MODIS
Science Data Support Team Presentation

Ed Masuoka
Code 920.2
GSFC/NASA
emasuoka@ltpsun.gsfc.nasa.gov

AND

Dr. Albert Fleig
Department of Geography
University of Maryland College Park
afleig@ltpsun.gsfc.nasa.gov

Topics

- SDST Contractor Support
- 10/94 Modeling Exercise
- Ancillary Data Set Needs
- Q/A Plans
- 12/94 S/W Readiness Review

HAIS Modeling Effort 10/94

- MODIS input to model has TBD's for some parameters. These will end up zeroed out for processing or storage.

- Modeling supports:
  analysis of product growth - Mel Banks
  presentation to IWG - Bruce Barkstrom
  costing of ECS for PDR - HAIS/ECS

- MODIS July 1994 was 3.6 GFLOPS and is now 4.9 GFLOPS. The 1.6x multiplier we had in previous updates was dropped from the last SPSO database update. Storage volume grew from 938 GB to 1,082 GB.

Ancillary Data
Cloud Product

Parameter Description	Tangible Source[1]	Type (P/V/D)[2]	Applicable Epoch (BL/AL/PL)[3]
Global Surface Parameters (Temp, Pres, and Wind Speed)	NMC	P	AL/PL
Reynolds Blended SST	NMC	P	AL/PL
Global Model Profiles (Temp and Moisture)	NMC	P	AL/PL
Vegetation Type		P	AL/PL
Digital Elevation Map		P	AL/PL
AIRS/AMSU Profiles (Temp and Moisture)	GSFC/DAAC	P	PL

[1]ftp server and pathname, archive site, CD ROM
[2]Production (P), validation (V), algorithm development (D)
[3]Before Launch (BL), At Launch (AL), and Post-Launch (PL)

Q/A Plans

- Robert Lutz common Q/A for AM instruments
  comments from Evans and Masuoka

- Need to work Q/A plan for MODIS products
  Impact on wide area networks
  Q/A activities at DAAC and SCF
  Commonalty with other instruments

- Needed for data management plan revision in early November

A software readiness review of MODIS will take place in December 1994 for Dixon Butler and will cover:

- Products to be generated, their phasing, and readiness plans

- Software implementation plan and status

- Resource requirements for development (hardware and personnel) and status

- External interfaces and status (e.g., data dependencies, tool kits, network requirements)

- Test plans

- QA plans, procedures and resource implications

- Plans for receiving and integrating Team Members' software at the Team Leader Computing Facility

- Plans for participation in integration of MODIS software into the EOSDIS product generation system

- Resource requirements for product generation on EOSDIS

- Significant problems/issues

This is intended to be more a status review than an algorithm, science or software design review. Sufficient detail should be provided commensurate with the time to demonstrate that all relevant developmental issues have been identified and are being addressed.

THANKING YOU IN ADVANCE FOR YOUR SUPPORT.

Topics

- Flathead Lake - Al Fleig
- Validation Plan - Al Fleig

Topics

- Beta Software Delivery
- SDST Utilities
- Nested ISSCP Grids
- L1B Rectified/Mapped
- DAAC Activities

Beta Software Deliveries

- 1/94 Heritage s/w

  Work the delivery process
  Develop plans for heritage s/w

- 10/94 "MODIS" s/w

  Related to ATBDs
  Uses Ancillary Data
  Meets ECS programming/language standards

Beta Software Deliveries

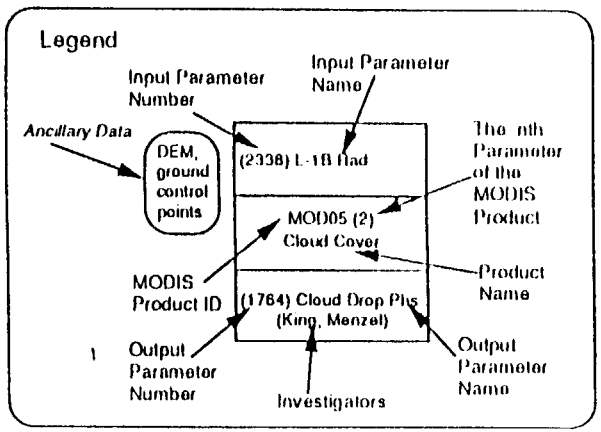
- 4/95 Integrated "MODIS" s/w

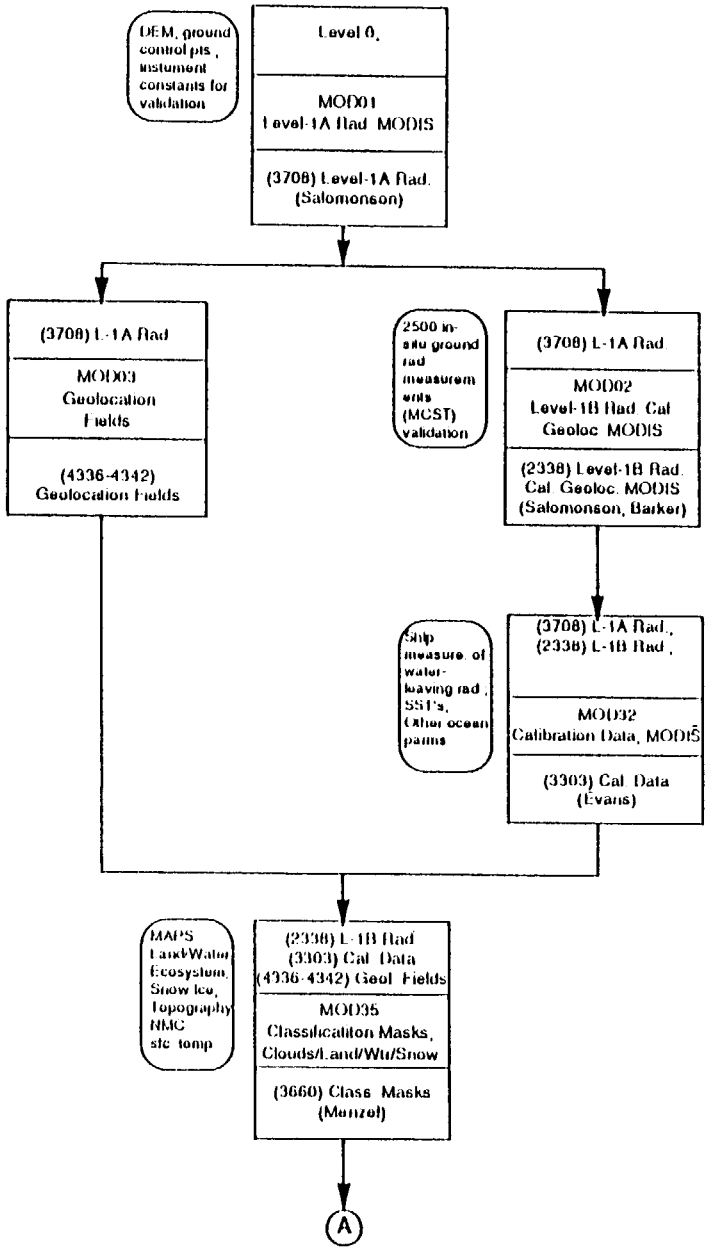
  Integrated science s/w
  Use PGS Toolkit
  Runs on SCF and TLCF
  Runs with simulated global data sets

- 7/95 Deliver Beta s/w to ESDIS

  Meets all ECS Standards
  All at-launch MODIS products

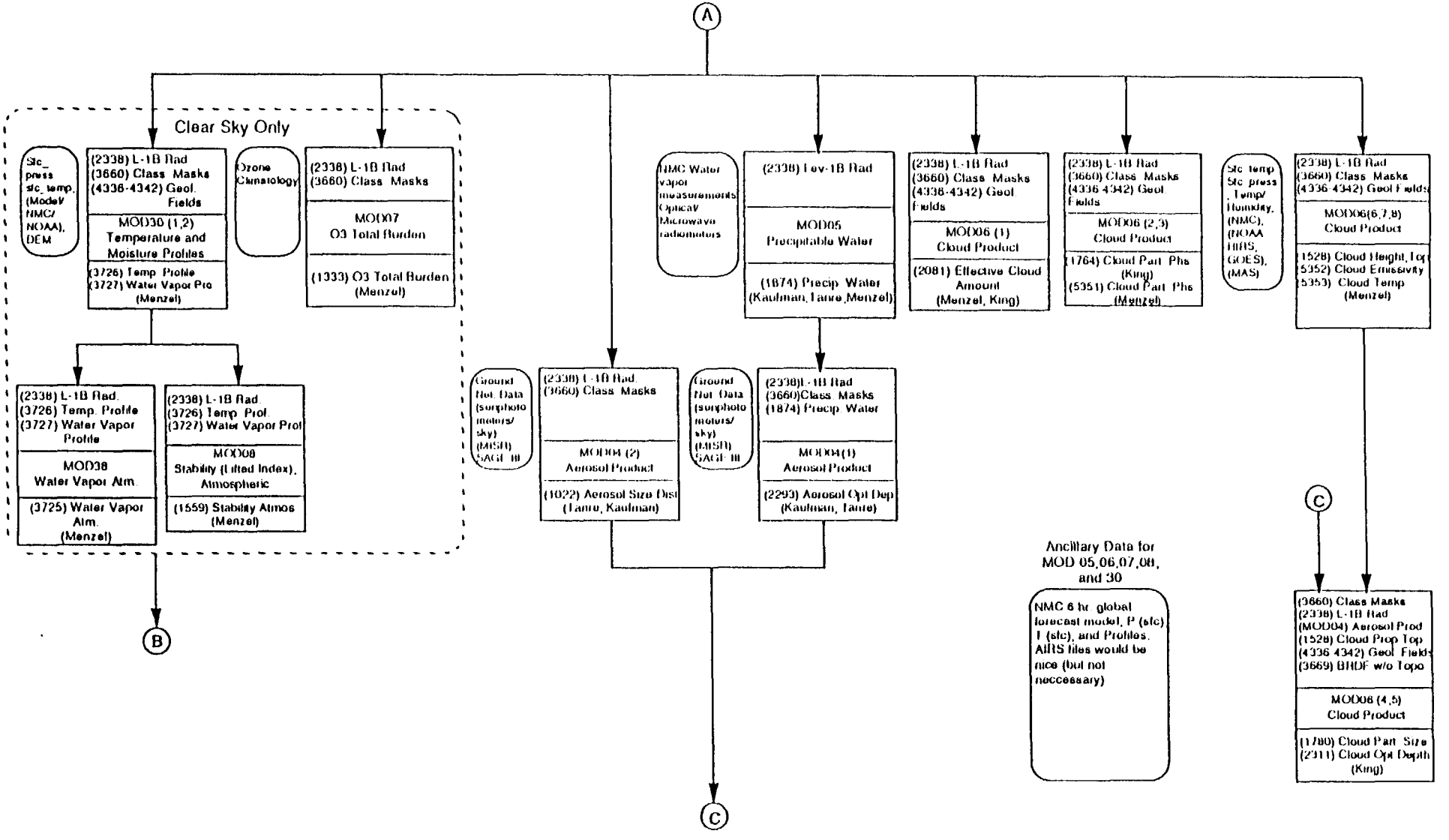
MODIS Level 0, Level 1, and Level 2 Hybrid Data Products (DRAFT)





10/7/94

MODIS Level 2 Atmosphere Data Products (DRAFT)



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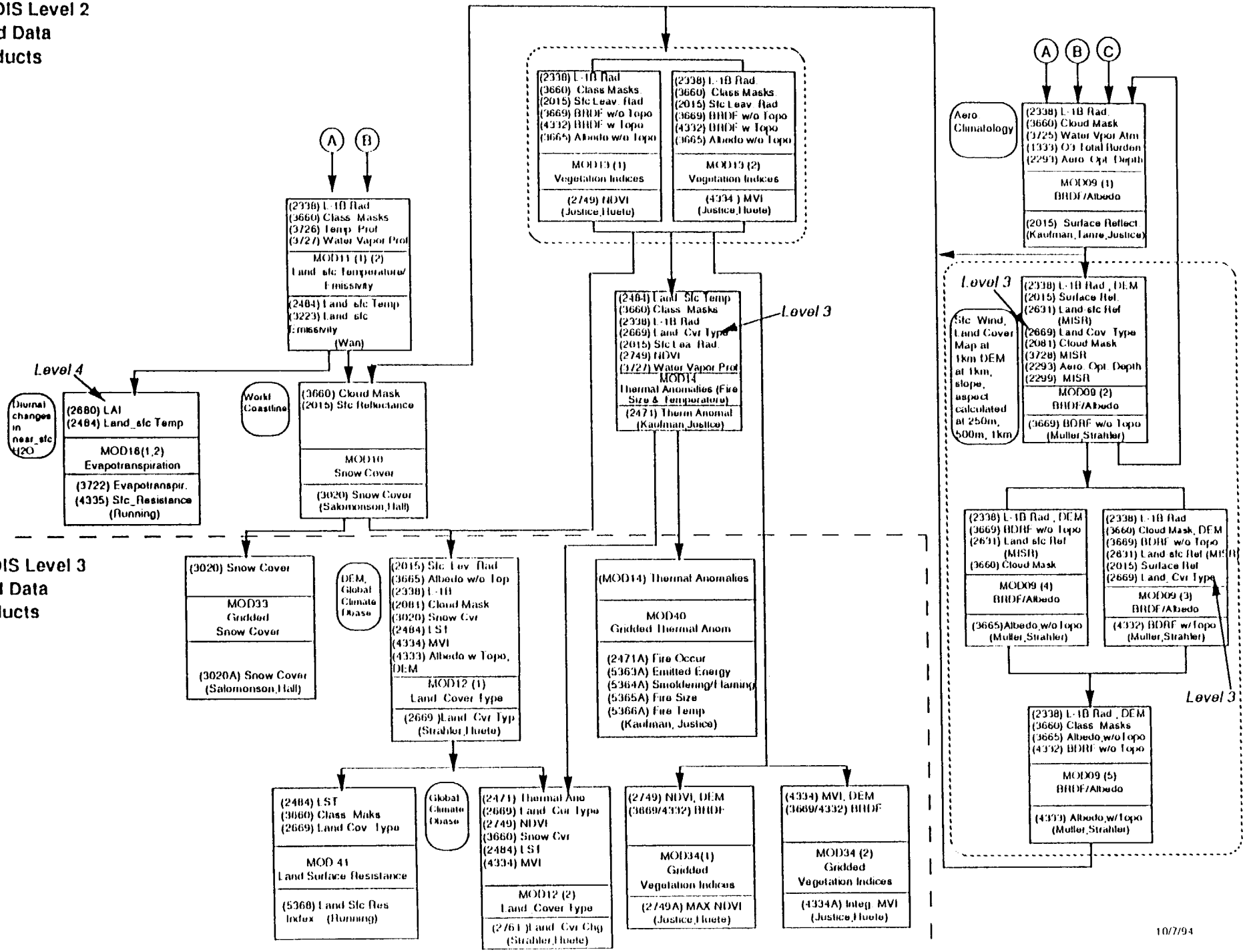
MODIS Level 2 Land Data Products



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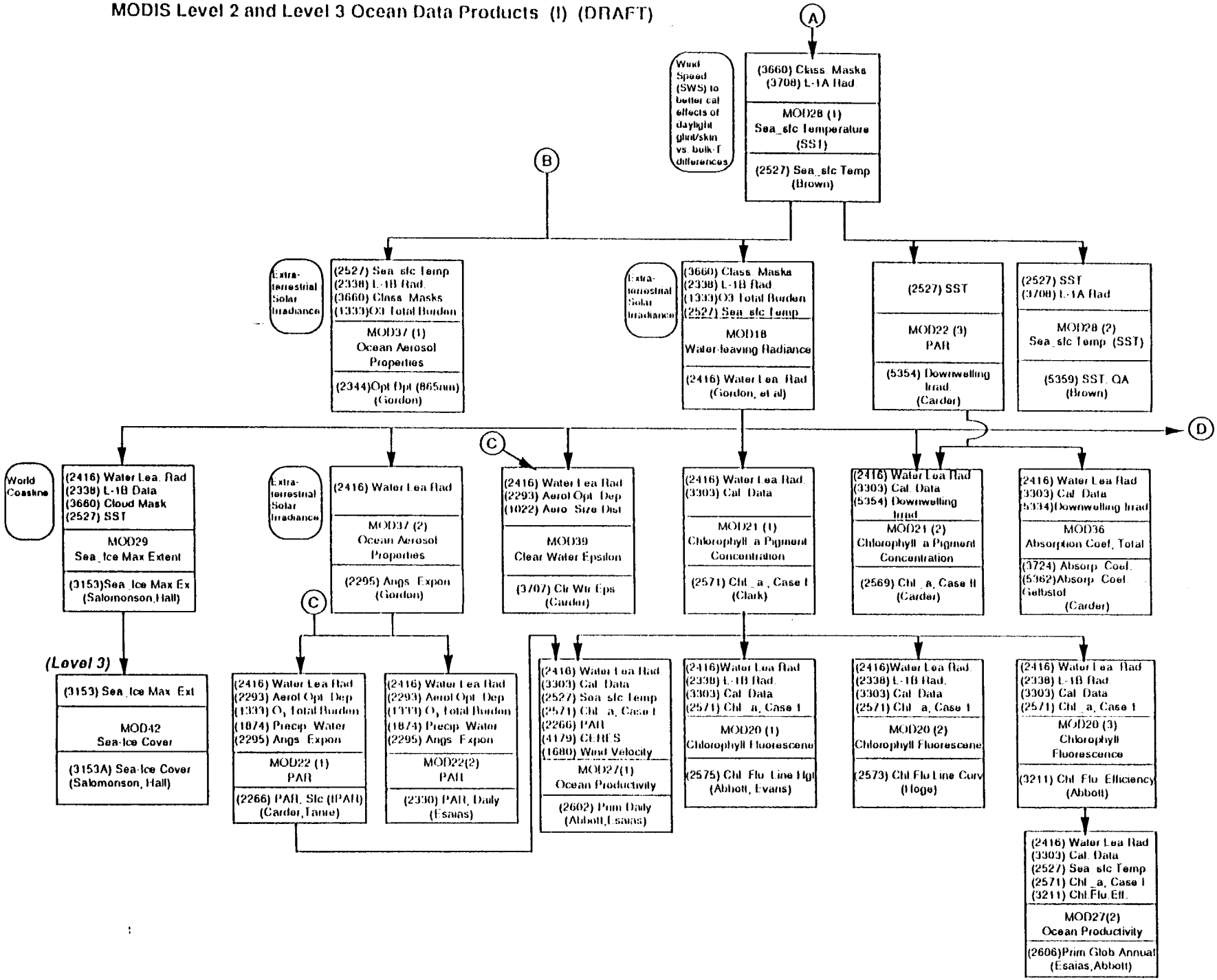
MODIS Level 2 and Level 3 Ocean Data Products (I) (DRAFT)



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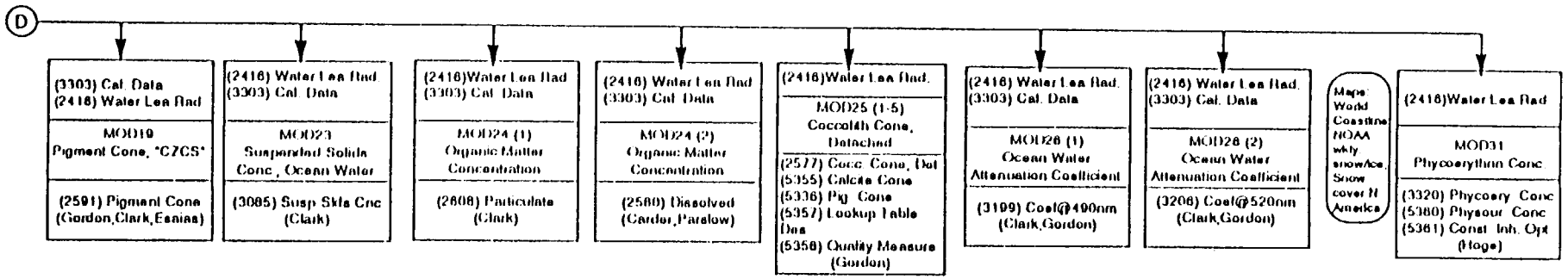
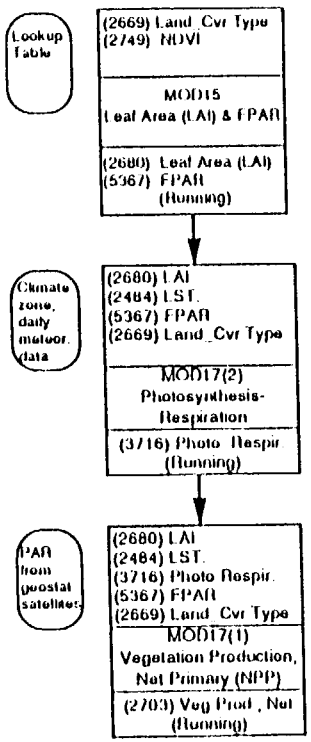
MODIS Level 2 and Level 3 Ocean Data Products (II) (DRAFT)



MODIS Level 4 Data Products

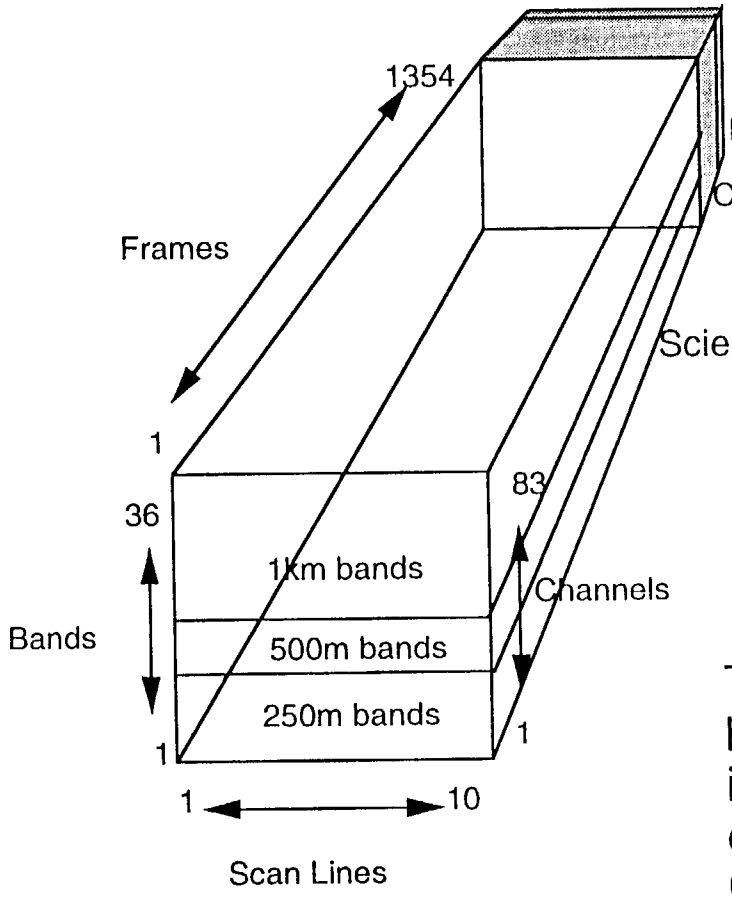


The SDST Utility Library for Scan Cube and Simulated Data Set I/O will be sent to your software development teams this month

I will:

- describe why the library was developed
- touch on what it offers
- tell why we'd like you to use it

I/O with the Level 1B Scan Cube can be complex



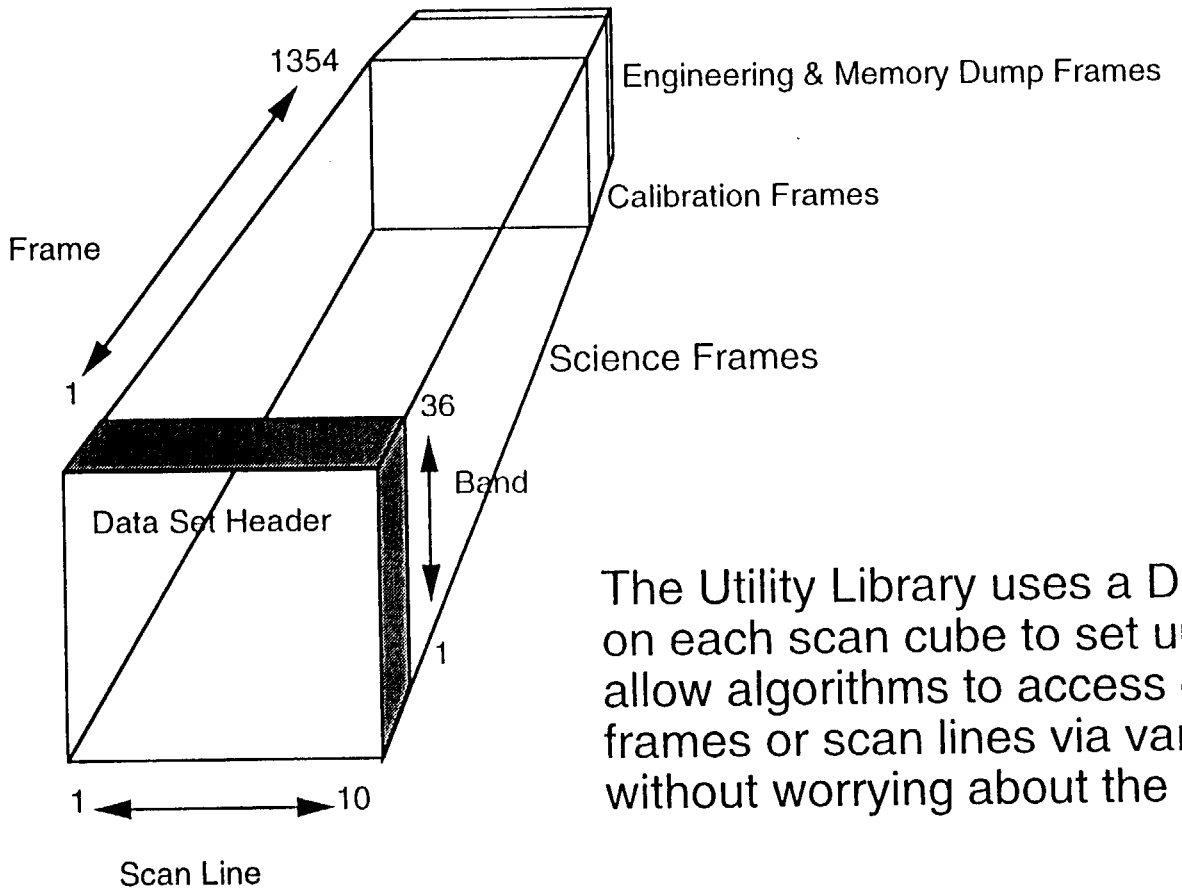
Engineering & Memory Dump Frames(may be present)

Calibration Frames(number varies)

Science Frames(commandable, currently 1354)

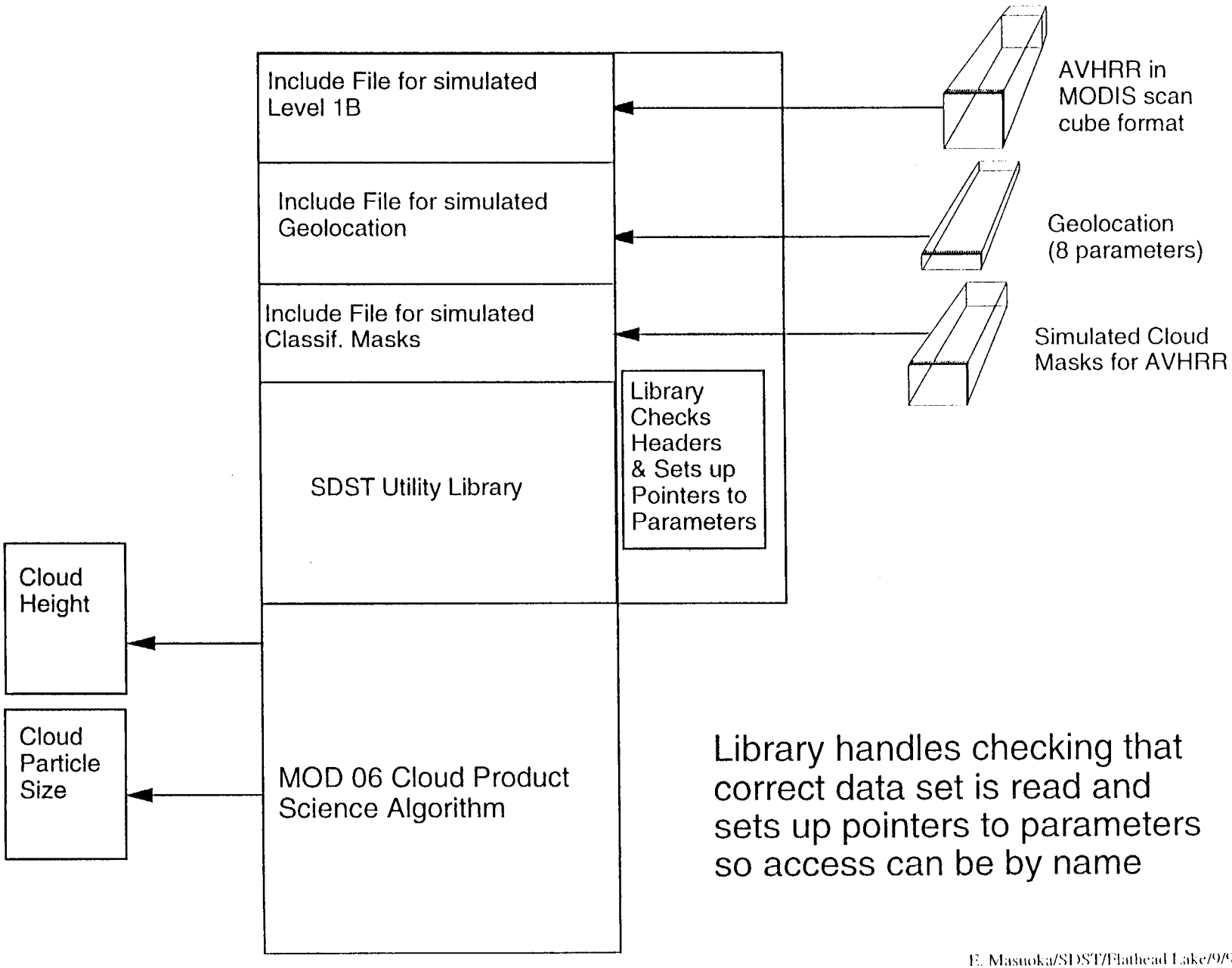
The MODIS scan cube data structure can be complex to handle due to differences in spatial resolution between bands and a commandable number of Science and Calibration frames.

A Utility Library was Developed to Simplify I/O with the Scan Cube



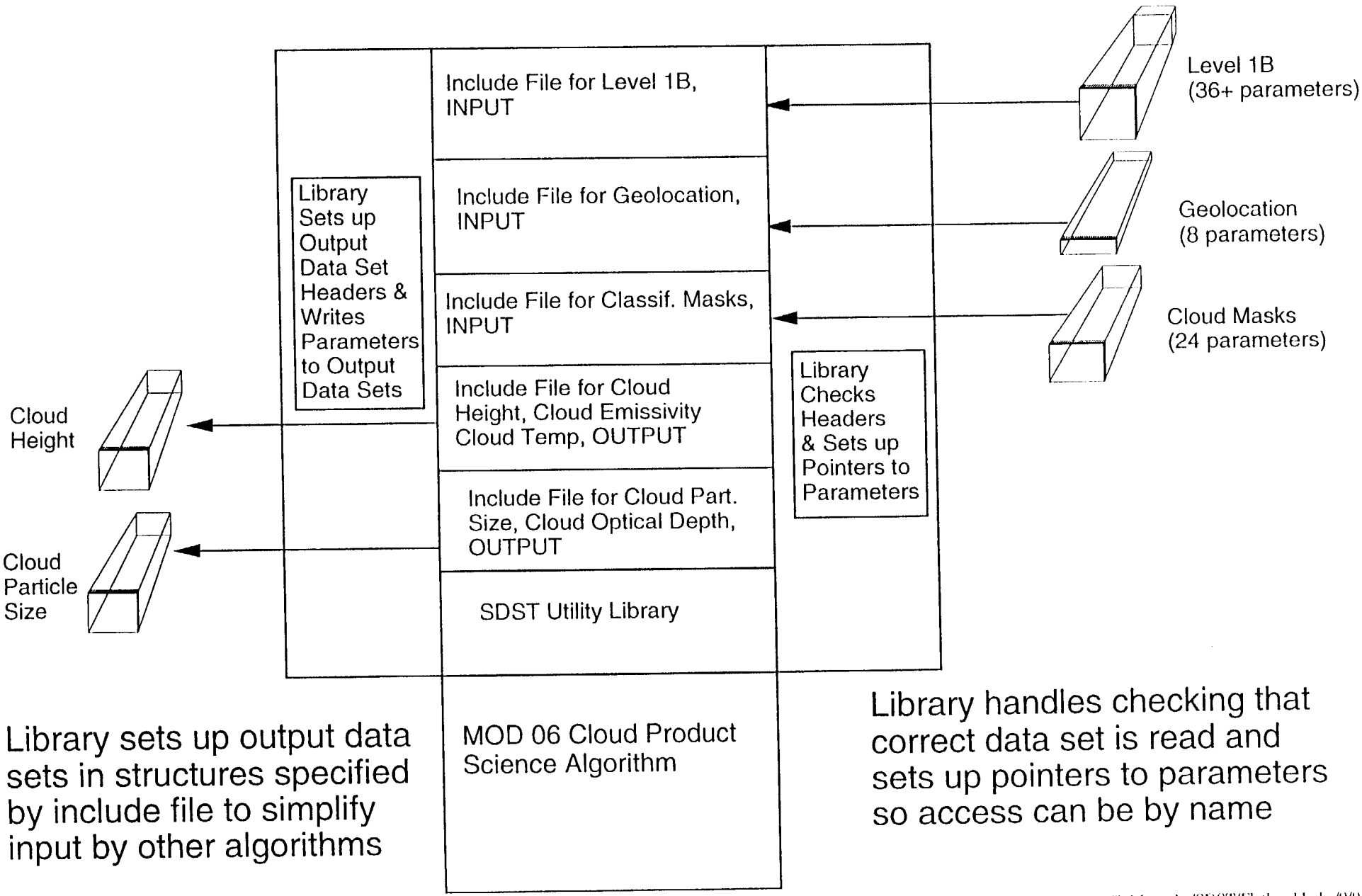
The Utility Library uses a Data Set Header on each scan cube to set up pointers that allow algorithms to access data by bands, frames or scan lines via variable names without worrying about the internal format.

The Utility Library will be used to simplify I/O between Science algorithms and simulated data sets



Library handles checking that correct data set is read and sets up pointers to parameters so access can be by name

The Utility Library will simplify I/O between Science algorithms



Library sets up output data sets in structures specified by include file to simplify input by other algorithms

Library handles checking that correct data set is read and sets up pointers to parameters so access can be by name

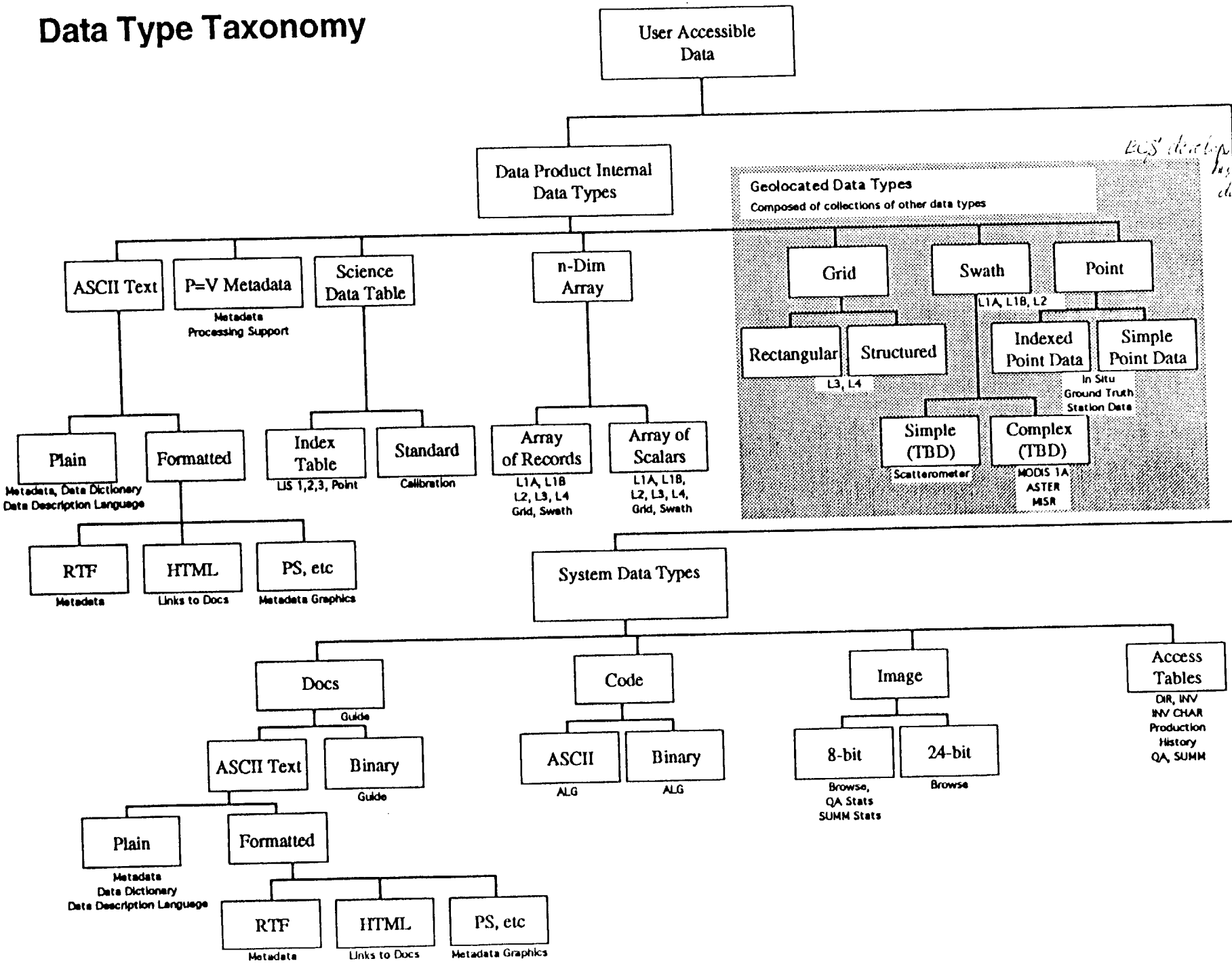
To Use the Utility Library You Need:

- Include files for each data set that will be written by the library. SDST can help.
- The names of variables in each data set
- Information about each variable (units, how calculated)
- The utilities are written in C (SDST will need to develop a wrapper if you are delivering FORTRAN 77 or FORTRAN 90)

But there is also HDF.

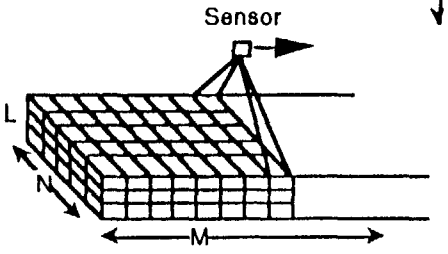
- Self describing data structures
- Approved by ECS for archival and production
- Supports viewers
- May support our scan cube

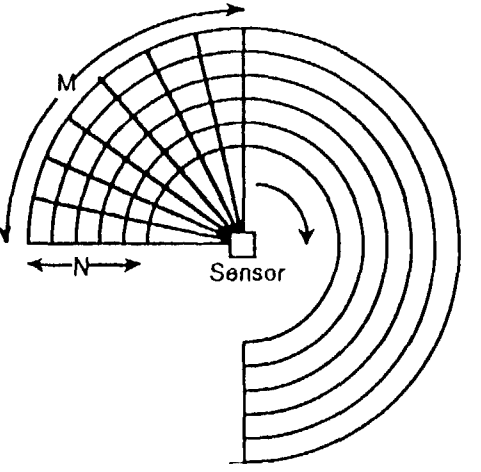
Data Type Taxonomy



Swath

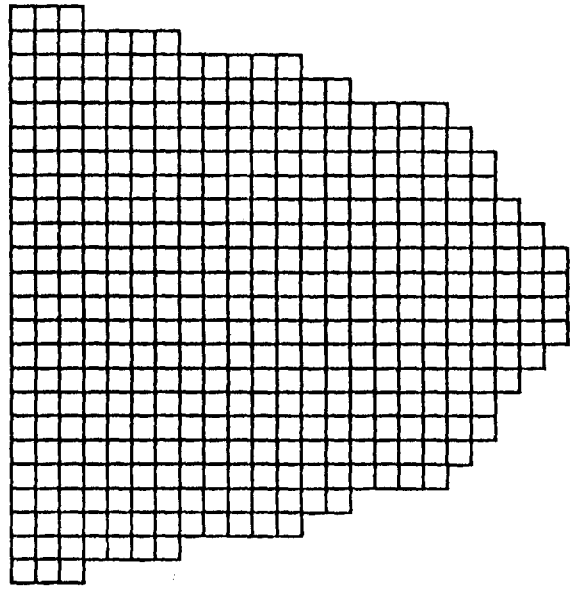
- Simple
  - Created by a sensor making N observations in the across-track direction. The along-track direction causes the footprint to form a ribbon of M scans along the subnadir track. The data forms an array of observations N by M by L (where L is the number of data channels taken for each observation time). An additional array of geo-location or observation time data is provided at a resolution equal to or lower than the observations
- Indexed
  - Similar to the Simple Swath but may have observations of varying resolution



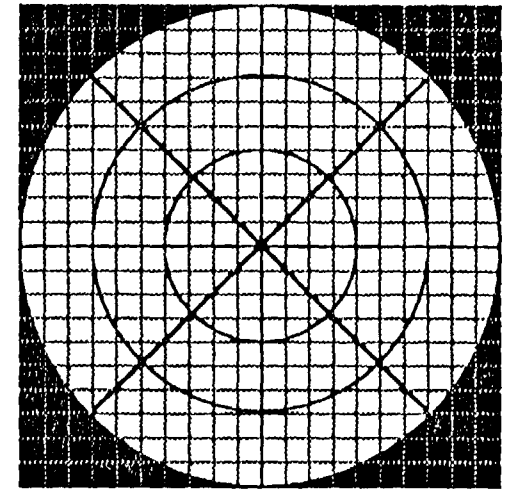


Grid

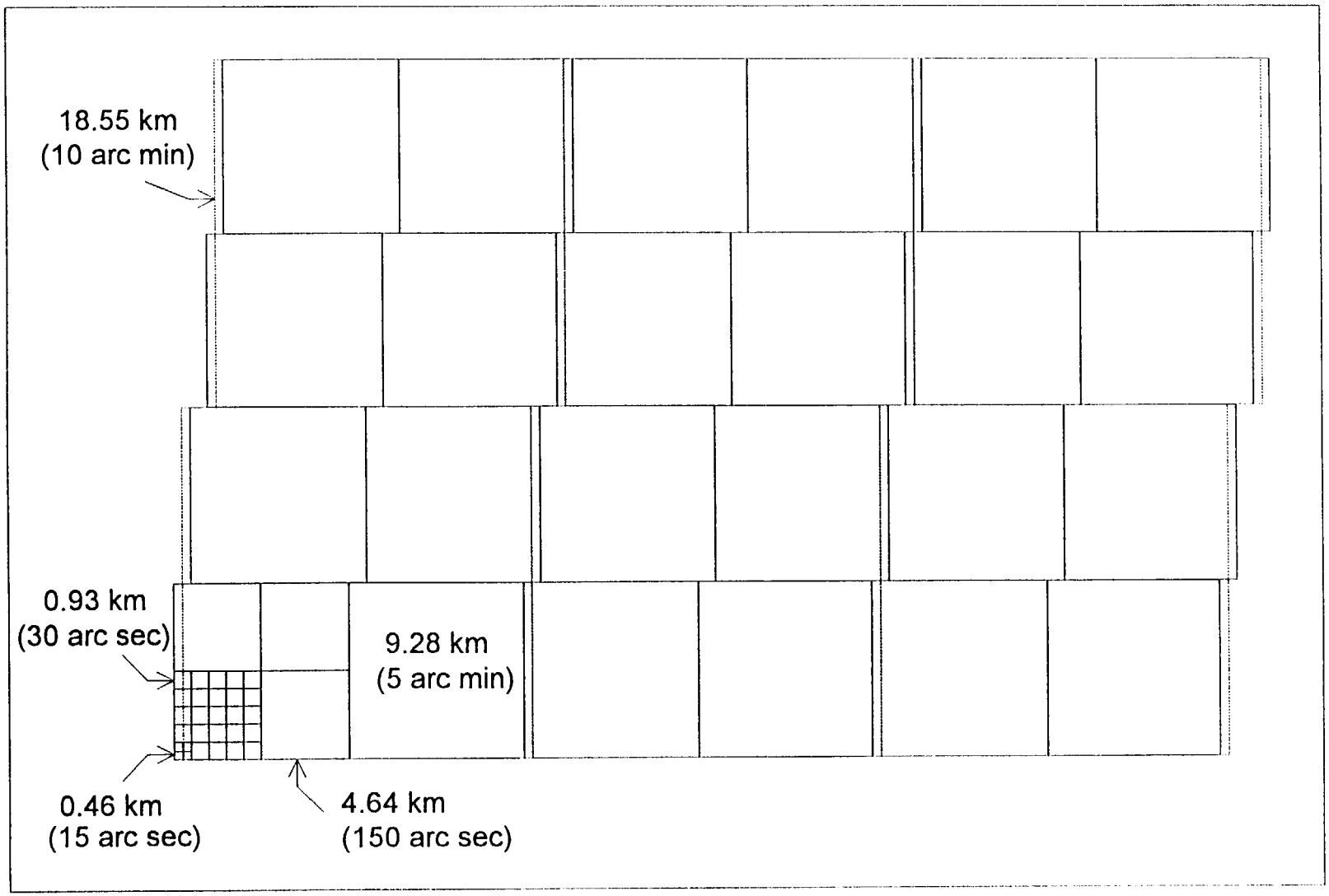
- Structured
  - Data which has been projected and binned into a non-rectilinear data structure using a known methodology. Metadata such as projection name, projection limits, & geometry are included in order to identify geo-location and coverage of data structure cells



- Rectangular
  - Data which has been projected and binned into a rectangular grid using a known methodology. Metadata such as projection name, projection limits, & geometry are included in order to identify geo-location and coverage of grid cells.



ISSCP Grid - Nested Cells (from 9.28 km down)



ISSCP Grid Nesting Issues

Nesting Advantages

- Only Needed Horizontally - ISSCP Grid Naturally Nested Vertically
- Boundaries Line up Nicely Within 9.28 km Area - Interpolation Easier
- Area Based Compression (Quad tree) Can be Used

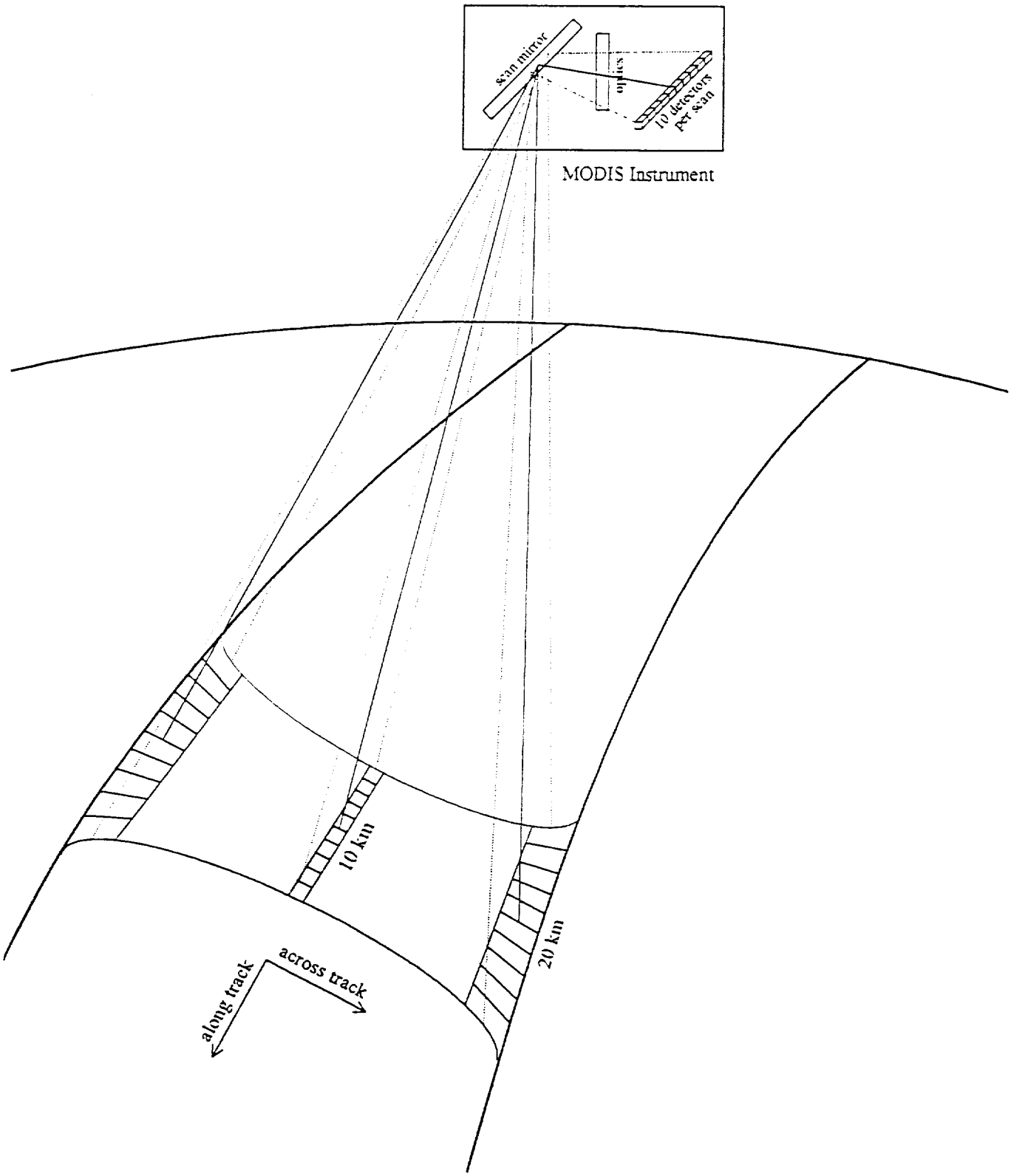
Is 9.28 km the "best" nesting size?

- Satisfies Equal Area Criteria
- Oceans Currently Use 9.28 km Grid Size
- Most Land/Ocean Grid Sizes Handled - Land/Sea Boundary
- Atmosphere may Use 18.55 km or Larger Grid

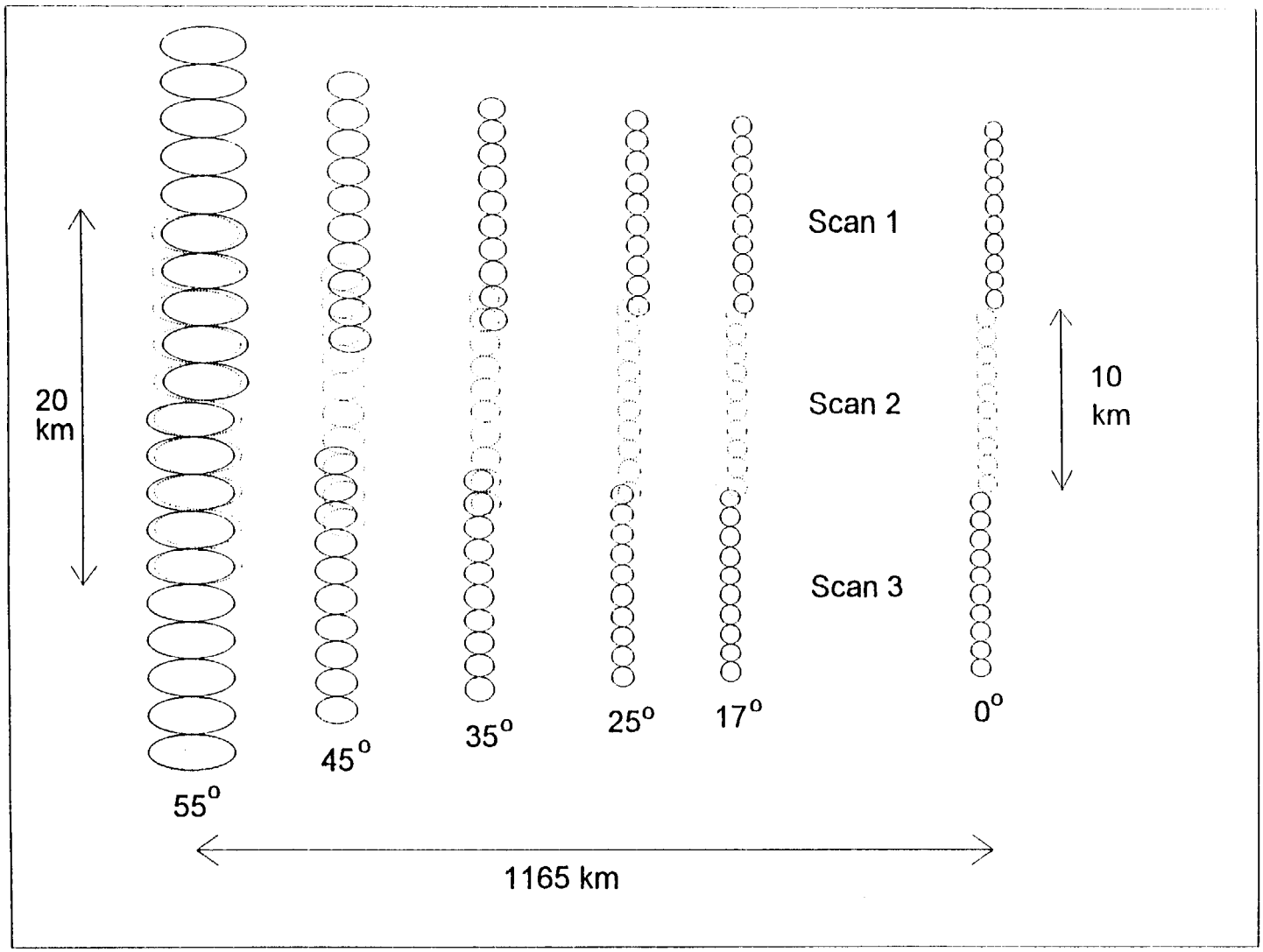
Indexing Uses Hybrid Approach

- Simplifies Indexing within Nested Area
- Uses Standard ISSCP Indexing when Crossing Upper/Lower Boundaries

MODIS Scanning Geometry



Pixel Size Growth and Overlap within a Scan



DAAC activities with SDST

- GSFC DAAC
  - Distribution of MAS
- EDC DAAC
  - ATM link from TLCF to EDC to provide access to global AVHRR at 1km