



EVLA Overall Software Design

Final Internal Review
Subsystems II
by Tom Morgan

14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 1



Outline



- Monitor and Control
- AMCS, CMCS
- Online Analysis
- TelCal
- Quick-Look Pipeline
- Data Capture and Format
- Offline Data Reduction

14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 2



Color Code Key



Major EVLA
Software
Subsystem

Subsystem
Component or
Independent
Function

Permanent Data
Store (Database
or Archive)

Data Entity

Information Flow

Bulk Data Flow

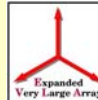
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 3



Monitor and Control



- Large Number of External Connections
- Connections with Many other Subsystems
- Wide Range of Data Volumes
- Wide Range of Data Types
- Wide Range of Communication Patterns and Frequencies

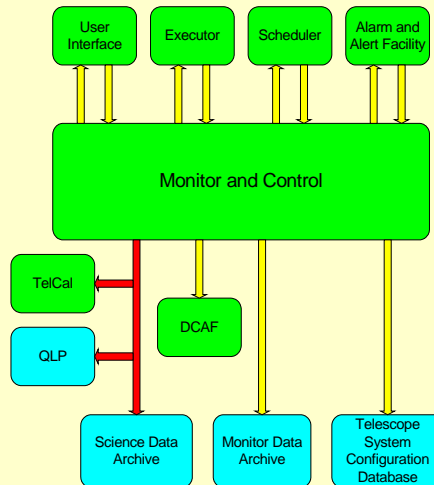
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 4



Monitor and Control



14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 5



Online Monitor and Control



- Focus on Connections with other Online Components
- Manual Control from the User Interface
- Automatic Control via Scheduler and Executor
- Feedback to Executor and Scheduler

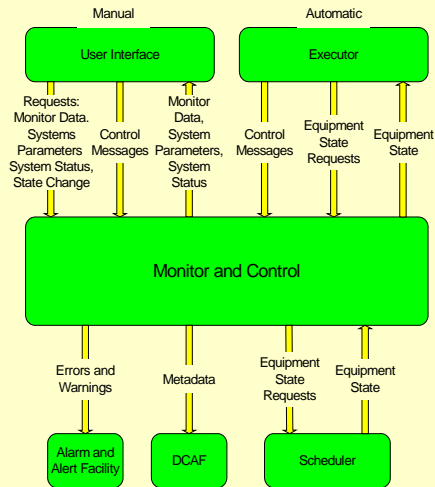
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 6



Online Monitor and Control



14 June, 2004

EVLA Overall Design
Subsystems II

Tom Morgan 7



M&C Permanent Store



- Continuous Output of Monitor Data to the Monitor Data Archive
- Updates of Data Essential to Real-Time Operations
- Retrieval of Data Essential to Real-Time Operations

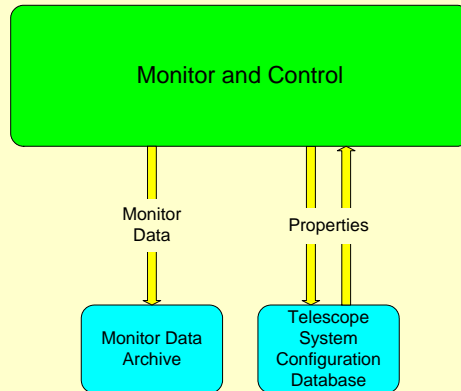
14 June, 2004

EVLA Overall Design
Subsystems II

Tom Morgan 8



M&C Permanent Store



14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan 9



M&C High Volume Data



- Direct Feed of Raw Output from the Correlator Backend
- Primary Route is to Science Data Archive
- Copy Forked to TelCal when needed
- Copy Forked to QLP when needed

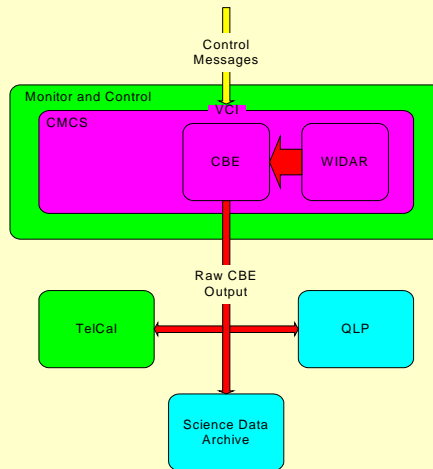
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
10



M&C High Volume Data



14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
11



Antenna Control



- Antenna Objects for a Single Sub-array
- Antenna Objects Receive Control Messages from the Executor
- Antenna Objects form and transmit individualized Control Messages to the MIBs

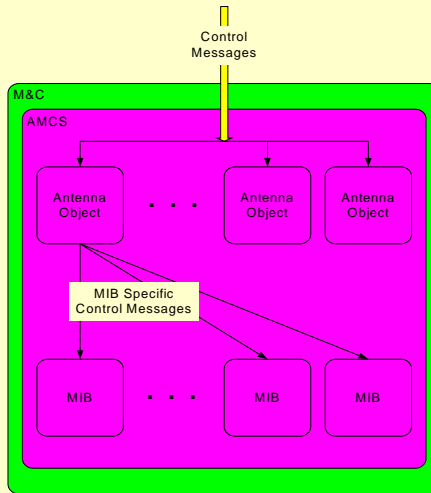
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
12



Antenna Control



14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
13



Online Data Analysis



- Flagging
- RFI Detection and Excision
- Atmospheric Modeling
- Complex Gain
- Pointing Offsets
- Focusing Offsets
- CBE Processes

14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
14



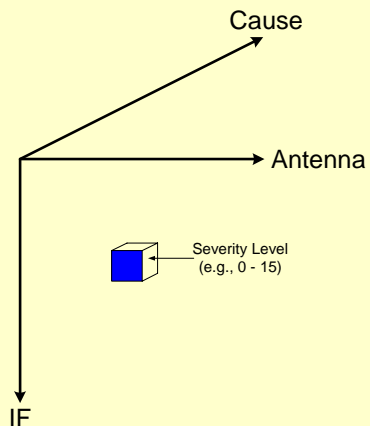
Flagging



- Needed by TelCal, QLP, Offline Data Reduction, and Operations
- Needs monitor data and desired Antenna state
- Generated once every Correlator Dump (for VLA)
- Sent to DCAF
- Located in Executor (?)



Flags Array





QLP



- Just enough DR to Display Spectra and Produce “Dirty” Images
- Triggered from DCAF when Sufficient Data is available
- Visibility Data comes directly from CBE
- Visibility Data could come from Science Archive if timely delivery is possible

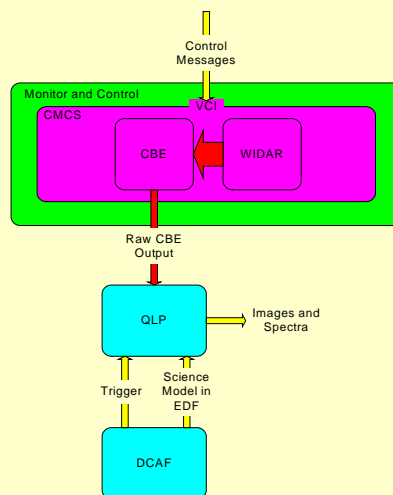
14 June, 2004

EVLA Overall Design
Subsystems II

Tom Morgan
17



QLP



14 June, 2004

EVLA Overall Design
Subsystems II

Tom Morgan
18



DCAF



- Capture and combine Metadata from a number of sources
- Organized data into hierarchy of Integrations, Sub-scans and Scans for each Execution Block
- Associate data from different Integrations, Sub-scans, Scans and Execution Blocks based on time tags
- Reformat for external use

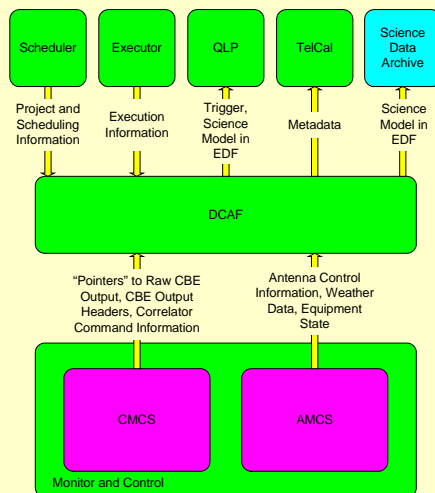
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
19



DCAF



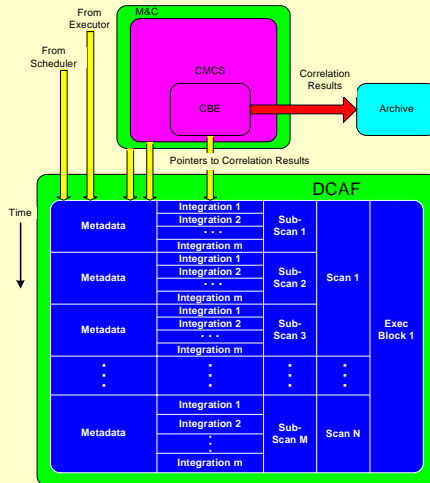
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
20



DCAF



DCAF



| Word | CBE Metadata |
|------|---|
| 0 | Adjusted Time Stamp |
| 1 | (Double precision - occupies two slots) |
| 2 | First (earliest) Time Stamp |
| 3 | (Double precision - occupies two slots) |
| 4 | Last (latest) Time Stamp |
| 5 | (Double precision - occupies two slots) |
| 6 | Baseline Number |
| 7 | Integration Number |
| 8 | Baseband Number |
| 9 | Sub-band Number |
| 10 | Polarization Product Number |
| 11 | Unused |
| 12 | FFT Flag (0 = Lags, 1 = Spectra) |
| 13 | Number of Lags or Spectral Channels |
| 14 | Unused |
| 15 | Unused |
| 16 | Data Valid Flags |
| 17 | Unused |
| 18 | Unused |
| 19 | Unused |



TelCal



- Homeless Function
- High volume data input from CBE
- Complex Gains
- Stored Complex Gains used for Pointing and/or Focus determinations
- Pointing Offsets
- Focus Offsets

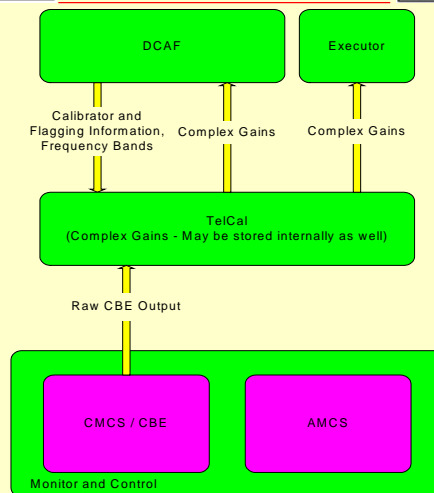
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
23



TelCal (Integration Level)



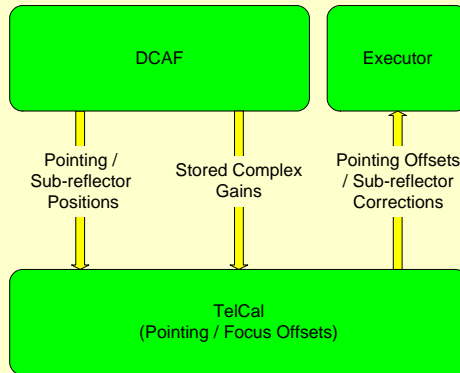
14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
24



TelCal (Scan Level)



14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
25



Offline Data Reduction



- Offline Data Reduction Requirements provided in SSR
- DCAF will send output to Science Archive in Export Data Format required by the Archive
- Data Reduction packages will access the Archive

14 June,
2004

EVLA Overall Design
Subsystems II

Tom Morgan
26