

# GUVI Science Algorithms

## Preliminary Design

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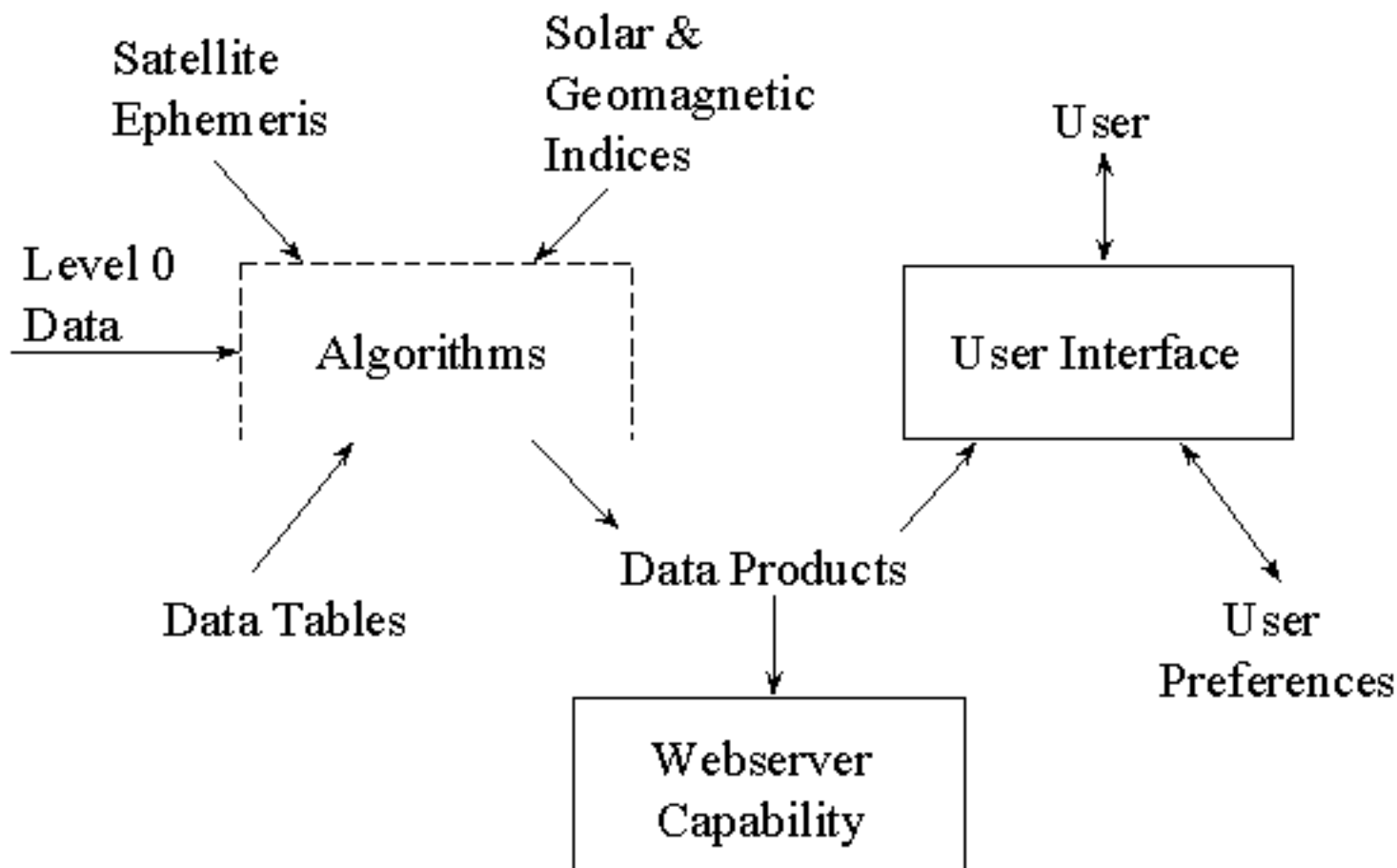
# Software Requirements

- Produce Level 1C data products.
- Produce Level 2 data products.
- Produce overlays for user-interface.

# Software Reuse

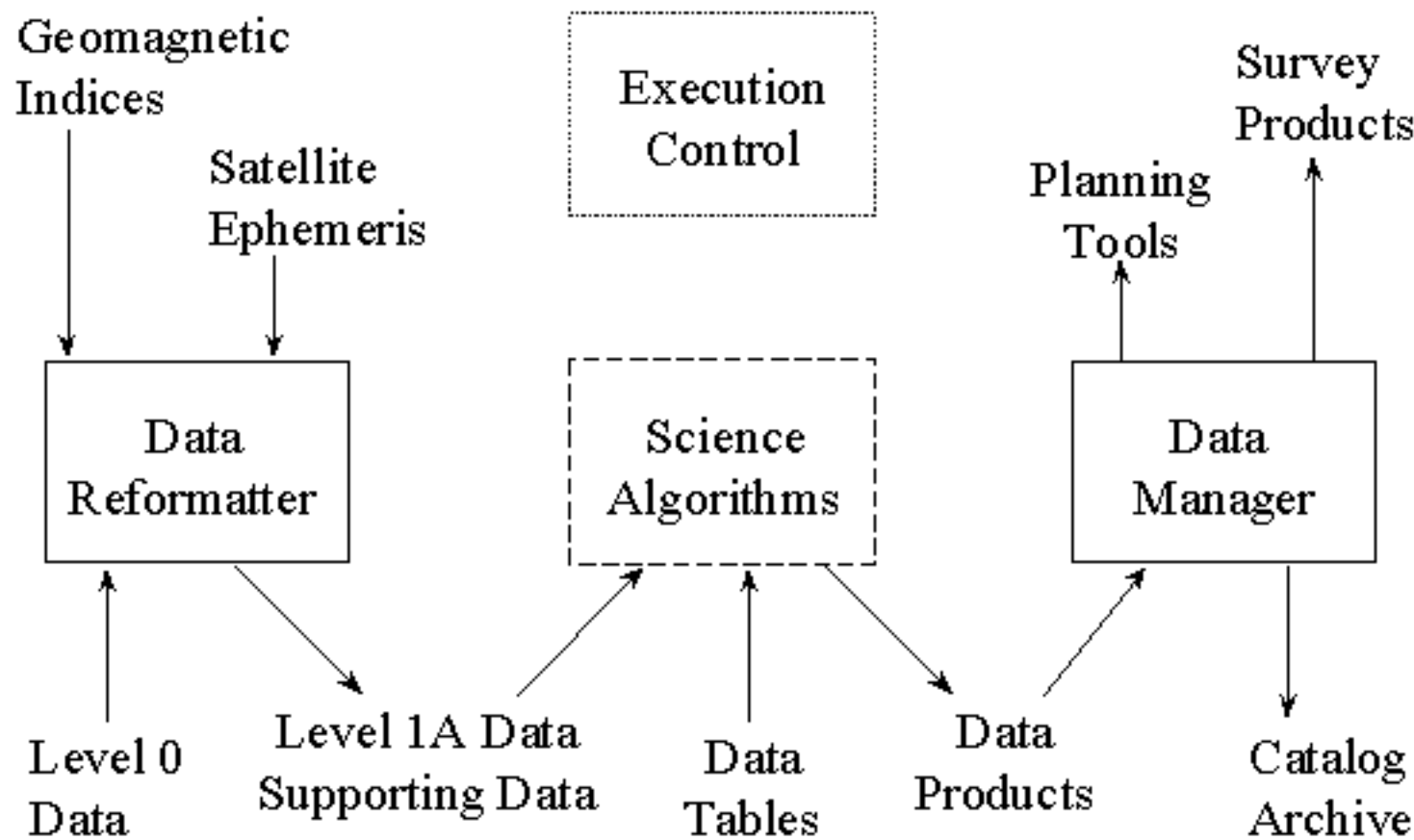
- GUVI patterned after SSUSI
- GUVI Data Processing POC reuse SSUSI GDAS software
- Reusable software components are indicated with a dashed line -

# DP POC Top-Level Design

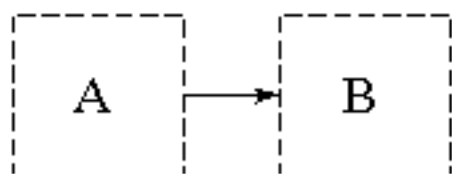


--- Reusable

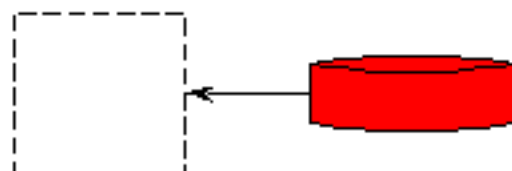
# Algorithms Top-Level Design



# Diagram Symbolism

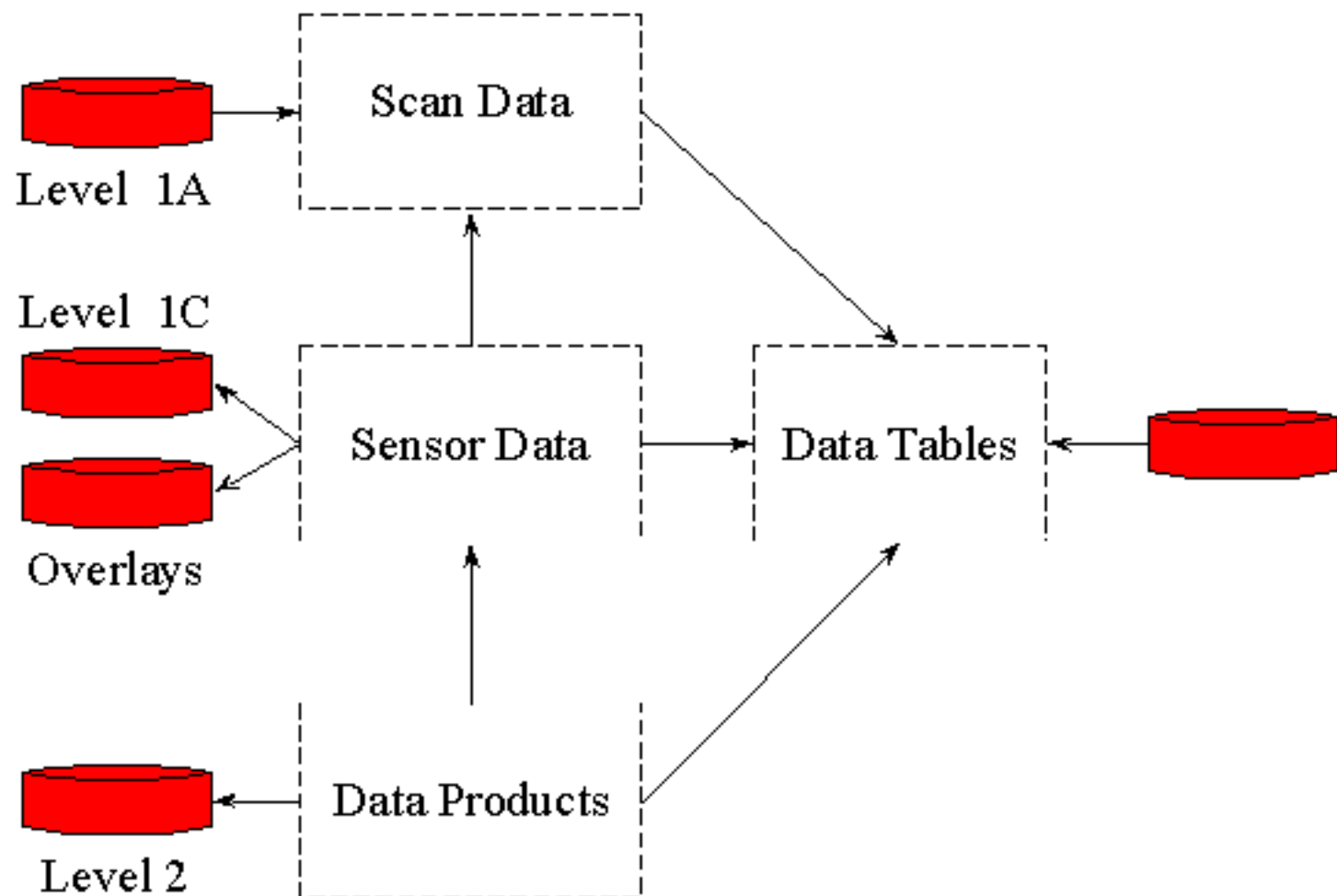


- Read as “A uses the services of B”.



- Arrow indicates direction of data flow.

# Science Algorithms Top-Level Design

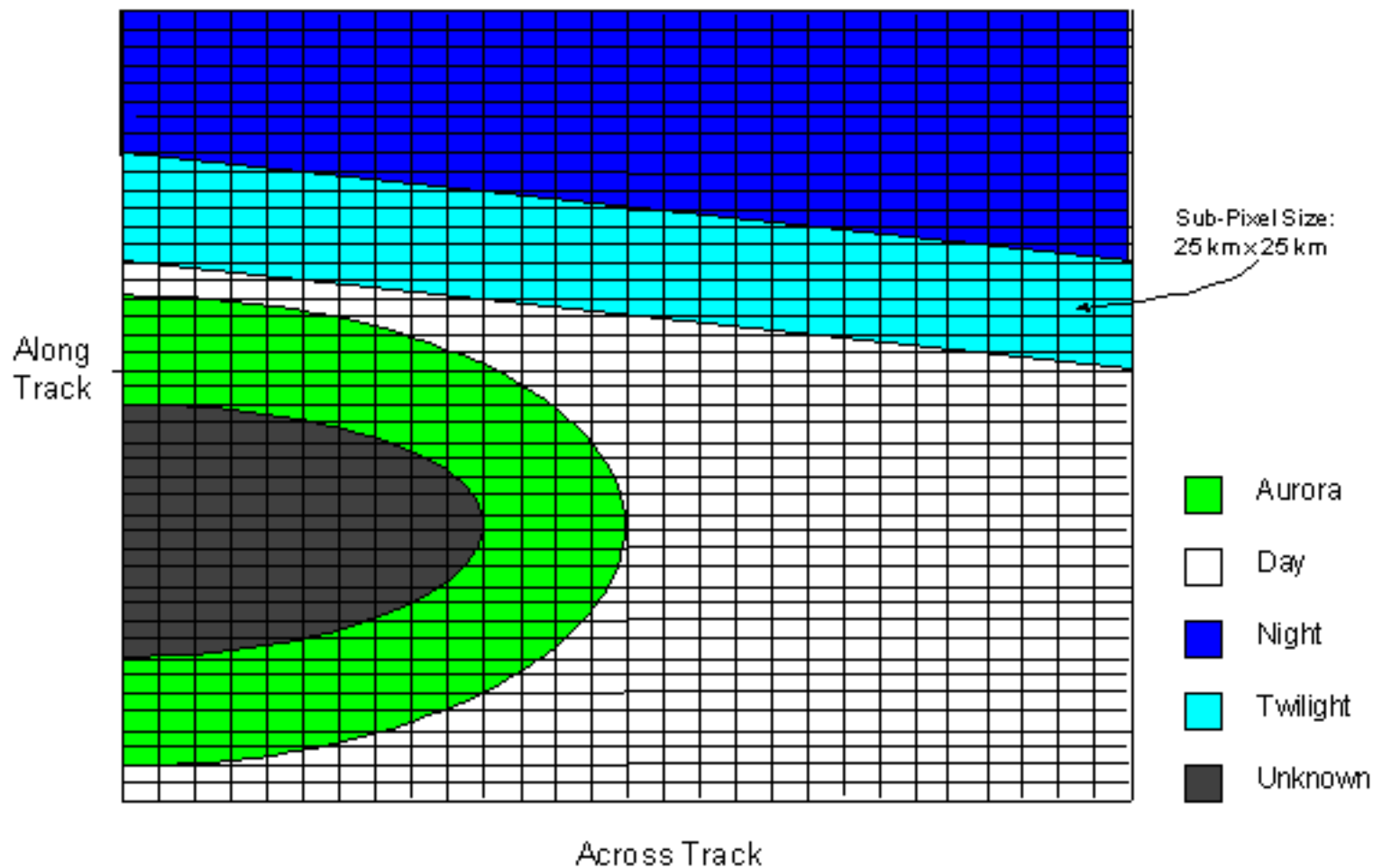


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Creator: IDL Version 3.5.0 (IRIX mipseb)  
CreationDate: Thu Oct 27 07:58:56 1994

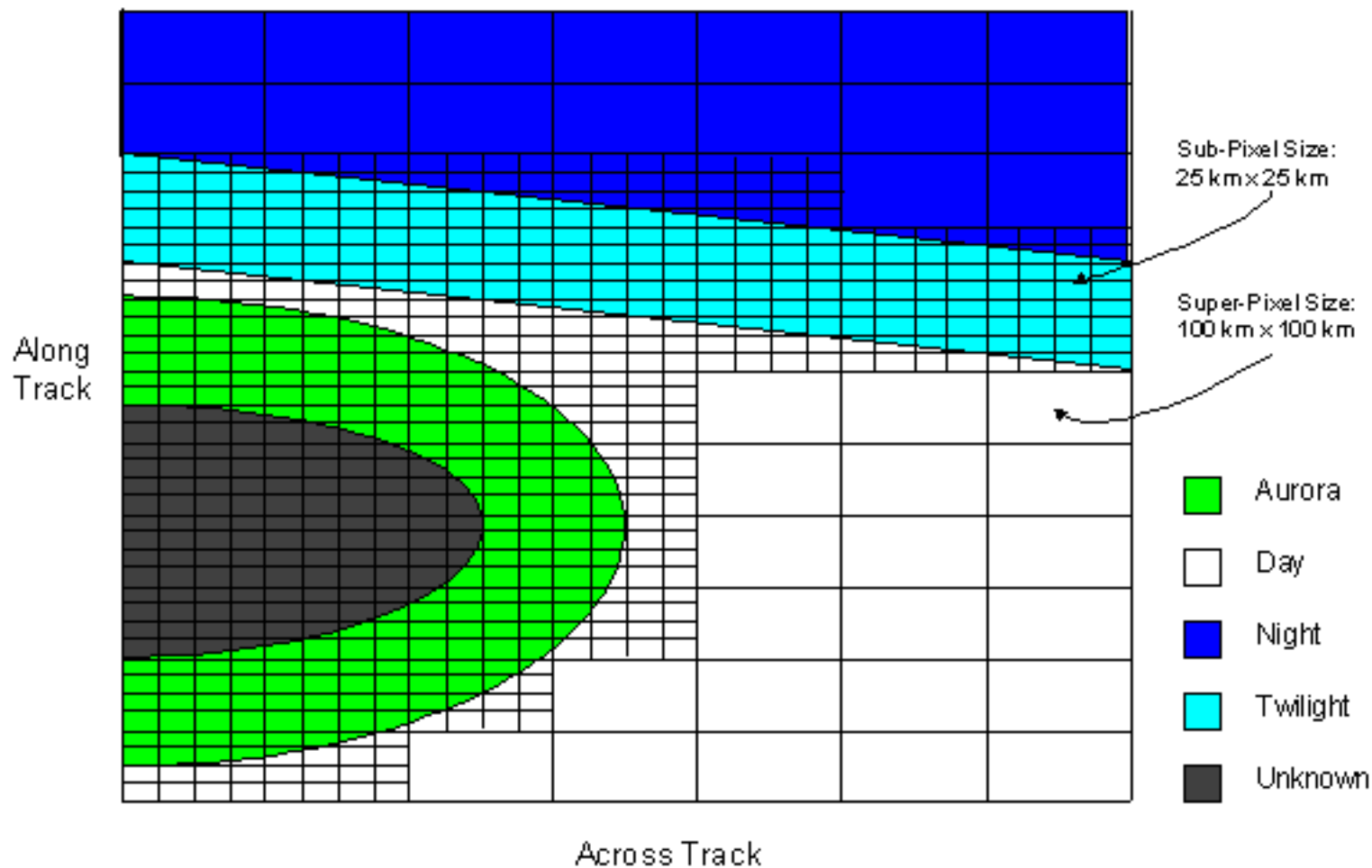


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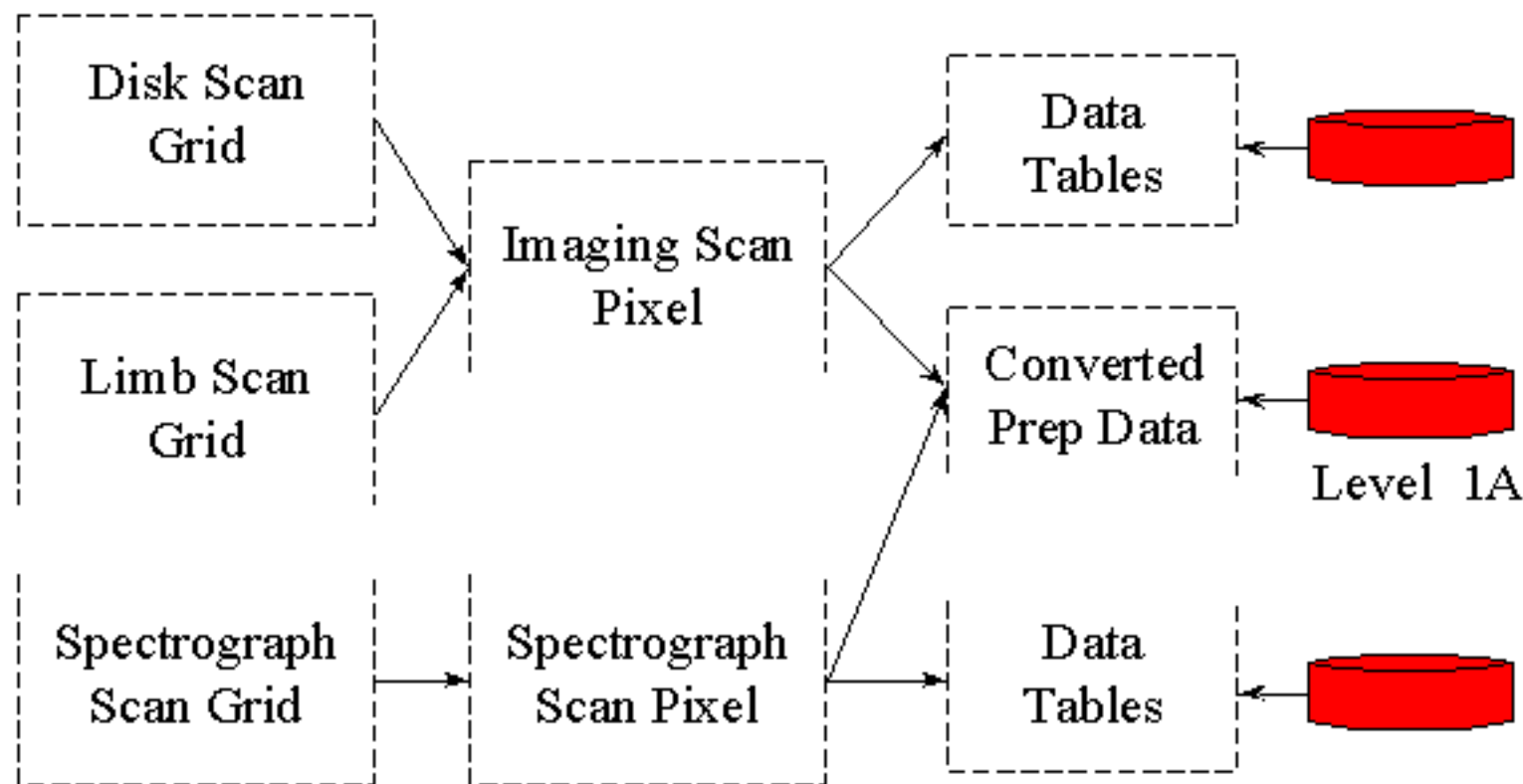
# Sensor Data Disk Grid



# Data Product Disk Grid



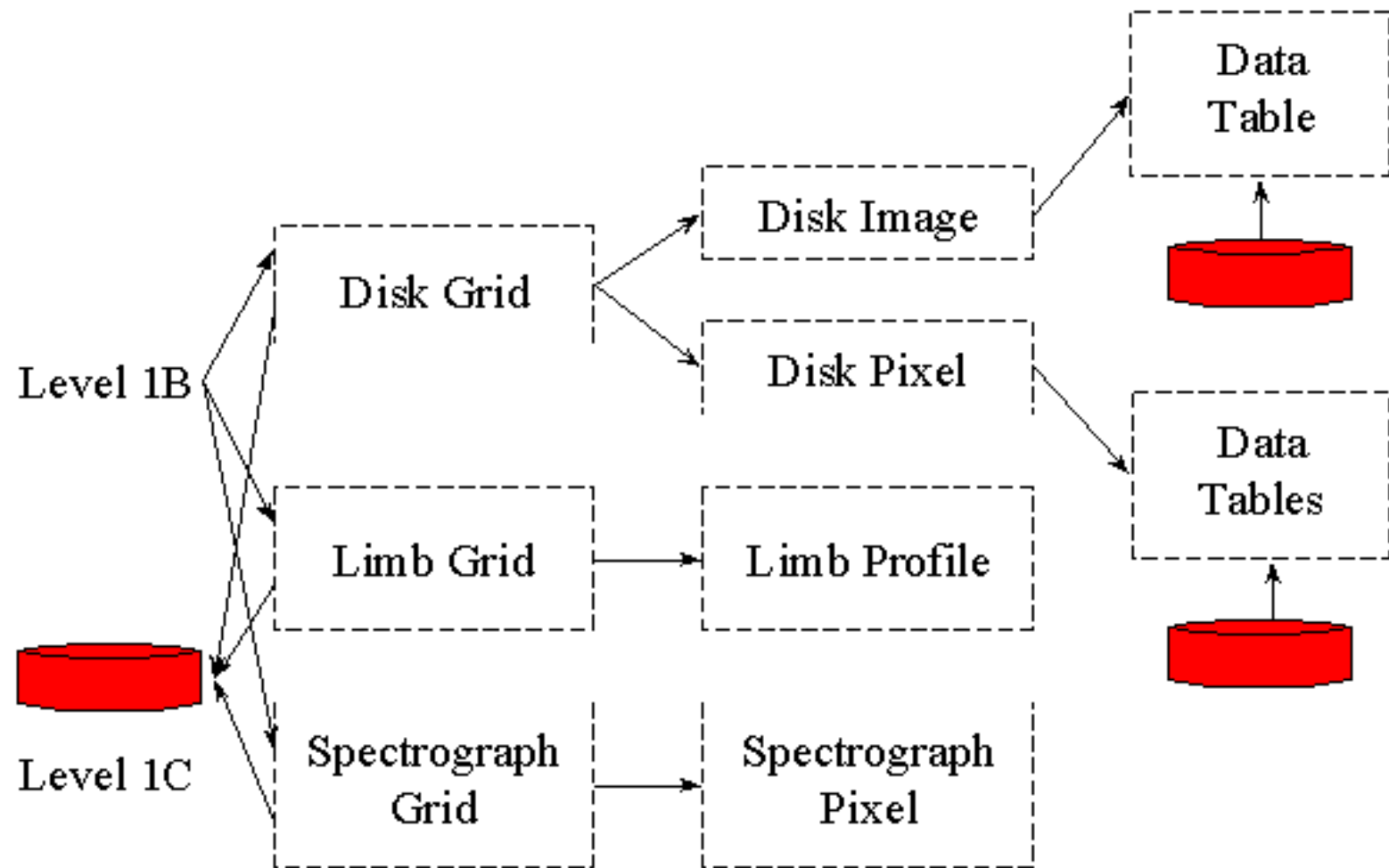
# Scan Data Control Flow



# Scan Data

- Decompress Level 1A compressed counts using Decompression Data Table.
- Compute Level 1B radiances from decompressed counts using Calibration Data Table.
- Provide services to get Level 1A ephemeris information.
- Provide services to get Level 1B radiance data.

# Sensor Data Control Flow



# Sensor Data

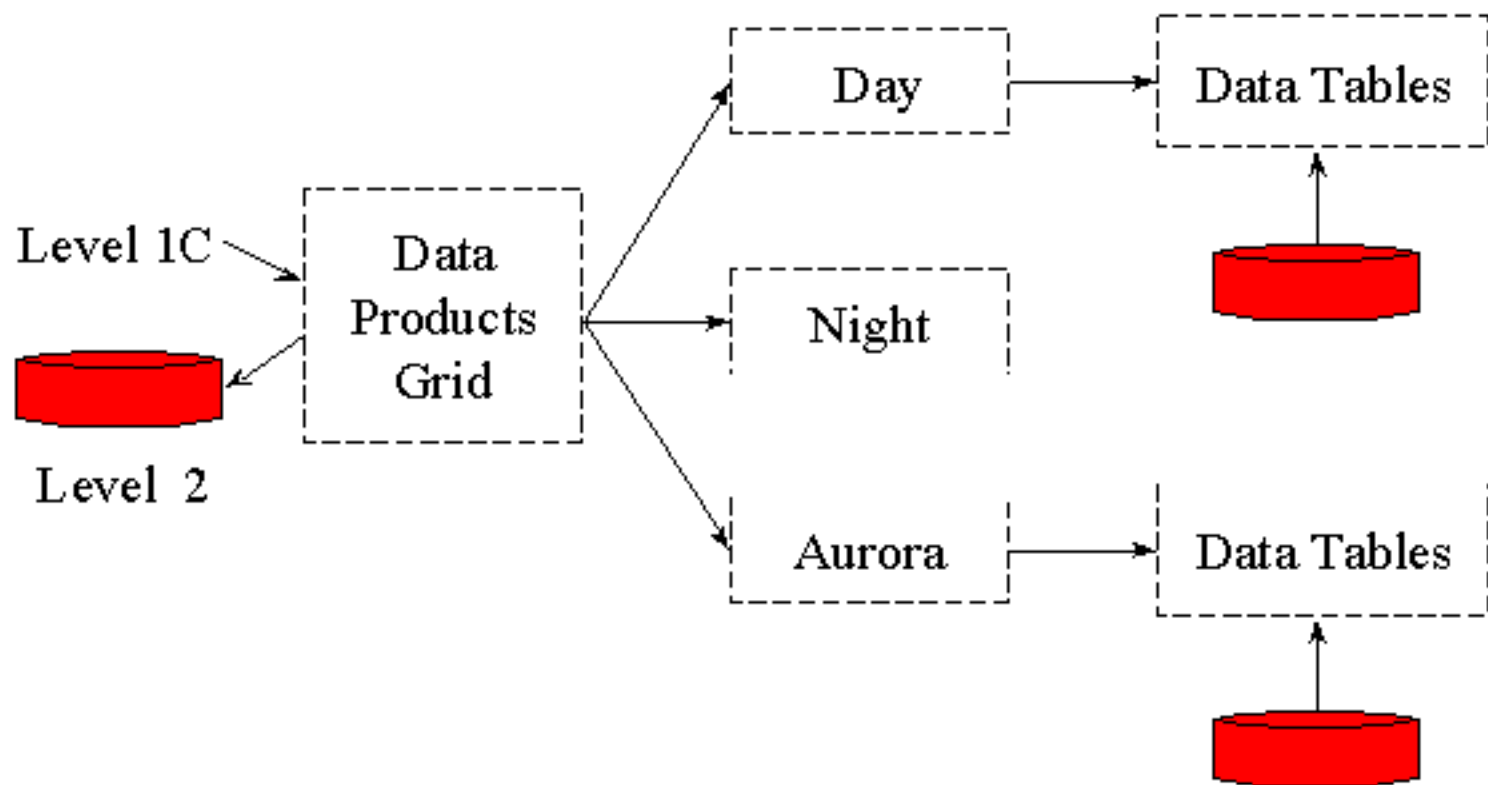
- Map Level 1B radiance data to Level 1C radiance data on sensor data grid.
- Geolocate Level 1C data.
- Remove dayglow and geocoronal background from Level 1C aurora radiances using Midlatitude Background Data Table.
- Determine aurora boundaries using Level 1C aurora radiance data or Statistical Aurora Data Table.

## Sensor Data (cont.)

- Rectify Level 1C off-nadir day and aurora disk radiances using Day and Aurora Rectification Data Tables.
- Provide services to get Level 1C data.



# Data Products Control Flow



# Data Products

- Map Level 1C radiance data to Level 2A radiance data on the data product grid.
- Geolocate Level 2A data.
- Derive Level 2B data products from Level 2A radiances using the QEUV Data Table, ROVCDN2VCD Data Table, DITF Data Table, and Aurora Coefficient Data Table.
- Provide services to get Level 2 data.

# Data Tables

- Decompression Data Table.
- Calibration Data Table.
- Day Rectification Data Table.
- Aurora Rectification Data Table.
- Statistical Aurora Data Table.
- Geomagnetic Data Table.
- Midlatitude Background Data Table.
- QEUV Data Table.
- ROVCDN2VCD Data Table.
- DITF Data Table.
- Aurora Coefficients Data Table.

# Assumptions

- Overlapping scan data are mapped onto an orthogonal grid (sensor data grid).
- Sensor data grid pixel radiances are averages of values from all spatially overlapping scan pixels.
- Aurora boundaries are determined from Level 1C radiances and a statistical model.
- Sensor data disk pixel resolution is 25 km x 25 km at 150 km.

## Assumptions (cont.)

- Data product day and night disk pixel resolution is 100 km x 100 km at 150 km.
- Day and aurora disk pixel centers are geolocated at 150 km.
- Day limb profiles are geolocated at 150 km tangent altitude.
- Night disk pixels centers are geolocated at 350 km.
- Night limb profiles are geolocated at 350 km tangent altitude.

# Issues

- Level 2 aurora data products.
- Dayside limb retrieval algorithm.
- Timing requirement.