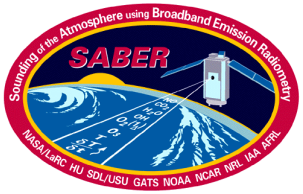


SABER Science Processing Overview

Guy Beaver
Instrument Performance Engineer
beaver@gats.hampton.va.us

SABER Science Processing System Requirements

Input: Level 0 Data

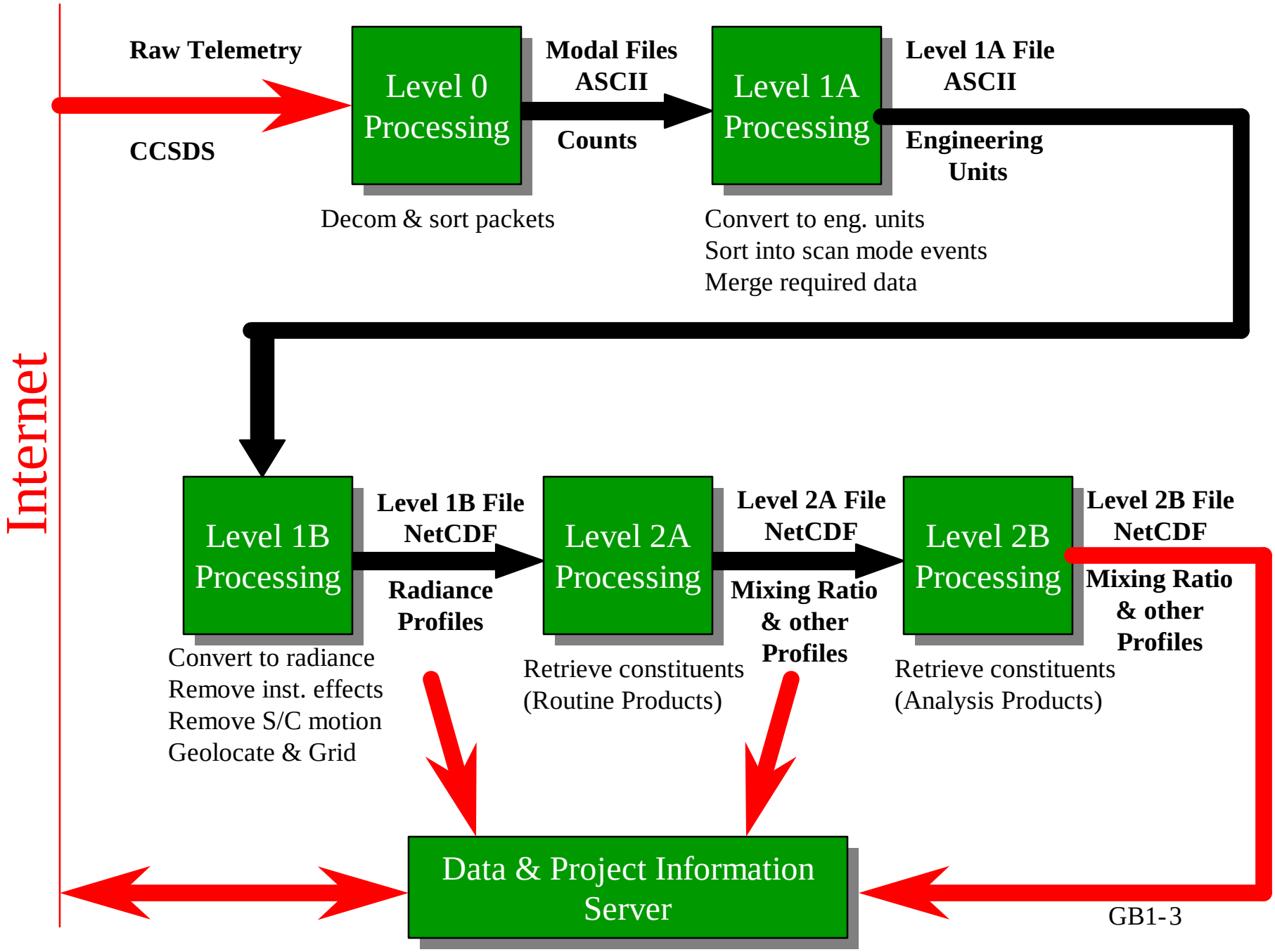
- Instrument/Spacecraft Packets (CCSDS)
- Ancillary Data (NMC, PVAT, Solar,…)

Output:

Level 0B Files (local)
Level 1A File (local)
Level 1B File (netCDF/Routine)
Level 2A File (netCDF/Routine)
Level 2B File (netCDF/Analysis)

Processing: PERL Scripts

- Schedule runs and monitor file availability
- All executables return success value.
- Control Files under CM
- Log Files saved for each run.

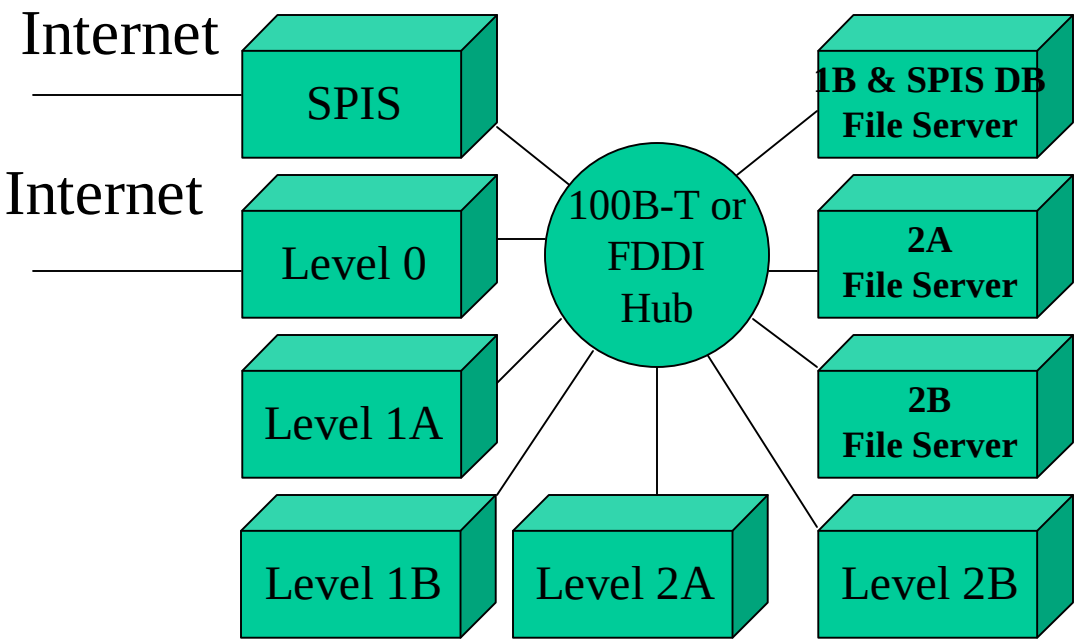

Internet
Raw Telemetry
CCSDS
Level 0 Processing
Modal Files ASCII
Counts
Level 1A Processing
Level 1A File ASCII
Engineering Units
Decom & sort packets
Convert to eng. units
Sort into scan mode events
Merge required data
Level 1B Processing
Level 1B File NetCDF
Radiance Profiles
Level 2A Processing
Level 2A File NetCDF
Mixing Ratio & other Profiles
Level 2B Processing
Level 2B File NetCDF
Mixing Ratio & other Profiles
Convert to radiance
Remove inst. effects
Remove S/C motion
Geolocate & Grid
Retrieve constituents
(Routine Products)
Retrieve constituents
(Analysis Products)
Data & Project Information Server
GB1-3

SABER Science Processing Time Requirements

Node	Estimated Time to Process 1 Day*	Estimated Storage
Level 0	2 Hours	400 MB (Scratch)
Level 1A	3 Hours	400 MB (Scratch)
Level 1B	6 Hours	108 MB/Day
Level 2A	17 Hours	190 MB/Day
Level 2B	24 Hours	190 MB/Day
SPIS	1 Hour	50 MB/Day

* Time will decrease on H/W available in 2000.

SABER Science Processing Beowulf Cluster



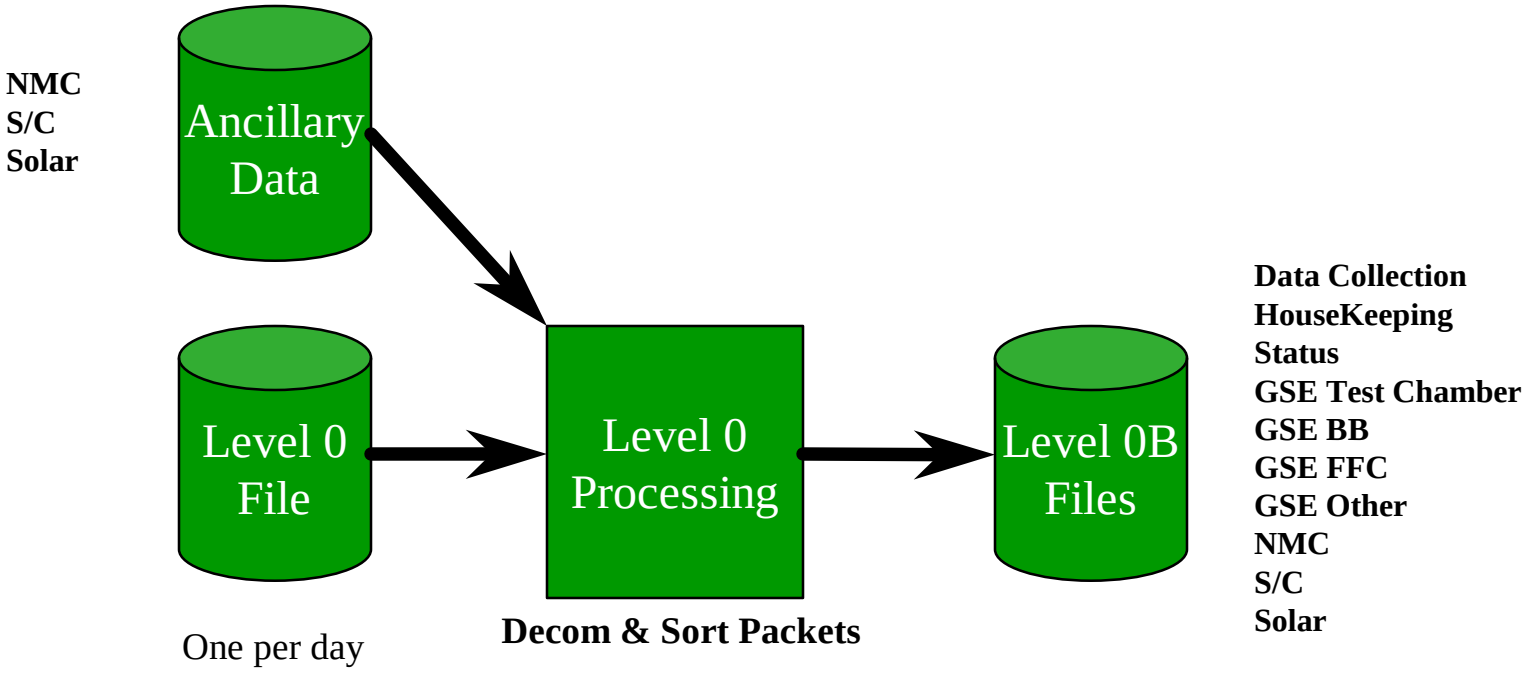
Common Configuration (1998*)
- 400 MHz P-II
- 128 MB Ram
- 6 GB System Disk
- 100 B-T Ethernet or FDDI
- Linux O/S
- GCC/G++ Compiler
- Perl
- Fortran
- Xmgr/IDL/GnuPlot

* Purchase delayed until 2000 to maximize (Performance/$)

6 Processing Nodes
- SPIS
- Level 0
- Level 1A
- Level 1B
- Level 2A
- Level 2B

3 Server Nodes
- Level 1B & SPIS Database
- Level 2A
- Level 2B

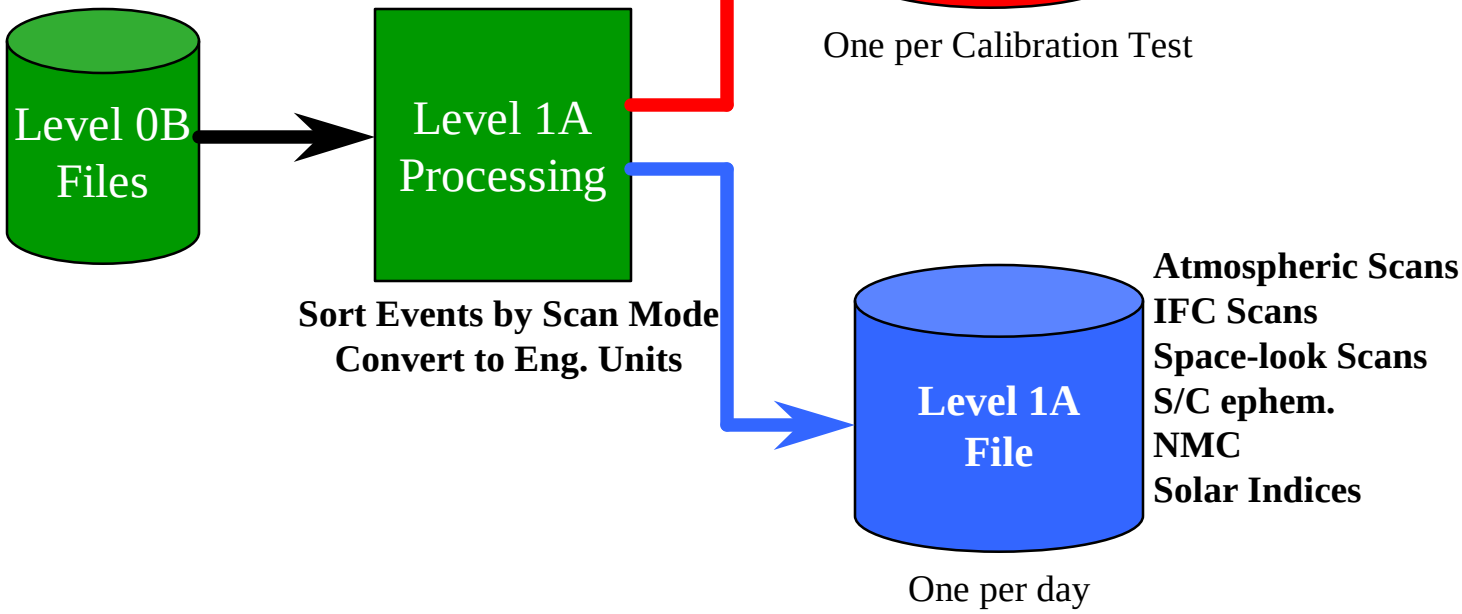
SABER Level 10 Dataflow



SABER Level 1A Dataflow

Color Key
Calibration
Operation
Both

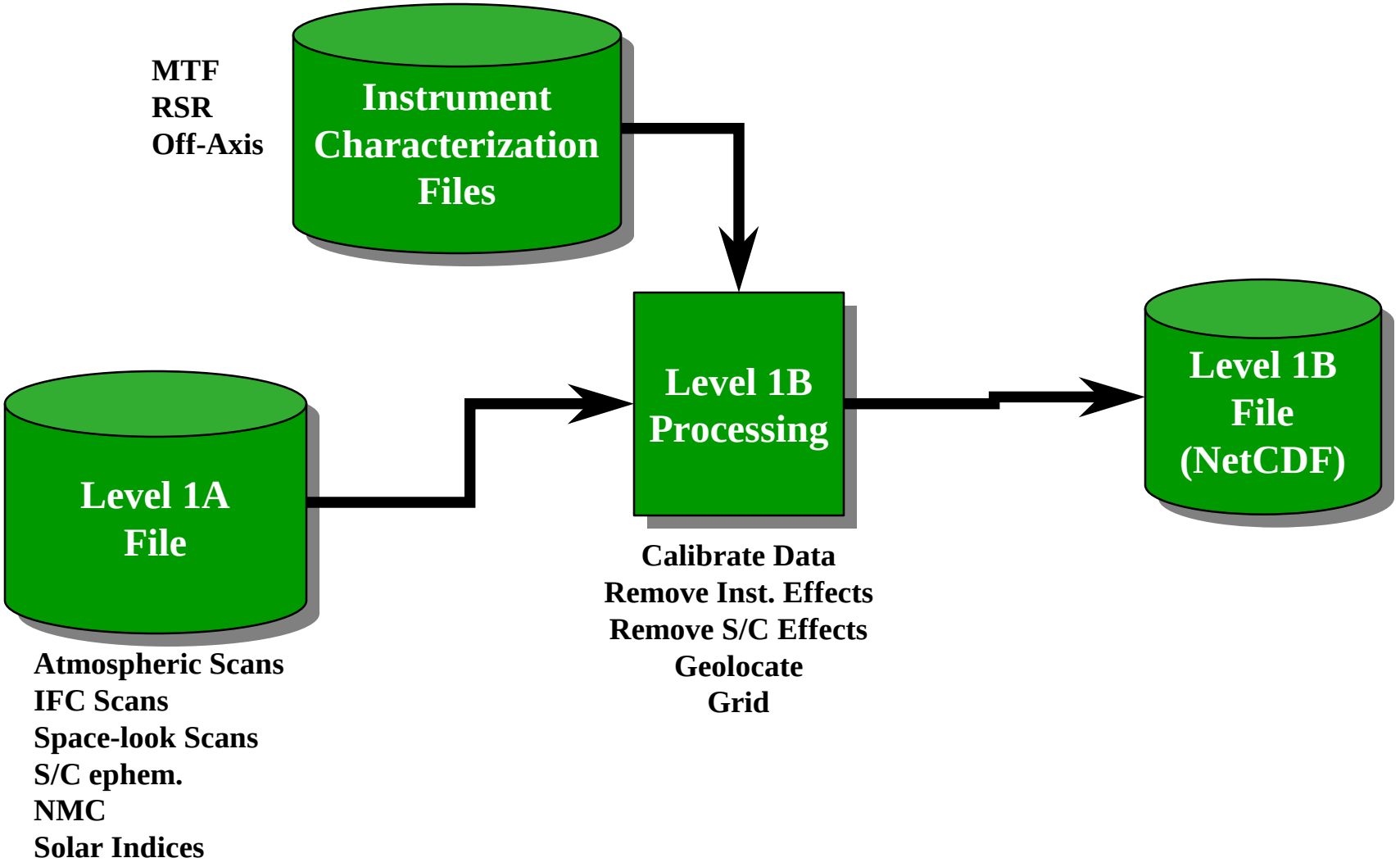
Data Collection
HouseKeeping
Status
GSE Test Chamber
GSE BB
GSE FFC
GSE Other
NMC
S/C
Solar



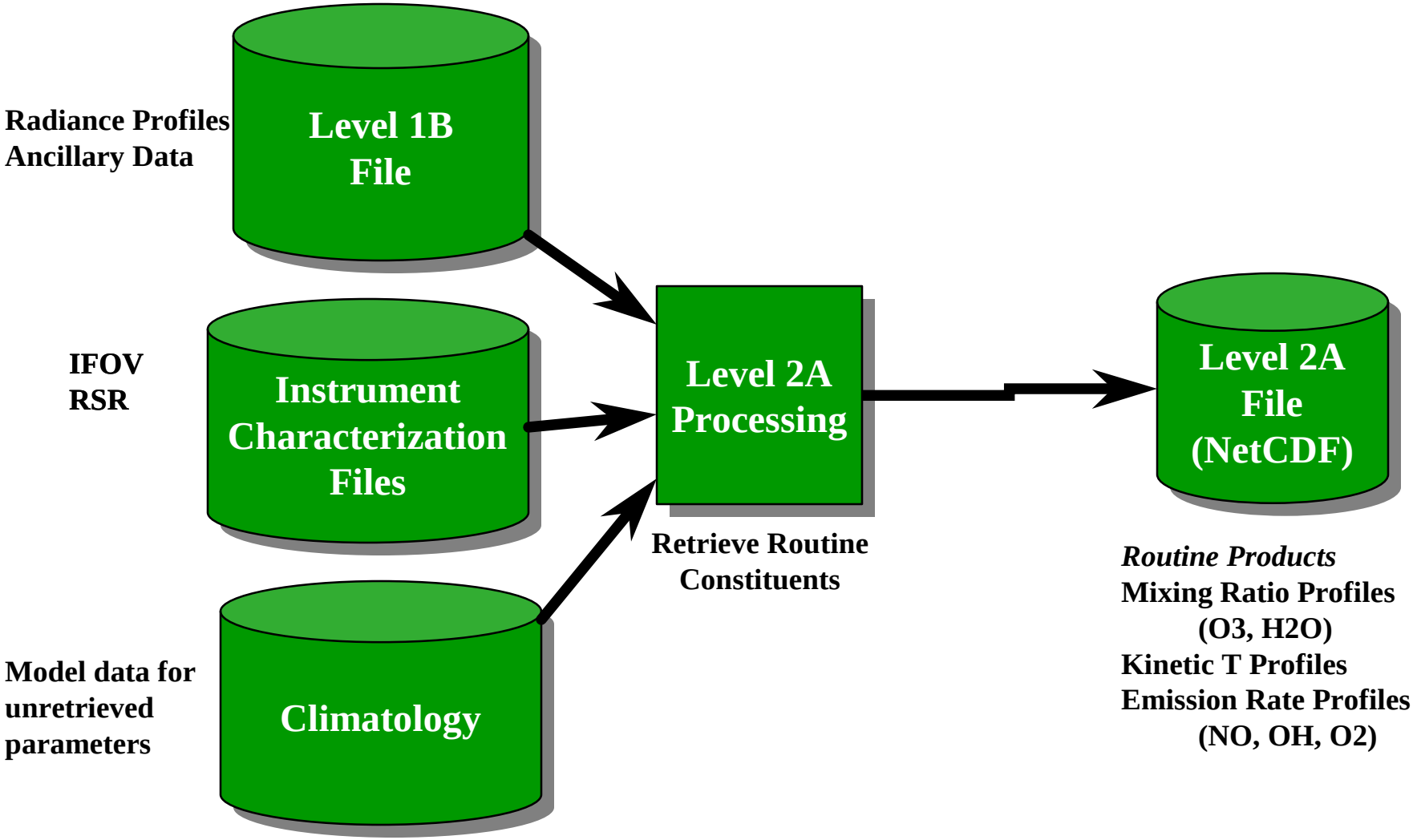
Calibration Test Events

Atmospheric Scans
IFC Scans
Space-look Scans
S/C ephem.
NMC
Solar Indices

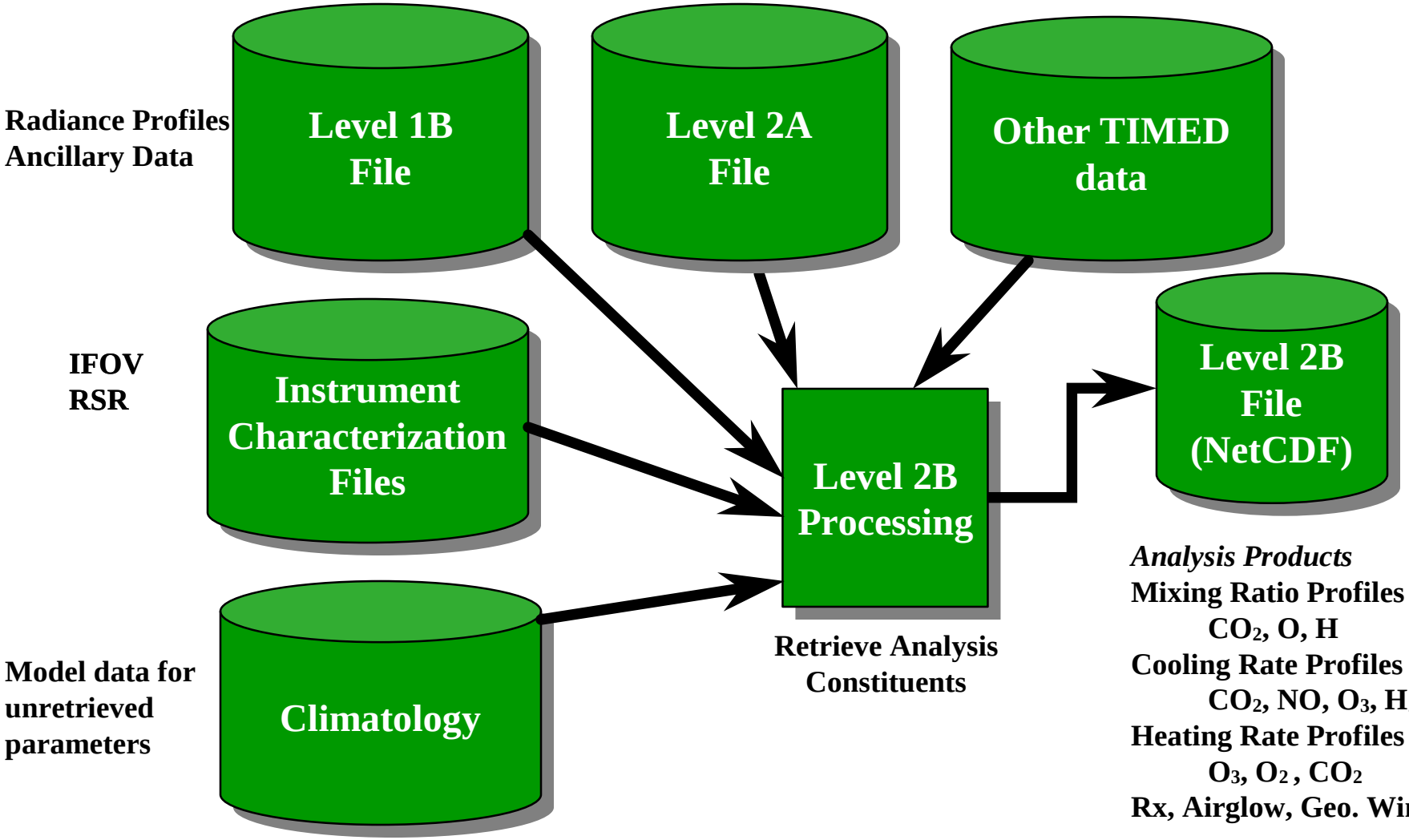
SABER Level 1B Dataflow



SABER Level 2A Dataflow



SABER Level 2B Dataflow



SABER Science Processing Storage Requirements

- Level 1A: 108 MB/Day
- Level 2A: 190 MB/Day
- Level 2B: 190 MB/Day

Total: ~500 MB/Day

2 Year Mission requires 365GB x 2 (cushion)
730 GB

SABER Science Processing Summary

- Overall system design for ground processing is complete
- Flight Ops & Calibration Analysis have been reviewed
  - PDR (June '97), CDR (October '97)
- Level 1-2 have been through PDR (June '97)
- GATS Heritage for Science Processing:

  Software & Lessons Learned from:
  - HALOE Level 0-3, Data Management/Access
  - LIMS Level 1-2
  - MASDA (LIMS reprocessing) Level 1-2, Data Management/Access
  - SAGE III Level 0
  - Retrieval Algorithms/Support
    - ISAMS
    - CLAES
    - CRISTA