

Hardware and Software Development for MOSES II Flight Operations

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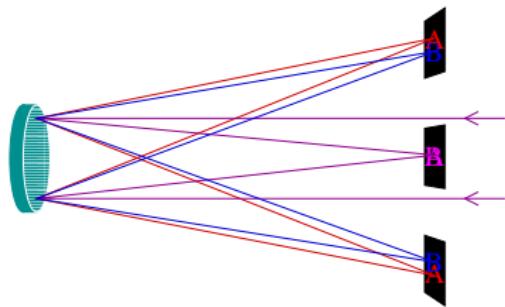
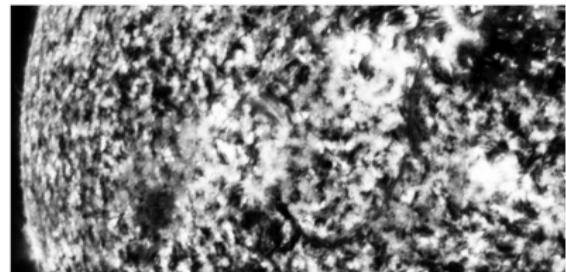
May 1st, 2015

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MOSES Scientific Goals



- hey!



First Launch



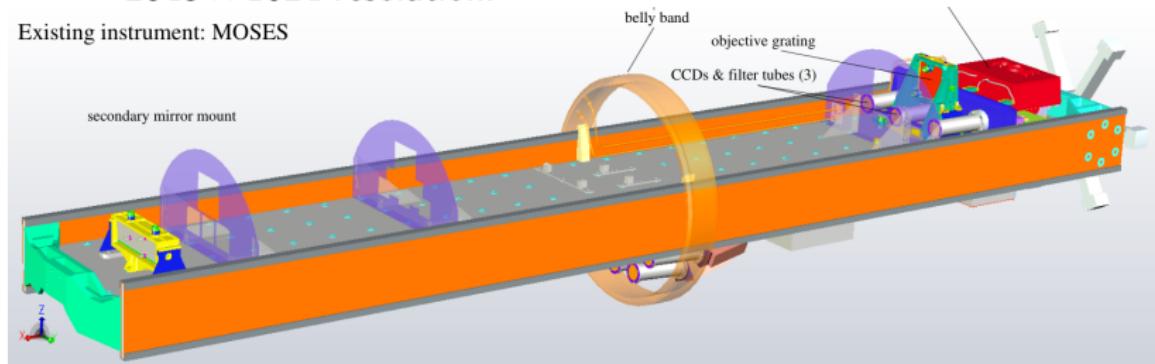
- MOSES first launched in February 8th, 2006 [1].
 - Utilized a Black Brant IX sounding rocket
 - Observed the Sun in He II 304 Å
 - Identified a Transition Region Explosive Event.
 - Payload was retrieved with data intact.
 - Flight computer was damaged after launch.
We hypothesize that it was damaged after splashdown into atmosphere.

System Requirements



- Data characteristics
 - MOSES captures the sun in three spectral orders $m = -1, 0, 1.$
 - Each spectral order is captured by CCDs at 2048×1024 resolution.

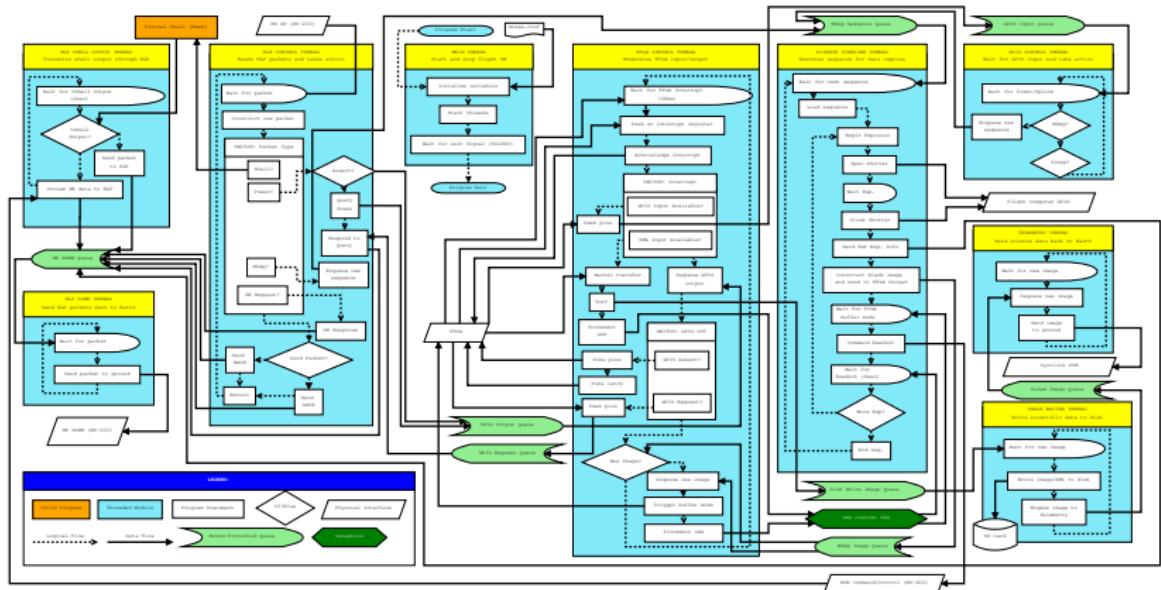
Existing instrument: MOSES



Hardware Overview



Flight Software





Ground Station Software

- Server module
- Client module
- Grounded communication
 - Serial console
 - Ethernet
- In-flight communication
 - Housekeeping Link Protocol (HLP)
 - Timers
 - High-speed telemetry

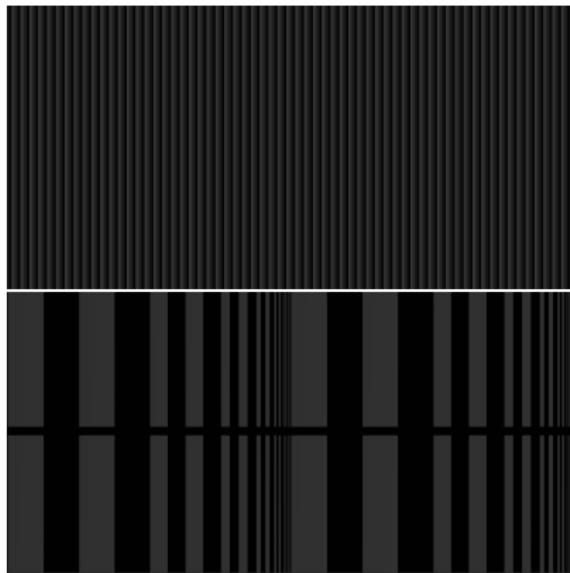
Two screenshots of the Moses software interface. The top screenshot shows the "Moses Server" window with tabs for "Uplink Com Port" and "TCP IP Server". It includes dropdown menus for port, baud rate, and parity, along with buttons for disconnect, connect, and start/stop. The bottom screenshot shows the "Moses Client" window with tabs for "Received Data" and "Timers Shell Power Housekeeping Custom Uplink HDAC". The "Received Data" tab displays a log of messages, including:

```
Apr 22, 2015 8:50:45 PM: %205904MBSQ01/"  
Apr 22, 2015 8:50:05 PM: %205903UDX101%"  
Apr 22, 2015 8:50:03 PM: %205903UDX101%"  
Apr 22, 2015 8:50:01 PM: %205903UDX101%"  
Apr 22, 2015 8:50:00 PM: %205903UDX101%"  
Apr 22, 2015 8:50:45 PM: %205904MBSQ01/"
```

The "Timers Shell Power Housekeeping Custom Uplink HDAC" tab contains various configuration options for timers, shell scripts, power management, and housekeeping.

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Capturing Data



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Data Retrieval



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Next Launch



References



-  Charles C. Kankelborg J. Lewis Fox and Roger J. Thomas.
A transition region explosive event observed in He II with the
moses sounding rocket.
The Astrophysical Journal, 719:1132–1143, August 2010.
[http://solar.physics.montana.edu/MOSES/papers/
2010/FoxKankelborgThomas2010.pdf](http://solar.physics.montana.edu/MOSES/papers/2010/FoxKankelborgThomas2010.pdf).