



Application of DoDAF 2.0 for NOAA's JPSS Ground System and Project

Alan Jeffries Presenting

Authors:

Robert Morgenstern, 240-684-0648,
Robert.M.Morgenstern@nasa.gov

NASA Goddard Space Flight Center, Code 581/474
8800 Greenbelt Road Greenbelt, MD 20771

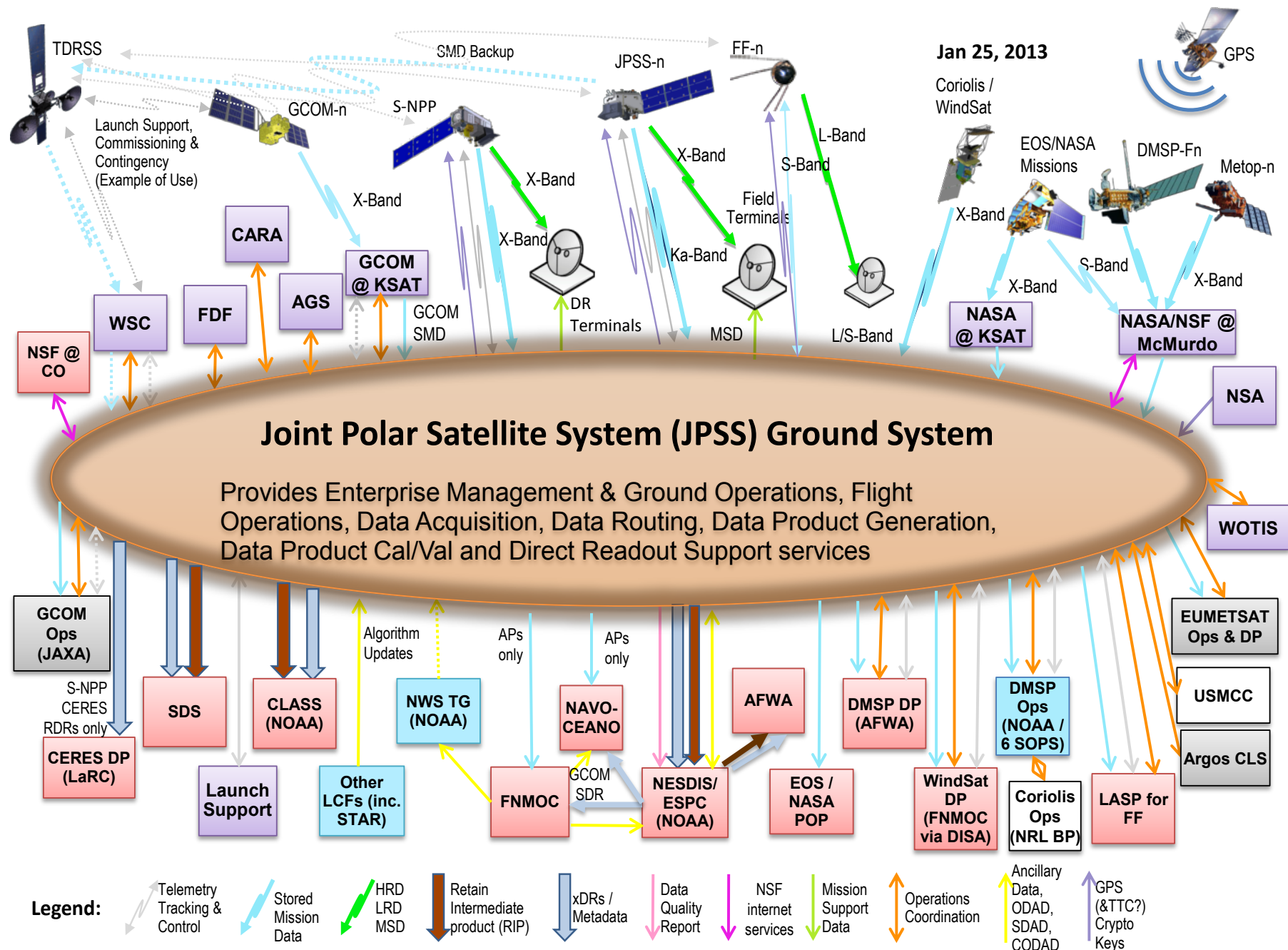
Jeff Hayden, 303-703-6911 / 240-684-0982,
Jeff.Hayden@jetsi.com

Alan Jeffries, 703-582 0228/ 240 684 0982, Alan@jetsi.com

Laura Ellen Dafoe, (303) 721-6011, lauraellen.dafoe@jetsi.com

Jeffries Technology Solutions, Herndon VA 20170

OV-1 JPSS Ground Systems High Level Operational Concept



Using DoDAF 2 with UPDM 2 to Describe JPSS Data Reduction Processes

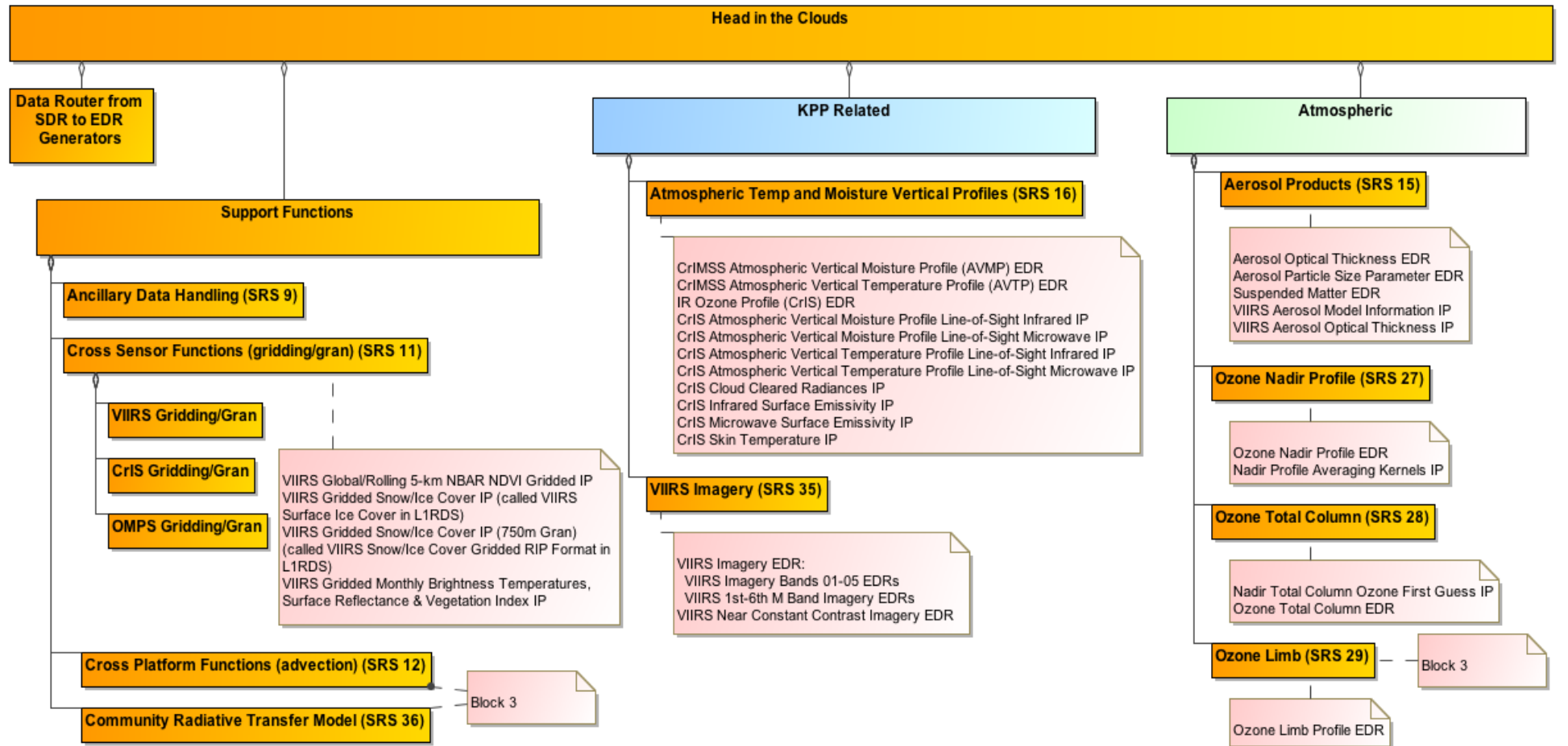
- The systems views prescribed by the Department of Defense Architecture Framework version 2 (DoDAF 2) SV-4 and SV-6 diagrams are used to describe the software object handling of the downloaded JPSS satellite data to produce Environmental Data Records (EDRs).
- The DoDAF 2 views are presented using the Unified Profile for DoDAF and MODAF version 2.0 (UPDM 2).
- The modeling tool used is MagicDraw UML version 17.0.3 with UPDM 2 version 17.0.3.

SV-4 System Functionality Description Diagrams

- Provide hierarchical views of the systems with their included functions.
- Documentation of the systems and functions are captured in the properties of those systems and functions.
- Show the lower level system and software functions used to process the data captured by the JPSS Project.
- Identify the system and software functional process flows that generate each deliverable data product.
- Assist in Systems Engineering requirements tracking.
- Identify the lower level specifications and verification plans defined in the Software Requirements Specification (SRS) that govern the JPSS data products.
- Identify the software algorithms contained in the lower level specifications

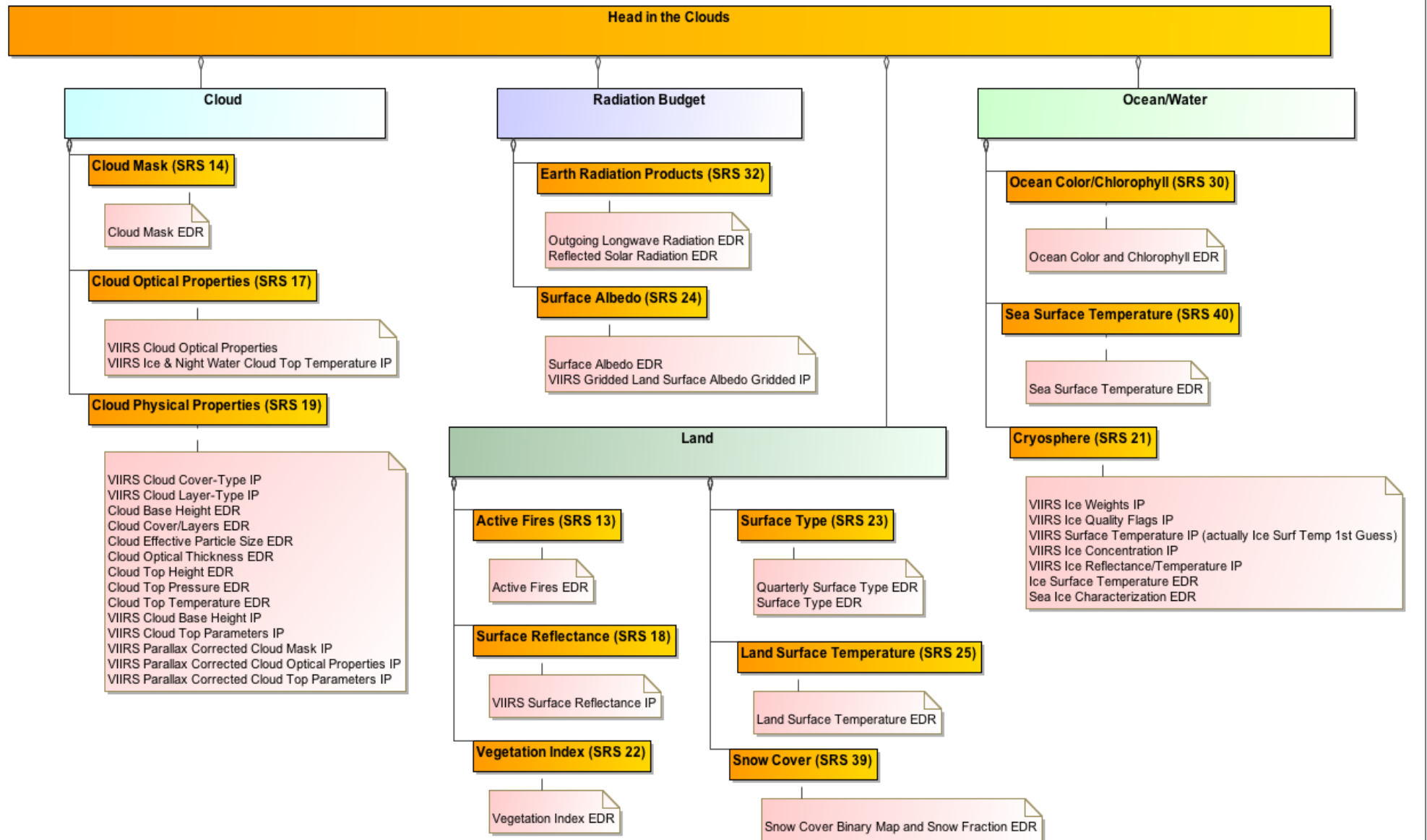
SV-4 System Functionality Description, ADL Full Hierarchy (1)

SV-4 Systems Functionality Description [SV-4a ADL Full Hierarchy for CAS p 1]

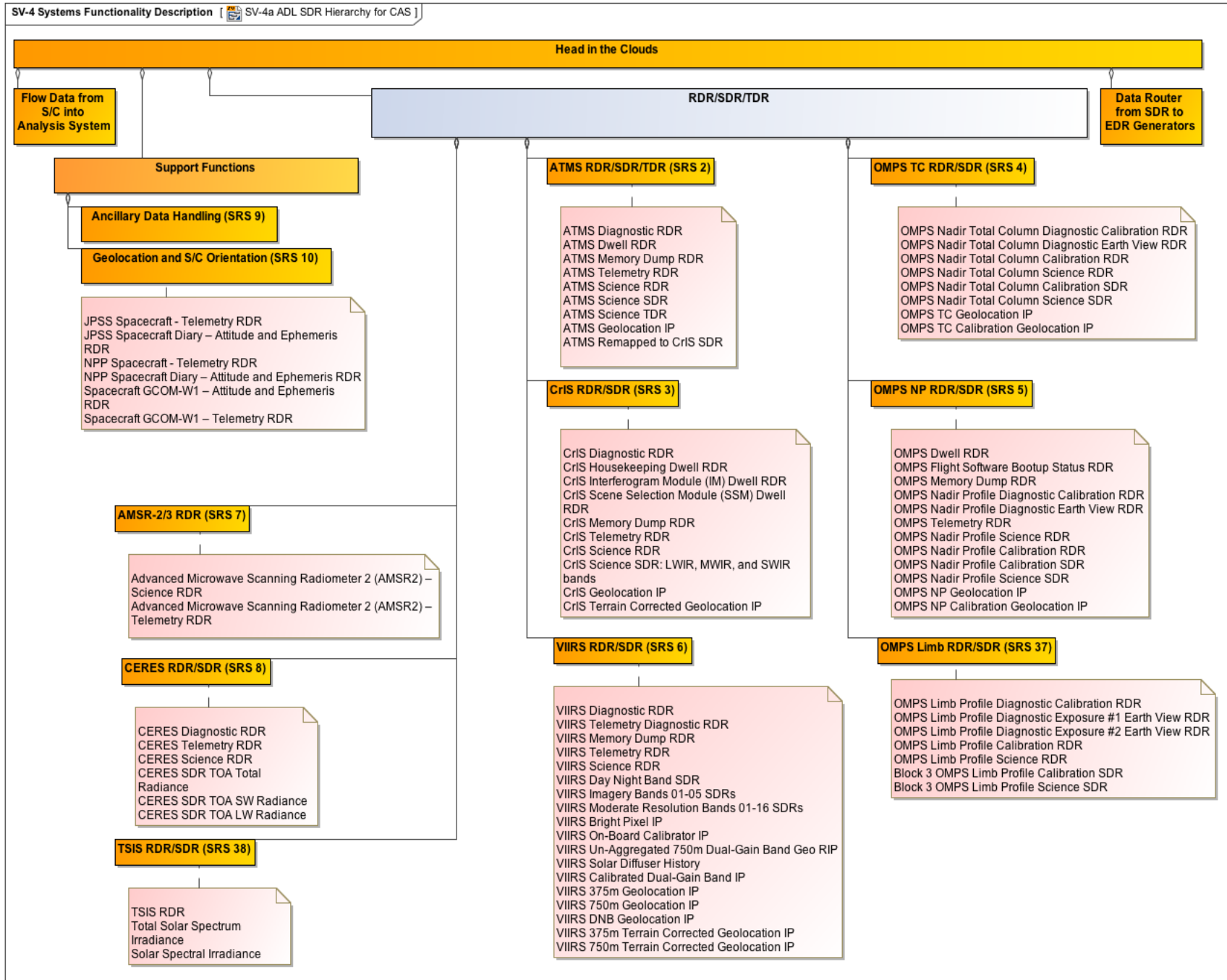


SV-4 System Functionality Description, ADL Full Hierarchy (2)

SV-4 Systems Functionality Description [SV-4a ADL Full Hierarchy for CAS p 2]

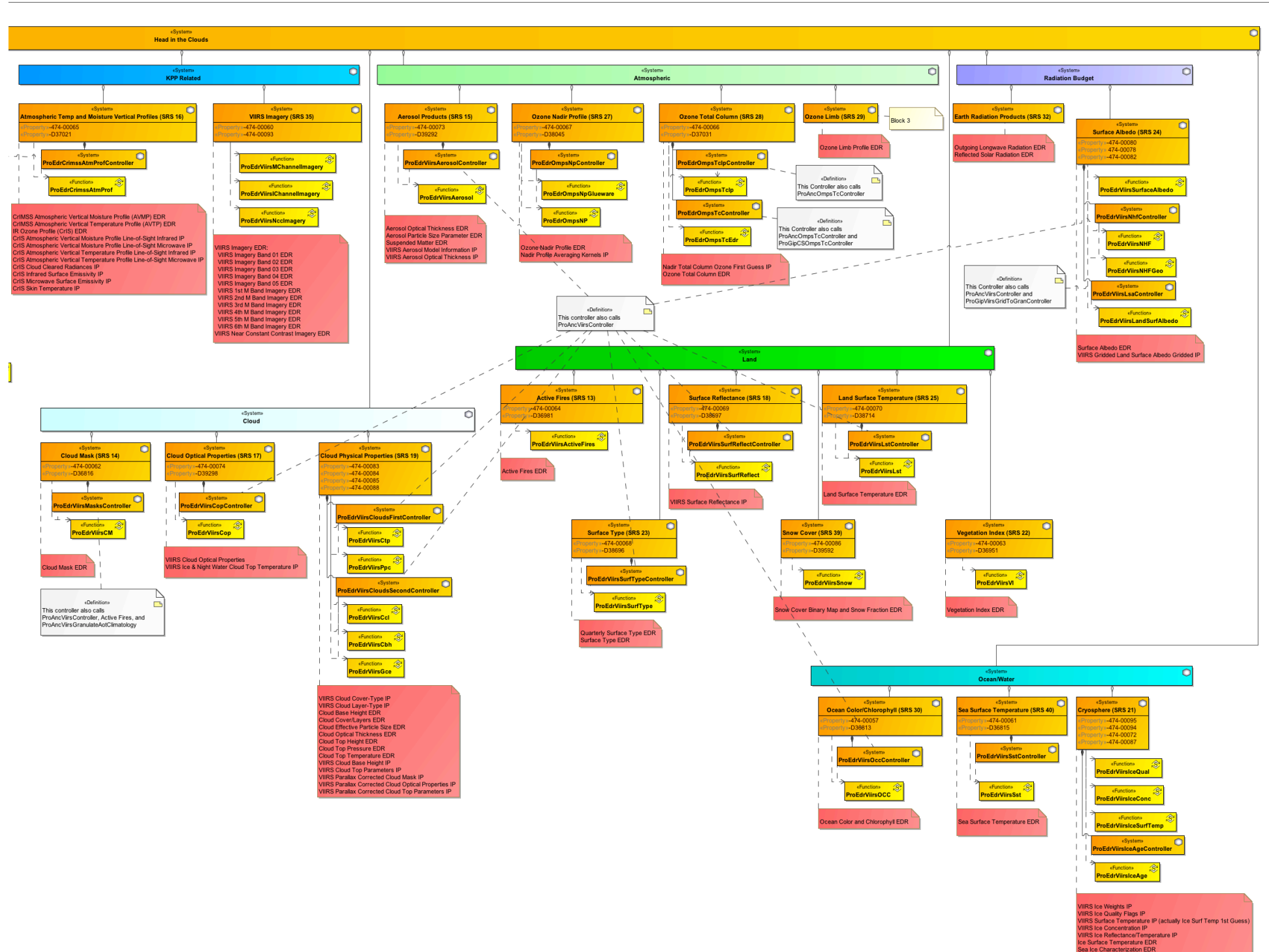


SV-4 System Functionality Description, Sensor Data Record (SDR) Hierarchy



[illegible]

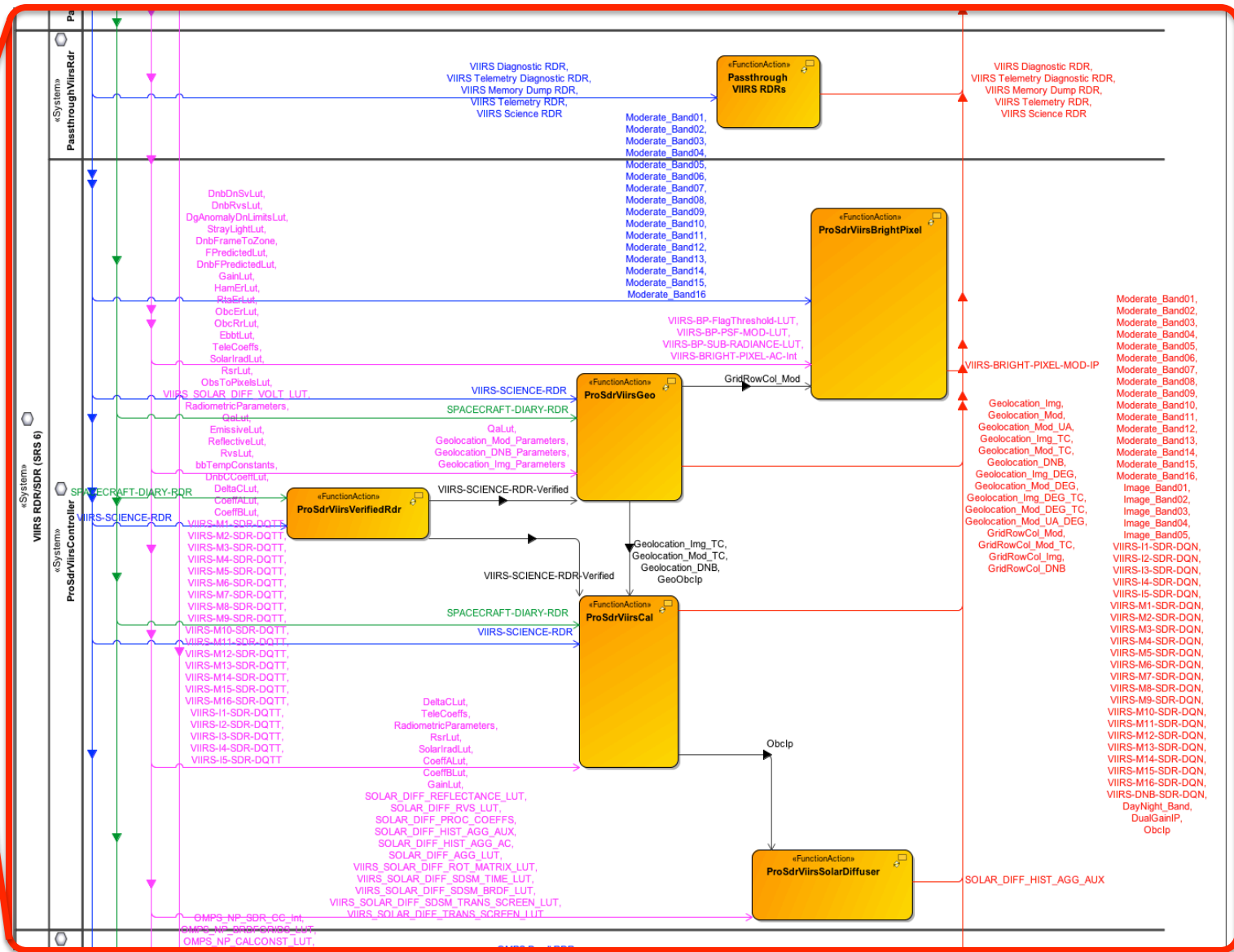
SV-4 System Functionality Description, Full Hierarchy (2- Right)



SV-4 System Functionality Flow Diagrams

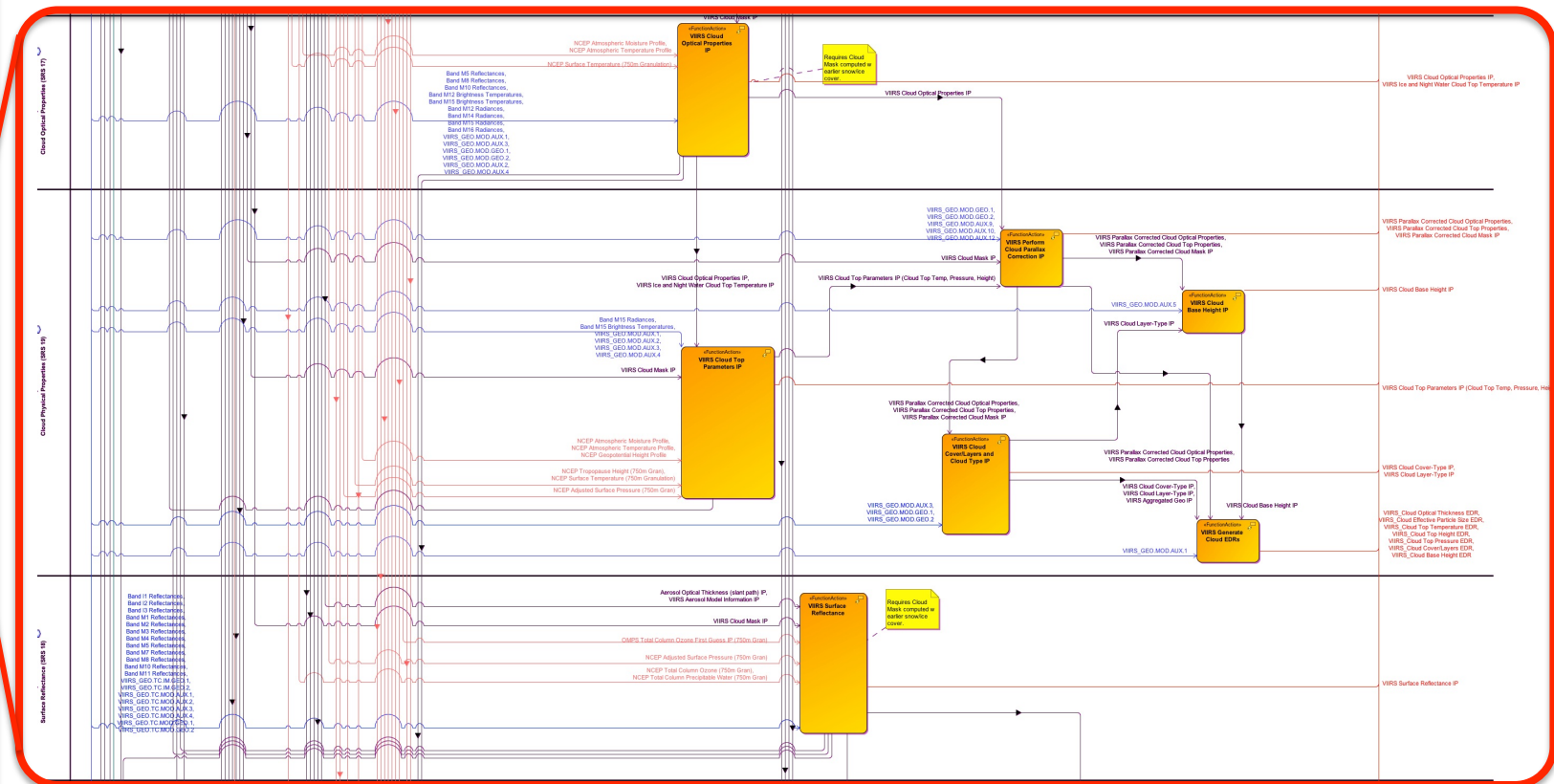
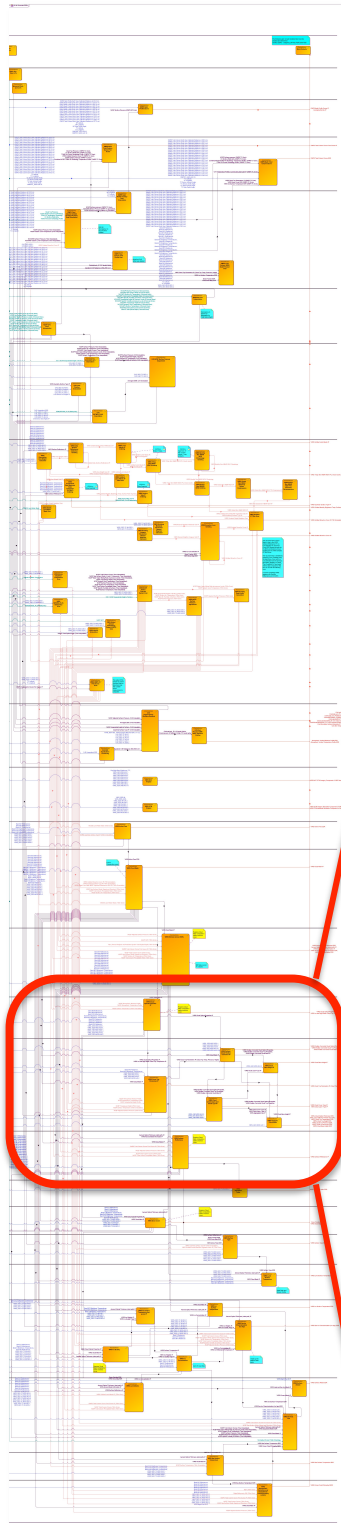
- Used to describe system and software functional process flow to assist management and end user understanding of end product production.
- Inputs, outputs, and interdependencies are shown for each software process.
- Each horizontal swim lane is a system identified by the specification in the swim lane header
 - Input data flows from the top processes to each specification's swim lane.
 - The data production process flows from FunctionAction (software object) to FunctionAction to produce each swim lane's data products
 - The deliverable products are at the far right of each swim lane.
- The SDR flow shows the analysis chain through SDRs, and the EDR flow shows the remainder of the chain through to the data products to be delivered to the Comprehensive Large Array-data Stewardship System, (CLASS).
 - Analysis of the interdependencies among the systems, software, and functional flows help to identify downstream impacts when considering the scope of proposed changes or product degradation.

VIIRS Processing



SV-4 Function Flow Diagram for Environmental Data Record (EDR) Algorithm Processing

Cloud Optical Properties portion of the diagram



SV-6 Systems Resource Flow Matrix

- Provides a tabular representation of the cross-swim lane resource traffic.
- Tracks resource flows from one swim lane's FunctionAction to a FunctionAction in a different swim lane.
 - The flowing resources are identified
 - The resource producing and consuming swim lanes are identified as well as the producing and consuming FunctionActions.
- The SV-6 provides a human-readable format of the input and output dependencies for each algorithm module.

SV-6 For VIIRS SDR (SRS 6)

#	Interaction ID	Resource Interaction Item	▲ Sending Performer	Receiving Performer	Producing Function	Consuming Function
1	RI754	① IE295 VIIRS_Fire_Mask_IP ① IE296 VIIRS_AF_EDR ① IE297 VIIRS_AF_DQN	☒ Active Fires (SRS 13)	☒ Data Router from SDR to EDR Generators	☑ ProEdrViirsActiveFires	☑ Store Products
2	RI753	① IE294 VIIRS_AF_DQTT ① IE293 ActiveFires_Thresholds	☒ Ancillary Data Handling (SRS 9)	☒ Active Fires (SRS 13)	☑ Auxiliary Data – Spacecraft Data	☑ ProEdrViirsActiveFires
3	RI622	① IE383 VIIRS_GTM_EDR_DQTT_1 ① IE384 VIIRS_GTM_EDR_DQTT_2 ① IE385 VIIRS_GTM_EDR_DQTT_3 ① IE386 VIIRS_GTM_EDR_DQTT_4 ① IE387 VIIRS_GTM_EDR_DQTT_5	☒ Ancillary Data Handling (SRS 9)	☒ VIIRS Imagery (SRS 35)	☑ Auxiliary Data – Spacecraft Data	☑ ProEdrViirsImagery
4	RI628	① IE463 Lunar_Phase	☒ Ancillary Data Handling (SRS 9)	☒ VIIRS Imagery (SRS 35)	☑ Dynamic Ancillary Data	☑ ProEdrViirsNcdImagery
5	RI627	① IE462 NCC_Thresholds ① IE464 NCC_GVVSSE_LUT ① IE465 NCC_GVVSLE_LUT ① IE466 NCC_Solar_BRDF_LUT ① IE467 NCC_Lunar_BRDF_LUT ① IE468 VIIRS_NCC_EDR_DQTT	☒ Ancillary Data Handling (SRS 9)	☒ VIIRS Imagery (SRS 35)	☑ Auxiliary Data – Spacecraft Data	☑ ProEdrViirsNcdImagery
6	RI572	① IE700 DeltaCLut ① IE688 TeleCoeffs ① IE693 RadiometricParameters ① IE690 RsrLut ① IE689 SolarIradLut ① IE701 CoeffALut ① IE702 CoeffBLut ① IE682 GainLut ① IE757 SOLAR_DIFF_REFLECTANCE_LUT ① IE758 SOLAR_DIFF_RVS_LUT	☒ Ancillary Data Handling (SRS 9)	☒ VIIRS RDR/SDR (SRS 6)	☑ Auxiliary Data – Spacecraft Data	☑ ProSdrViirsSolarDiffuser

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