Science Operations Center Requirements

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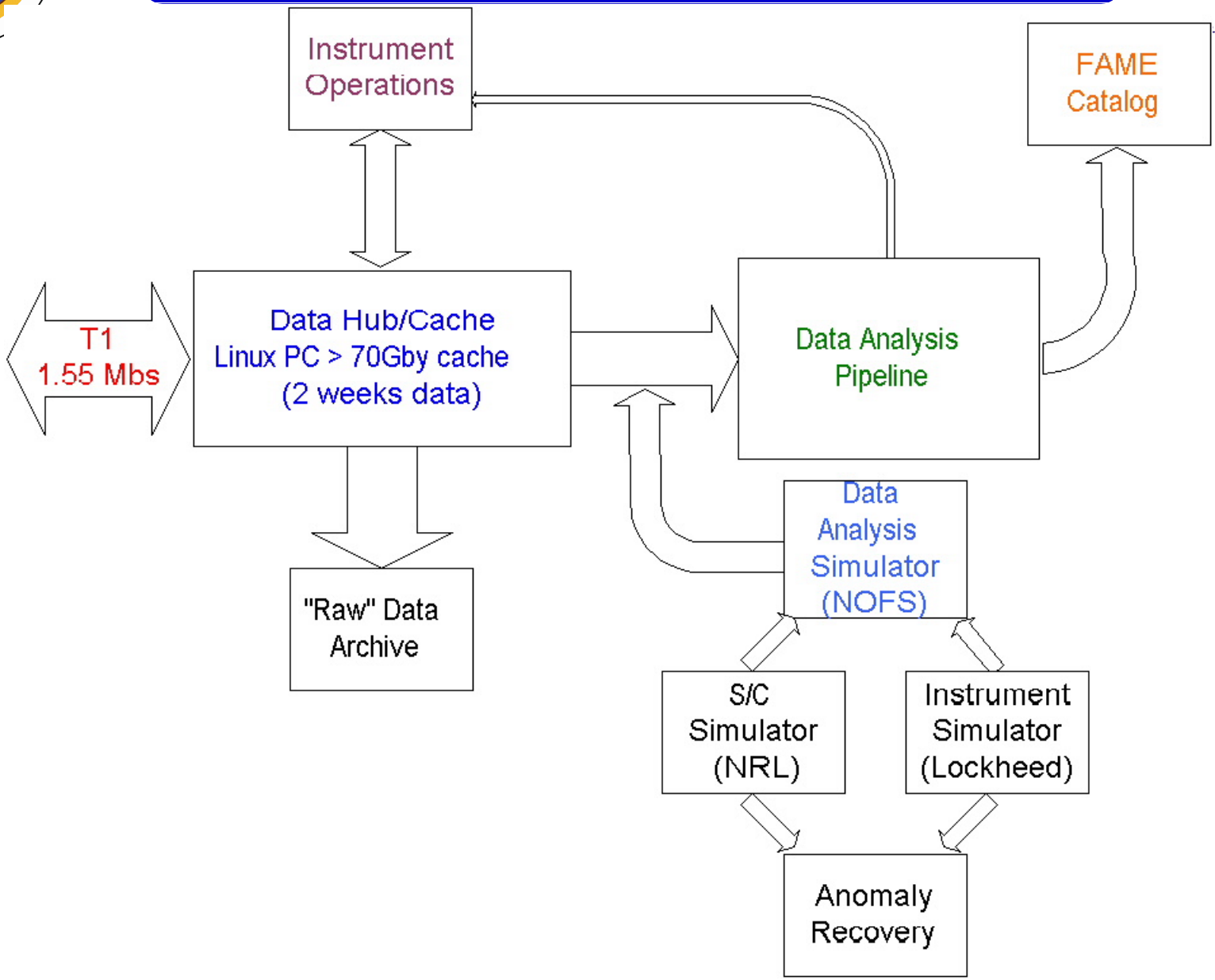
SOC Characteristics

- Science Operations Center (SOC) is part of the FAME observatory ground segment.
- SOC is located at USNO-DC
- SOC has two primary functions/components
  - Operate the Instrument
    - Instrument Management & Planning
    - Monitor Instrument SOH
    - Operate a First Look and Troubleshooting Pipeline
  - Operate the Data Analysis & Reduction Pipeline

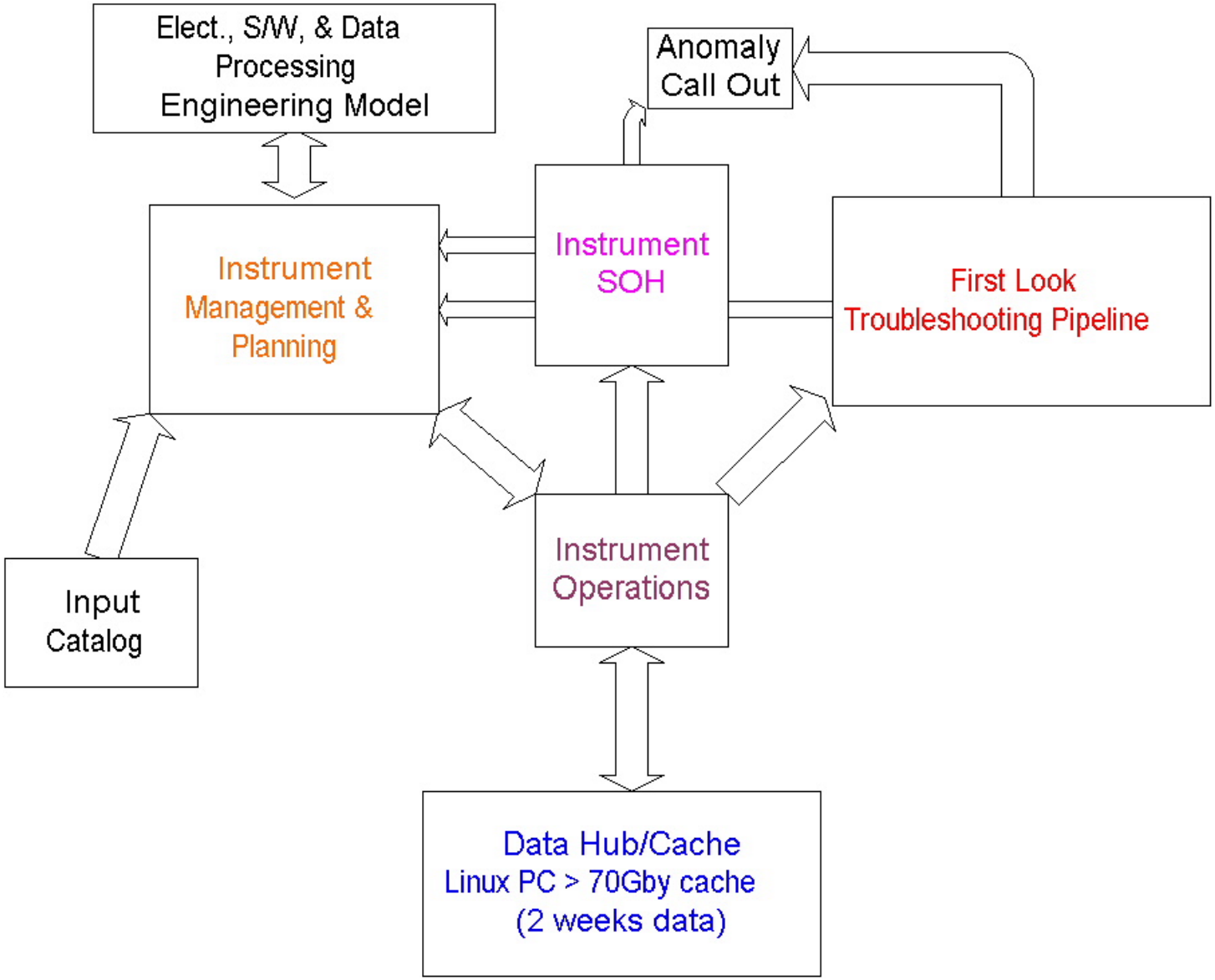
SOC

T-1 Link from BP Mission Operations Center (MOC)
Interfacility Communications
Color Laser Printer
B/W Laser Printer
Internet
Web Server with Firewall
Ultra 60
Ethernet Switch
Ultra 10
Ultra 10
Secure Remote Access
Ultra 60
DVD Raw Data Archive
DVD Data Archives
Sun Multi-processor Pipeline Engine
Disk Farm 182 GByte

SOC Operations



SOC Instrument Operations



SOC Requirements

- Receive from MOC all S/C data streams relevant for instrument operations and science data analysis.
- Archive data streams along with critical intermediate products of the astrometric/photometric data analysis pipeline
- Monitor the on-orbit FAME observatory, particularly the instrument.
- Operate the on-orbit FAME observatory instrument.
- Provide on-orbit mission and instrument planning.
- Employ Electronics, Software, and Data Processing Engineering Model to develop, test and verify instrument scripts (Instrument Simulator deliverable)
- Provide near real-time analysis of FAME observatory science data employing a First Look and Troubleshooting Pipeline. Confirm stellar image detection, monitor image quality, determine satellite attitude. Science data anomalies trigger recovery activities in cooperation with the MOC.
- Staffed normal working hours, but with auto anomaly call-out

SOC-Data Analysis/Processing

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SOC-Data Analysis Organization

- Pipeline Data Analysis Group Established Nov 01 (George Kaplan, USNO-DC)
  - Pipeline Algorithm Development (George Kaplan) (5FTE, 3PT)
  - Production Code Team (Software Project Manager, TBN)

- Data Analysis Simulator Group Established Nov 15 (Jeff Pier, USNO-Flagstaff) (personnel 5 NOFS, 1 DC)

- 1st versions of Developments Plans for both the Pipeline and Simulator are available on the Web site.

SOC-DA Requirements

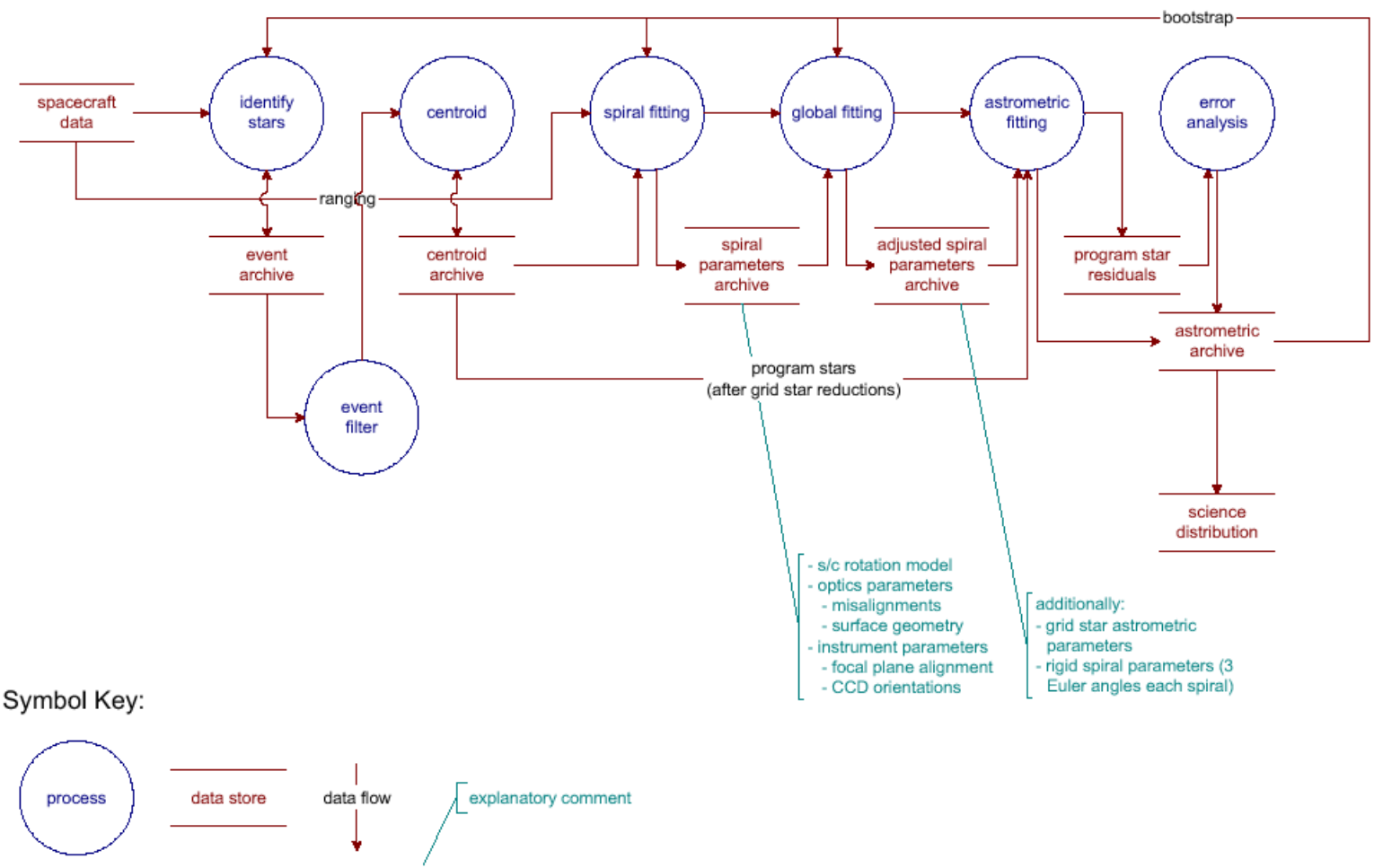
- **Produce mission science deliverables: operate an astrometric/photometric data reduction pipeline.**

- **Test/verify correct operation of the D-R pipeline: develop an astrometric/photometric mission data simulator.**
  - **Employ Lockheed Instrument Simulator(s) as input to DA Simulator, and for on-orbit anomaly recovery**
  - **Employ NRL S/C Simulator(s) as input to DA Simulator, and for on-orbit anomaly recovery**

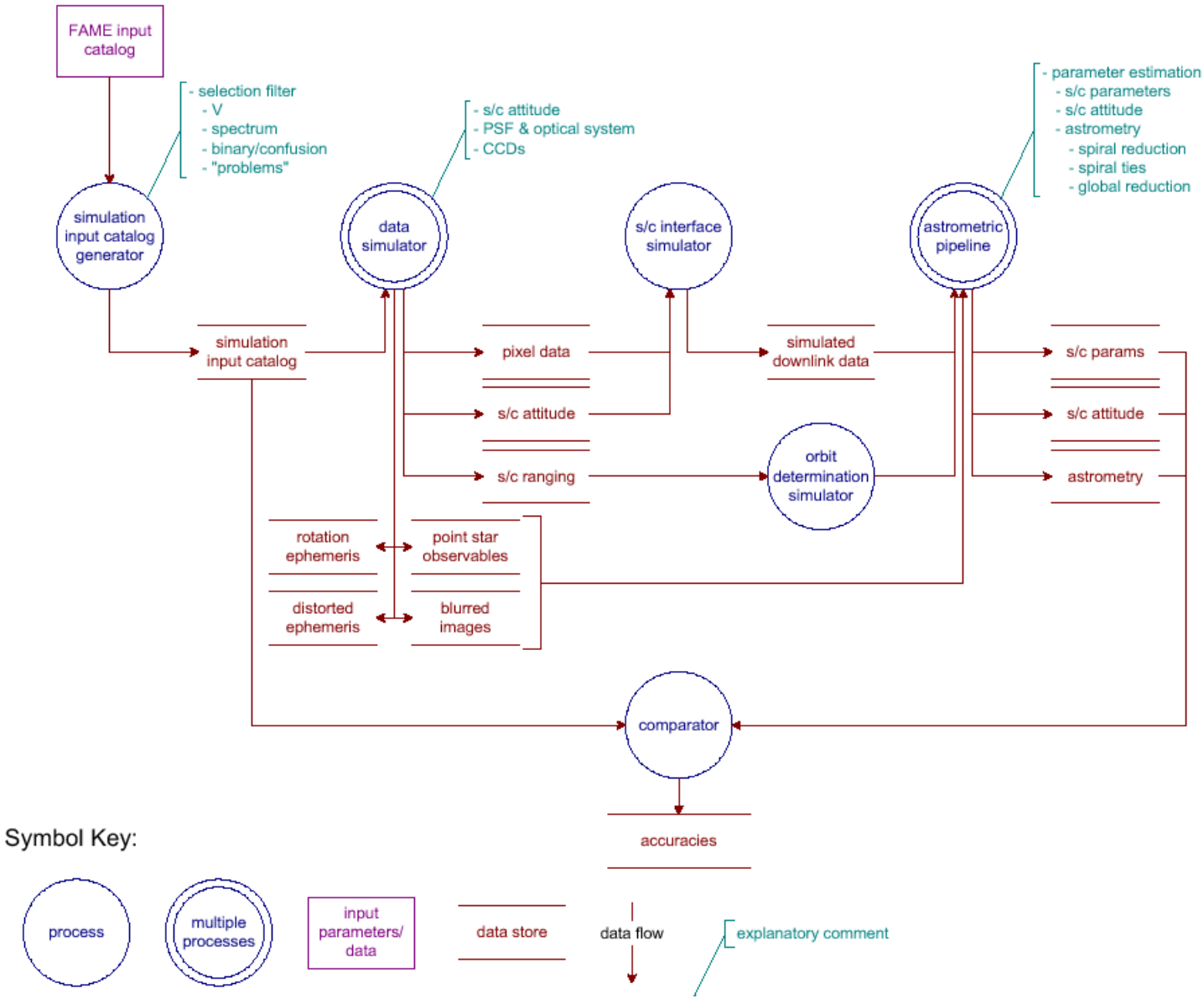
- **Provide the FAME science deliverables:**
  - **Input Catalog – the basic list of targets for the FAME mission – positions to 0.1 arcsecond – 100,000+ grid stars – carried on-board the FAME instrument for real-time use. Delivered to the FAME Science Team for review 1 year prior to launch. Reprogrammable after launch.**

  - **Science Catalog – astrometric & photometric parameters of the stars observed during the FAME mission. Final FAME catalog meets the accuracy requirements of the FAME Sci. Req. Doc. 1st FAME catalog delivered 1 calendar year after the end of the baseline mission. 2nd FAME catalog delivered 1 calendar year after the end of the extended mission.**

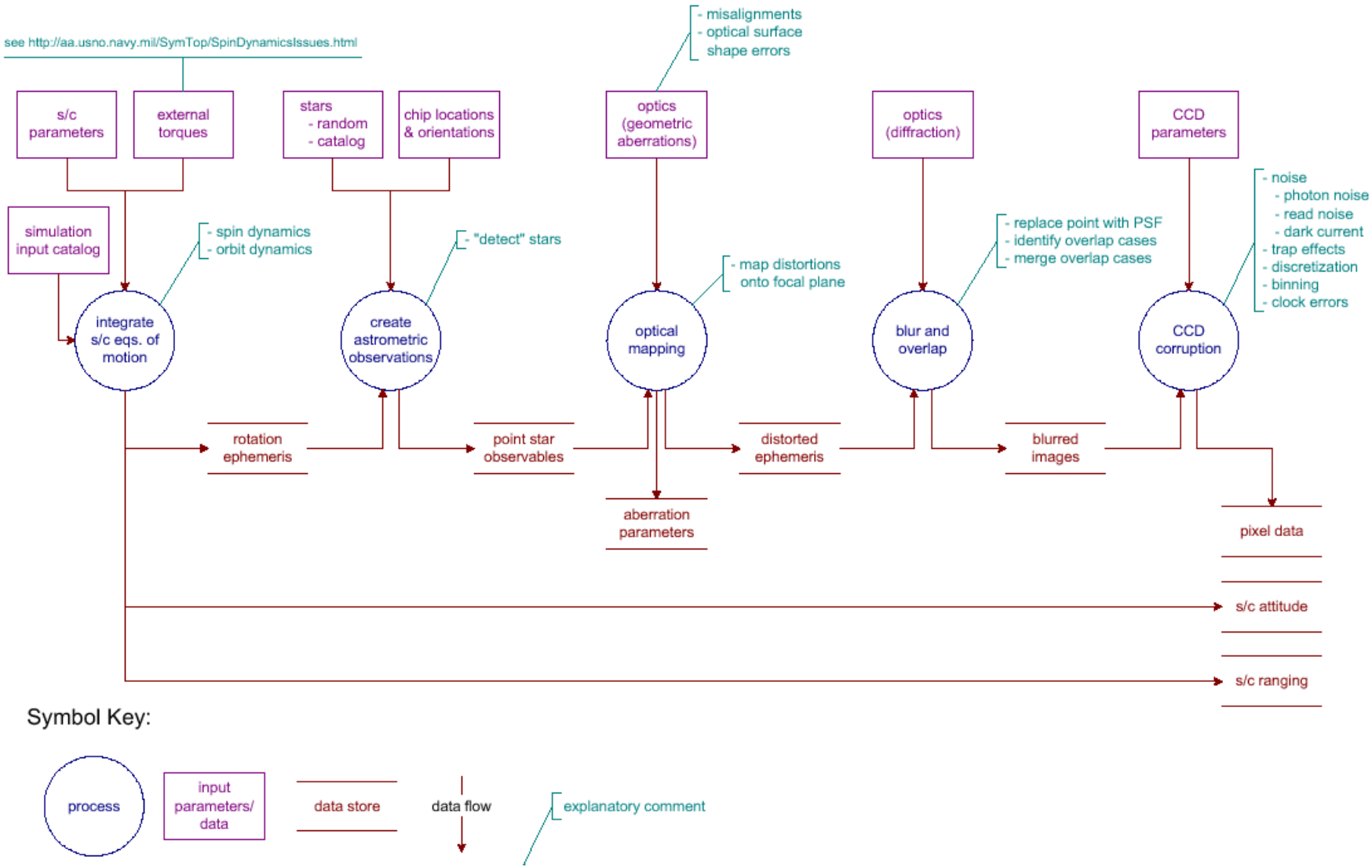
SOC Data Analysis: Astrometric Pipeline (9 November, 2000)



SOC Data Analysis: Simulator Overview (9 November, 2000)



SOC Data Analysis: Data Simulator (9 November, 2000)



SOC-Data Analysis Milestones

- 01 Nov 00 Estab. Pipeline Algorithm Dev. Team
- 15 Nov 00 Estab. Simulator Dev. Team
- 15 Dec 00 FAME Pipeline Dev. Plan Document (1st release)
  - 02 Jul 01 final version
- 15 Dec 00 FAME Data Simulator Dev. Plan Document (1st release)
  - 02 Jul 01 final version
- 01 Mar 01 Prototype Simulator
- 02 Apr 01 Prototype Pipeline

SOC-Data Analysis Milestones

- 02 Apr 01 Pipeline/Simulator studies begin using prototype pipeline/simulator
  - Report 01 Jun 01
- 02 Apr 01 S/W Project Manager on-board
- 02 Jul 01 Pipeline Code Development Plan Document delivered
  - Pipeline Dev. and Simulator Dev. Also delivered 02 Jul 01
- 02 Jul 01 SOC Development Plan Document delivered
- 01 Aug 01 Mission Science Data Analysis Document delivered
- 03 Sep 01 Establish Pipeline Code Development Team, begin construction of Production Pipeline

SOC-Data Analysis Milestones

- 31 Dec 02 End-to-End Production Pipeline Available
- 31 Dec 03 Production Pipeline Complete
- Oct/Nov 04 Begin On-Orbit Data Collection and Analysis
- Launch + 3 ½ years Release first Catalog
- End of Extended Mission + 1 year Release Second Catalog