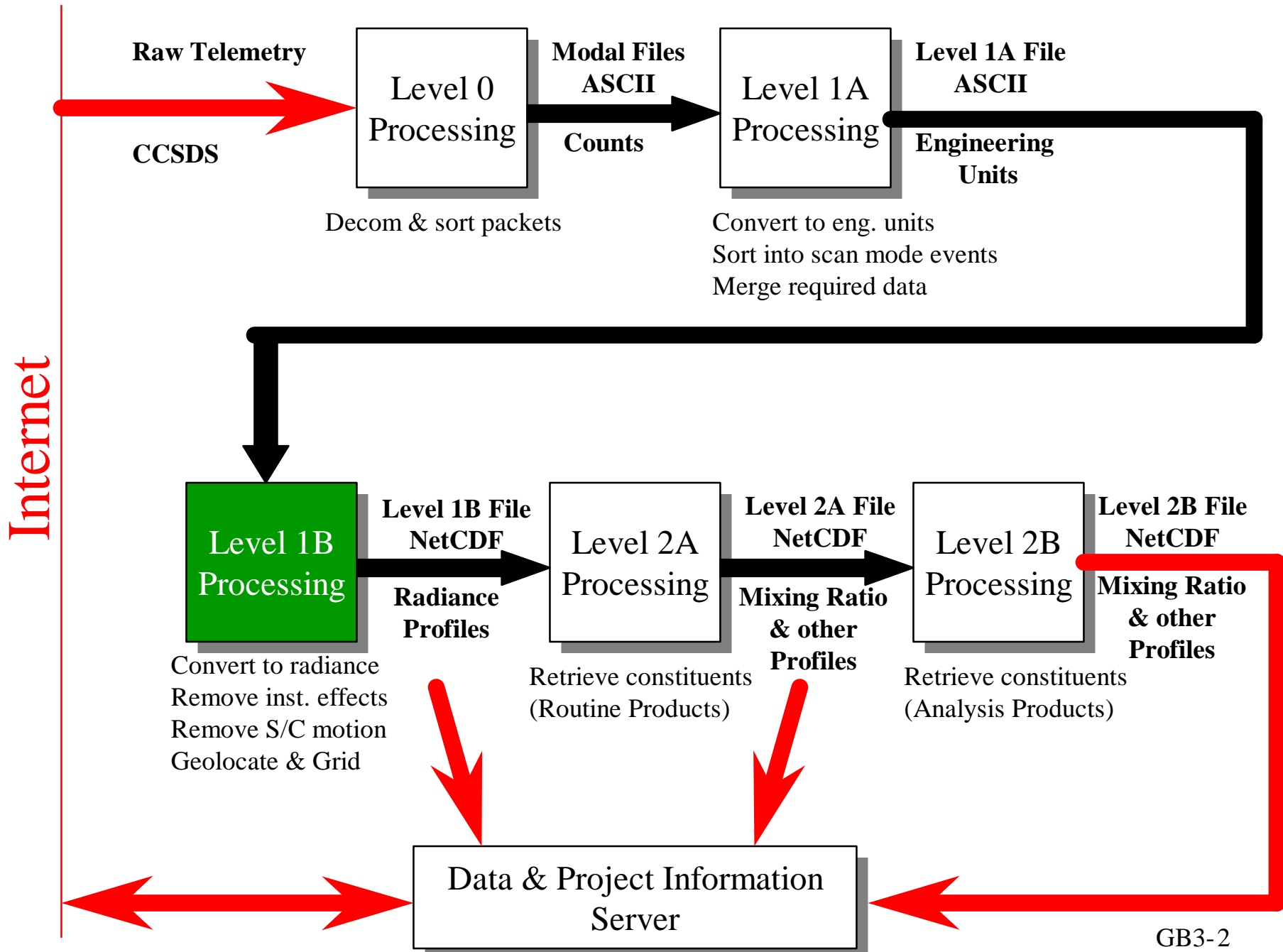
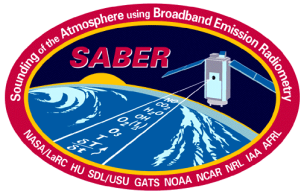


SABER Level 1B Processing

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

GB3-1





SABER Level 1B Heritage

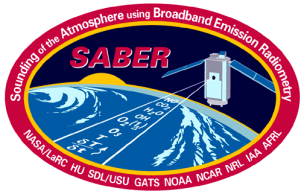


GATS heritage for Level 1 processing:

Software & Lessons Learned from:

- LIMS Level 1
- MASDA (LIMS reprocessing) Level 1
- HALOE Level 1

GB3-3



SABER Level 1B System Requirements

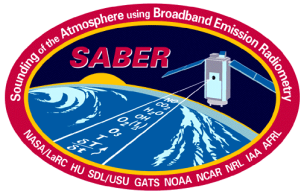


- Input:** Level 1A File
- Scan Events
 - Relevant Data
 - Engineering Units

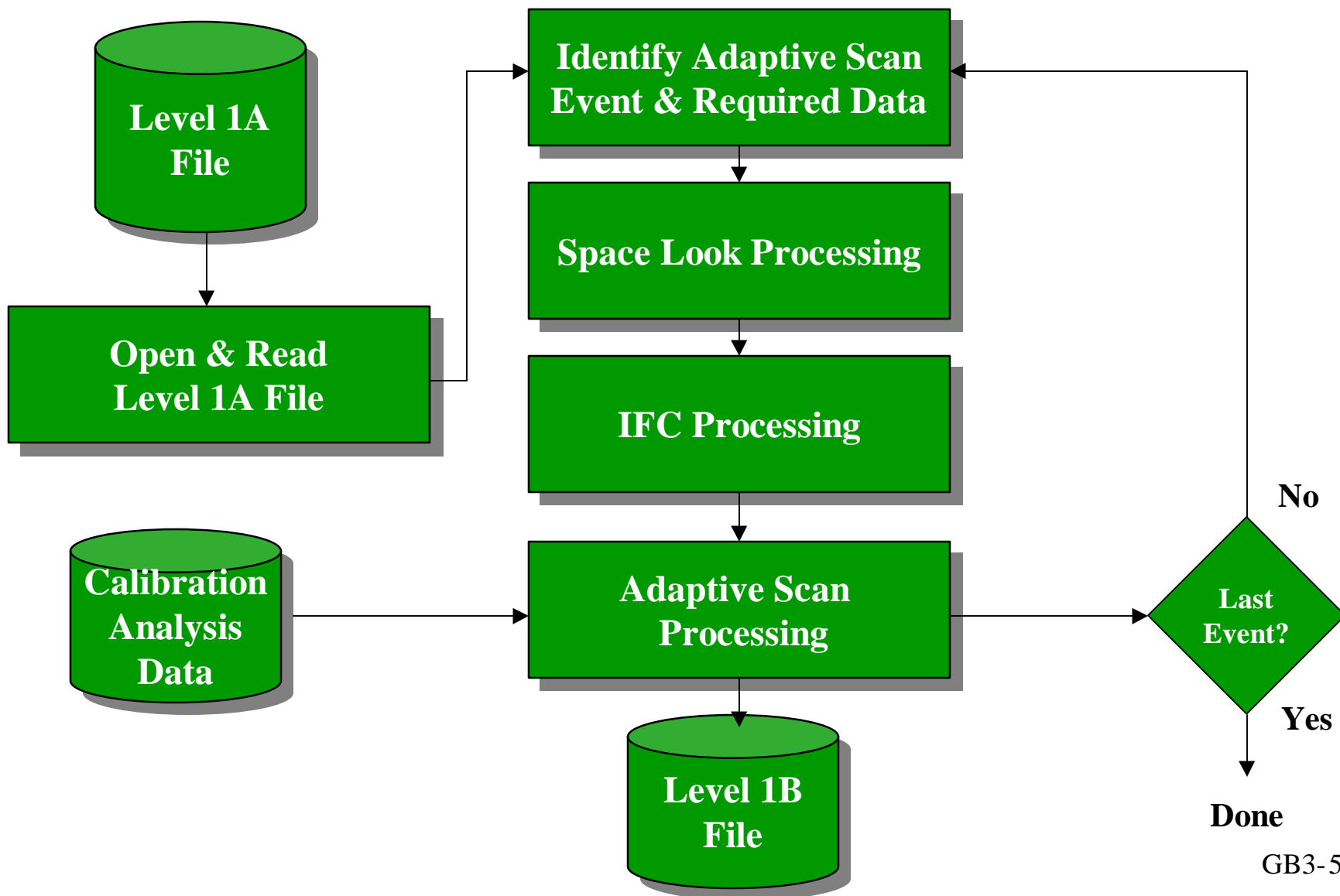
- Output:** Level 1B File (1 per day)
- Calibrated Radiance Profiles
 - NetCDF

- Processing:**
- Signal Processing
 - Remove S/C & Instrument Effects
 - Convert to Calibrated Radiance
 - Geolocate and Grid
 - Output NetCDF file

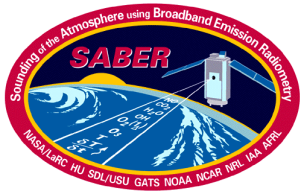
GB3-4



SABER Level 1B System Design



GB3-5

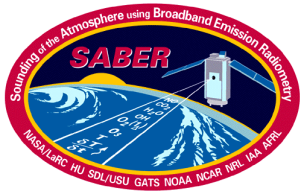


CSCI: Open & Read Level 1A Files Requirements



Requirements:

- (1) Open Level 1A file for reading.
 - (2) Determine scan event mode.
 - (3) Reuse classes from 1A based on event type.
 - (4) Track and pass quality flags
- Formats defined in SDD*



CSCI: Open & Read Level 1A Files Testing



Testing:

<u>Test</u>	<u>Requirement</u>
• Test data will be generated during Engineering Calibration (September-October 1998).	1-4
• Test data will contain all on-orbit nominal scan modes	2
• Class structures from Level 1A will be re-used	3
• Errors will be implanted in test data	4



CSCI: ID Adaptive Scan Event & Required Data Requirements

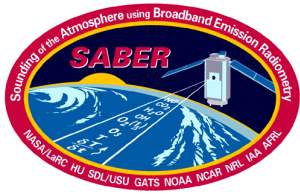


Requirements:

(1) Load each component of scan event class (below) for the current event.

- Atmospheric Scans
- Bracketing IFC data
- Bracketing Space-Look data
- HouseKeeping
- NMC data for current TP location
- Solar Indices for current day
- PVAT for current event
- Baffle-Look data

GB3-8



CSCI: ID Adaptive Scan Event & Required Data Testing



Testing:

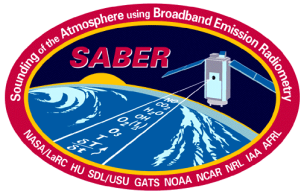
Test

- Test data will be generated during Engineering Calibration (September-October 1998). Event class contents can be verified by inspection.

Requirement

1

GB3-9



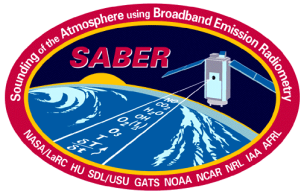
CSCI: Space-Look Processing Requirements



Requirements:

- (1) Calculate the mean voltage for each channel for the duration of the Space-Look events that bracket the current adaptive scan pair.

GB310



CSCI: Space-Look Processing Testing



Testing:

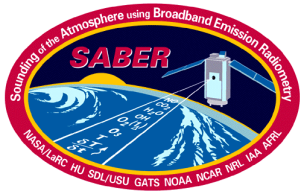
Test

- Cold measurements from calibration will be used to simulate Space-Look events. These data will be evaluated for mean voltages for each channel. The mean voltages will be compared to the CSCI calculation.

Requirement

1

GB3-11



CSCI: IFC Processing Requirements

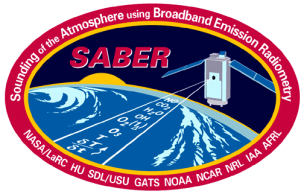


Requirements:

- (1) Determine (on-orbit) the IFC Source function ($S(T(t))$) where $T(t)$ is the time-dependent IFC temperature) using the calibration transfer measured on the ground.
- (2) Calculate calibration coefficient ($C(t)=V(t)/S(T,t)$) for each channel, and average over time duration of the bracketing IFC events.

$$C_{\text{ground}} = \text{Volts}/N_{\text{BB}}$$

$$C_{\text{space}} = \text{Volts}/S(T(t))$$



CSCI: IFC Processing Testing



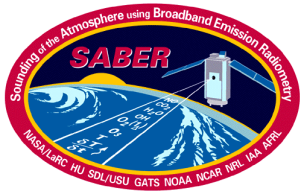
Testing:

Test

- IFC data from ground calibration will be used to generate IFC events in test Level 1A file. These data will be evaluated for mean calibration coefficients that will be compared to the coefficients calculated by the CSCI

Requirement

1,2

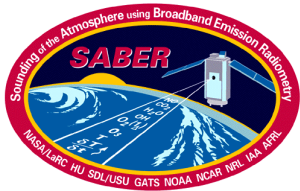


CSCI: Adaptive Scan Processing Requirements



Requirements:

- (1) Deconvolve the electronic filter function from the data.
- (2) Co-Align channels.
- (3) Convert volts to radiance units.
- (4) Estimate and remove any detectable spacecraft motion.
- (5) Geolocate each sample and grid to uniform angle spacing.
- (6) Write out each event profile in NetCDF format.



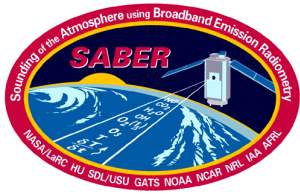
CSCI: Adaptive Scan Processing Testing



Testing:

<u>Test</u>	<u>Requirement</u>
• Adaptive scans of point source and knife-edge are scheduled during calibration. The module will successfully remove the electronics filter if time-delay and overshoots are removed.	1
• Knife-edge data will be used to validate the module's ability to co-align each detector's offset from the center of the focal plane.	2
• IFC data from engineering calibration will be used to validate the radiance output by the module based on the IFC and Jones Source temperatures.	3
• Simulated PVAT data from MDC will be used which have attitudes perturbations, causing known rotations to the simulated data. The module will be validated if it successfully removes these perturbations.	4
• Irregularly space data with know piece-wise linear values will be input to the gridding routines. The output data will have values that can be checked by verification.	5
• NetCDF reader software (IDL & Xmgr) will be used to validate the output NetCDF file.	6

GB3-15



SABER Level 1B Summary



- Overall system design for Level 1B is complete
- Level 1 has been through PDR (June '97)
- Level 1B uses calibration analysis front end.
- GATS Heritage for Level 1:

Software & Lessons Learned from:

- HALOE Level 1
- LIMS Level 1
- MASDA (LIMS reprocessing) Level 1