

# **STEREO Mission Operations**

**Early Mission Definition  
Conceptual Design**

**CONOPS**

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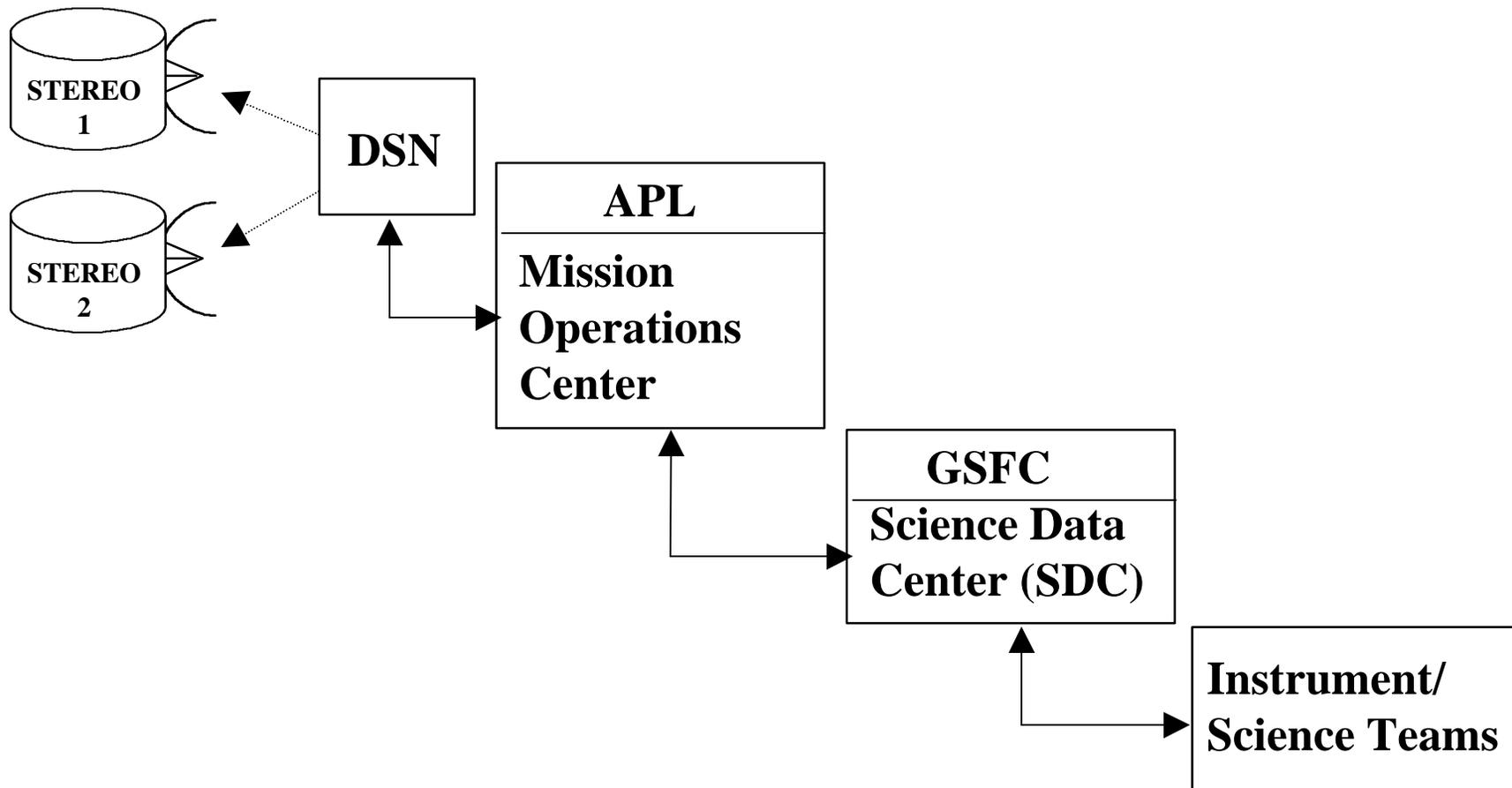
## STEREO Mission Operations

# Requirements

- **Designed to support I&T, launch, early orbit checkout, and the first 800 days of the mission.**
- **Decoupled instrument commanding/assessment via Science Data Center (SDC) at GSFC.**
- **One contact/day/vehicle.**
- **Playback high rate data on each pass.**
- **Support I&T and Ops for two concurrent S/C.**
- **Maintain UT to MET correlation to within 0.5 seconds and provide correlation data to GSFC.**
- **Provide capability to schedule and support urgent DSN contacts to support broadcast (space weather) emergencies.**

## STEREO Mission Operations

# Data Flow



STEREO Mission Operations

# Planning and Assessment Tasks

- **Contact planning.**
- **SSR management.**
- **Timekeeping management.**
- **S/C bus performance evaluation.**
  - **Web-based reports and MOPS products (NEAR).**
- **Anomaly investigation/resolution.**

**STEREO Mission Operations**

# **Autonomous Operations**

- **Normal Ops: Day shift only, 5 days/week.**
- **Mission well suited for implementing various autonomous operations:**
  - **Unattended contacts (NEAR).**
  - **Use automated paging for alarms with supplemental email with detailed information (TIMED Implementation).**

## STEREO Mission Operations

# Design Drivers/Trade Studies

- **Final mission design.**
- **On board navigation.**
- **Autonomous HGA pointing.**
- **Autonomous wheel desaturation.**
- **Autonomous power management.**
- **Investigate APL 10M antenna for Early Ops telemetry only use.**
- **Lockheed Martin Space Mission Systems (CSOC) management of DSN.**
- **Science Team to Mission Operations Team Interface.**
  - **Overwriting SSR data.**

## STEREO Mission Operations

# Spacecraft Design Recommendations

- **Use a Standard Command Format.**



- No state dependent commanding.
- **S/C ID (leading/lagging) in each command message.**
- **Common Data Structure command format.**
  - Data structure IDs and XOR checksums.
- **Avoid sub-commutating housekeeping telemetry.**

## STEREO Mission Operations

# Spacecraft Design Recommendations

- **Provide functional verification of command execution in telemetry (all processors).**
- **Provide command reject counter and last command executed telemetry (all processors).**
- **Provide a command history buffer (size = 1 day of commands).**
- **Provide a critical telemetry history buffer (telemetry processors).**
  - **Adaptable telemetry points and sampling time.**
- **Use the Frame Error Control Field (part of CCSDS packetization) for each minor frame of housekeeping telemetry (telemetry processors).**
- **Provide a built-in test pattern for SSR performance assessment.**