National Aeronautics and Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

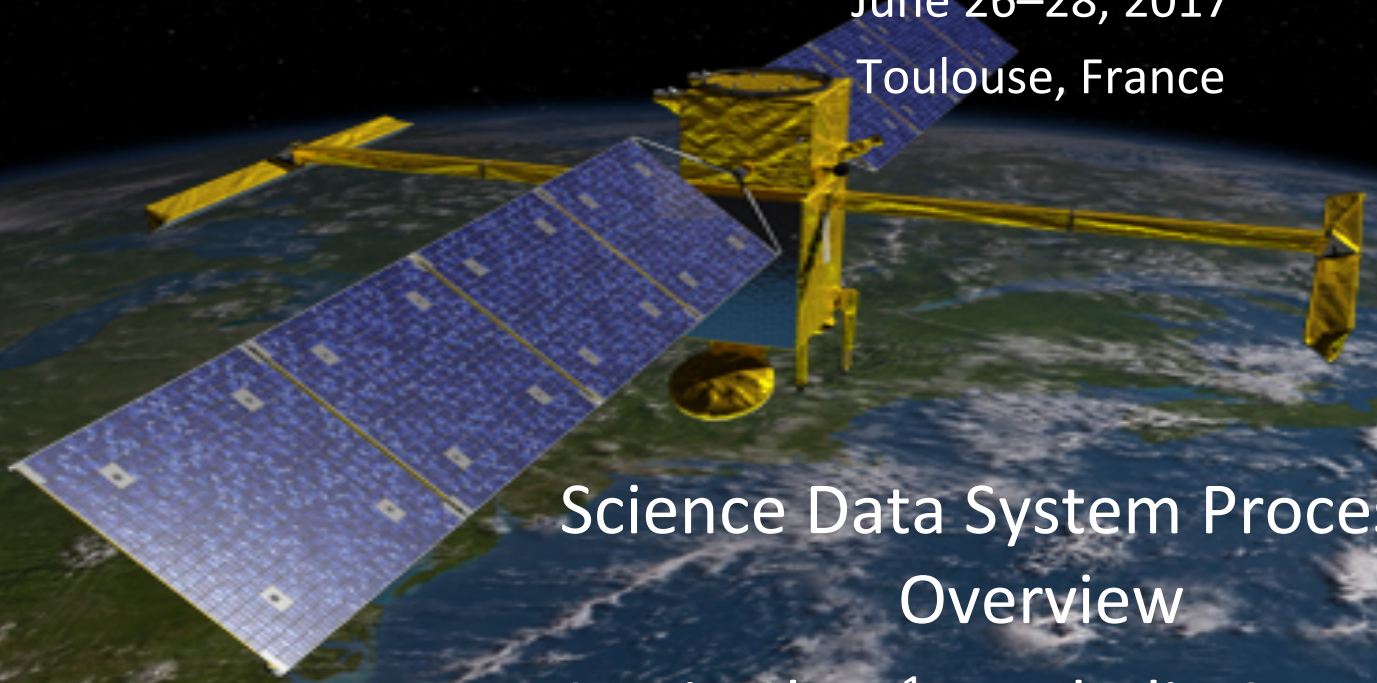
http://swot.jpl.nasa.gov

Surface Water and Ocean Topography (SWOT) Mission

SWOT Science Team Meeting

June 26–28, 2017

Toulouse, France



Science Data System Processing Overview

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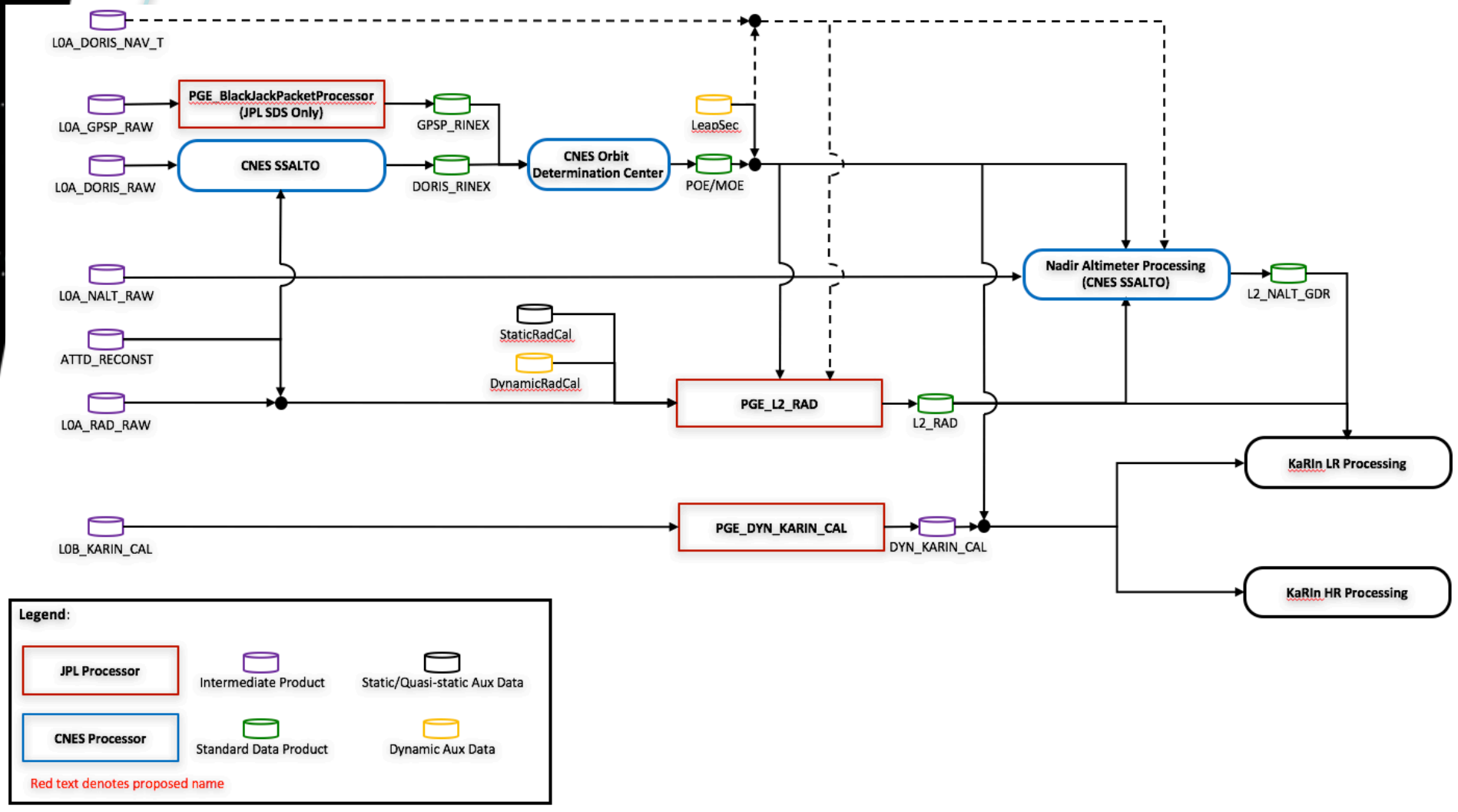
Team Organization

- Joint US+French Algorithm Development Team (ADT):
  - Develops and implements L1 and L2 science processing software
  - Defines L1 and L2 data products for science users
  - ADT includes JPL/CNES Project and Science Team representatives
- JPL and CNES Science Data Systems (SDSs) run common set of science processors built from ADT-delivered code (albeit within different production environments)
  - CNES SDS processes nadir altimeter and Eurasia HR data
  - JPL SDS processes LR data and non-Eurasia HR data
  - All L2 data will be distributed by both US and French distribution centers regardless of which side did processing
    - Identical data at both centers since no duplication of processing
- Calibration and validation (Cal/Val) of SWOT products will be done by joint US+French team that includes Science Team representatives

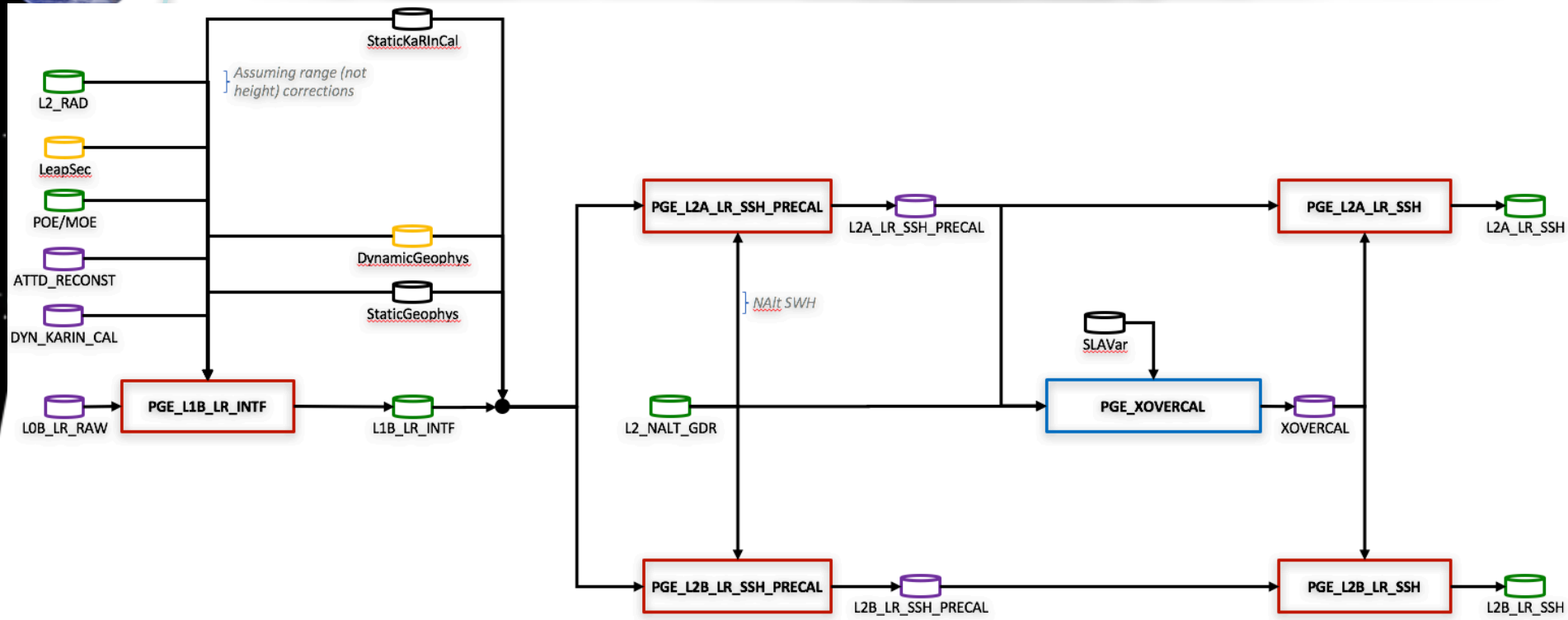
Processing System Organization

- Processing related to Nadir Altimeter (including Radiometer, Orbit Ephemeris, etc.) has high heritage from previous missions
- KaRIn processing is new for SWOT and is main focus of ADT effort
  - Data are split into Low-Rate (LR, ~17 Mbps) and High-Rate (HR, ~350 Mbps) data streams out of KaRIn
  - LR and HR data streams are processed by separate ground processing chains in SDS
    - HR algorithms are tailored to hydrology
    - LR algorithms are tailored to oceanography
  - Within each SDS processing chain, flow is split into 'processors' and 'products', which are basic organizational units for documentation, work split, etc.
    - Processors run ADT-developed algorithms and software to produce data products
    - Some products are 'standard data products' that will be archived and made available to Science Team (see talk by J. Hausmann and H. Vadon)
    - Other products are 'intermediate data products' that are generated only to facilitate processing architecture (not archived or publicly available)

Radiometer, POE/MOE, KaRIn Calibration



KaRIn LR Flow

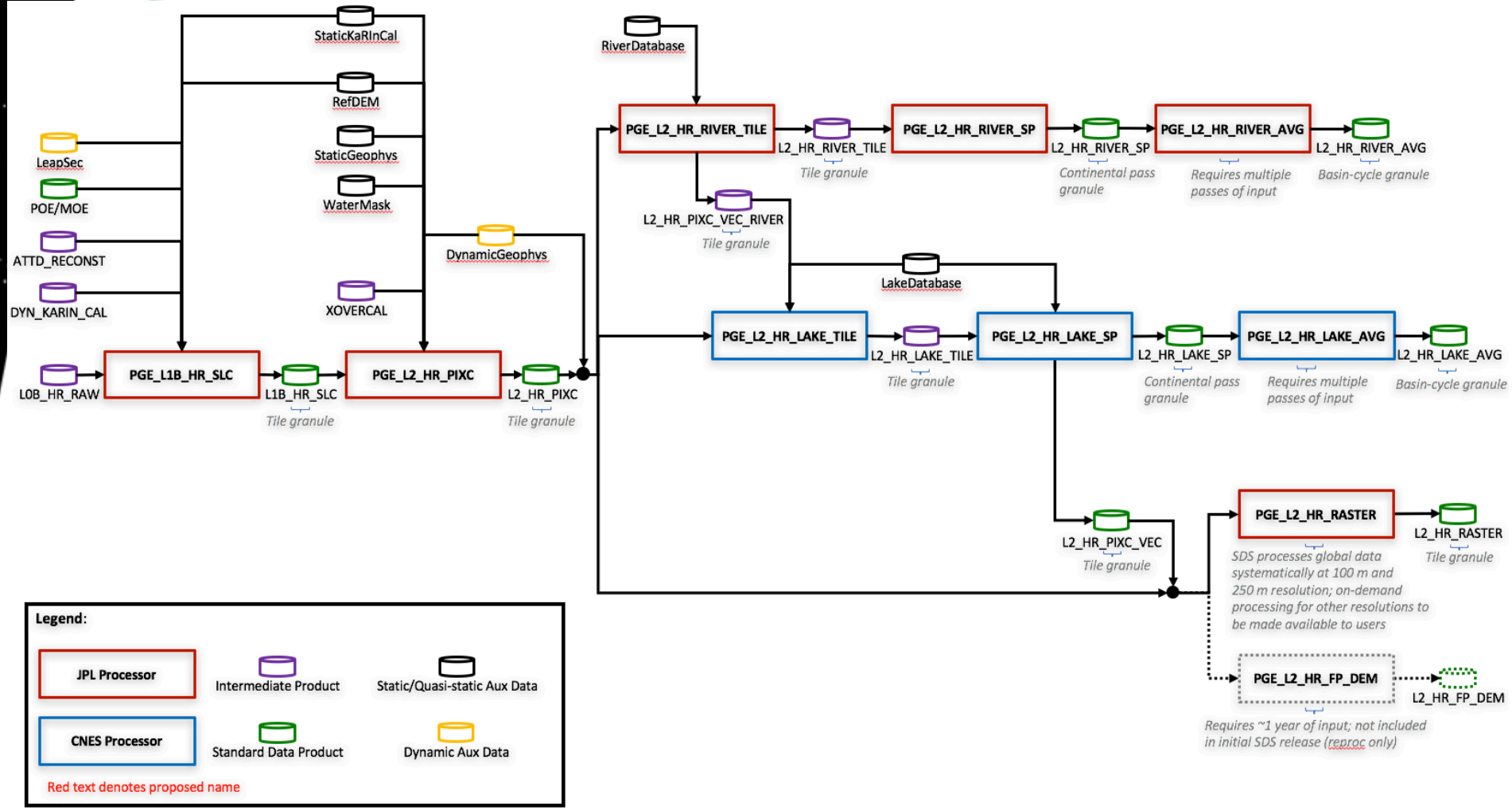


Legend:

- JPL Processor
- CNES Processor
- Intermediate Product
- Standard Data Product
- Static/Quasi-static Aux Data
- Dynamic Aux Data

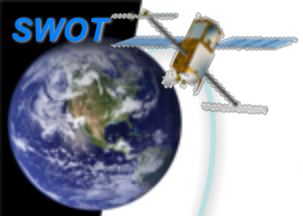
Red text denotes proposed name

KaRIn HR Flow



Science Team Involvement

- Science Definition Team / Science Team representatives to ADT have been involved in data product definitions and algorithm choices to date
- Science Team interaction will continue in many ways:
  - ADT meetings with Science Team representation
  - Direct interaction between algorithm developers and Science Team
  - Review of Algorithm Theoretical Basis Documents (ATBDs); see ATBD topic
  - Review of prototype products
  - Selection and/or provision of geophysical models provided on products
  - Involvement in select code and simulation sharing
  - Science Team meetings, reviews, etc.



Algorithm Development Schedule

- Focus on developing and validating performance of prototype KaRIn processors during remainder of CY2017 and early CY2018
  - Prototypes will be tested using simulated data
  - Algorithm Theoretical Basis Documents (ATBDs) will be written to document algorithms that have been validated with prototype software
    - ATBDs will be reviewed by Science Team representatives (see ATBD topic)
  - Prototype data products will be generated from simulations and prototype software
    - Prototype products and documentation will be made available for Science Team evaluation by 2018 Science Team meeting
- Initial delivery of operational processing software to SDS will be in late CY2018
- Further releases of processing software with algorithm updates are planned through validation phase after launch