Critical Design Review

27 May 2015

NCEI Boulder, CO

Note: *On 22 April 2015 references to NGDC were formally transitioned to the National Centers for Environmental Information (NCEI).*

Satellite Product Analysis & Distribution Enterprise System (SPADES)

NOAA Space Weather

Dial In: 866-769-5434 // 6139663#

Weblink: https://global.gotomeeting.com/join/837836333

SPADES CDR 27-May-15

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Leader: 76133549

SPADES CDR
Outline

Time	Slides	Topic	Presenter
13:00 – 13:10	**03 – 09**	**Introduction**	**W. Denig**
13:10 – 13:20	11 – 13	Objectives / Success Criteria	W. Denig
13:20 – 13:45	15 – 28	PDR Outbrief Feedback	W. Denig
13:45 – 14:00	30 – 33	SPADES Architecture	W. Rowland
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14:15 – 14:15	47 – 83	L2+ Algorithms (*not briefed*)	W. Denig
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15:00 – 15:30	104	Wrap-up & Internal Discussions	Review Team

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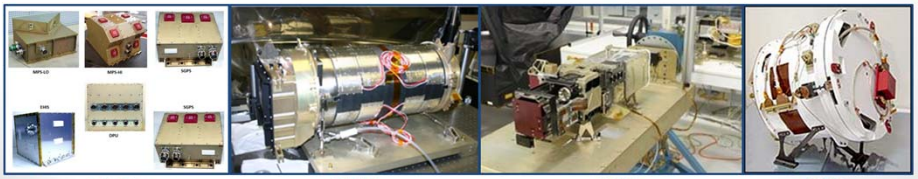
Introduction

What is GOES-R?

The GOES-R series of space/solar sensors provide incremental improvements to current NOAA GEO space weather monitoring. The first launch date of the GOES-R series is 15 March 2016.

SENSOR	IMPROVEMENT	APPLICATION
Space Environmental In-Situ Suite (SEISS)	Improved energy range / contamination rejection	Spacecraft charge models for electrostatic discharge
Solar Ultra-Violet Imager (SUVI)	Multi-wavelength solar imagery	Surface features and thermal height profiles
EUV and X-ray Irradiance Sensors (EXIS)	Improved accuracy and precision	Solar backgrounds/events impacting climate models
Magnetometer (MAG)	Gradiometer rejection of satellite generated fields	Geomagnetic field data with improved fidelity



SEISS SUVI EXIS MAG

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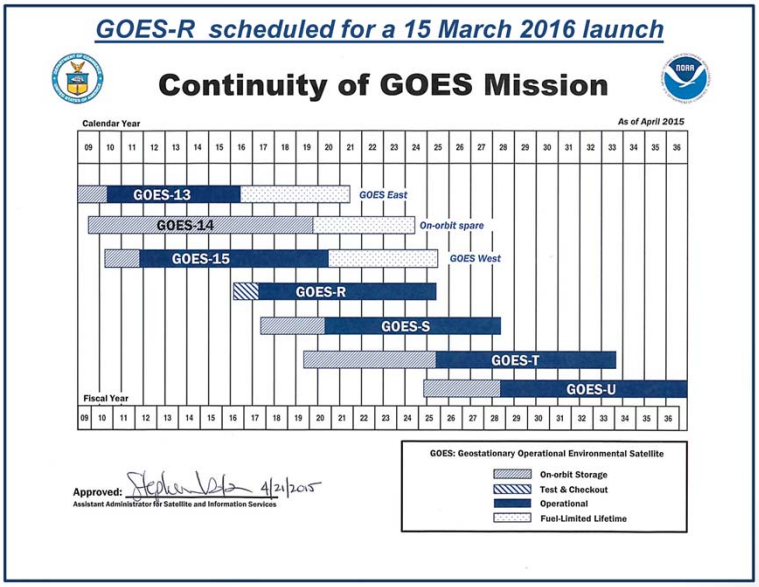
Introduction

GOES Flyout Chart



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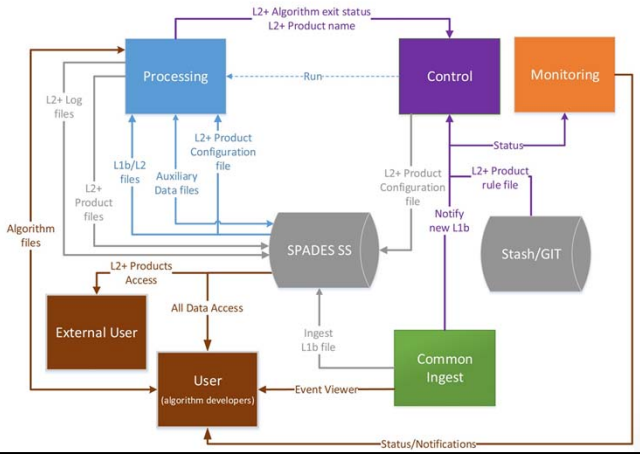
Introduction
What is SPADES?

SPADES is an internal developmental program within NCEI wherein NCEI will design, build and operate a demonstration system to 1) **acquire** GOES-R Level 1b (L1b) space weather products in real time, 2) **produce** the Level 2+ (L2+) space weather products and 3) **disseminate** these products to the NWS Space Weather Prediction Center (SWPC) and others.

SPADES High Level Flow



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Introduction

SPADES – What It Is Not

SPADES is *not "plug and play"*

- L2+ Science algorithms were developed from 2008 to 2014.
  - ✓ Early Algorithm Theoretical Basis Documents (ATBDs) were developed before the contents and formats of the L1b products were known.
  - ✓ ATBDs will need to be revised and/or updated to be consistent with currently known limitations in the L1b products.
- Research-grade software codes were written to validate the ATBDs under the assumption that Harris would implement the ATBDs within the GOES-R Ground System (GS).
  - ✓ Re-work is required to accommodate the L1b product I/O formats in the software codes and to account for the L1b product contents.
  - ✓ Final algorithms should still be considered "research-grade"; Research-to-Operations (R2O) transition will follow the SPADES development.
- Algorithm installation schedule is divided into 3 phases:
  - ✓ Phase 1: 4/16/15 – 8/31/15 – Pre-launch
  - ✓ Phase 2: 9/1/15 – 3/31/16 – Launch Window
  - ✓ Phase 3: 4/1/16 – 8/31/16 – Post-launch

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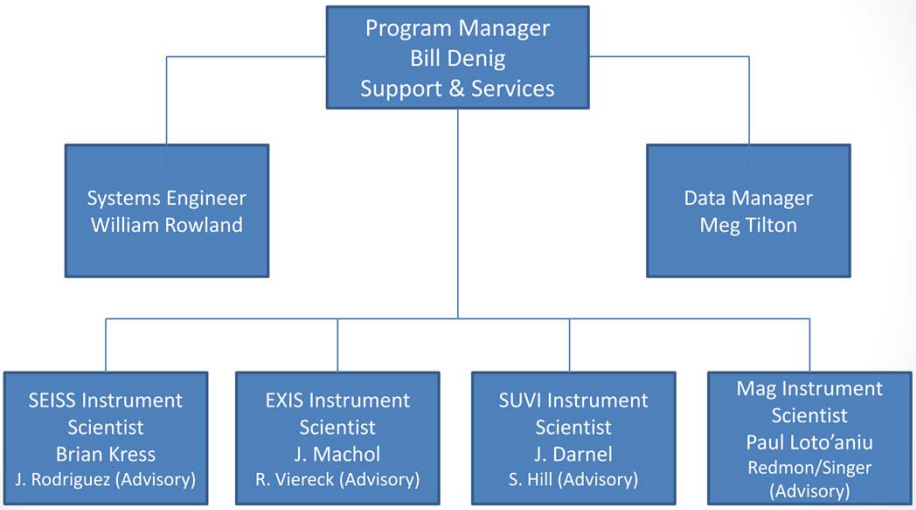
Introduction

Boulder GOES-R SWx Team



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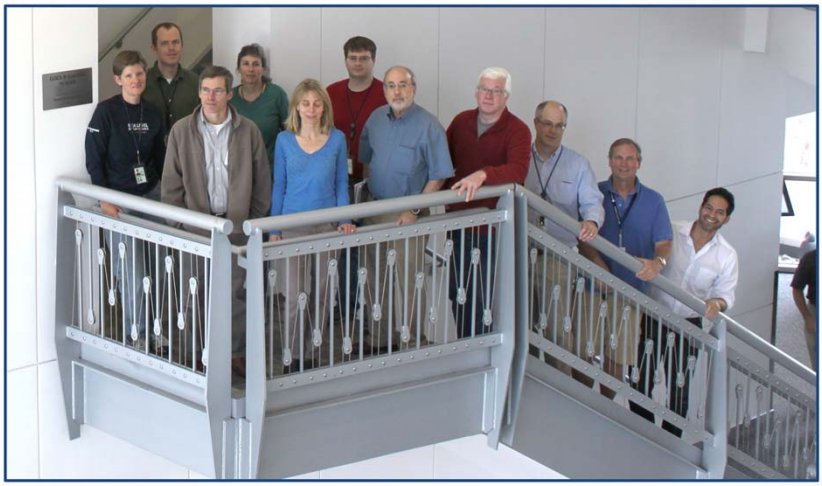
Introduction

Boulder GOES-R SWx Team



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Introduction

GOES-R New Hires

These announcements are for increased GOES-R support

National Oceanic and Atmospheric Administration | National Centers for Environmental Information

CIRES/NCEI Research Associate Solar Physicist

The Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado at Boulder has an immediate opening for a Research Associate supporting NOAA's National Centers for Environmental Information (NCEI). NCEI is a new organization within NOAA formed through the consolidation of the National Geophysical Data Center, the National Oceanographic Data Center and the National Climatic Data Center. Within NCEI the Space Weather Team is responsible for supporting NOAA's space weather mission and for ensuring the operational and scientific utility of NOAA's space environmental data. The Geostationary Operational Environmental Satellite series R (GOES-R) is NOAA's next generation of spacecraft which will include a complement of space-weather sensors to monitor the local space environment and the sun. The first GOES-R satellite is slated for a March 2016 launch. The GOES-R Solar UltraViolet Imager (SUVI) will image the sun to identify and classify features in support of operational space weather.

The Solar Physicist is NCEI's senior scientific authority responsible for scientific data stewardship of solar environmental datasets and derived products from GOES and from other related sources. The Solar Physicist is a key member of the NCEI Space Weather Team. The immediate focus for the Solar Data Manager is preparing for the GOES-R launch and the post-launch testing of the SUVI. Applicants for this position must possess excellent scientific skills and a demonstrated capacity for team leadership. Applicants should also possess strong attention to detail, excellent communication skills and the ability to translate scientific requirements and findings into traceable/actionable tasks. The Solar Physicist position is located within the Solar Geophysics Branch of the NCEI Center for Coasts, Oceans, and Geophysics at the David Skaggs Research Center, Broadway, Boulder, CO.

Responsibilities:

- Serve as SGB's senior scientific interface to the GOES-R Program Office for SUVI.
- Oversee the technical efforts of the SUVI Instrument Scientist in preparing for the launch and post-launch testing of GOES-R.
- Contribute to the overall success of the GOES-R space weather mission as a member of the NCEI Space Weather Team.
- Steward NOAA solar imagery datasets and related products derived from the SUVI sensor and from the predecessor Solar X-ray Imager (SXI) on GOES 12-15.
- Identify research opportunities to leverage and encourage the use of SUVI data.
- Conduct research with the solar imager data.
- Present results in peer-reviewed publications and at scientific meetings.
- Present oral and written status reports to NCEI management and staff as needed.
- Other duties from time to time as needed.

Requirements & Desired Skills

- PhD in physics or similar scientific discipline, or equivalent demonstrable experience.
- Proven experience in managing solar imagery or other large datasets for the operational and research communities.
- Experience with higher-level computer languages, such as Python, for environmental data processing.
- Ability to work well individually and as a part of a larger team.
- Excellent oral and written communication skills.
- Familiarity with the NOAA space weather satellite programs.
- U. S. citizenship or permanent resident status.

POSITION BENEFITS

For further information, please contact Dr. William Denig (William.Denig@noaa.gov).

This position will be filled as a Research Associate at the University of Colorado at Boulder and will be eligible for employee benefits, including 22 days of vacation (for a 100% position) per year.

To Apply

You must use www.jobsatcu.com to formally apply for this position. Search for this position using job posting ID xxxxx

Be prepared to upload a cover letter, your current resume/cv, proof of your degree (upload under Doc 1, this can be a scan of your diploma or scan of transcripts confirming your degree) and all contact information for 3 references familiar with the applicant's professional qualifications for the position.

The University of Colorado is an Equal Opportunity Employer committed to building a diverse workforce. We encourage applications from women, racial and ethnic minorities, individuals with disabilities and veterans. Alternative formats of this ad can be provided upon request for individuals with disabilities by contacting the ADA Coordinator at (303) 492-1334. The University of Colorado at Boulder conducts background checks for all final applicants being considered for employment.

NCEI-X

05/2016

National Oceanic and Atmospheric Administration | National Centers for Environmental Information

CIRES/NCEI Research Associate Space Particles Post-Doctoral Scholar

The Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado at Boulder has an immediate opening for a 1-year Research Associate (Post-Doc) supporting NOAA's National Centers for Environmental Information (NCEI). NCEI is a new organization within NOAA formed through the consolidation of the National Geophysical Data Center, the National Oceanographic Data Center and the National Climatic Data Center. Within NCEI the Space Weather Team is responsible for supporting NOAA's space weather mission and for ensuring the operational and scientific utility of NOAA's space environmental data. The Geostationary Operational Environmental Satellite series R (GOES-R) is NOAA's next generation of spacecraft which will include a complement of space-weather sensors to monitor the local space environment and the sun. The first GOES-R satellite is slated for a March 2016 launch. The GOES-R Space Environment In-situ Sensor Suite (SEISS) will measure the local energetic charged particle environment across a broad energy range and at multiple pitch angles.

The role of the Space Particles Post-Doc is to support the calibration and validation of the GOES-R SEISS. Specific tasks include investigating techniques for inverting differential flux spectra from broad energy channel measurements and for removing cross-species contamination, and documenting these corrections within an Algorithm Theoretical Basis Document (ATBD). The Space Particles Post-Doc will work as a member of the Space Weather Team to implement the correction within a real-time ground processing system. Applicants for this position should possess excellent scientific skills and a capacity for working within a team environment. Applicants should also possess strong attention to detail, good communication skills, and the ability to complete assigned tasks on time. The Space Particles Post-Doc position is located within the Solar Geophysics Branch of the NCEI Center for Coasts, Oceans, and Geophysics at the David Skaggs Research Center, Broadway, Boulder, CO.

Duties Include:

- Investigating algorithm methodologies to improve the quality of SEISS data.
- Selecting a methodology which best improves the SEISS data quality within the constraints of a real-time processing system.
- Preparing an ATBD to document and describe the selected approach.
- Implementing the methodology within a real-time ground processing system.
- Conducting related research leading to peer-reviewed publications.
- Other duties from time to time as needed.

Requirements & Desired Skills

- Ph.D. in physics or similar scientific discipline, or equivalent demonstrable experience.
- Excellent technical skills and experience handling space particle datasets.
- Strong background in the use of higher-level computer languages, such as Python.
- Ability to work cooperatively within a teaming environment.
- Good oral and written communication skills.
- U. S. citizenship or permanent resident status.

For further information, please contact Dr. William Denig (William.Denig@noaa.gov)
The position will be filled as a 1-year Research Associate (Post-Doc) at the University of Colorado at Boulder and will be eligible for employee benefits, including 22 days of vacation (for a 100% position) per year.

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NCEI-X

Not yet posted

SPADES CDR
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Objectives / Success Criteria

GOES-R CDR

CDR OBJECTIVES

- Present the final SPADES architecture and implementation plan.
- Review Hardware (H/W) and Software (S/W) status.
- Identify risks associated with the demonstration system.
- Conduct an independent assessment of the overall program.
- Allow NWS stakeholders to plan for the eventual R2O transition.
- ***Ensure that all team members have a shared level of expectation for the overall development and their responsibilities in the development.***

SUCCESS CRITERIA

- Independent review team assesses the program as executable.
- Team members understand their specific roles and responsibilities.
- NWS representatives are familiar with the SPADES development.

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Objectives / Success Criteria

CDR Score Card

Criteria	Yes	No[1]
SPADES L1 and L2 requirements exist and are available		
SPADES design is mature enough for algorithm installation		
Program is executable with no “show-stoppers”		
Developmental team is in place to proceed		
Risks have been identified and are being managed		
Schedule is reasonable to support the GOES-R program		

[1]Requests For Action (RFAs) should be assigned to criteria where follow-up action is required.

Reviewers: Brent Gordon (SWPC – user)
Dan Linsey (STAR – GOESRRR lead)
Ken Tanaka (NCEI – agile Scrum Master)

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Objectives / Success Criteria

Request for Action (RFA) Form

Request for Action Form – SPADES CDR

Title			Date
Subject			
Requested By	Organization	Email	Item No (leave blank)
Reference ☐ Presentation ☐ Data Package ☐ Other _____		Reference Section(s)	Reference Page(s)

Statement of Concern/Reason For Requesting Action

Description of Action Requested

Specific Action to Facilitate Closure:

Please Do Not Write Below This Line.

Disposition: ☐ **Action Item** ☐ **Advisory Item** ☐ **Directive** ☐ **Withdrawn Item**			Due Date:
Leader:	Org:	Contact (for External Assignee)	
Notes:			
Priority: ☐ **High** ☐ **Medium** ☐ **Low**	☐ **Affects Cost/Schedule**	☐ **Prior Phase Error**	☐ **Requires Design Mod.**
Verifier:		Reviewer (Optional):	
Defer To:		Deferred Event Code:	

For GOES-R Program Purposes Only –For GOES-R Program Purposes Only –

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 1. The PDR presentation stated that the Agile team will operate the production system.

1.1 Recommend that next review makes it clear that SPADES will be operated by NGDC Information Services Division and coordinate this w/ ISD Chief (Prendergast)

Response: *The infrastructure for SPADES will be maintained as a part of the overall NCEI-CO IT infrastructure. The Agile team has leveraged Common Ingest (CI) to include the receipt of GOES-R products via the Product Distribution and Access (PDA) system. Similarly, the Agile team will be responsible for the receipt of data via GOES-R ReBroadcast (GRB) and CI. The Agile team will also develop the Control Segment (CS) and Monitor Segment (MS) in FY16 (complete by end of 2QFY16). The remaining parts of SPADES will be the responsibility of the Space Weather Team (SWT).*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 2. Concern about the transition of research SPADES system (NESDIS) to operational IDP system (NWS).

2.1 Request a clear plan that outlines inter-dependencies and responsibilities of both sides.

Response: *The PDR and CDR provide forums for the NWS to remain engaged in the SPADES development. To date, discussions regarding the R2O for SPADES remain ad hoc. Initial funding for the transition effort will start in FY16 pending the outcome of the Ground Readiness Project (GRP) Program Change Summary (PCS). A SPADES Transition Plan will be developed in FY16.*

2.2 Request clarification between NESDIS plans to hand the code over to weather service as is, and NWS plans to integrate code into IDP.

Response: *The PCS includes 0.5 FTE (NCEI) in FY16 and FY17 (total of 1 FTE) for transition support.*

***** Continued on Next Slide *****

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 2 (Continued). Concern about the transition of research SPADES system (NESDIS) to operational IDP system (NWS).

2.3 Request examining differences in notification requirements between NWS and NESDIS. Ensure NWS operational requirements are compatible with notification priorities for the monitoring segment?

Response: The SPADES demonstration system includes a Monitoring Segment that is capable of detecting issues, notifying relevant parties and creating logs that can be used in troubleshooting or retrospective analyses of the events. The operational SPADES may have additional monitoring requirements that go beyond that of the demo system.

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 3. SWPC is currently using the XML format for time series data ingest into AWIPS.

3.1. Recommend the SPADES project investigate producing output in the XML format for this data type to minimize additional effort for transition to operations.

Response: *At the 17 Jul 2014 SPADES planning meeting at NWS Headquarters it was decided that the L2+ products, with the exception of some SUVI products, will be provided in NetCDF4 format. Most SUVI products will be provided in FITS format. This is the established baseline for the SPADES L2+ products. Details are provided in the algorithm section of this CDR package.*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 4. The plan to switch between PDA and GRB raises concerns about how seamless the transition will be as this is switched back and forth for separate satellites or for the same satellite. We are concerned that simultaneous access to PDA and GRB will increase the storage needs on SPADES.

4.1. Recommend SPADES team investigate this further and demonstrate exactly how switching will be accomplished and what possible impacts to processing and storage are present.

Response: *Interfacing to PDA and GRB will be on a per satellite basis. The SPADES plan is to store at least 72 hours (3 days) worth of L1b data from the GOES-R series spacecraft at ~45 GB per satellite per day from either PDA or GRB. Storage requirements for the GOES-R L2+ products are comparable. The SPADES baseline storage allocation is 10 TB which is adequate. As we evolve the system we can provide better estimates which the NWS can use to properly size the operational SPADES.*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 5. Uncertainty over the interface between the Control Segment and Processing Segment. How will the communication between those occur and who has responsibility for QA, retry, missing data, etc.

5.1. Recommend the software in the Processing Segment be developed independently, a common interface will need to be developed to allow "plugging in" updates. The logic for data requirements and dependencies for the Processing Segment seems to be offloaded to the Control Segment and ways to modularize or externalize that will need to be considered.

Response: *Algorithms can be executed via a command-line run to facilitate developer testing and simplify the Control Segment logic.*

5.2. Recommend prototyping the above to demonstrate a robust interface and to demonstrate adequate communication between the segments.

Response: *The SWT is currently developing to a command-line execution approach to facilitate algorithm installation and test.*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 6. Concerns about the robustness of the Processing Segment modules in the face of missing/bad data or unavailability of (external) non GOES data.

6.1. Recommend defining the expectations for the science code and conducting thorough testing in "worst-case" situations.

Response: *The only L2+ algorithm that has a dependency on real-time ancillary (non GOES-R) data is MAG.10 (Magnetopause Crossing).*

6.2. Are there dependencies on non GOES-R ingest data that could impact processing segment efficiency?

Response: *The MAG.10 algorithm was retrofitted using GOES-NOP data via the Satellite Product and Services Review Board (SPSRB). The Magnetopause Crossing algorithm has been running in beta mode for over a year without impact to the NCEI IT infrastructure.*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 7 Concern over aggregation of incoming data files and generated products into daily files. Are raw incoming files removed once daily file produced?

7.1. Request clarification.

Response: *The aggregation of incoming files is specified later in this CDR package. Raw input files are aged off no sooner than 72 hours. The L2+ Products are described in section 6 (not briefed).*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 8. Concern that ERDDAP is a "weak link" in processing.

8.1. Longevity and support of ERDDAP software given the small development and user community.

Response: *Post PDR we determined that ERRDAP is not an effective choice for the SPADES front end. The SWT will code directly to the incoming NetCDF4 files.*

8.2. Will ERDDAP be able to handle the quantity and total size of files for the life of the project.

Response: *No longer applicable.*

8.3. Will ERDDAP be able to provide notification of file's arrival and incorporation into aggregation (indexing).

Response: *No longer applicable.*

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PDR Outbrief Feedback

Review Committee Response – Concerns

Concern 9. A prioritized list for algorithm development should be created. This list should also scope the effort required for each product. In combination, work should be executed in such a way that guarantees the highest priority items are completed/completed first.

9.1. Include a prioritization of product development work in the overall plan.

Response: *Recall that the effort here is to implement the existing L2+ algorithms which, in turn, are specified in the Algorithm Theoretical Basis Documents (ATBDs). Updates to the basic algorithm methodologies are by exception. The SWT Instrument Scientists have worked with the Responsible Scientists within SWPC to develop the algorithm implementation schedule. The overall plan has been reviewed and approved by SWPC management.*

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PDR Outbrief Feedback

Review Committee Response – Risks

Risk 1. Delays in establishing communication with PDA may impact the development schedule.

Response: *The SPADES interface to PDA has been developed and tested.*

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PDR Outbrief Feedback

Review Committee Response – Risks

Risk 2. Uncertainty around the mechanism by which files will be transferred to NGDC.

Response: *A provider push mechanism has been developed and tested for the PDA interface. Similarly for GRB, a provider push mechanism is the baseline.*

Note: While we have successfully performed interface testing with the PDA developers, NESDIS/OSPO will control all PDA interfaces once the PDA system is delivered. We are working to obtain confirmation from OSPO that a Push mechanism is approved for the NCEI/PDA interface when PDA goes operational.

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PDR Outbrief Feedback

Review Committee Response – Risks

Risk 3. Validation criteria not sufficient for various incoming data files. Are there any checks on the quality of the incoming L1B data?

Response: *The GOES-R Program is responsible for L1b processing and the quality of the L1b products. Quality flags are included for the science data contained in the L1b files. Our initial reliance on these quality flags will be conservative but will evolve over time as we gain experience. We also note that the SPADES demonstration system currently validates the checksums of incoming data to ensure that none of the data provided by GOES-R are corrupted in transfer.*

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PDR Outbrief Feedback

Review Committee Response – Risks

Risk 4. Some product developments are at risk (e.g. SUVI.19 Thematic Maps). Need a mitigation strategy to ensure alternative development paths for other dependent products (e.g. SUVI.14 Flare Location's dependence on SUVI.19).

Response: *The GOES-R program office has approved and funded a solar physicist position to support the SUVI program. We are currently in the hiring approval process within NCEI for a CIRES associate to work with the SUVI Instrument Scientist and mitigate risks to the SPADES program.*

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SPADES Architecture

L1 Key Requirements[1]

Number	Requirement
L1-SPADES-100	SPADES shall be developed as a real-time demonstration system for GOES-R L2+ product generation and dissemination.
L1-SPADES-110	SPADES shall have a design mission lifetime of 20 years.
L1-SPADES-120	SPADES shall have a System Availability of greater than or equal to 98% over any 30-day period for the mission lifetime.
L1-SPADES-130	SPADES hardware and system software elements (operating system and software languages) shall be Commercial Off-The-Shelf (COTS).
L1-SPADES-140	SPADES shall be built in a modular fashion consisting of the following functional segments; Ingest Segment, Storage Segment, Processing Segment, Control Segment and Visualization Segment.

[1]SPADES Level 1 (L1) requirements are traceable to the SPADES Program Plan.

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SPADES Architecture
Changes Since PDR

- **ERRDAP is no longer part of SPADES**
  - NetCDF4 L1b files not compliant with ERRDAP
  - Developers will use NetCDF files directly
- **SPADES interface via PDA is complete and tested**
  - Leveraged NCEI Common Ingest
  - Based on a PDA product push to SPADES
- **Hardware purchases underway – Dell servers and storage**
  - Disk storage allocation complete
  - Ongoing installations using development environment
- **Increased overall FTE/SWT support – *Thanks Steve & Ed!***
  - Multi-year solar physicist position
  - Space particle post-doc
  - Raised agile s/w support from 0.8 to 1.8 FTE

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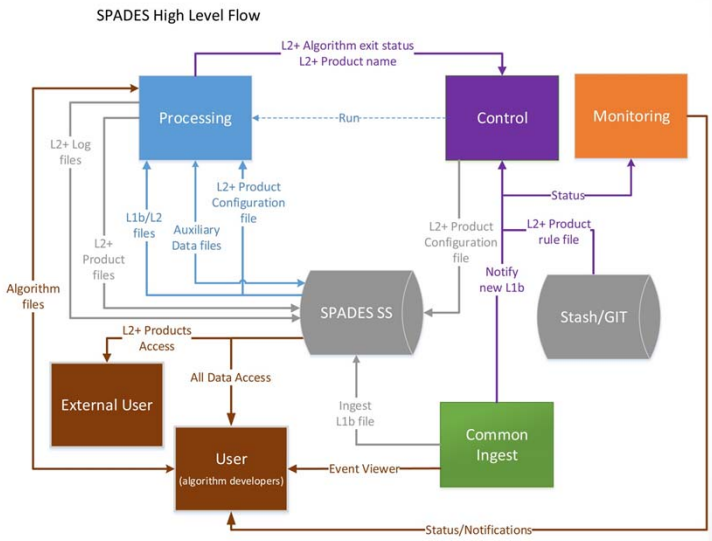
SPADES Architecture
Functional Schematic



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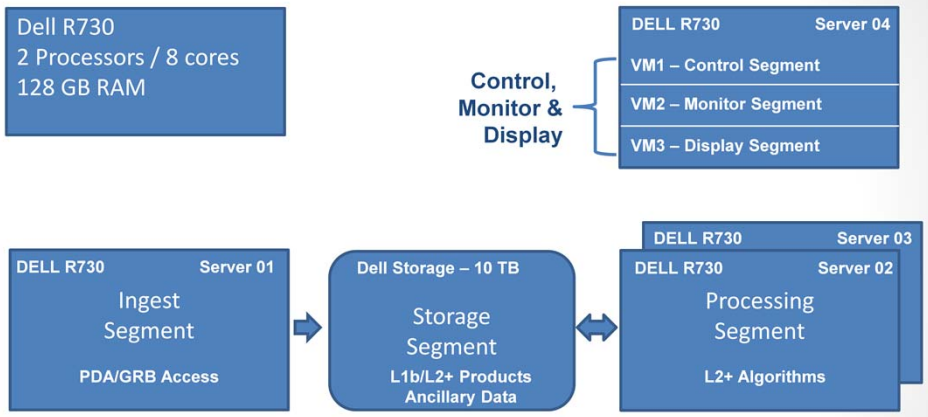
SPADES Architect

H/W & S/W Components



Hardware Specifications

Servers:
Dell PowerEdge R730 (4 servers)
Dual Intel Xenon E5 200 (8 cores)
128 GB RAM

Operating System:
RedHat Enterprise Linux with Python SciPy, C/C++, Fortran

Disk Storage:
Dell Storage Systems
Nexenta Controller
10 TB

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SPADES CDR
Outline

Time	Slides	Topic	Presenter
13:00 – 13:10	03 – 09	Introduction	W. Denig
13:10 – 13:20	11 – 13	Objectives / Success Criteria	W. Denig
13:20 – 13:45	15 – 28	PDR Outbrief Feedback	W. Denig
13:45 – 14:00	30 – 33	SPADES Architecture	W. Rowland
14:00 – 14:15	**35 – 45**	**Installation Schedule**	**W. Denig**
14:15 – 14:15	47 – 83	L2+ Algorithms (*not briefed*)	W. Denig
14:15 – 14:30	85 – 94	Interfaces	W. Rowland
14:30 – 14:45	96 – 97	Schedule/Manpower	W. Denig
14:45 – 15:00	99 – 102	Program Risks	W. Rowland
15:00 – 15:30	104	Wrap-up & Internal Discussions	Review Team

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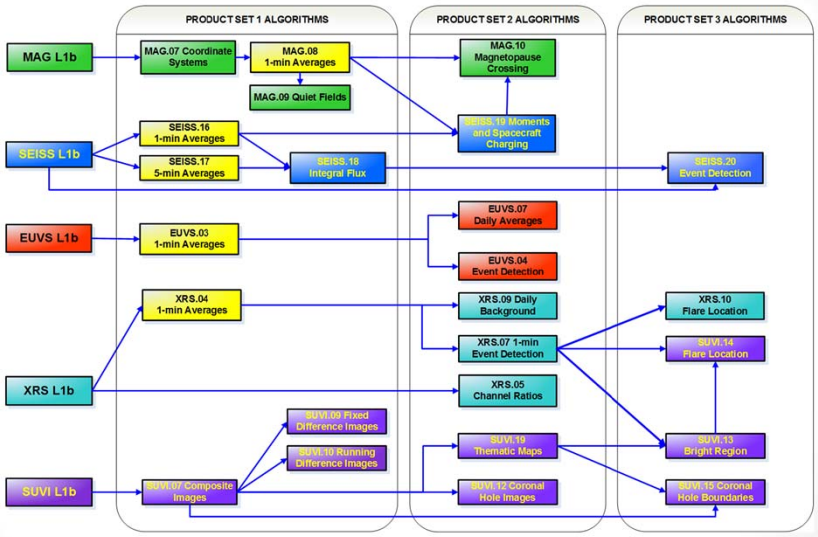
Installation Schedule

Historical Developmental Chart



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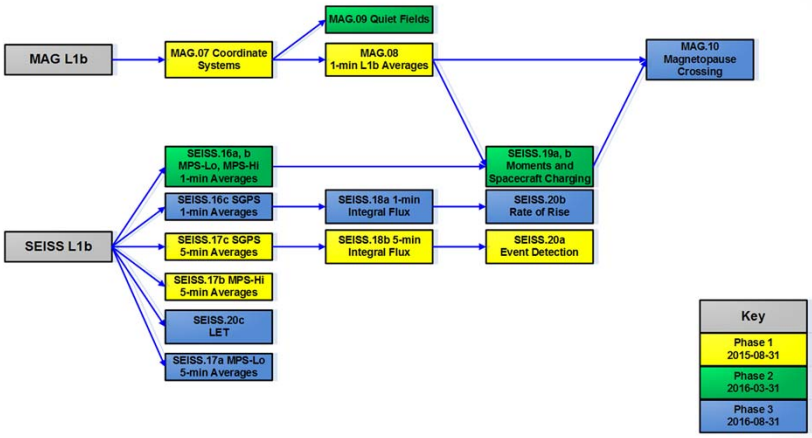
Installation Schedule

Precedence/Installation Chart (1 of 2)



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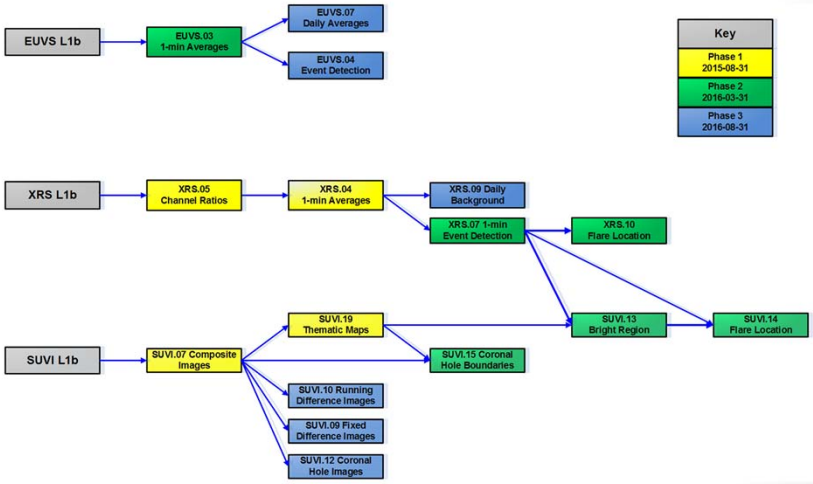
Installation Schedule

Precedence/Installation Chart (2 of 2)



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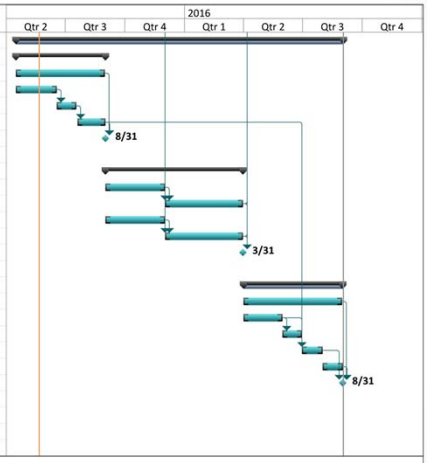
Installation Schedule

SEISS L2+ Products

L2+ Product	Data Short Name	Install	Product Description
SEISS.17b (MPSH)	mpsh-l2-avg5m	1	5-min Averages – SEISS MPSH (from L1b)
SEISS.17c (SGPS)	sgps-l2-avg5m	1	5-min Averages – SEISS SGPS (from L1b)
SEISS.18b	sgps-l2-int5m	1	5-min Integral Flux (from SGPS SEISS.17c)
SEISS.20a (Event)	sgps-l2-evdet	1	Event Detection (from SGPS SEISS.18b)
SEISS.16a	mpsl-l2-avg1m	2	1-min Averages – SEISS MPSL (from L1b)
SEISS.16b	mpsh-l2-avg1m	2	1-min Averages – SEISS MPSH (from L1b)
SEISS.19a	mpsl-l2-mom1m	2	Moments (from MPSL SEISS.16a)
SEISS.19b	mpgh-l2-mom1m	2	Moments (from MPSH SEISS.16b)
SEISS.16c (SGPS)	sgps-l2-avg1m	3	1-min Averages – SEISS SGPS (from L1b)
SEISS.17a (MPSL)	mpsl-l2-avg5m	3	5-min Averages – SEISS MPSL (from L1b)
SEISS.18a	sgps-l2-int1m	3	1-min Integral Flux (from SGPS SEISS.16c)
SEISS.20b (Rate)	sgps-l2-rrise	3	Rate of Rise (from SGPS SEISS.18a)
SEISS.20c (LET)	ehis-l2-ehlet	3	Linear Energy Transfer (from EHIS L1b)

Installation Schedule
SEISS

ID	Task Mode	Task Name
53		**SEISS Level 2+ Algorithms**
54		**Phase 1 Installations**
55		SEISS.17b: mpsh-l2-avg5m (JR)
56		SEISS.17c: sgps-l2-avg5m (BK)
57		SEISS.18b :sgps-l2-int5m (BK)
58		SEISS.20a: sgps-l2-evdet (BK)
59		Phase 1 Install Complete
60		
61		**Phase 2 Installations**
62		SEISS.16a: mpsl-l2-avg1m (JR)
63		SEISS.19a: mpsl-l2-mom1m (JR)
64		SEISS.16b: mpsh-l2-avg1m (BK)
65		SEISS.19b: mpsh-l2-mom1m (BK)
66		Phase 2 Install Complete
67		
68		**Phase 3 Installations**
69		SEISS.17a: mpsl-l2-avg5m (JR)
70		SEISS.16c: sgps-l2-avg1m (BK)
71		SEISS.18a: sgps-l2-int1m (BK)
72		SEISS.20b: sgps-l2-rrise (BK)
73		SEISS.20c: ehis-l2-ehlet (BK)
74		Phase 3 Install Complete
75		
76		
77		
78		



Project: L2-Install_21may15.mpp
Date: Fri 5/22/15

Task		External Milestone		Manual Summary Rollup	
Split		Inactive Task		Manual Summary	
Milestone		Inactive Milestone		Start-only	
Summary		Inactive Summary		Finish-only	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress	

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Installation Schedule

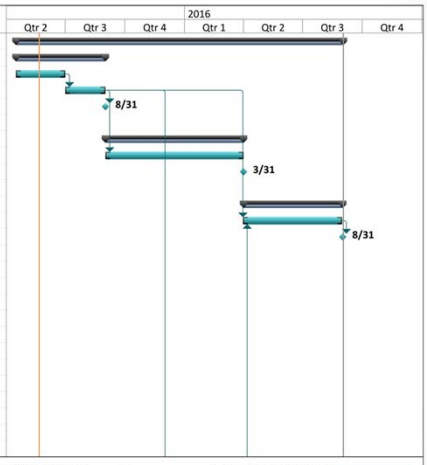
MAG L2+ Products

L2+ Product	Data Short Name	Install	Product Description
MAG.07	magn-l2-coord	1	Coordinate Systems (from L1b)
MAG.08	magn-l2-avg1m	1	1-min Averages (from MAG.07)
MAG.09	magn-l2-quiet	2	Quiet Fields (from MAG.07)
MAG.10	magn-l2-cross	3	Magnetopause Crossing (from MAG.08)

Installation Schedule

MAG

ID		Task Mode	Task Name
27			**MAG L2+ Algorithms**
28			**Phase 1 Installations**
29			MAG.07:magn-l2-coord (PL)
30			MAG.08: magn-l2-avg1m (PL)
31			Phase 1 Install Complete
32			
33			**Phase 2 Installations**
34			MAG.09: magn-l2-quiet (PL)
35			Phase 2 Install Complete
36			
37			**Phase 3 Installations**
38			MAG.10: magn-l2-cross (RR)
39			Phase 3 Install Complete
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			



Project: L2-Install_21may15.mpp
Date: Fri 5/22/15

Task		External Milestone		Manual Summary Rollup	
Split		Inactive Task		Manual Summary	
Milestone		Inactive Milestone		Start-only	
Summary		Inactive Summary		Finish-only	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress	

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Installation Schedule

SUVI L2+ Products

L2+ Product	Data Short Name	Install	Product Description
SUVI.07	suvi-l2-ciyyy[1]	1	Composite Images (from L1b)
SUVI.19	suvi-l2-thmap	1	Thematic Maps (from SUVI.07)
SUVI.13	suvi-l2-brght	2	Bright Regions (from SUVI.19 & XRS.07)
SUVI.14	suvi-l2-flloc	2	Flare Location (from SUVI.13 & XRS.07)
SUVI.15	suvi-l2-chbnd	2	Coronal Hole Bndr (SUVI.19 & SUVI.07)
SUVI.10	suvi-l2-rdyyy[1]	3	Running Diff. Images (from SUVI.07)
SUVI.12	suvi-l2-chimg	3	Coronal Hole Images (from SUVI.07)
SUVI.09	suvi-l2-fdyyy[1]	3	Fixed Diff. Images (from SUVI.07)

[1]ciyyy:

ci093	Fe093
ci131	Fe131
ci171	Fe171
ci195	Fe195
ci284	Fe284
ci303	He303

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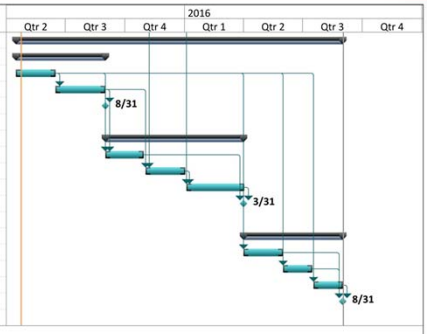
Installation Schedule

SUVI

ID		Task Mode	Task Name
79			**SUVI L2+ Algorithms**
80			**Phase 1 Installations**
81			SUVI.07: suvi-l2-ciyyy (JD)
82			SUVI.19: suvi-l2-thmap (JD)
83			Phase 1 Install Complete
84			
85			**Phase 2 Installations**
86			SUVI.15: suvi-l2-chbnd (JD)
87			SUVI.13: suvi-l2-brght (JD)
88			SUVI.14: suvi-l2-flloc (JD)
89			Phase 2 Install Complete
90			
91			**Phase 3 Installations**
92			SUVI.09: suvi-l2-fdyyy (JD)
93			SUVI.10: suvi-l2-rdyyy (JD)
94			SUVI.12: suvi-l2-chimg (JD)
95			Phase 3 Install Complete
96			



Project: L2-Install_24apr15b
Date: Fri 4/24/15

Task		External Milestone		Manual Summary Rollup	
Split		Inactive Task		Manual Summary	
Milestone		Inactive Milestone		Start-only	
Summary		Inactive Summary		Finish-only	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress	

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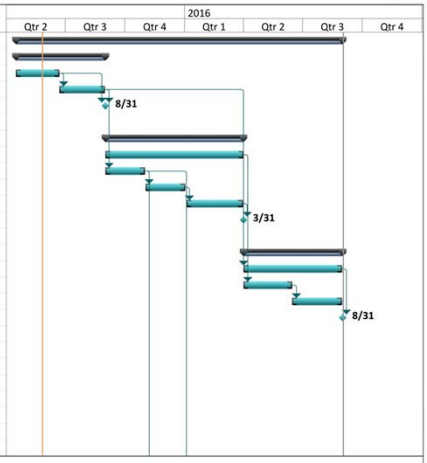
Installation Schedule

EXIS L2+ Products

L2+ Product	Data Short Name	Install	Product Description
XRS.04	xrsf-l2-avg1m	1	1-min Averages for XRS (from XRS.05)
XRS.05	xrsf-l2-ratio	1	Channel Ratio (from L1b)
EUVS.03	euvs-l2-avg1m	2	1-min Averages for EUVS (from L1b)
XRS.07a	xrsf-l2-fldet	2	1-min Event Detection (from XRS.04)
XRS.07b	xrsf-l2-flsum	2	Post Event Summary (from XRS.04
XRS.10	xrsf-l2-flloc	2	Flare Location (from XRS.07)
EUVS.04a-e	euvs-l2-flzzz[2]	3	Event Detection (from EUVS.03)
EUVS.07	euvs-l2-avg1d	3	Daily Averages (from EUVS.03)
XRS.09	xrsf-l2-bkd1d	3	Daily Background (from XRS.04)

Installation Schedule
EXIS

ID		Task Mode	Task Name
79			**EXIS L2+ Algorithms**
80			**Phase 1 Installations**
81			XRS.05: xrsf-l2-ratio (JM)
82			XRS.04: xrsf-l2-avg1m (JM)
83			Phase 1 Install Complete
84			
85			**Phase 2 Installations**
86			EUVS.03: euvs-l2-avg1m (JM)
87			XRS.07a: xrsf-l2-fldet (JM)
88			XRS.07b: xrsf-l2-flsum (JM)
89			XRS.10: xrsf-l2-ffloc (JM)
90			Phase 2 Install Complete
91			
92			**Phase 3 Installations**
93			XRS.09: xrsf-l2-bkd1d (JM)
94			EUVS.07: euvs-l2-avg1d (JM)
95			EUVS.04a: euvs-l2-flzzz (JM)
96			Phase 3 Install Complete
97			
98			
99			
100			
101			
102			
103			
104			



Project: L2-Install_27may15
Date: Wed 5/27/15

Task		External Milestone		Manual Summary Rollup	
Split		Inactive Task		Manual Summary	
Milestone		Inactive Milestone		Start-only	
Summary		Inactive Summary		Finish-only	
Project Summary		Manual Task		Deadline	
External Tasks		Duration-only		Progress	

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SPADES CDR
Outline

Time	Slides	Topic	Presenter
13:00 – 13:10	03 – 09	Introduction	W. Denig
13:10 – 13:20	11 – 13	Objectives / Success Criteria	W. Denig
13:20 – 13:45	15 – 28	PDR Outbrief Feedback	W. Denig
13:45 – 14:00	30 – 33	SPADES Architecture	W. Rowland
14:00 – 14:15	35 – 45	Installation Schedule	W. Denig
14:15 – 14:15	**47 – 83**	**L2+ Algorithms (*not briefed*)**	**W. Denig**
14:15 – 14:30	85 – 94	Interfaces	W. Rowland
14:30 – 14:45	96 – 97	Schedule/Manpower	W. Denig
14:45 – 15:00	99 – 102	Program Risks	W. Rowland
15:00 – 15:30	104	Wrap-up & Internal Discussions	Review Team

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L2+ Algorithms

Phase 1 Installations (16Apr15 – 31Aug15)

L2+ Product	Data Short Name	Platform	Product Description
MAG.07	magn-l2-coord	gxx	Coordinate Systems (from L1b)
MAG.08	magn-l2-avg1m	gxx	1-min Averages (from MAG.07)
SEISS.17b (MPSH)	mpsh-l2-avg5m	gxx	5-min Averages – SEISS MPSH (from L1b)
SEISS.17c (SGPS)	sgps-l2-avg5m	gxx	5-min Averages – SEISS SGPS (from L1b)
SEISS.18b	sgps-l2-int5m	gxx	5-min Integral Flux (from SGPS SEISS.17c)
SEISS.20a (Event)	sgps-l2-evdet	gxx	Event Detection (from SGPS SEISS.18b)
XRS.04	xrsf-l2-avg1m	gxx	1-min Averages for EXIS XRS (from L1b)
XRS.05	xrsf-l2-ratio	gxx	Channel Ratio (from L1b)
SUVI.07	suvi-l2-ciyyy[1]	gxx	Composite Images (from L1b)
SUVI.19	suvi-l2-thmap	gxx	Thematic Maps (from SUVI.07)

L2+ Algorithms

magn-l2-coord (MAG.07)

- Title: MAG – Coordinate Transformations (from L1b)
- Instrument Scientist: P. Loto'aniu
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: P. Loto'aniu
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): MAG-L1b-GEOF
- L1b Input File Periodicity: 15 seconds (GRB/IDP) // 60 seconds (PDA)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: IGRF
- L2+ Product Description: Transform MAG data into geophysical coords
- L2+ Product Filename (Data Short Name): magn.l2.coord
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 15 seconds (GRB/IDP) // 60 seconds (PDA)
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

magn-l2-avg1m (MAG.08)

- Title: MAG – 1-minute Averages (from MAG.07)
- Instrument Scientist: P. Loto'aniu
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: P. Loto'aniu
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): magn-l2-coord (MAG.07)
- L2+ Input File Periodicity: 15 seconds (GRB/IDP) // 60 seconds (PDA)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: 1-min averages of full resolution data
- L2+ Product Filename (Short Name): magn-l2-avg1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

mpsh-l2-avg5m (SEISS.17b)

- Title: SEISS/MPSH – 5-minute Averages (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: J. Rodriguez
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SEIS-L1b-MPSH
- L1b Input File Periodicity: 30 seconds
- Configuration Table: Yes
- Auxiliary Data: Calibration Tables
- Ancillary Data: None
- L2+ Product Description: 5-min averages of full resolution 1 sec data
- L2+ Product Filename (Data Short Name): mpsh-l2-avg5m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 5 minutes
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

sgps-l2-avg5m (SEISS.17c)

- Title: SEISS/SGPS – 5-minute Averages (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SEIS-L1b-SGPS
- L1b Input File Periodicity: 30 seconds
- Configuration Table: Yes
- Auxiliary Data: Calibration Tables
- Ancillary Data: None
- L2+ Product Description: 5-min averages of full resolution 1 sec data
- L2+ Product Filename (Data Short Name): sgps-l2lavg5m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 5 minutes
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

sgps-l2-int5m (SEISS.18b)

- Title: SEISS/SGPS – 5-min Integral Flux (from SEISS 17c)
- Instrument Scientist: B. Kress
- ATBD: 06 Nov 2009 (v1.0) / Author: J. Rodriguez
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): sgps-l2-avg5m (SEISS.17c)
- L2+ Input File Periodicity: 5 minutes
- Configuration Table: Yes
- Auxiliary Data: Calibration Tables
- Ancillary Data: None
- L2+ Product Description: Calculate SGPS 5-minute proton integral flux
- L2+ Product Filename (Data Short Name): sgps-l2-int5m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 5 minutes
- Algorithm Status: Retain C++ and install

L2+ Algorithms

sgps-l2-evdet (SEISS.20a // Event)

- Title: SEISS/SGPS – Event Detection (from SEISS.18b)
- Instrument Scientist: B. Kress
- ATBD: 03 Jun 2013 (v1.0) / Author: J. Rodriguez
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): sgps-l2-avg5m (SEISS.18b)
- L2+ Input File Periodicity: 5 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Detect proton events from SGPS
- L2+ Product Filename (Data Short Name): sgps-l2-evdet
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Event driven
- Algorithm Status: Implement as is in C++ and install

L2+ Algorithms

suvi-l2-ciyyy (SUVI.07)

- Title: SUVI – Composite Images (from L1b)
- Instrument Scientist: J. Darnel
- ATBD: 30 Nov 2009 (v1.0) / Author: J. Rigler
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SUVI-L1b-xxxxx
- L1b Input File Periodicity: varies 60 to 240 seconds (see above table)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: Solar β & P angles (USNO)
- L2+ Description: SUVI Composite Images
- L2+ Filename (Short Name): suvi-l2-ciyyy
- L2+ Product Format: FITS
- L2+ Product Periodicity: varies 60 to 240 seconds (see above table)
- Algorithm Status: Phase 1 installation; Convert to Python

xxxxx:	Fe093	@120 sec
	Fe131	@240 sec
	Fe171	@240 sec
	Fe195	@ 60 sec
	Fe284	@240 sec
	He303	@240 sec

ciyyy:	ci093	Fe093
	ci131	Fe131
	ci171	Fe171
	ci195	Fe195
	ci284	Fe284
	ci303	He303

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L2+ Algorithms

suvi-l2-thmap (SUVI.19)

- Title: SUVI - Thematic Maps (from SUVI.07)
- Instrument Scientist: J. Darnel
- ATBD: 21 Jul 2011 (v1.0) / Author: J. Rigler
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-ciyyy (SUVI.07)
- L2+ Input File Periodicity: Wavelength dependent
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Create a solar thematic map
- L2+ Product Filename (Data Short Name): suvi-l2-thmap
- L2+ Product Format: FITS
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

xrsf-l2-ratio (XRS.05)

- Title: EXIS/XRS - Channel Ratio (from L1b)
- Instrument Scientist: J. Machol
- ATBD: 09 Jun 2010 (v1.4) / Author: D. Bouwer (SET)
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): EXIS-L1b-SFXR
- L1b Input File Periodicity: 3 seconds (GRB/IDB) / 30 seconds (PDA)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Calculate ratio of short-to-long x-ray wavelengths
- L2+ Product Filename (Data Short Name): xrsf-l2-ratio
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 3 seconds (GRB/IDB) / 30 seconds (PDA)
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

xrsf-l2-avg1m (XRS.04)

- Title: EXIS/XRS – 1-minute Averages (from XRS.05)
- Instrument Scientist: J. Machol
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): xrsf-l2-ratio
- L2+ Input File Periodicity: 3 seconds (GRB/IDB) / 30 seconds (PDA)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: 1-min averages of the full resolution 1-sec data
- L2+ Product Filename (Data Short Name): xrsf-l2-avg1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 1 installation; Convert to Python

L2+ Algorithms

Phase 2 Installations (01Sep15 – 31Mar16)

L2+ Product	Data Short Name	Platform	Product Description
MAG.09	magn-l2-quiet	gxx	Quiet Fields (from MAG.07)
SEISS.16a	mpsl-l2-avg1m	gxx	1-min Averages – SEISS MPSL (from L1b)
SEISS.16b	mpsh-l2-avg1m	gxx	1-min Averages – SEISS MPSH (from L1b)
SEISS.19a	mpsl-l2-mom1m	gxx	Moments (from MPSL SEISS.16a)
SEISS.19b	mpgh-l2-mom1m	gxx	Moments (from MPSH SEISS.16b)
EUVS.03	euvs-l2-avg1m	gxx	1-min averages for EXIS/EUVS (from L1b)
XRS.07a	xrsf-l2-fldet	gxx	1-min Event Detection (from XRS.04)
XRS.07b	xrsf-l2-flsum	gxx	Post Event Summary (from XRS.04
XRS.10	xrsf-l2-flloc	gxx	Flare Location (from XRS.07)
SUVI.13	suvi-l2-brght	gxx	Bright Regions (from SUVI.19 & XRS.07)
SUVI.14	suvi-l2-flloc	gxx	Flare Location (from SUVI.13 & XRS.07)
SUVI.15	suvi-l2-chbnd	gxx	Coronal Hole Bndr (SUVI.19 & SUVI.07)

L2+ Algorithms

magn-l2-quiet (MAG.09)

- Title: MAG – Quiet Fields (from MAG.07)
- Instrument Scientist: P. Loto'aniu
- ATBD: 11 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: P. Loto'aniu
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): magn-l2-coord (MAG.07)
- L2+ Input File Periodicity: 15 seconds (GRB/IDP) // 60 seconds (PDA)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: Olson-Pfitzer (OP77); IGRF
- L2+ Product Description: Mag field deviation from quiescent state
- L2+ Product Filename (Short Name): magn-l2-quiet
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 15 seconds (GRB/IDP) // 60 seconds (PDA)
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

mpsl-l2-avg1m (SEISS.16a)

- Title: SEISS/MPSL – 1-minute Averages (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: J. Rodriguez
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SEIS-L1b-MPSL
- L1b Input File Periodicity: 30 seconds
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: 1-min averages of full resolution 1-sec data
- L2+ Product Filename (Data Short Name): mpsl-l2-avg1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

mpsh-l2-avg1m (SEISS.16b)

- Title: SEISS/MPSH – 1-minute averages (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SEIS-L1b-MPSH
- L1b Input File Periodicity: 30 seconds
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: 1-min averages of full resolution 1-sec data
- L2+ Product Filename (Data Short Name): mpsh-l2-avg1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

mpsl-l2-mom1m (SEISS.19a)

- Title: SEISS/MPSL - Moments (from SEISS.16a)
- Instrument Scientist: B. Kress
- ATBD: 10 May 2011 (v1.1) / Author: J. Rodriguez
- Algorithm Lead: J. Rodriguez
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): mpsl-l2-avg1m (SEISS.16a)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: magn-l2-avg1m (MAG.08)
- Ancillary Data: None
- L2+ Product Description: Particle moments for MPSL
- L2+ Product Filename (Data Short Name): mpsl-l2-mom1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Retain C++ and install during phase 2

L2+ Algorithms

mpsh-l2-mom1m (SEISS.19b)

- Title: SEISS/MPSH - Moments (from SEISS.16b)
- Instrument Scientist: B. Kress
- ATBD: 10 May 2011 (v1.1) / Author: J. Rodriguez
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): mpsh-l2-avg1m (SEISS.16b)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: magn-l2-avg1m (MAG.08)
- Ancillary Data: None
- L2+ Product Description: Particle moments for SEISS/MPSH
- L2+ Product Filename (Data Short Name): mpsh-l2-mom1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Retain C++ and install during phase 2

L2+ Algorithms

euvs-l2-avg1m (EUVS.03)

- Title: EXIS/EUVS - 1-minute Averages (from L1b)
- Instrument Scientist: J. Machol
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): EXIS-L1b-SFEU
- L1b Input File Periodicity: 30 second
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: 1-min averages for EXIS/EUVS
- L2+ Product Filename (Data Short Name): euvs-l2-avg1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 30 second
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

xrsf-l2-fldet (XRS.07a)

- Title: EXIS/XRS - Event Detection (from XRS.04)
- Instrument Scientist: J. Machol
- ATBD: 24 Sep 2010 (v1.2) / Author: D. Bouwer (SET)
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): xrsf-l2-avg1m (XRS.04)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Solar x-ray flare detection / characterization
- L2+ Product Filename (Data Short Name): xrsf-l2-fldet
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

xrsf-l2-flsum (XRS.07b)

- Title: EXIS/XRS - Post-event Summary (from XRS.04a)
- Instrument Scientist: J. Machol
- ATBD: 24 Sep 2010 (v1.2) / Author: D. Bouwer (SET)
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): xrsf-l2-fldet (XRS.04a)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Post-event summary of daily x-ray flares
- L2+ Product Filename (Data Short Name): xrsf-l2-flsum
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Daily, updated each minute
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

xrsf.l2.flloc (XRS.10)

- Title: EXIS/XRS - Flare Location (from XRS.07)
- Instrument Scientist: J. Machol
- ATBD: 15-Dec-2013 (v1.1) / Author: A. Reinard
- Algorithm Lead: J. Machol
- Language: Python (Research-grade code)
- L2+ Input File (Short Name): xrsf-l2-fldet (XRS.07a)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Locate the detected flare on the solar disk
- L2+ Product Filename (Data Short Name): xrsf.l2.flloc
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Per detection
- Algorithm Status: Phase 2 installation

L2+ Algorithms

suvi-l2-brght (SUVI.13)

- Title: SUVI - Bright Regions (from SUVI.19)
- Instrument Scientist: J. Darnel
- ATBD: 22-Aug-2013 (v0.0) / Author: J. Darnel
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-thmap & xrsf-l2-fldet
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: xrsf-l2-fldet (XRS.07a)
- Ancillary Data: Solar β & P angles (USNO) / SRS (SWPC)
- L2+ Product Description: Detect solar bright (active) regions for flaring sun
- L2+ Product Filename (Data Short Name): suvi.l2.brght
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

suvi-l2-flloc (SUVI.14)

- Title: SUVI - Flare Location (from SUVI.13)
- Instrument Scientist: J. Darnel
- ATBD: 11-Dec-2013 (v0.1) / Author: J. Darnel
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-brght & xrsf-l2-fldet
- L2+ Input File Periodicity: Event driven (XRS.07a)
- Configuration Table: Yes
- Auxiliary Data: xrsf-l2-fldet (XRS.07a)
- Ancillary Data: None
- L2+ Product Description: Locate flaring location on the solar disk
- L2+ Product Filename (Data Short Name): suvi.l2.flloc
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Event driven
- Algorithm Status: Phase 2 installation; Convert to Python

L2+ Algorithms

suvi-l2-chbnd (SUVI.15)

- Title: SUVI - Coronal Hole Boundary (from SUV.07)
- Instrument Scientist: J. Darnel
- ATBD: 11-Dec-2013 (v0.2') / Author: J. Darnel
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-thmap & suvi-l2-ci*yyy*
- L2+ Input Periodicity: suvi-l2-thmap (1 minute) // suvi-l2-ci*yyy* (varies)
- Configuration Table: Yes
- Auxiliary Data: suvi-l2-thmap (SUVI.19)
- Ancillary Data: Solar β & P angles (USNO)
- L2+ Product Description: Create shape file for solar coronal boundaries
- L2+ Product Filename (Data Short Name): suvi.l2.chbnd
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Daily
- Algorithm Status: Phase 2 installation; Convert to Python

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L2+ Algorithms

Phase 3 Installations (01Apr16 – 31Aug16)

L2+ Product	Data Short Name	Platform	Product Description
MAG.10	magn-l2-cross	geo[1]	Magnetopause Crossing (from MAG.08)
SEISS.17a	mpsl-l2-avg5m	gxx	5-min Averages – SEISS MPSL (from L1b)
SEISS.16c	sgps-l2-avg1m	gxx	1-min Averages – SEISS SGPS (from L1b)
SEISS.18a	sgps-l2-int1m	gxx	1-min Integral Flux (from SGPS SEISS.16c)
SEISS.20b	sgps-l2-rrise	gxx	Rate of Rise (from SGPS SEISS.18a)
SEISS.20c	ehis-l2-ehlet	gxx	Linear Energy Transfer (from EHIS L1b)
SUVI.10	suvi-l2-rdyyy[1]	gxx	Running Diff. Images (from SUVI.07)
SUVI.12	suvi-l2-chimg	gxx	Coronal Hole Images (from SUVI.07)
SUVI.09	suvi-l2-fdyyy[1]	gxx	Fixed Diff. Images (from SUVI.07)
EUVS.04a-e	euvs-l2-flzzz[2]	gxx	Event Detection (from EUVS.03)
EUVS.07	euvs-l2-avg1d	gxx	Daily Averages (from EUVS.03)
XRS.09	xrsf-l2-bkd1d	gxx	Daily Background (from XRS.04)

L2+ Algorithms

magn-l2-cross (MAG.10)

- Title: MAG - Magnetopause Crossing Detection (from MAG.08)
- Instrument Scientist: P. Loto'aniu
- ATBD: 11 Apr 2008 (v1.0) / Author: P. Loto'aniu
- Algorithm Lead: R. Redmon
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): magn-l2-ang1m (MAG.08)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: mpsl-l2-mom1m (SEIS.19a)
- Ancillary Data: Solar Wind/IMF & GOES-NOP data (SWPC)
- L2+ Product Description: Magnetopause location / GEO crossing detection
- L2+ Product Filename (Data Short Name): magn-l2-cross
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 3 installation; Convert to Python

L2+ Algorithms

mpsl-l2-avg5m (SEISS.17a)

- Title: SEISS/MPSL – 5-minute Averages (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: Juan Rodriguez
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SEIS-L1b-MPSL
- L1b Input File Periodicity: 30 seconds (30 samples)
- Configuration Table: Yes
- Auxiliary Data: Calibration Tables
- Ancillary Data: None
- L2+ Product Description: 5-min averages of full resolution 1-sec data
- L2+ Product Filename (Data Short Name): mpsl-l2-avg5m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 5 minute
- Algorithm Status: Phase 3 installation; Convert to Python

L2+ Algorithms

sgps-l2-avg1m (SEISS.16c)

- Title: SEISS/SGPS – 1-minute Averages (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 10 Dec 2009 (v1.3) / Author: P. Loto'aniu
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L1b Input File (Short Name): SEIS-L1b-SGPS
- L1b Input File Periodicity: 30 seconds (30 samples)
- Configuration Table: Yes
- Auxiliary Data: Calibration Tables
- Ancillary Data: None
- L2+ Product Description: 1-min averages of full resolution 1-sec data
- L2+ Product Filename (Data Short Name): sgps-l2-avg1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 3 installation; Convert to Python

L2+ Algorithms

sgps-l2-int1m (SEISS.18a)

- Title: SEISS/SGPS – 1-min Integral Flux (from SEISS.16c)
- Instrument Scientist: B. Kress
- ATBD Date: 06 Nov 2009 (v1.0) / Author: J. Rodriguez
- Algorithm Lead: B. Kress
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): sgps-l2-avg1m (SEISS.16c)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: Calibration Tables
- Ancillary Data: None
- L2+ Product Description: Calculate SGPS 1-min proton integral flux
- L2+ Product Filename (Data Short Name): sgps-l2-int1m
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 3 Installation; Adapt from SEISS.18b

L2+ Algorithms

sgps.l2.rrise (SEISS.20b // Rate)

- Title: SEISS/SGPS - Rate of Rise (from SEISS.18a)
- Instrument Scientist: B. Kress
- ATBD: 03 Jun 13 (v1.0) / Author: J. Rodriguez
- Algorithm Lead: B. Kress
- Language: Python (Research-grade code)
- L2+ Input File (Short Name): sgps-l2-int1m (SEISS.18a)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Detect SGPS energetic particle flux rate-of-rise
- L2+ Product Filename (Data Short Name): sgps.l2.rrise
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Per detection
- Algorithm Status: Phase 3 installation

L2+ Algorithms

ehis.l2.ehlet (SEISS.20c // LET)

- Title: SEISS/EHIS - Linear Energy Transfer (LET) (from L1b)
- Instrument Scientist: B. Kress
- ATBD: 03 Jun 13 (v1.0) / Author: J. Rodriguez
- Algorithm Lead: B. Kress
- Language: Python (Research-grade code)
- L2+ Input File (Short Name): SEIS-L1b-EHIS
- L2+ Input File Periodicity: 5 minute
- Configuration Table: Yes
- Auxiliary Data: Lookup Tables (SRIM - Stopping Range of Ions in Matter)
- Ancillary Data: None
- L2+ Product Description: Calculate LET from EHIS measurements
- L2+ Product Filename (Data Short Name): ehis.l2.ehlet
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: Event detection
- Algorithm Status: Phase 3 installation

L2+ Algorithms

suvi-l2-rdyyy (SUVI.10)

- Title: SUVI – Running Difference Images
- Instrument Scientist: J. Darnel
- ATBD: 30-Nov-2009 (v1.0) / Author: J. Rigler
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-ciyyy (SUVI.07)
- L2+ Input File Periodicity: varies, see SUVI.07
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Short Baseline Diff.
- L2+ Filename (Short Name): suvi-l2-rdyyy
- L2+ Product Format: FITS
- L2+ Product Periodicity: varies per input
- Algorithm Status: Phase 3 installation

ciyyy:	ci093	Fe093
	ci131	Fe131
	ci171	Fe171
	ci195	Fe195
	ci284	Fe284
	ci303	He303

rdyyy:	rd093	Fe093
	rd131	Fe131
	rd171	Fe171
	rd195	Fe195
	rd284	Fe284
	rd303	He303

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L2+ Algorithms

suvi-l2-chimg (SUVI.12)

- Title: SUVI - Coronal Hole Images (from SUVI.07 & SUVI.19)
- Instrument Scientist: J. Darnel
- ATBD: 21 Jul 2010 (v1.0) / Author: J. Rigler
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-ciyyy (SUVI.07)
- L2+ Input File Periodicity: varies 60 to 240 seconds (see table)
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Create a solar coronal hole image
- L2+ Product Filename (Data Short Name): suvi-l2-chimg
- L2+ Product Format: FITS
- L2+ Product Periodicity: 1 hour
- Algorithm Status: Phase 3 installation

L2+ Algorithms

suvi-l2-fdyyy (SUVI.09)

- Title: SUVI – Fixed Diff Images (from SUVI.07)
- Instrument Scientist: J. Darnel
- ATBD: 30-Nov-2009 (v1.0) / Author: J. Rigler
- Algorithm Lead: J. Darnel
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): suvi-l2-ciyyy (SUVI.07)
- L2+ Input File Periodicity: varies 60 to 240 seconds (see table)
  Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Long baseline diff.
- L2+ Filename (Short Name): suvi-l2-fdyyy
- L2+ Product Format: FITS
- L2+ Product Periodicity: varies 60 to 240 seconds (see table)
- Algorithm Status: Phase 3 installation

ciyyy:	ci093	Fe093
	ci131	Fe131
	ci171	Fe171
	ci195	Fe195
	ci284	Fe284
	ci303	He303

fdyyy:	fd093	Fe093
	fd131	Fe131
	fd171	Fe171
	fd195	Fe195
	fd284	Fe284
	fd303	He303

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L2+ Algorithms

euvs-l2-flzzz (EUVS.04)

- Title: EXIS/EUVS - Post-event Summary
- Instrument Scientist: J. Machol
- ATBD: 15 Sep 2011 (v1.2) / Author: S. Mueller (LASP)
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): euvs-l2-avg1m (from EUVS.03)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Event detection at EUV wavelengths
- L2+ Filename (Data Short Name): euvs-l2-flzzz
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 minute
- Algorithm Status: Phase 3 installation; Convert to Python

zzz:	Fe093	@120 sec
	Fe131	@240 sec
	Fe171	@240 sec
	Fe195	@ 60 sec
	Fe284	@240 sec
	He303	@240 sec

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L2+ Algorithms

euvs-l2-avg1d (EUVS.07)

- Title: EXIS/EUVS - Daily Averages (from EUVS.03)
- Instrument Scientist: J. Machol
- ATBD: 24 Sep 2010 (v1.2) / Author: D. Woodraska (LASP)
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): euvs-l2-avg1m (EUVS.03)
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Calculate daily EUVS averages
- L2+ Filename (Data Short Name): euvs-l2-avg1d
- L2+ Product Format: NetCDF4
- L2+ Product Periodicity: 1 day
- Algorithm Status: Phase 3 installation; Convert to Python

L2+ Algorithms

xrsf-l2-bkd1d (XRS.09)

- Title: EXIS/XRS - Daily Background (from L2+)
- Instrument Scientist: J. Machol
- ATBD: 24 Sep 2010 (v2.0) / Author: D. Bouwer (SET)
- Algorithm Lead: J. Machol
- Language: C++ (Research-grade code)
- L2+ Input File (Short Name): xrsf-l2-avg1b
- L2+ Input File Periodicity: 1 minute
- Configuration Table: Yes
- Auxiliary Data: None
- Ancillary Data: None
- L2+ Product Description: Calculate daily bkgnd; short/long wavelengths
- L2+ Filename (Data Short Name): xrsf-l2-bkd1d
- L2+ Product Output Format: NetCDF4
- L2+ Product Periodicity: 1 day
- Algorithm Status: Phase 3 installation; Convert to Python

SPADES CDR
Outline

Time	Slides	Topic	Presenter
13:00 – 13:10	03 – 09	Introduction	W. Denig
13:10 – 13:20	11 – 13	Objectives / Success Criteria	W. Denig
13:20 – 13:45	15 – 28	PDR Outbrief Feedback	W. Denig
13:45 – 14:00	30 – 33	SPADES Architecture	W. Rowland
14:00 – 14:15	35 – 45	Installation Schedule	W. Denig
14:15 – 14:15	47 – 83	L2+ Algorithms (*not briefed*)	W. Denig
14:15 – 14:30	**85 – 94**	**Interfaces**	**W. Rowland**
14:30 – 14:45	96 – 97	Schedule/Manpower	W. Denig
14:45 – 15:00	99 – 102	Program Risks	W. Rowland
15:00 – 15:30	104	Wrap-up & Internal Discussions	Review Team

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Interfaces
Test Data Sets

L1b Baseline Data Set (BDS) – currently available

- Provided by Instrument Vendors/Harris)
- References “Frozen Baseline” file formats
- No science content
- NetCDF4 / FITS files have been successfully read

L0 Mission Validation Test Data Sets – Data Operation Tests (DOTs)

- Prepared by MIT/LL – 2 hour duration – limited science content
- L0 data ingested/processed by the GOES-R GS to create L1b products
- DOT1/2 (6/15) – Frozen Baseline GPAs; Connectivity test via PDA
- DOT3 (8/15) – Current plan is to use “Operational Prototype” GPAs

Proxy Data Files – developed on an as needed basis

- Instrument scientist responsibility assisted by GOES-R data manager
- L1b files used to test SPADES algorithms – developed as needed
- Sufficient science content for various environmental scenarios

Interfaces

Daily Data Volumes

Daily Data Volumes (per satellite)

L0 **46.0 GB** - FYI, only
L1b **45.0 GB**
L2+ **43.9 GB**
Total daily volume ~89 GB

Sensor	L0	L1b	L2+
	MB	MB	MB
SEISS	298	118	81
MAG	2,333	173	34
EXIS	2,351	20	109
SUVI	40,973	44,678	43,632
TOTAL	**45,955**	**44,989**	**43,856**

SPADES infrastructure includes 10 TB of local storage which can easily accommodate a 3-day store. The L2+ daily data volumes are estimates only.

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Interfaces
L1b Product Filenames (1 of 2)

L1b Short Name	Description
EXIS-L1b-SFXR	EXIS L1b Solar Flux: X-Ray
EXIS-L1b-SFEU	EXIS L1b Solar Flux: EUV
MAG-L1b-GEOF	Magnetometer L1b Geomagnetic field
SEIS-L1b-EHIS	SEISS L1b Energetic Heavy Ions
SEIS-L1b-MPSL	SEISS L1b Magnetospheric Electrons and Protons: Low Energy
SEIS-L1b-MPSH	SEISS L1b Magnetospheric Electrons and Protons: Medium & High Energy
SEIS-L1b-SGPS	SEISS L1b Solar and Galactic Protons

Interfaces

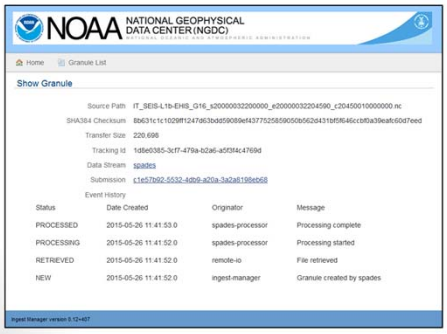
L1b Product Filenames (2 of 2)

L1b Product	Description
SUVI-L1b-Fe093	SUVI L1b Solar Imagery X-Ray Iron 93.9 Angstroms
SUVI-L1b-Fe131	SUVI L1b Solar Imagery X-Ray Iron 131.2 Angstroms
SUVI-L1b-Fe171	SUVI L1b Solar Imagery X-Ray Iron 171.1 Angstroms
SUVI-L1b-Fe195	SUVI L1b Solar Imagery X-Ray Iron 195.1 Angstroms
SUVI-L1b-Fe284	SUVI L1b Solar Imagery X-Ray Iron 284.3 Angstroms
SUVI-L1b-He303	SUVI L1b Solar Imagery X-Ray Helium 303.8 Angstroms

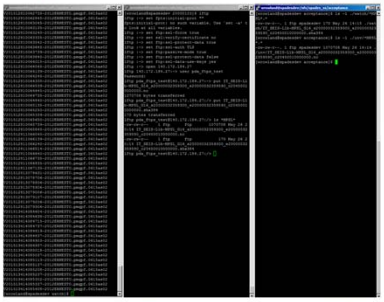
Interfaces

Product Distribution & Access (PDA)

Status: Initial interface testing with the PDA Ops string is now complete. End-to-End system validation will be performed during the GOES-R Data Operations Experiments (DOEs) planned for June – August 2015.



A B C



A. Interface Testing – List of files successfully received via PDA – no space weather files.
B. Internal File Handling – List of proxy space weather files used for testing.
C. Successful Ingest – List of files validated and processed.

PDA POC: Mike Brogan

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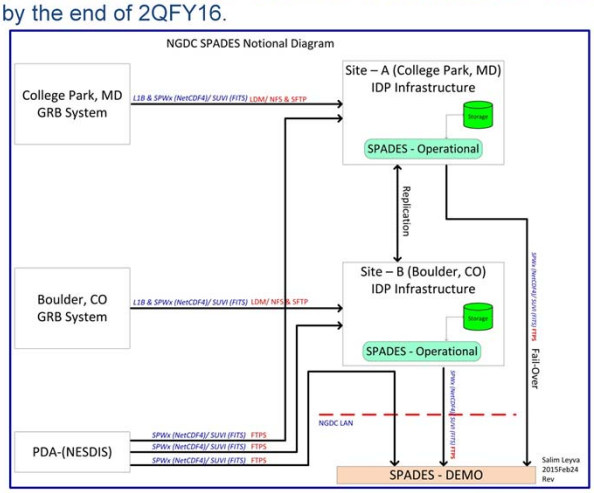
Interfaces

GOES ReBroadcast (GRB)

Status: The SPADES interface design to the GOES-R ReBroadcast is continuing to mature. We are scheduled to complete the SPADES GRB interface by the end of 2QFY16.



GRB POC: Salim Leyva

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Interfaces

L1b Resolutions / Periodicities / Latencies

Product Name	Sensor Resolution (sec)	PDA – Product Periodicity (sec)	PDA – Product Latency (sec)	GRB/IDB Periodicity[1] (sec)	GRB - Product Latency (sec)
MAG-L1b-GEOF	.1	60	81.8	15	5.8
EXIS-L1b-SFXR	1	30	51.8	3	5.8
EXIS-L1b-SFEU	1 (max)	30	44	30	28
SEIS-L1b-MPSL	1	30	71	30	55
SEIS-L1b-MPSH	1	30	71	30	55
SEIS-L1b-SGPS	1	60	71	30	55
SEIS-L1b-EHIS	300	300	287	300	271
SUVI-L1b-Fe093	40	*See Next Slide*	70	*See Next Slide*	54
SUVI-L1b-Fe131	80	*See Next Slide*	70	*See Next Slide*	54
SUVI-L1b-Fe171	120	*See Next Slide*	70	*See Next Slide*	54
SUVI-L1b-Fe195	34.3	*See Next Slide*	70	*See Next Slide*	54
SUVI-L1b-Fe284	120	*See Next Slide*	70	*See Next Slide*	54
SUVI-L1b-He303	120	*See Next Slide*	70	*See Next Slide*	54

[1]Aggregation of GRB L1b products included in UW-Madison SOW

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– EXIS/SFEU has a configurable resolution/

– There is a four minute epoch associated with the entire sequence of solar images at different wavelengths and exposure periods. Four to six images are observed in any minute of this epoch. The best case refresh rate is 10 seconds.

- Refresh rate is defined as the time between the completion of the nth update of the product and the completion of the (n+1)th update of the same product for the user.

- Latency for GRB is defined as the interval between the end of an observation by an instrument on the satellite to the availability of the observation at the GRB user terminal.

- Latency for PDA is defined as the interval between the end of an observation by an instrument on the satellite to the availability of the observation at the PDA system.

Interfaces
SUVI Periodicity (Details)

There is a four minute epoch associated with the entire sequence of solar images at different wavelengths and exposure periods. Four to six images are observed in any minute of this epoch. The best case refresh rate is 10 seconds.

Table 5-1: SUVI recommended 4-minute nominal operations sequence structure

Minute	1						2						3						4					
Image in Min	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Image No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Time	0:10	0:20	0:30	0:40	0:50	1:00	1:10	1:20	1:30	1:40	1:50	2:00	2:10	2:20	2:30	2:40	2:50	3:00	3:10	3:20	3:30	3:40	3:50	4:00
SUVI Sequence Structure	94Å	94Å	94Å	195Å	195Å	171Å	171Å	131Å	131Å	131Å	195Å	195Å	94Å	94Å	94Å	Cal	Cal	195Å	284Å	284Å	304Å	304Å	195Å	195Å

The recommended sequence structure given in the table above is labeled and color coded for the different SUVI wavelengths using the key below.

Table 5-2 Number of Images per Channel to Capture Full Dynamic Range

Wavelength	Number of Images
94Å	3
131Å	3
171Å	2
195Å	2
284Å	2
304Å	2
Cal	N/A

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Interfaces

Ancillary Data (non GOES-R)

Real-time Ancillary Data	Used By	Availability
Real-time Solar Wind & Inter-planetary Magnetic Field Data	MAG.10	SWPC
GOES-NOP Magnetic Field Data	MAG.10	SWPC

Quasi-static Ancillary Data	Used By	Availability
International Magnetic Field Model (IGRF)	MAG.07/09	NCEI
Olson Pfitzer Magnetic Field Model (OP77)	MAG.09	GSFC
Solar Beta and P angles, Solar Distance	SUVI.07/13/15	USNO
USAF/NOAA Solar Region Summaries (daily)	SUVI.13	SWPC

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Ancillary data is defined as any data which is not produced by GOES-R, but is acquired directly for SPADES from external providers and used within SPADES to produce the GOES-R L2+ space weather products.

Interfaces

Auxiliary Data (GOES-R)

Real-time Auxiliary Data	Comments
SPADES L2+ Products	Reference Precedence Table

Quasi-static Auxiliary Data	Comments
Configuration Tables	Required for all algorithms
Lookup Tables	As needed by the algorithms
Calibration Tables	As needed by the algorithms

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Auxiliary data for SPADES are those data parameters other than the set of GOES-R L1b space weather data products (Table 2) that are produced internally by GOES-R and are required to produce the GOES-R L2+ space weather products.

SPADES CDR
Outline

Time	Slides	Topic	Presenter
13:00 – 13:10	03 – 09	Introduction	W. Denig
13:10 – 13:20	11 – 13	Objectives / Success Criteria	W. Denig
13:20 – 13:45	15 – 28	PDR Outbrief Feedback	W. Denig
13:45 – 14:00	30 – 33	SPADES Architecture	W. Rowland
14:00 – 14:15	35 – 45	Installation Schedule	W. Denig
14:15 – 14:15	47 – 83	L2+ Algorithms (*not briefed*)	W. Denig
14:15 – 14:30	85 – 94	Interfaces	W. Rowland
14:30 – 14:45	**96 – 97**	**Schedule/Manpower**	**W. Denig**
14:45 – 15:00	99 – 102	Program Risks	W. Rowland
15:00 – 15:30	104	Wrap-up & Internal Discussions	Review Team

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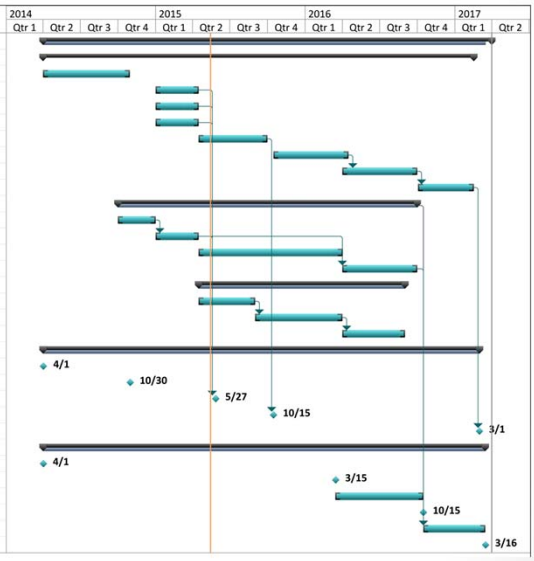
Schedule / Manpower

SPADES-Demo Master Schedule

ID	Task Name
1	**SPADES Prototype (Tasks)**
2	**SPADES Development**
3	Preliminary Design
4	Ingest Segment (IS)
5	Storage Segment (SS)
6	Processing Segment (PS)
7	Visualization Segment (VS)
8	Controller Segment (CS)
9	Monitor Segment (MS)
10	System Hardening - R2O prep
11	**Data Access/Availability**
12	Adopt/create L1b proxy dataset
13	Interface Development: PDA
14	Ancillary Data Access
15	Interface Development: GRB
16	**L2+ Algorithms**
17	L2+ Product Set 1 Installation
18	L2+ Product Set 2 Installation
19	L2+ Product Set 3 Installation
20	**Program Reviews/Milestones**
21	Authorization To Proceed (ATP)
22	Preliminary Design Review
23	Critical Design Review
24	Initial Capability Review
25	Final Capability Review
26	**Key Dates /Activities- GOES-R**
27	SPADES Program Start
28	GOES-R Launch
29	GOES-R PLT
30	PLT Complete
31	GOES PLPT
32	GOES-R Operations (TBD)



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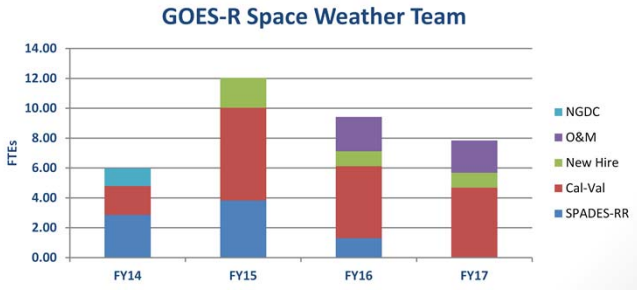
SPADES Program

Leveraged Funding / Manpower

PROGRAM FUNDING	FY14	FY15	FY16	FY17
SPADES RR	500 K	637 K	250 K	
GOES-R Cal/Val	300 K	625 K	625 K	625 K
GOES-R New Hires		316 K	182 K	193 K
GOES-R O&M			411 K	411 K
NGDC (AAA)	145 K			
Total	1,068 K	1,578 K	1,468K	1,229 K



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SPADES CDR
Outline

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14:45 – 15:00	**99 – 102**	**Program Risks**	**W. Rowland**
15:00 – 15:30	104	Wrap-up & Internal Discussions	Review Team

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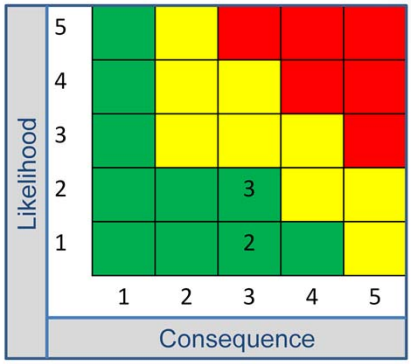
Program Risks

Summary – Open Items

Risk ID	Criticality	Title
2	L1C3	Agile S/W team unavailable to support GOES-R
3	L2C3	L2+ processing needs exceed SPADES capabilities



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Program Risks

Risk ID 1 – Closed Items (from PDR)

Risk 1 - ERDDAP fails to meet requirements

Mitigation:

- Modified interface expectations for L2+ Algorithm inputs.
- Consolidated essential functionality from ERDDAP into the Control and Monitoring segments.
- Began discussing updated CS/MS role with Agile Team.

2015-05-15 - Issue closed.

Program Risks

Risk ID 2 - Agile S/W team unavailable

Risk Description

IF the Agile software development teams are not available for sufficient time to complete development efforts on schedule THEN schedule may be adversely impacted.

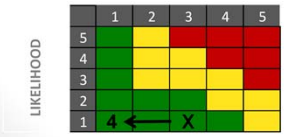
Owner: W. Rowland

Potential Impact: Cost and schedule

Status

- 10/07/2014 – NGDC resource management assigned a number of sprints that are expected to be sufficient..
- 04/01/2015 – PDA Ingest, Storage, and Processing Segment complete.
- 2015-04-01 – Began work to specify details of CS-PS and MS-PS interfaces, in preparation for CS implementation.

CONSEQUENCES



Current Risk Level & Mitigation Plan

Likelihood: 2	Consequence: 3	Criticality: L

Steps	Mitigation	Status	Start	Finish
1	Bill Denig successfully sets a workable schedule with Agile Team.	Done		10/07/14
2	SPADES PDA Ingest, Storage, and Processing Segments completed	Done	01/22/15	03/04/15
3	(New) Fund an additional Agile team Programmer, to ensure adequate resources. L2->L1	Done	05/20/15	05/20/15
4	SPADES GRB Ingest and Control Segments completed.	Pending	Q1CY16	Q1CY16
5	SPADES Monitoring Segment completed.	Pending	Q3CY16	Q3CY16

Timeframe:
Near-Term – Define CS/MS interfaces to PS
Complete SPADES Increment 2

Program Risks

Risk ID 3 – L2+ Processing Requirements

Risk Description

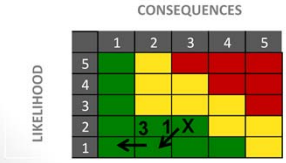
IF the computational resource requirements for processing L2+ algorithms are significantly higher than expected THEN additional hardware may be required, impacting cost and (if additional equipment must be ordered) schedule.

Owner: W. Rowland

Potential Impact: Cost and Schedule

Status

- 10/08/14 – Based on existing documentation attempted to plan hardware that should be suitable. Past testing was not done on a common platform, which contributes to this risk.



Current Risk Level & Mitigation Plan

Likelihood: 2	Consequence: 3	Criticality: L

Steps	Mitigation	Status	Start	Finish
1	Algorithm Set 1 installed and tested.	Pending	01/01/14	09/31/15
2	Algorithm Set 2 installed and tested.	Pending	10/01/15	03/31/16
3	Algorithm Set 3 installed and tested.	Pending	04/01/16	09/31/16

Timeframe:
Mid-Term – Install & test algorithms; assess processing loads

SPADES CDR
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Wrap-Up & Internal Discussions

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END