



National Aeronautics and Space  
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# Ingest Subsystem

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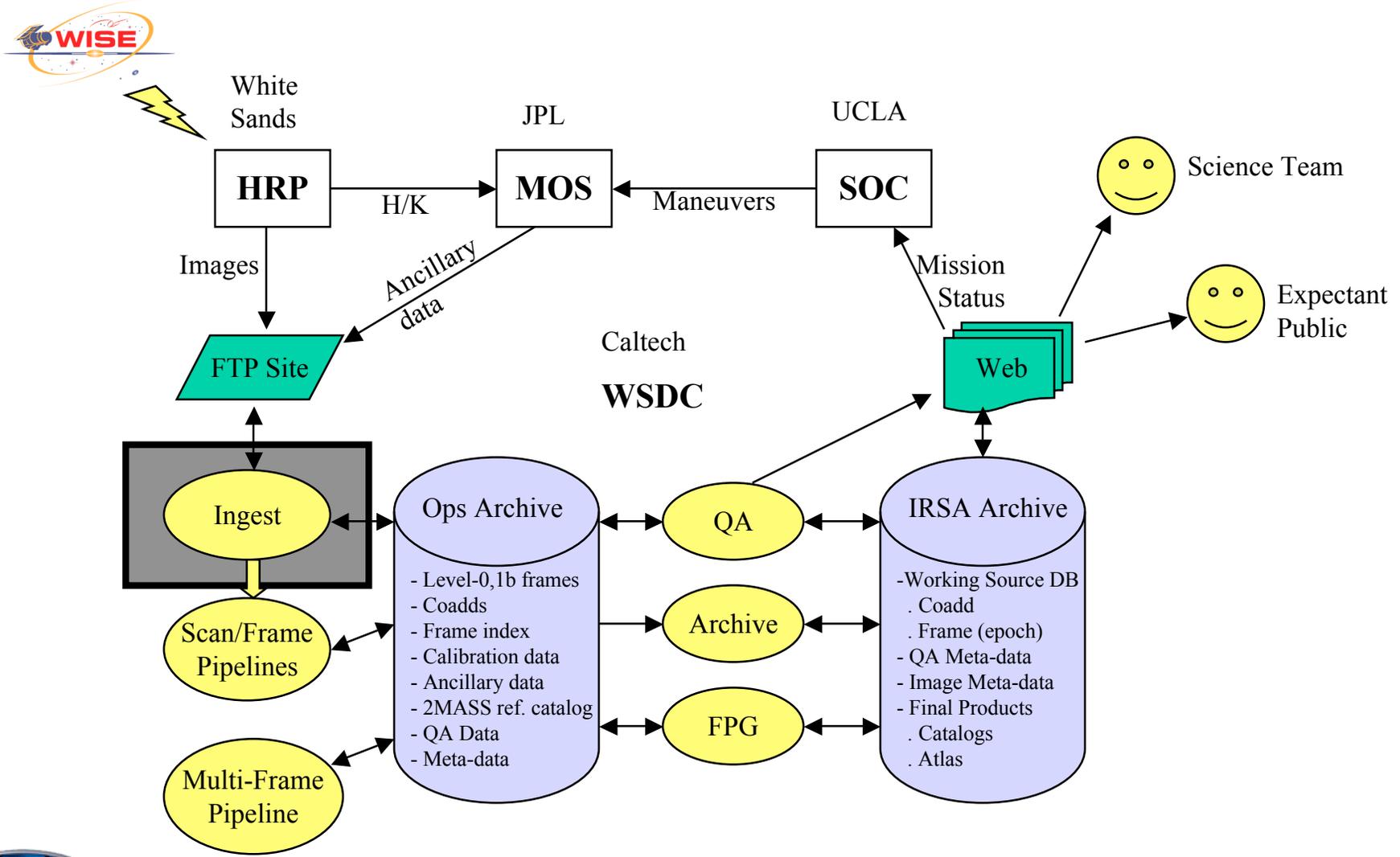


WISE Science Data Center CDR – January 29-30, 2008

TPC - 1



# WSDC Functional Block Diagram





# Driving Requirements



- Key WSDC System Level Functional Requirements
  - Ingest functions
    - Create Level-0 archive (L4WSDC-29)
      - Decompress
      - Depacketize
      - Make FITS files
      - Correlate with ancillary data
    - Create ancillary data archive (L4WSDC-33)
    - Validate data (L4WSDC-35)
    - Notify MOS of receipt (L4WSDC-36)
  - Throughput and Latency
    - Data volume: 25GB/day (L4WSDC-30), 50GB/day peak (L4WSDC-31)
    - 6 months of data acquisition (L4WSDC-82)
    - Quicklook: QA report within 24 hours (L4WSDC-32)
    - Ingest+Scan/Frame Pipelines: Level-1 available within 3 days (L4WSDC-34, L4WSDC-39)





# Ingest Status

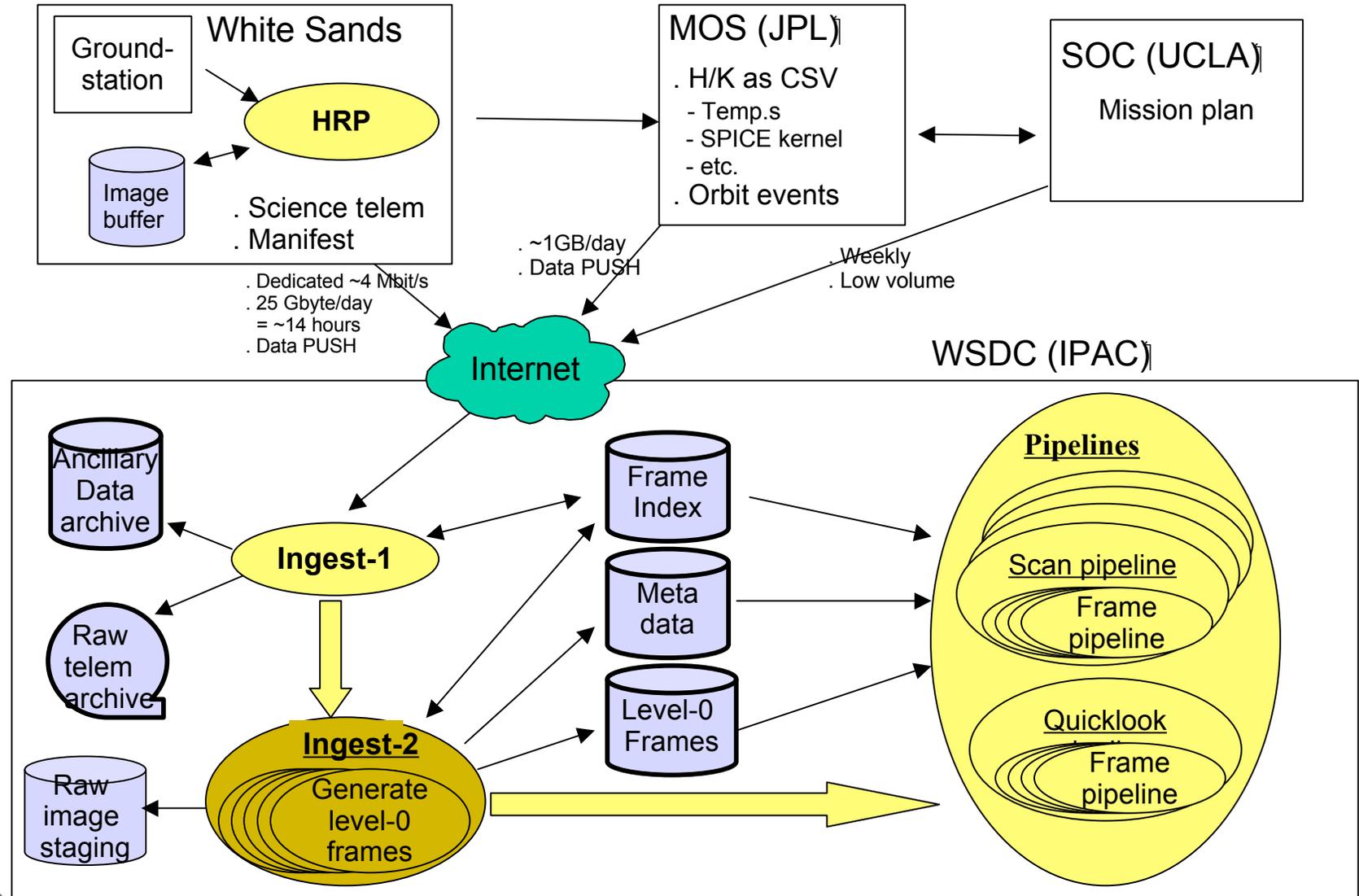


- Prototype Ingest supporting HRP testing
  - Depacketize realistic CCSDS source packet telemetry
  - Decompress images compressed with USES chip
    - Uses standard rice decompression software
  - Meta-data extractino from packet headers
  - Save FITS file with meta-data
  - Compare to truth image (not relevent to ops, of course)
  - Error checking and handling
  - Extracts 100 framesets in ~1 minute, <1 second/frameset



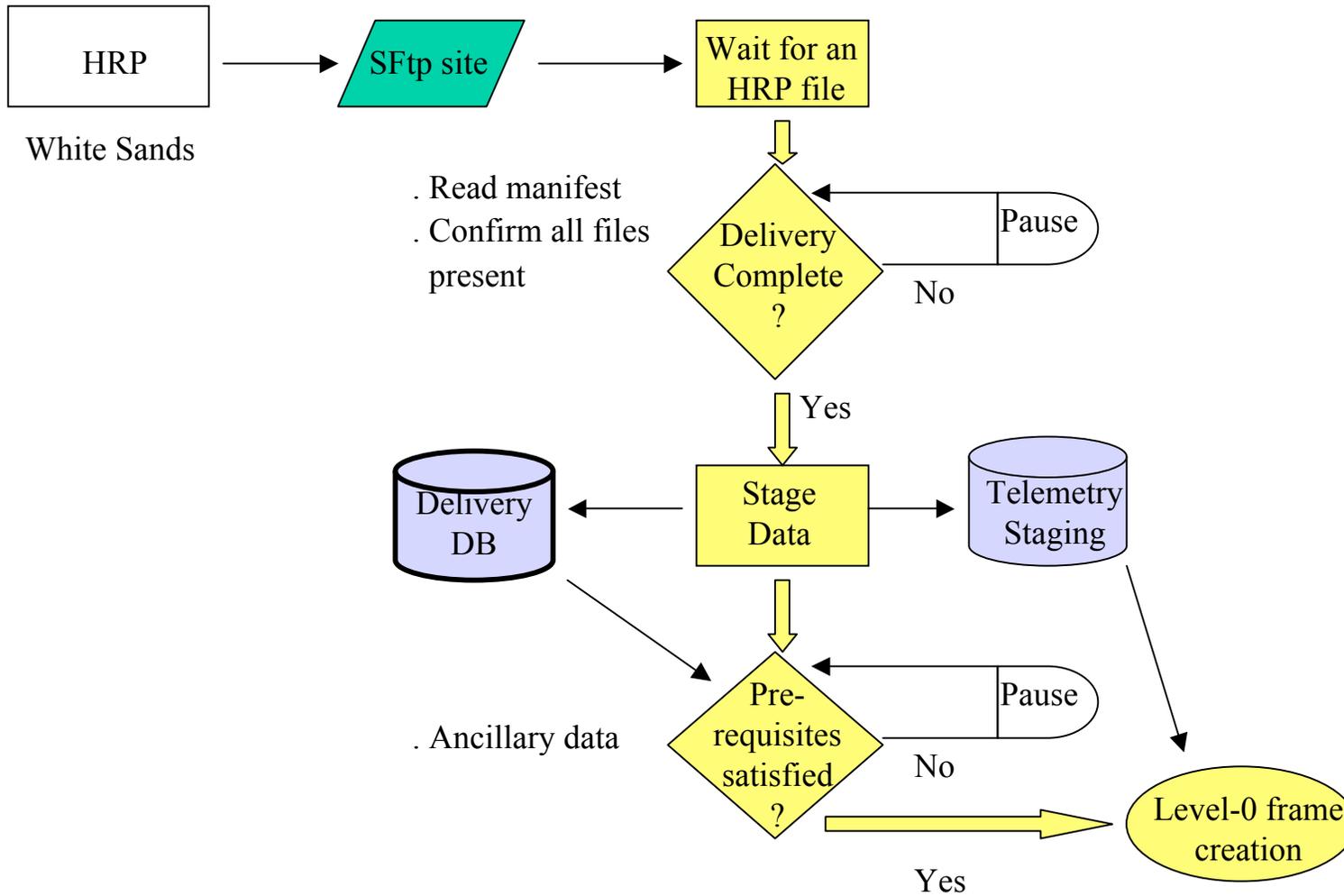


# Overview



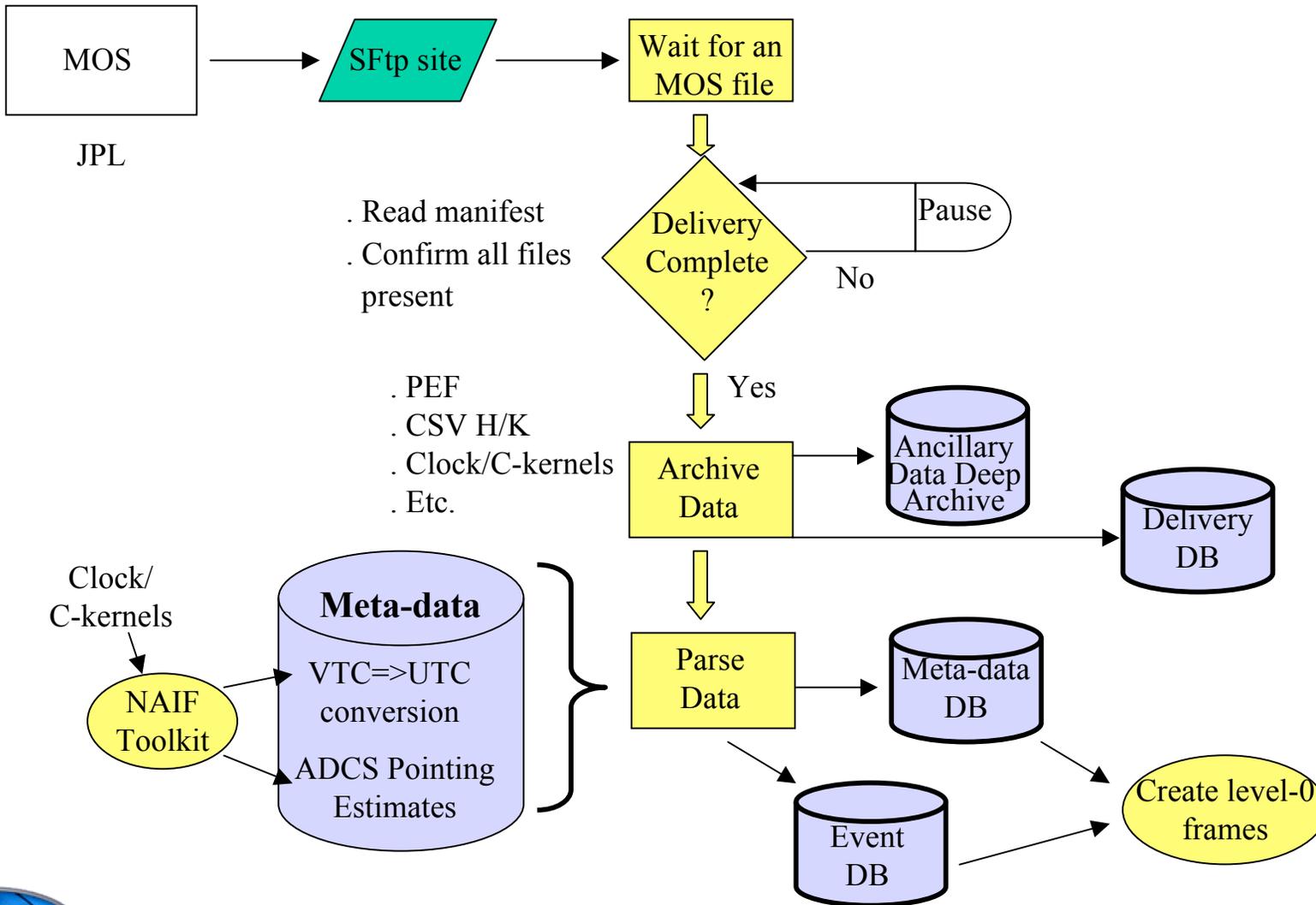


# Image Telemetry Receipt



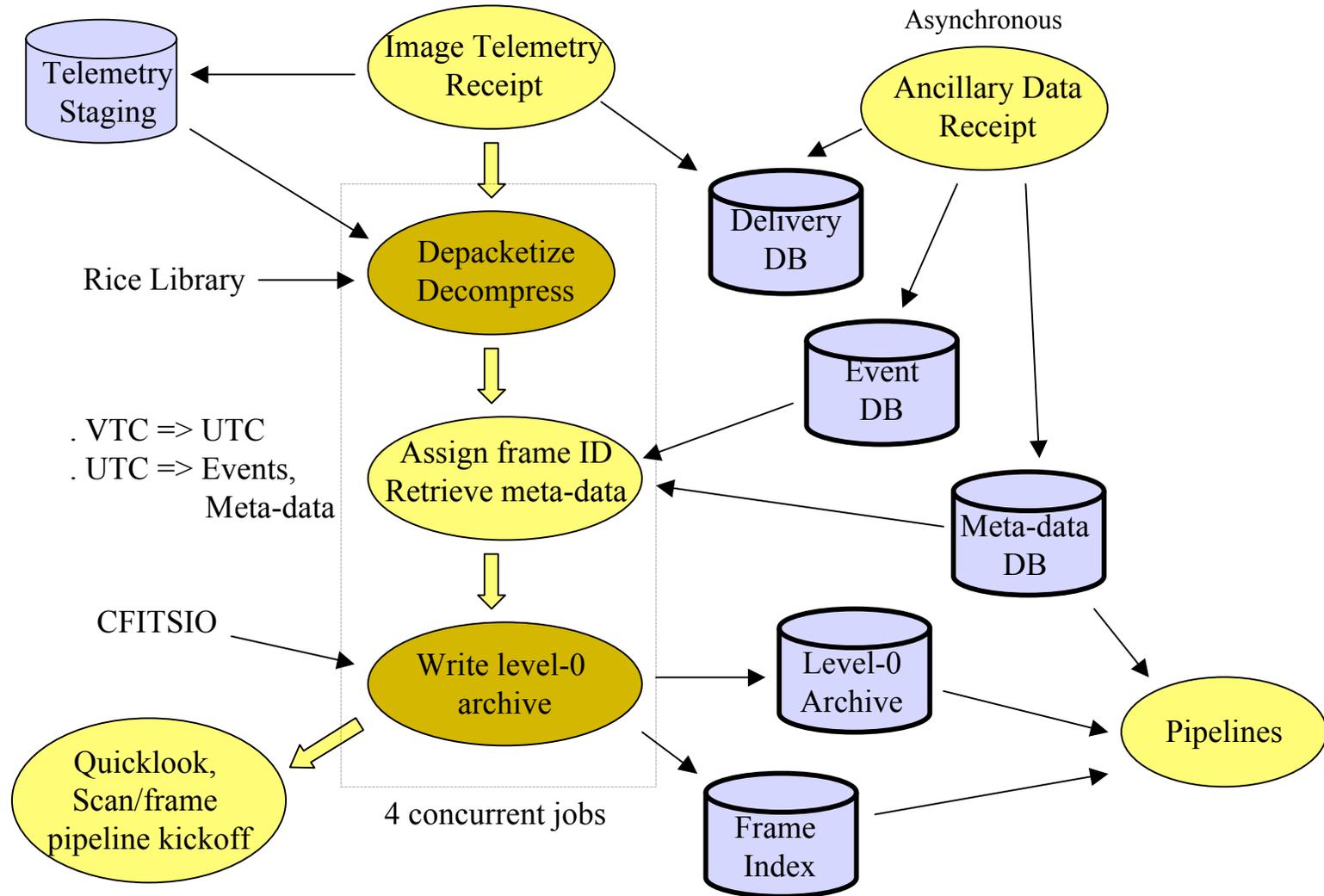


# Ancillary Data Receipt





# Level-0 Frame Creation





# Image Telemetry Handling



- Corrupted images are discarded
  - If an image is damaged in any way in transmission between detector and ground, it cannot be used
  - It is unlikely such images will be replayed
- Incomplete images are discarded; they cannot be reconstructed
  - Downlink gaps due to transmission dropouts will be recovered if the gap size exceeds a replay threshold
    - Replaying is scheduled without WSDC input since it must happen quickly
    - Exact replay protocol still to be negotiated between MOS and WSDC
  - Partial images at the start/end of downlinks will be covered by other downlinks
- Duplicate images (as per the frame index) are discarded
- Framesets with missing bands are processed as fully as possible





# Frame Index

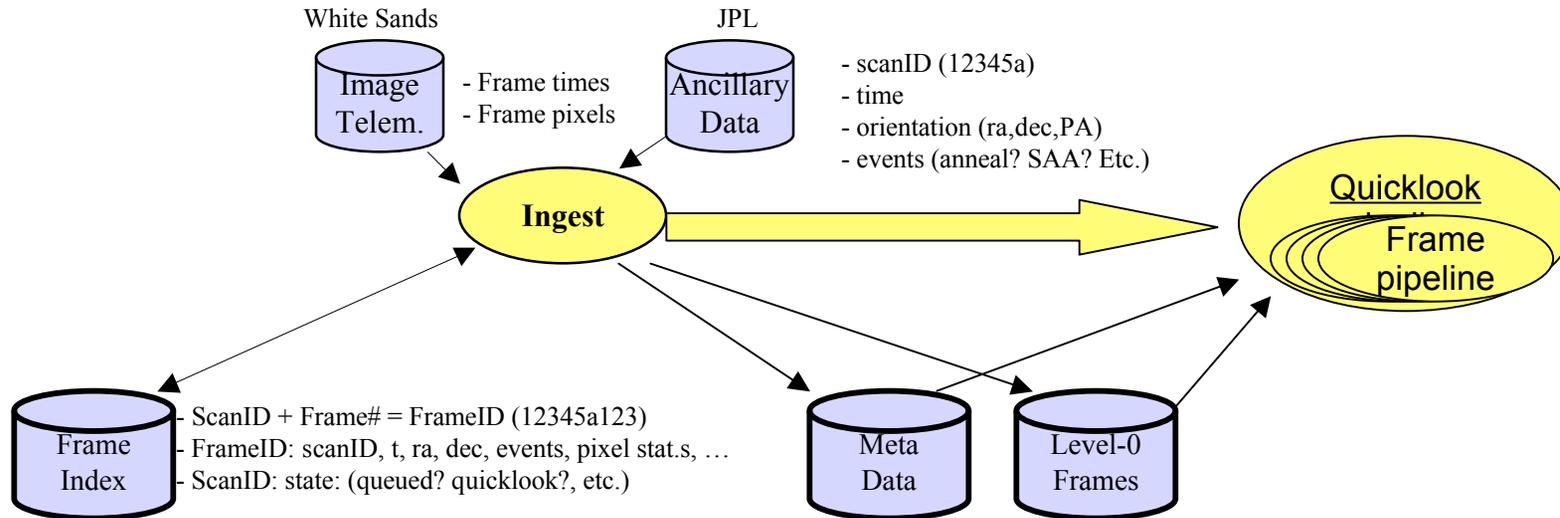


- Used for
  - Deciding on completeness of a scan
  - Frame searches
    - Position, time, grade (Coadd)
    - Position, time, image stats, events, grade (dynamic ICal)
    - Delivery, time, image stats, events, grade (Quicklook)
    - Scan (QA)
- Columns (\* = indexed)
  - Identification: vtc\*, utc\*, deliv\_id\*, scan\_id\*, frame\_num, frame\_id\*, band
  - Delivery: deliv\_utc\*, deliv\_sz, deliv\_file, level0\_file
  - Position: ra\_raw, dec\_raw, pa\_raw, ra\_raw, dec\_raw, pa\_raw, hpbin\_coarse\*, hpbin\_fine\*
  - Events: orbn, saa\_stat, sci\_stat, anneal\_stat, anneal\_dt, frame\_dt, tdrss\_dt
  - Image stats: ave, min,max,med, sig, psig, p1, p5, p16, p84, p95, p99, p999, etc.
  - Other: hk\_utc, pipe\_rel, pipe\_utc, pipe\_stat, ingest\_grade, qa\_grade





# Quicklook Kickoff



- Choose frames for quicklook processing based on info in the frame index
  - In current delivery
  - Position (away from GP, LMC, etc.)
  - Events (away from SAA, anneals, etc.)
  - Image statistics (normal looking pixel histogram, normal source density)
  - Etc.

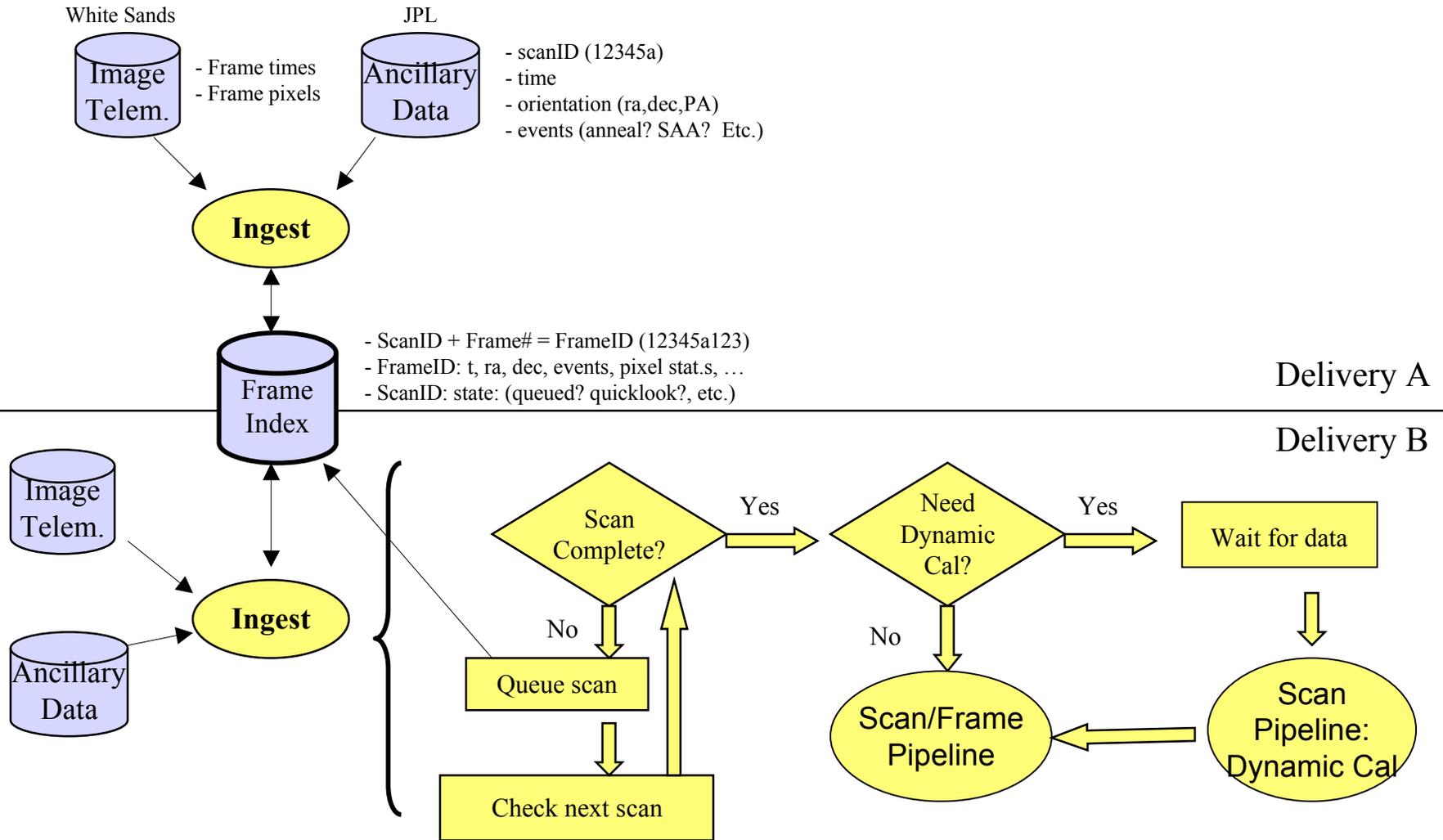




# Scan Pipeline Kickoff



WSDS Design





# Schedule



- WSDS v0: Oct. 15 '07
  - Prototype: depacketize, decompress, FITS files
- WSDS v1: July 17 '08
  - Prelim: depacketize, decompress, FITS files
  - Prototype: image/ancillary receipt, frame index, delivery/event/meta-data DBs, kickoff logic
- WSDS v2: Feb. 28 '09
  - Complete: All
- WSDS v3: Aug. 4 '09
  - Mature: All
- WSDS v3.5: Jan. 26 '10
  - No change
- WSDS v4: Oct. 18 '10
  - No change

