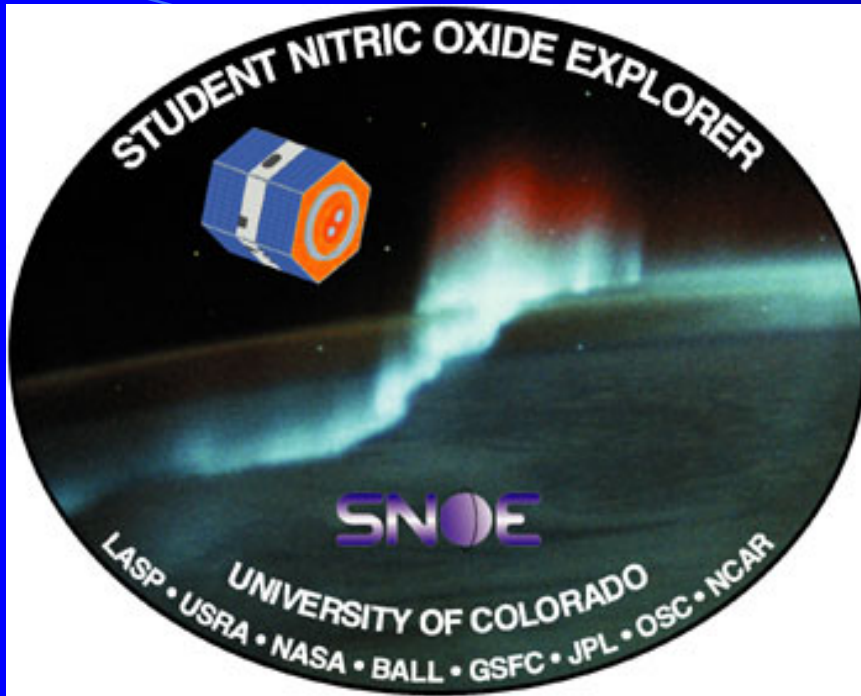


SNOE



Feb 1998

to

Dec 13th 2003

Outline

- SNOE Overview
 - Science Objectives
 - Initial Orbit vs. Final Orbit
 - Instruments
- Lessons Learned
 - Toggle Commands
 - Documentation
 - Error Check Commands



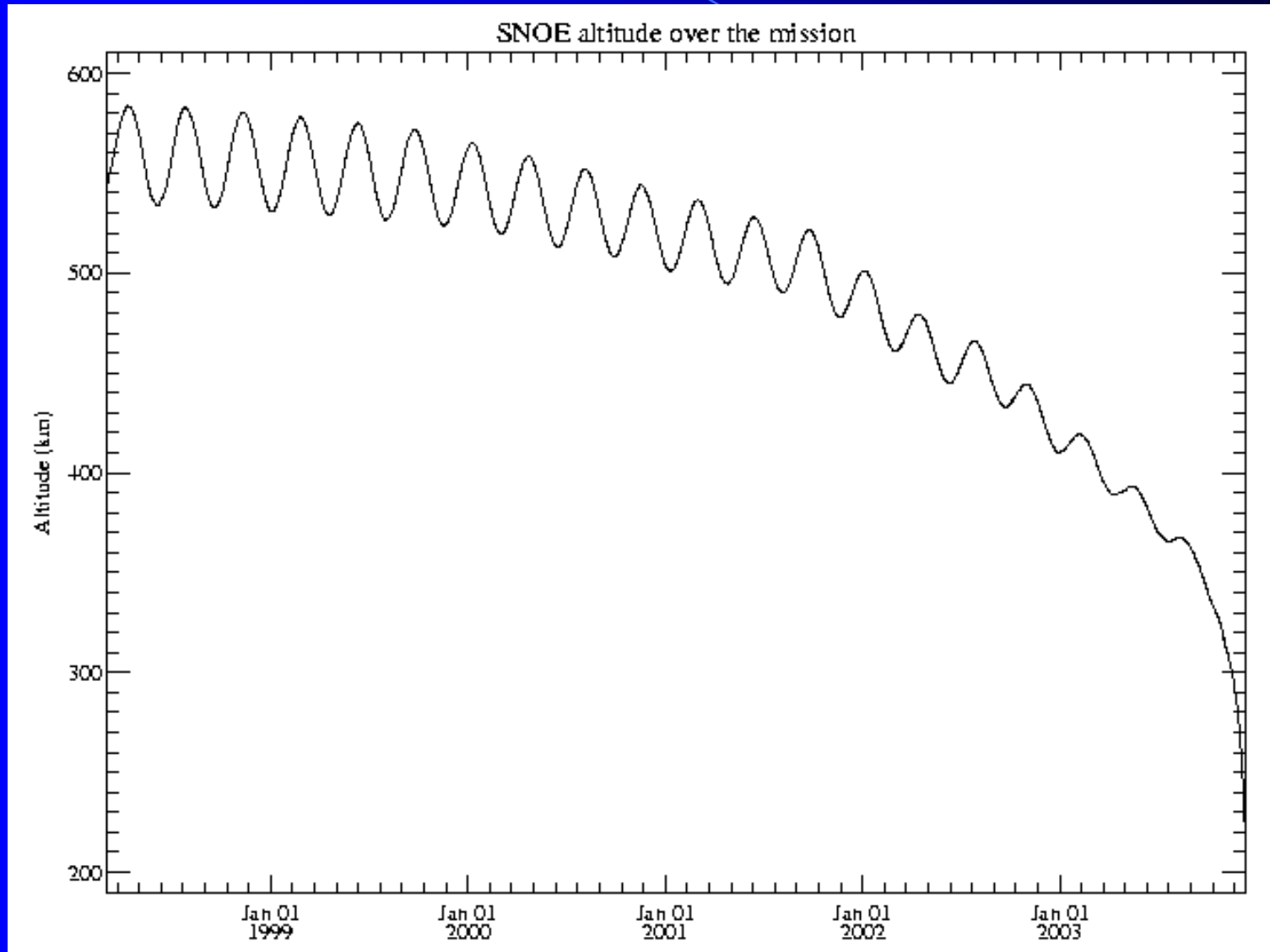
SNOE Science Objectives

- Study nitric oxide (NO) in the earth's upper atmosphere
 - Measure the effect of solar soft x-rays on NO production in the thermosphere
 - Measure the effect of the aurora on NO
- Why Study NO?
 - Breaks down ozone
 - Infrared radiator

Initial Orbit vs. Final Orbit

- Feb 1998 (launch)
 - 550 km circular orbit
 - 10:17 am/pm sun synchronous
 - Study peak auroral activity (midnight)
- Today
 - 200 km near-circular orbit
 - 4:45 pm/am orbit sun synchronous
 - High drift rate due to launch vehicle being off by two lbs.

Orbit Decay

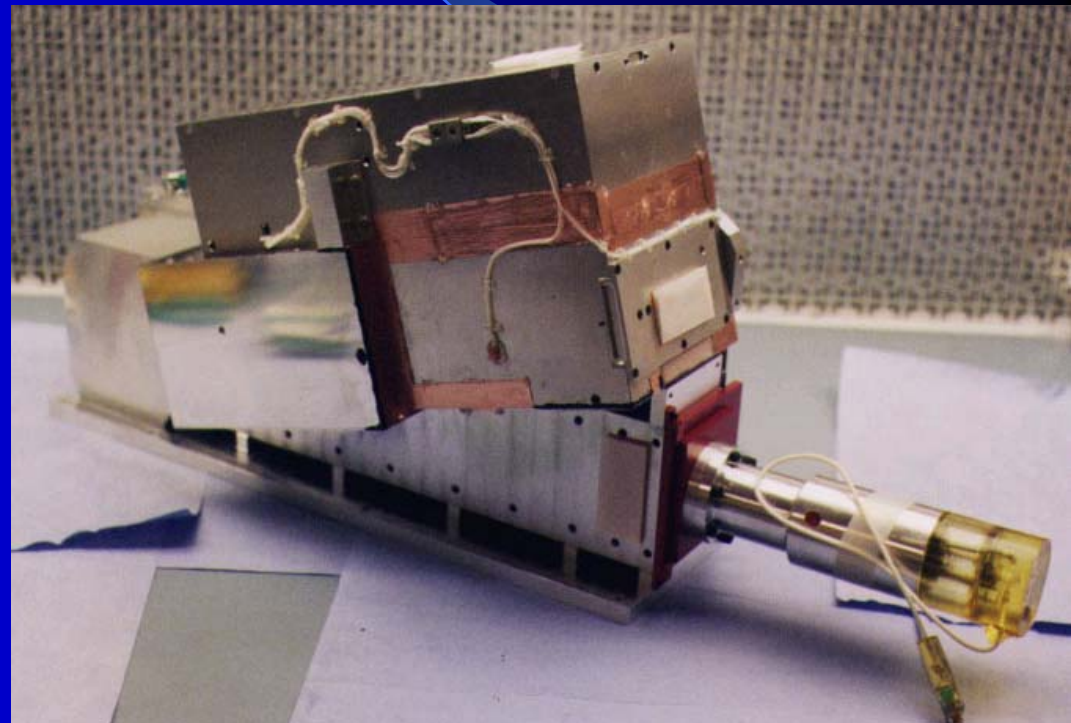


SNOE Attitude

- Spin Stabilize
 - 5 rpm
- Open loop ADCS control
 - Downlink HCI data
 - ADCS team member process data
 - Upload the maneuver
 - Torque Rods only

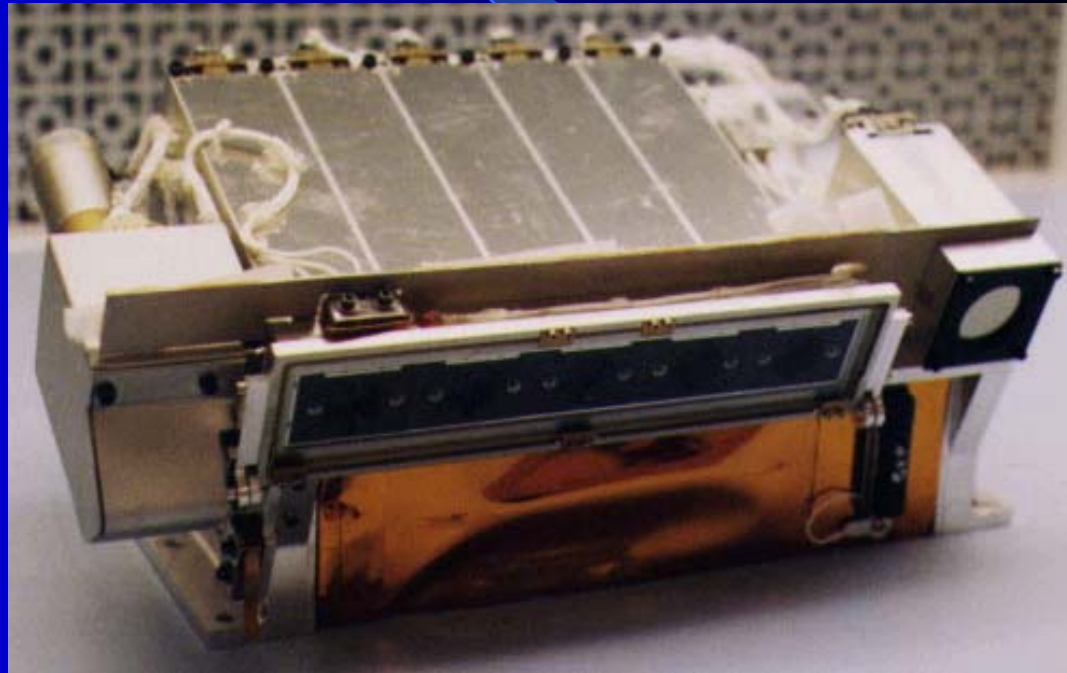
Ultraviolet Spectrometer (UVS)

- Measured NO
- altitude range 13-213km
- Currently still working
 - 50 % percent increase in NO during the October solar storms



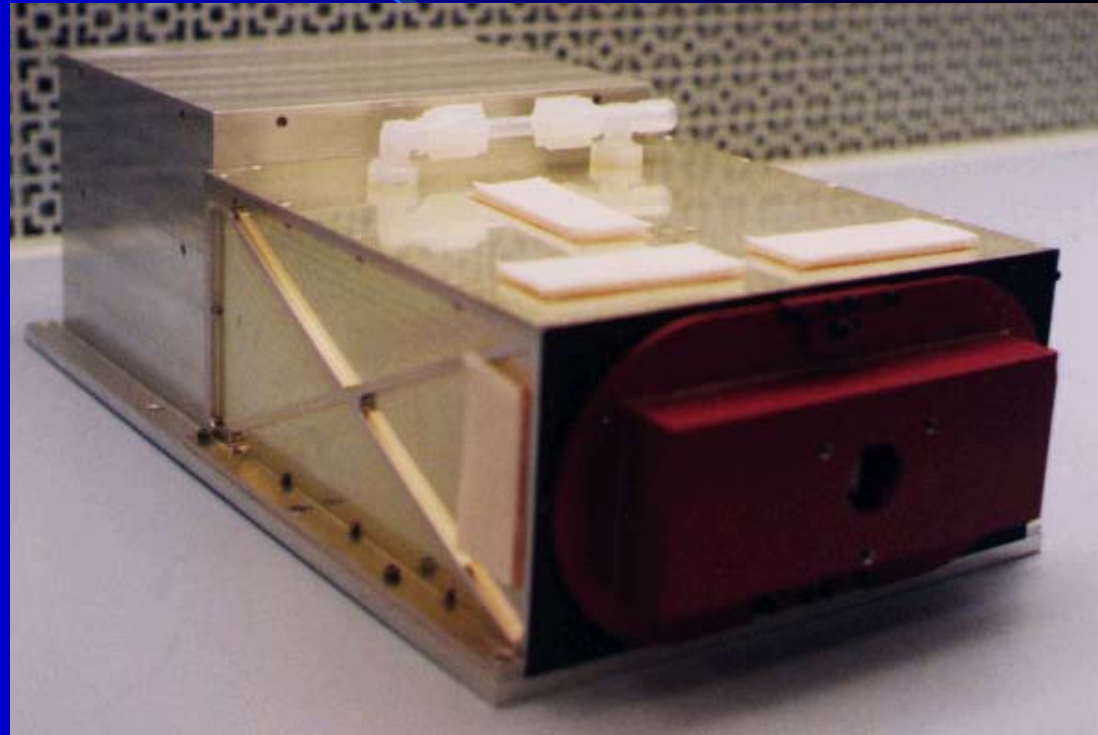
Soft X-Ray Photometer (SXP)

- Measured soft X-rays
- Currently turn off
 - Due to changes in the beta angle
 - Can no longer see the sun



Auroral Photometer

- Measure energy deposition due to aurora
 - Failed on orbit
 - Contamination of the lens



Lessons Learned (toggles)

- Toggle Commands are bad
 - Commanding to/from unknown state
 - Blind Acq.
 - Transmitter is supposed to be on
 - No data
 - Send Toggle transmitter command
 - Is the transmitter now on or off
 - Workaround: code load

Lessons Learned (Documentation)

- Documentation is help
- Example
 - SNOE's battery are getting cold
 - Due to increasing sun angle
 - Found command for battery heaters
 - Not mention in the Users Guide

Lessons Learned (Commands)

- Error check all commands
 - SNOE has 3 hardware commands
 - reboot spacecraft
 - No error checking (8 bit command)
 - Results in a reboot once per 30 days
 - Noisy carrier sweeps
 - adding a parity bit (9 bits) would reduce the probability to 1 per 5 years

Questions?

The background is a solid blue color with a gradient. A thin, light blue curved line starts from the left edge and curves downwards towards the bottom right. A larger, light blue shape, resembling a quarter-circle or a sector of a circle, is positioned in the bottom right corner, overlapping the main blue background.