data Query Interface.

8.3.2 Mondat

Mondat is a command driven package that has the ability to search, list, and plot a user specified set of VLA monitor points for a user specified time range. Where TPR might be used to spot a potential problem, Mondat would be used to investigate that problem in more detail. TPR operates in a batch mode from an external specification of what is to be done. Mondat is user interactive. While it is possible to save and retrieve sets of user entered parameters for the search, list, and plot modules, Mondat cannot read a search specification from an external file and it cannot be driven by a script.

To address the needs of Mondat users, a new monitor data query interface to the EVLA monitor data archive is being created. Please be reminded that the EVLA monitor data archive now contains both EVLA and VLA monitor data.

8.3.3 The New Monitor Data Query Interface

To better support the need for interactive access to EVLA & VLA monitor data, a new query interface to the monitor data archive is being developed. A prototype of this query interface has already been critiqued and commented upon at one users meeting, held on 01Feb2007, and a second users meeting is planned for sometime in late May or early June 2007. Rollout of the new interface, which also requires a rollover to a new version of the underlying monitor data archive, is planned for the end of June 2007. The prototype of this interface is available at http://mctest:8080/aux_mon/main.faces. Any and all are invited to point a web browser at this URL and to work with the new monitor data query interface, with the understanding that the query interface may not always be available or fully functional as it is still under development. At this point in time, the underlying database has several weeks worth of

monitor data, the same monitor data as the operational archive. (Please send any comments or questions re the query interface to either ccai@nrao.edu or bsahr@nrao.edu)

The new monitor data query interface presents an easy to use, flexible, user interactive method of building up a set of monitor points that are to be included in a monitor data archive query and attaching a user specified time range to the query. Modification of the query list and/or time range is easy to do, and the modified query list can be re-submitted by a simple button click. Results are returned to the user in a series of data files, one file for each monitor point in the query list. Results can be displayed or downloaded by selecting the data file of interest and clicking on the appropriate button – “show data” or “download data”. Each data file must be individually selected. There is no provision for displaying or downloading groups of files with a single command or button press.

A planned extension to the new query interface, currently under development, is the ability to save a monitor data query list as a named file. The interface will include a list of all of saved query lists, and if a saved query list is selected, it will become the active query. This capability will allow users to build, save, and recall monitor data archive queries they expect to use on a repetitive basis. It adds a TPR-like batch processing capability to the monitor data query interface.

One capability that the new monitor data query interface currently lacks is the ability to plot monitor data. Currently, the only way to produce a plot of data returned by the new query interface is to download the file or files of interest and feed this data to some program that does include a plotting capability. Ideally, one would like the query interface to include a plotting capability that functions in the same manner as the data display and data download functions – select the data file of interest & click on a “plot data” button. The possibility of adding a plotting capability to the query interface is being investigated.

The enhancement to the query interface that will allow a query list to be saved and recalled in combination with a plotting capability would provide a capability very similar to if not identical with the capabilities provided by TPR, with the added capability that users would be able to construct their own queries. These planned enhancements to the query interface are the second approach to supplying equivalent TPR functionality that was mentioned in section 8.3.1, TPR.

8.3.4 Mondmp & Monfil

The VLA Control System stores approximately 7 to 10 days of current monitor data on disk. The data is stored using an in-house developed format. Mondmp is a utility program that is used to move the monitor data on disk to tape. Monfil is a utility program that is used to move the data from tape back to disk, should historical information be needed. Analogs to these programs will not be needed by the EVLA Monitor and Control System, or more accurately, the analogs to these processes will be part of the care and feeding of the EVLA monitor data archive, with some of the functionality inherent in the capabilities supplied with the underlying database.

9 Checker

There are two functional aspects of Checker that must be supported after retirement of the Modcomps:

1. The display of Checker messages in the VLA Control Room for use by the VLA Operators, and
2. The creation and use of checker logs

9.1 Checker Display

Under the VLA Control System, the Checker Display is a dedicated terminal that is used to display various warning and error messages. The EVLA equivalent of Checker messages is alerts. There is an alerts screen available in the EVLA as part of the EVLA Operator Software. While this screen is equivalent, in theory and principle, to the VLA Checker screen, the VLA Operators do not find it to be a satisfactory replacement for the Checker Screen. An effort must be mounted to make a more precise and detailed determination of exactly why the alerts screen is unsatisfactory. Possible issues might include:

- First and foremost, do the alerts provide enough information? This question applies to the one line alert message that appears in the scrollable region of the EVLA display and to the supplementary text that can be viewed when an alert is selected.
- Is the display of the alerts adequate? The alerts pane when viewed as a part of the Array Operator screen truncates an important part of the alert message. Has this characteristic decreased the usefulness of the display?
- Is the date (day number) and time (UTC) format unsatisfactory?
- Are the icons and color coding used for severity levels inaccurate, ambiguous, and/or insufficiently descriptive?
- Are there problems with stale alerts – i.e., alert “on” messages that are never matched with a corresponding alert “off” message and remain on the alert screen forever?
- Would use of the central WYE display in the Array Operator Screen to flag an antenna icon if alerts have been issued against it be useful?

Other possibilities present themselves. Alert messages may be “missing”, i.e., there are conditions about which the operators need to know for which no EVLA alert messages are currently generated. One aspect of this issue is to ask if the proper set of alerts, within the EVLA M&C System, have been enabled for VLA antennas. Depending on the nature of the missing information, it may be possible to partially or wholly address this matter.

Another possibility is that the EVLA alert messages are simply too low level. For the most part, alert messages within the EVLA are currently issued directly by the MIBs and are very low level warnings concerning errant conditions in the hardware. EVLA alert messages are not currently subjected to additional processing that might yield higher level, more intelligent and more useful information. Major improvements in this area may have to wait until software entities, derived from the design of the final version of the EVLA Monitor and Control System, capable of processing and analyzing the low level alerts and of producing higher level alerts are

introduced into the system. This development will lag behind the retirement of the Modcomps by several years.

9.2 *Checker Logs*

The Checker software (CHK, runs in the Modcomp Monty) sends Checker messages not only to a display in the VLA Control room, but also, via a serial port, to a Linux PC. The Checker messages so received are written into files organized by date and these files can be selected and viewed via a web-based interface (see <http://checker.vla.nrao.edu/>). The files of Checker messages are known as Checker logs. The Checker logs are used regularly (daily or multiple times per day) by several groups in the Electronics Division and equivalent functionality must be supported.

As was mentioned earlier, the EVLA equivalent of Checker messages is alerts. As of early April 2007, EVLA alerts are being archived to the test monitor data archive, known as montest2, which runs on mc2host. As of early May 2007, a client has been written that has the ability to search montest2 for alerts. The client is web-based. It can be viewed and used by directing a web browser to the URL <http://mctest.evla.nrao.edu:8080/evla-alerts/>. The client has the following capabilities:

- Display of the currently active alerts with some filtering available
- A simple search mode that will display alerts for a coarser-grained user selected specification of antennas and modules for time ranges from the last 15 minutes through the last 2 days.
- An advanced search mode that allows a very fine grained specification of single or multiple antennas and modules, for time ranges from the last 15 minutes to the last 4 days, or for a user specified time range.
- A “loader” page that shows the status of the database filler program that catches the alerts and sends them to the database.

This web-based alerts client has capabilities that exceed those of the Checker logs currently in use. It is a superior replacement for the Checker logs, offering much greater utility and functionality. Interested readers of this memo are encouraged to try it and to offer their opinions and comments. Please send any comments or questions you may have to bsahr@nrao.edu. Please do be aware that the alerts client is a prototype, still under development, and that it depends on a new monitor data archive that is also a prototype and still under development. At times either the web based alert client or the underlying database may be out of service.

A point that needs to be re-emphasized is that this replacement for the Checker logs requires the new monitor data archive. It will be available for use only if the new monitor data archived is successfully deployed.

9.3 *PRATE (PRA)*

In the Modcomps, PRATE is a simple (1 page) Fortran program that runs hourly as a low priority background task. Its job is to collect the parity error information for both monitor data

and commands and to write a formatted display of this data to the Checker log. Functionality equivalent to PRATE will be needed within the EVLA Monitor and Control System.

As discussed in section 8.1.2 Parity Error Information, parity error information for monitor data is a set of software rather than hardware monitor points. The implementation of this set of monitor points was completed in mid April 2007, and parity error information is now being sent to the EVLA monitor data archive. Under the EVLA Monitor and Control System, it is likely that the parity error summary information formerly produced by PRATE will be produced by a special purpose database client that queries the monitor data archive, collects the necessary raw data, creates the summary statistics and presents the results to the user.

The creation of a PRATE client has been assigned to a software engineer within the ECD and the software is under development.

10 The F Display

F is a program that displays ANTSOL solutions for all antennas when observing a calibrator. It is an important indicator of the health and proper operation of the system. Ray Ferraro describes the F Display as “a critical component to detect and diagnose real time problems affecting data that are not being detected by monitor and control or correlator error reporting”. The current release of the EVLA Operator Software contains a display of TelCal solutions for amplitude and phase – advertised as an equivalent of the F display. *Recent feedback from Operations (email from Pat Van Buskirk, 06Jun2007, Subject: Screens) indicates that this F display equivalent may not supply the Operators with all of the information they need. No alternative is currently under development.*

11 The D10 Display

D10 displays data for one baseline for every integration. As with the F display, D10 is an important indicator of system health and correct operation. *It is used frequently and an EVLA M&C equivalent is needed. No useful replacement for D10 is currently under development. This situation needs attention.*

The state of a D10 equivalent for the EVLA M&C System is little changed from its condition in October 2006. Then and now a prototypical version of D10 that consumes archive records and must run on igloo exists. The current prototype is probably inadequate as a basis for extension to a production quality version of D10. Among other things, the restriction that it run on igloo only is probably unacceptable.

A design effort is needed here. The necessary design and decision making can probably be accomplished in a relatively short period of time – one or two weeks at most if the effort is focused. However, to date, that design effort has not been undertaken. Implementation would probably be a matter of a few additional weeks (4 to 6) of elapsed (calendar) time.

D10 is viewed as an essential operator tool. That the development effort has stagnated is a problem and needs to be addressed.

12 P10 and Plog

P10 & Plog provide ASCII plots of a spectrum from one baseline when in line mode. The degree to which P10 & Plog are used has not been determined. Whether or not equivalent functionality is needed under the EVLA Monitor and Control System has not been determined.

13 DAT Tapes

The use of tape in the VLA Control System is a backup. Archive records are written to a staging disk on igloo (at the VLA site). From that point they are made available both for realtime filling at the AOC and for ingestion by the VLA archive (also at the AOC). If igloo or the staging disk should fail, or if there is a sufficiently long outage on the network connecting the VLA site to the AOC, archive records will be lost. (For VLA data rates and volumes, the failure of igloo or the disk is the more interesting scenario. A sufficiently long network outage is very unlikely as the staging disk can hold two+ weeks of data.) Currently, lost archive records could be recovered from the DAT tapes that are made by the VLA Control System. So, the question is, will the EVLA Transition System also record archive records to tape? If yes, then software for labeling, recording, monitoring, assessing, and repairing the tapes must all be developed. The amount of effort needed would be significant.

The question of whether or not the EVLA Transition System will write archive records to tape was unanswered at the time the first version of this memo was circulated. Since then a decision has been made by the head of the ECD Division. The EVLA Transition System will not write archive records to tape.

14 VLBI Support

As indicated in the List of Tools and Utilities, three utility programs are used to support VLBI at the VLA. VLBLOG is used to record, in realtime, during the conduct of a VLBI+VLA observation, the information needed to support processing of the data. VLBCOP transcribes the data, reformatting it as a part of the transcription process. VLBRD is used to examine the data. When VLBI at the VLA is to be supported by the Transition System, equivalent functionality will be needed in the EVLA Monitor and Control System. Support of VLBI at the VLA is not an early goal for the Transition System, and the needed software is not currently under development.

15 Miscellaneous, Uninvestigated, Unknown

15.1 *Newfetch, OPCHK, FILCHK*

As per the annotated list given at the beginning of this document, Newfetch (or its successor Fetchobs) is a set of programs, scripts, procedures, etc that extract Observe files from email and transfers them to the Modcomp computers. While the last portion of this functionality will obviously not be needed when the Modcomps are retired, the first portion, extraction of the files from emails, will still be needed if Observe files are still to be submitted by email. There is an obvious opportunity here for Observe file validation (OPCHK & FILCHK).

15.2 TSYS

TSYS is a program that attempts to form an estimate of equivalent system temperatures by working backwards from the ANTSOL solutions. TSYS as implemented on the Modcomps requires not only the ANTSOL solutions but also an estimate of the flux of the object being observed. The estimate of the flux is provided on the source cards in the Observe file. TSYS is normally run in conjunction with the Observe file SYSFLUX. The method by which execution of TSYS is triggered – manually by an operator, by detection of a special mode, or from within a special purpose job control language procedure is unclear.

It has not yet been determined if an equivalent of TSYS will be needed by the EVLA M&C System.

15.3 MTCAL & MODCAL

MTCAL and an associated job control language procedure named MODCAL are used by the VLA Control System to adjust the peculiar gain and peculiar phase as recorded in the SYSXIF system files. MTCAL requires that a special purpose observe file, named SYSFLUX, be running at the time MTCAL is executed (which is usually done by typing the letter “M” as a command to the F display).

Current thinking does not call for the use of peculiar gain or peculiar phase parameters in the EVLA M&C System. As long as this thinking does not change, an MTCAL/MODCAL equivalent is not required when the Modcomps are retired.

15.4 FESN & FE Calibration Data

FESN is a short and simple Fortran program that runs on the Modcomps (it has an underlying assembly language subroutine). FESN produces a table of serial numbers for the X, L, Q, and K band receivers on VLA antennas. The serial numbers are contained in VLA antenna monitor points so they will be accessible to the EVLA Monitor and Control System via the CMP. FESN is needed by the FE group. A replacement program will be required. The effort required is minimal – no more than a few days should be needed.

Ken Sowinski has made the point that an equivalent of FESN will be needed for EVLA antennas. Some investigation will be needed here as the F317 EVLA FE Controller does not provide the same information.

Currently neither an FESN equivalent for either VLA antennas and/or EVLA antennas is under development.

Periodically, various members of the FE Group request FE calibration data from Ken. While it is true that FE Calibration data is maintained in the SYSIF files used by the VLA Control System, the FE Group is the original source for this data. So, the issue of access to the FE Calibration data probably reduces to a misunderstanding of the process and record keeping. In any case, the FE Calibration Data will be available in the EVLA parameters database and can still be supplied if needed.

15.5 *LSTANT*

A simple and short bit of software (about 1 page of Fortran) that sends 1 line of text to the terminal screen for each antenna giving the antenna ID, DCS #, pad, current subarray affiliation, and status of the antenna (Taken, Given, In Use). Not required for the EVLA Monitor and Control System. The Array Operator Screen already provides this information.

15.6 *VLACOM*

A one line description taken from a memo written by Ken Sowinski describes VLACOM as a (nonstandard) command line program that can display anything in the system. Users – unknown, frequency of usage – unknown, need – unknown. It is unlikely that an EVLA equivalent will be needed and no time or effort has been given to this item.

15.7 *DMT*

Again, a one line description taken from a memo written by Ken Sowinski describes DMT as a (nonstandard) command line program that allows finer control than AOI. Users – unknown, frequency of usage – unknown, need – unknown. As with VLACOM, it is unlikely that an EVLA equivalent will be needed.

15.8 *BLMERGE*

BLMERGE is a Fortran program that reads the system baseline file (SYSBASE) and a file containing a set of baseline corrections, and merges the corrections with the system baseline file. The baseline corrections are produced by running a special purpose observe file and processing the results via AIPS. An equivalent set of procedures with manual (Parmstool) or automated updating of the parameters file will be needed. Not currently under development.

15.9 *MIXIT*

MIXIT is a short (1/2 page) Fortran program that runs on the Modcomps. The comments in the program state that MIXIT creates a SYSLPIF file by combining the SYSLIF and SYSPIF files. A one line description from Ken describes MIXIT as a program that creates IF and ROT files for LP and 4P bands.

MIXIT is not relevant to the EVLA M&C System. LP band will not be supported.

15.10 *POLSOL*

A short (~ 1 page) Fortran program that is used to adjust the system IF files for the crosshand delay correction. The source code for this program indicates that the required delay corrections are taken from a printout & manually input into this program.

Equivalent functionality will be needed in the EVLA M&C System. To be a bit more specific, a control script plus reduction software suitable to measuring the crosshand delays coupled with either manual (Parmstool) or automated update of the parameters database will be needed.

Not currently under development.

15.11 OBSVGR

A Fortran program, written in December 1988 whose purpose was to create VLA Observe files for the Voyager passes at X band. Comments in the source code indicate that the program is valid only for the year 1989. Not needed for the EVLA M&C System.

15.12 The “Condon” Survey Mode

This item is taken from a brief (3 sentences) email from Ken Sowinski dated 15Mar2007 with a subject of “Re: Meeting Notes”. The email reads

Another capability that goes away with the Modcomps.

I was reminded in a discussion yesterday that we have made no attempt to support the “survey” mode invented for Condon to use in his L band survey. If we had to support it in the future it would surely all be done at the script level but it would still be a significant effort to create and debug.

Needs further investigation.

15.13 SNOW & SYSMELT

SNOW dumps accumulated snow from a dish and then orients the antenna such that the plane of the circle of the dish is parallel to the wind direction (to minimize additional snow accumulation). SYSMELT tracks the sun to melt ice from the dish. Both items have been implemented, as control scripts, for the EVLA.

15.14 LA1 & LA2

The point to be made in this section is that the two printers (LA1 & LA2) located next to the control console in the VLA Control Room function as logs that record all program events such as software error conditions, milestone markers produced by software components such as the reference pointing and delay stepping programs, output (solutions) produced by various programs such as delays and focus, Checker messages, source change events, etc. These hardcopy printouts can be quickly scanned by the operators to find information that was only transiently displayed. They are a very useful reference and have been specifically identified as a useful tool by the operators. Some thought must be given to whether or not a functional equivalent will be created for the EVLA M&C System, and, if yes, what form it will take. Needs further investigation.

15.15 FTPCAL

FTPCAL is a job control procedure that is used to transfer ANTSOL calibration data from the Modcomps to a system at the AOC (it is placed in /pub/incoming/vlcal). Presumably, equivalent functionality will be needed for the EVLA M&C System.

FTPCAL can be taken as a pointer to a somewhat larger issue, the flux density database. Antsol solutions, averaged over an entire scan with a computed RMS are kept in files on the Modcomps. Once a day these values are transferred from the Modcomps to the AOC (via FTPCAL) where software transforms this data into an AIPS++ table. The entire system of data gathering, averaging, computation of the RMS, and file transfer is needed. None of these components currently exist within the EVLA M&C System. Not currently under development.

15.16 SYSTEST

SYSTEST is a durations based observe file that is used by the LO/IF group to check the health of various aspects of the system. SYSTEST output is emailed to the LO/IF group. Needs further investigation.

15.17 SYSCORRX

SYSCORRX is a special purpose observe file that was run during the morning of every maintenance day. It is intended to be used as a weekly check of the VLA's health. Among other things, it is used to look for sampler problems. It tracks a bright source in the north and blank sky. The output is reduced in AIPS and analyzed by the VLA Operators on a weekly basis. Needs further investigation.

15.18 REFANT

In the Modcomps, REFANT is a short Fortran program that can be used by the operators to set a reference antenna for a subarray. Needs further investigation.

16 Functionality that is NOT Modcomp based

This section has been included only for the purpose of making clear which portions of needed or desired functionality will not disappear when the Modcomps are retired.

16.1 The API

The Atmospheric Phase Interferometer and its user interface are not Modcomp based. However, the API does require access to weather data. Currently the weather data is obtained directly from the Modcomps. Alternative, non-Modcomp based sources for weather data do exist – it can be obtained either by polling DCS00 in the CMP or from the monitor data archive. *Changes must be made to support access to the weather data from one of these alternative sources. Currently there is no development effort underway to make the needed modification(s).*

16.2 Wyemon

The Wyemon is a system that is independent from the Modcomps. The presence or absence of the Modcomps are irrelevant to the functioning of the Wyemon system. The Wyemon will be replaced, but only as M302/303 equipped EVLA antennas replace VLA antennas.

16.3 Logging (Operator Logs)

The logging system used by the operators to create operator logs is completely independent of the Modcomps and the ability to create and maintain operator logs will be unaffected by shutdown of the Modcomps.

16.4 Maint (Mainsaver)

Maint, otherwise known as Mainsaver is independent of the Modcomps.