Thermal Camera For Climate Change Prevention

Ramses Alcaide — Team Lead

John Thomson — Electrical Lead

Adrian Haruta — Mechanical Lead

ICARTT: COORDINATED ATMOSPHERIC CHEMISTRY CAMPAIGN OVER EASTERN NORTH AMERICA AND NORTH ATLANTIC IN SUMMER 2004

ICARTT Focus areas: regional air quality, intercontinental transport, and radiation balance

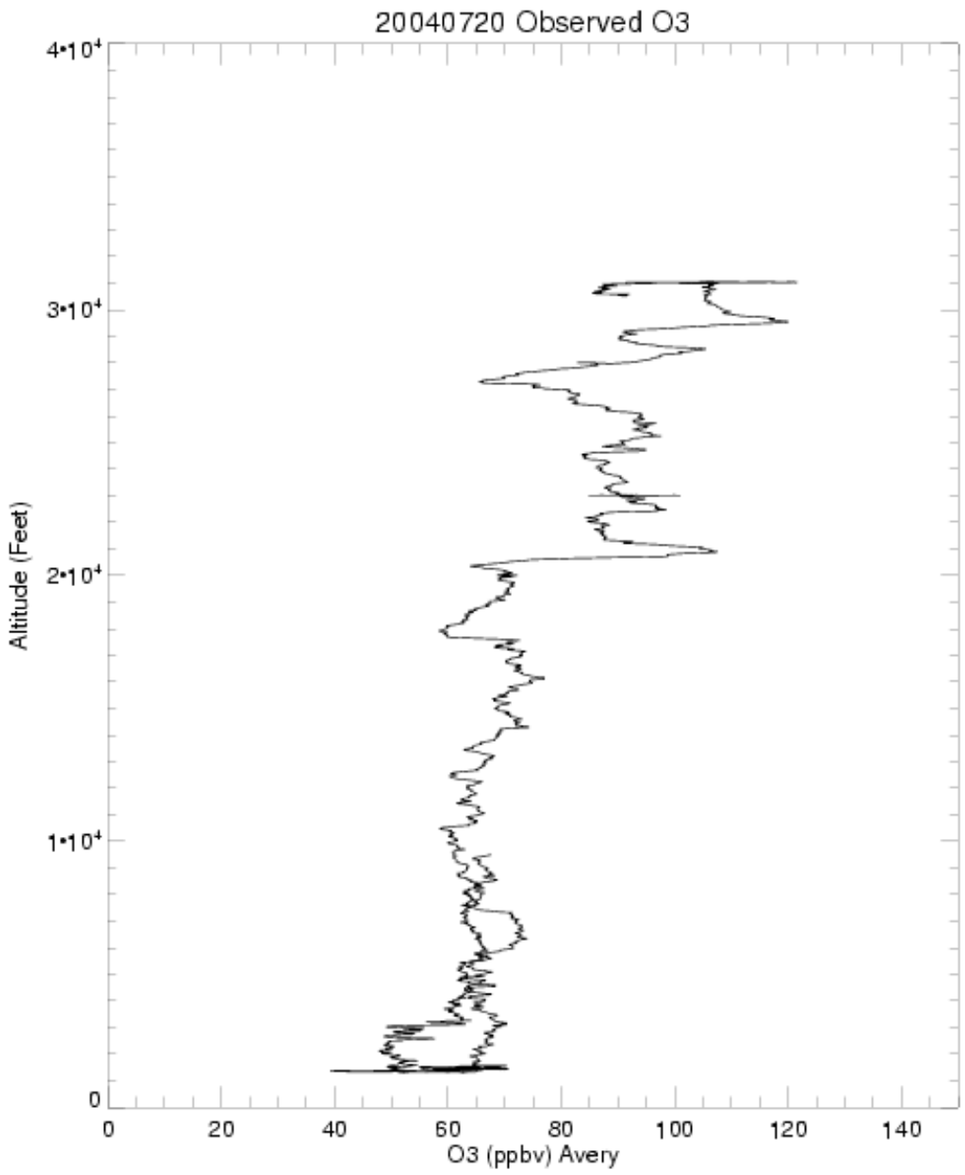
NASA Intercontinental Chemical Transport Experiment- North America (INTEX-NA) mission

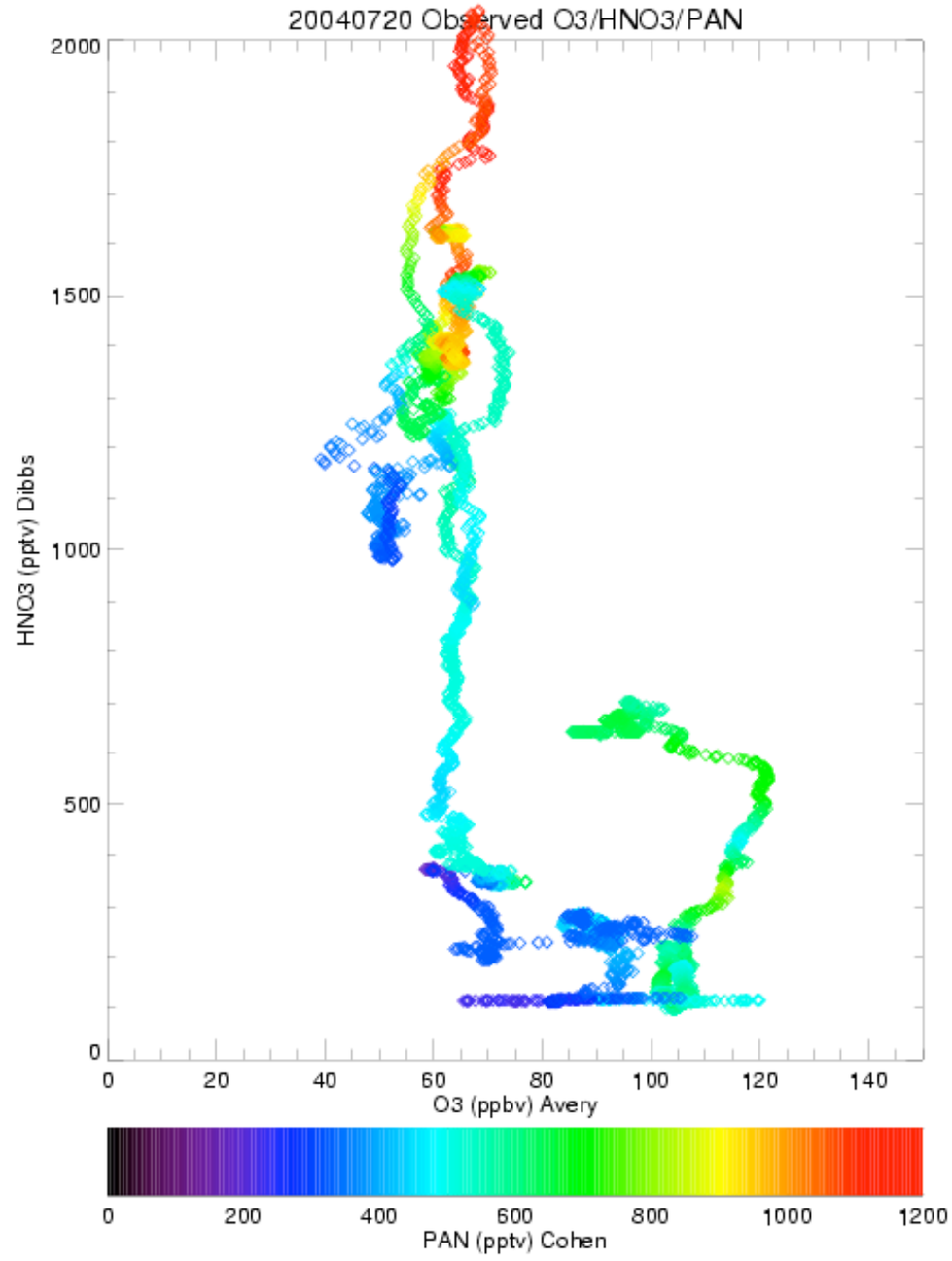
NOAA New England Air Quality Study (NEAQS) mission

EU International Transport of Pollution (ITOP) mission

JULY 20, 2004

DC-8 In-situ chemical properties: NC/VA flight leg





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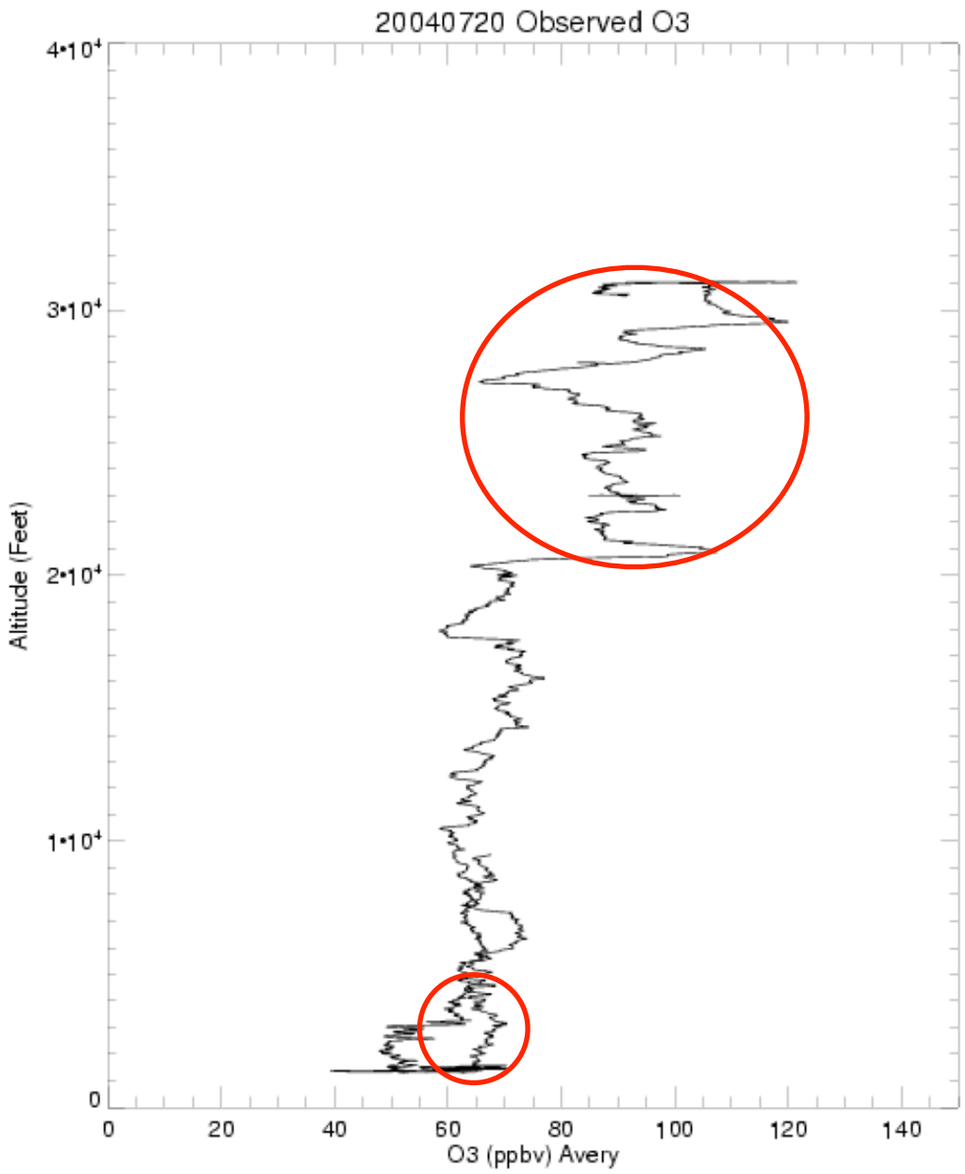

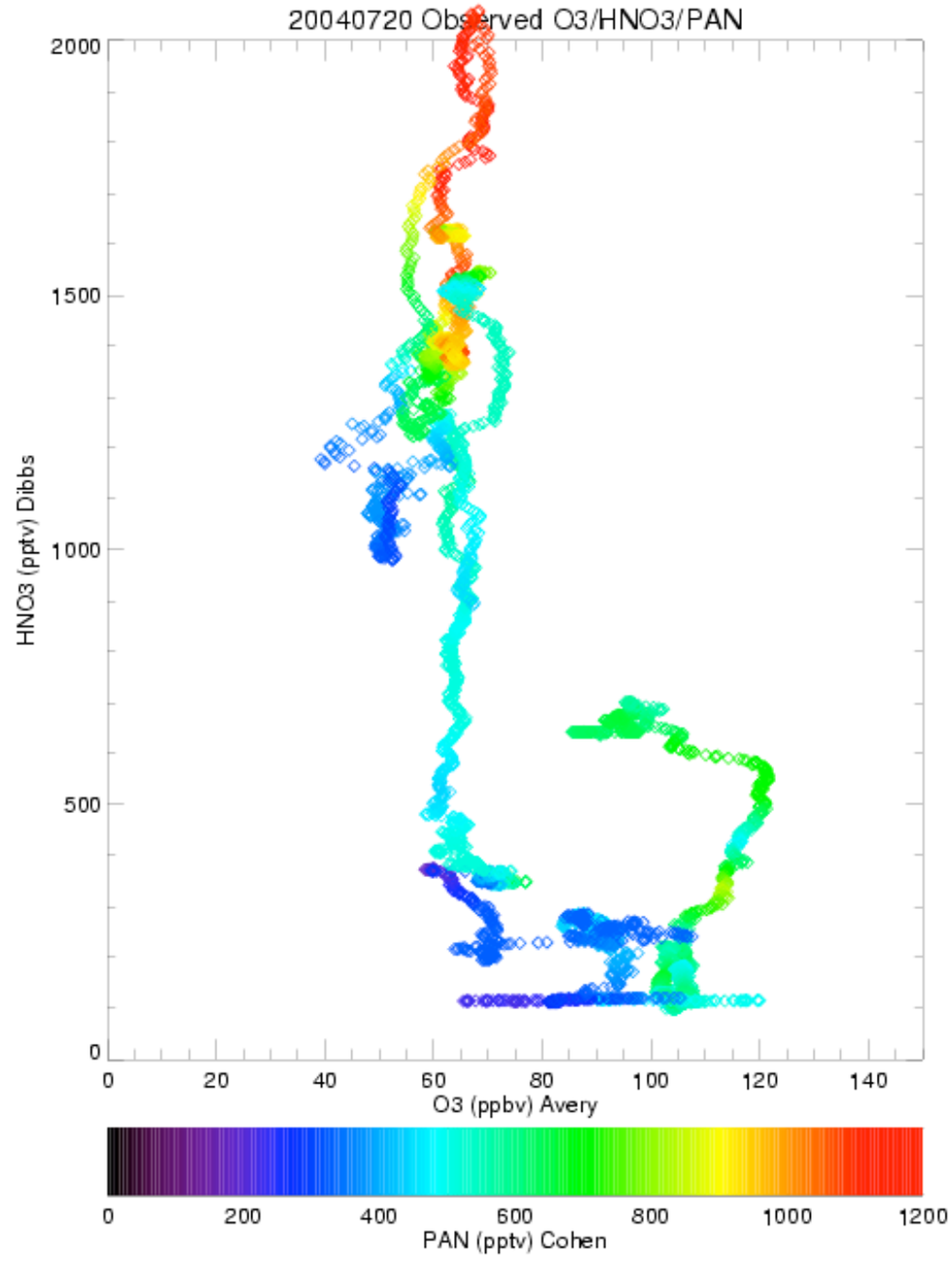

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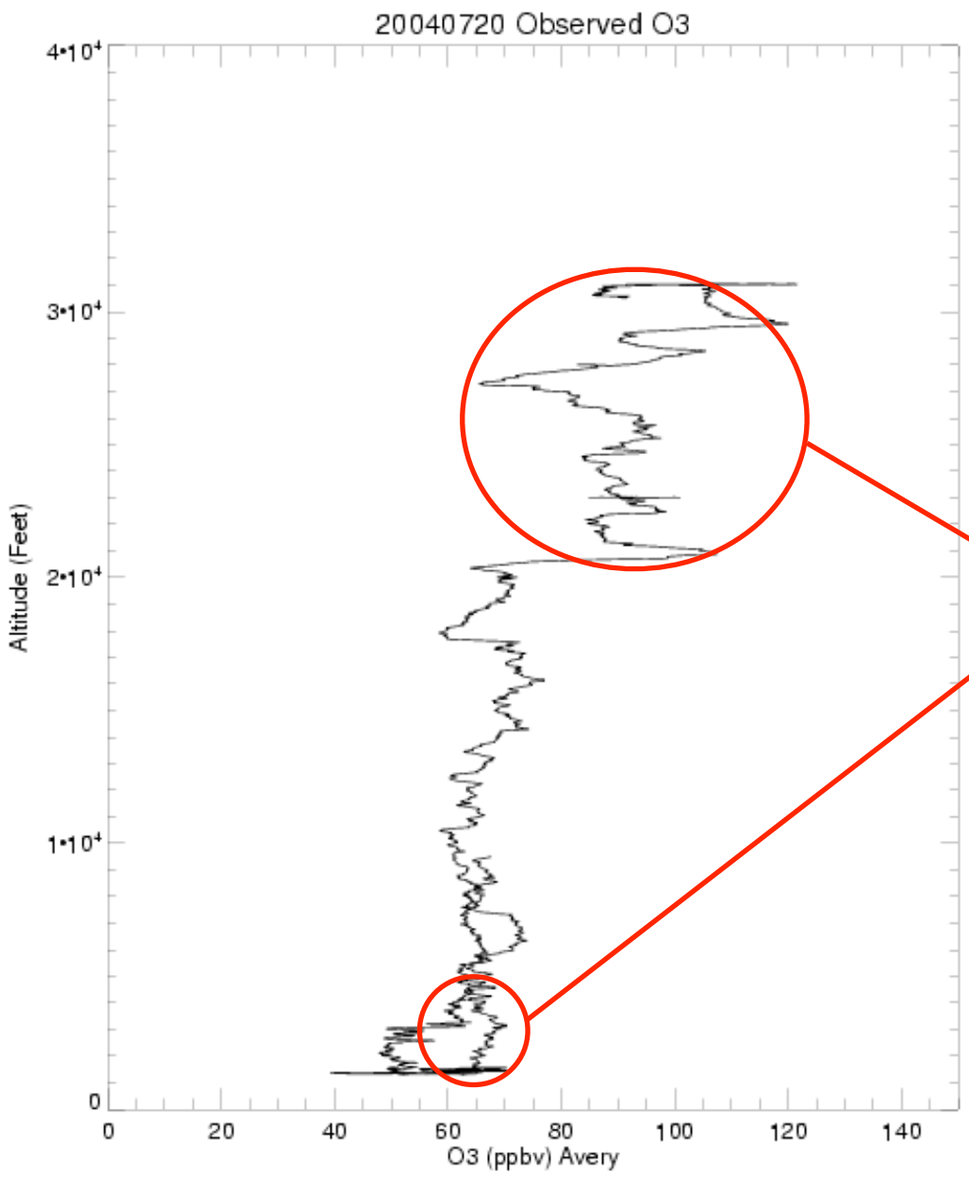

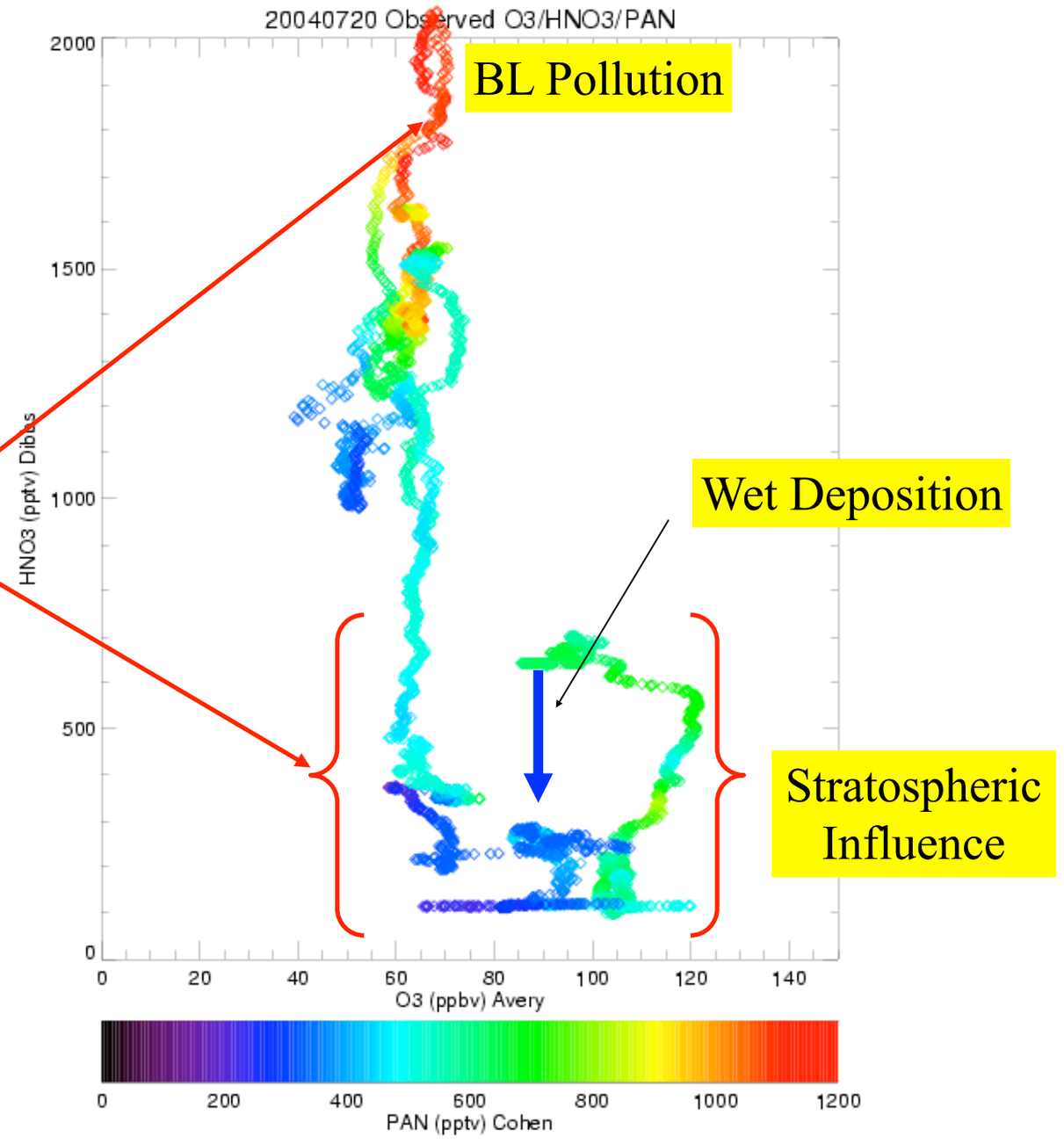

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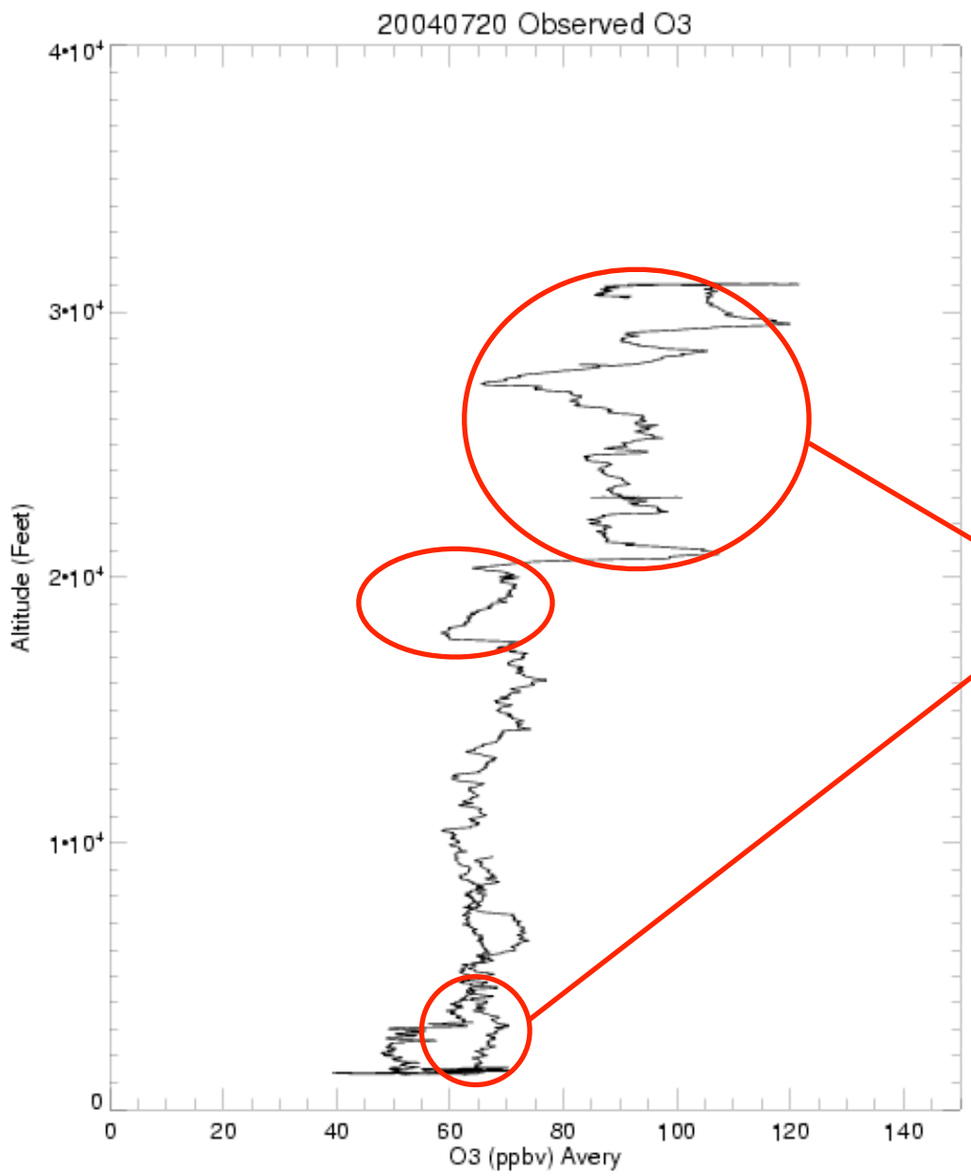

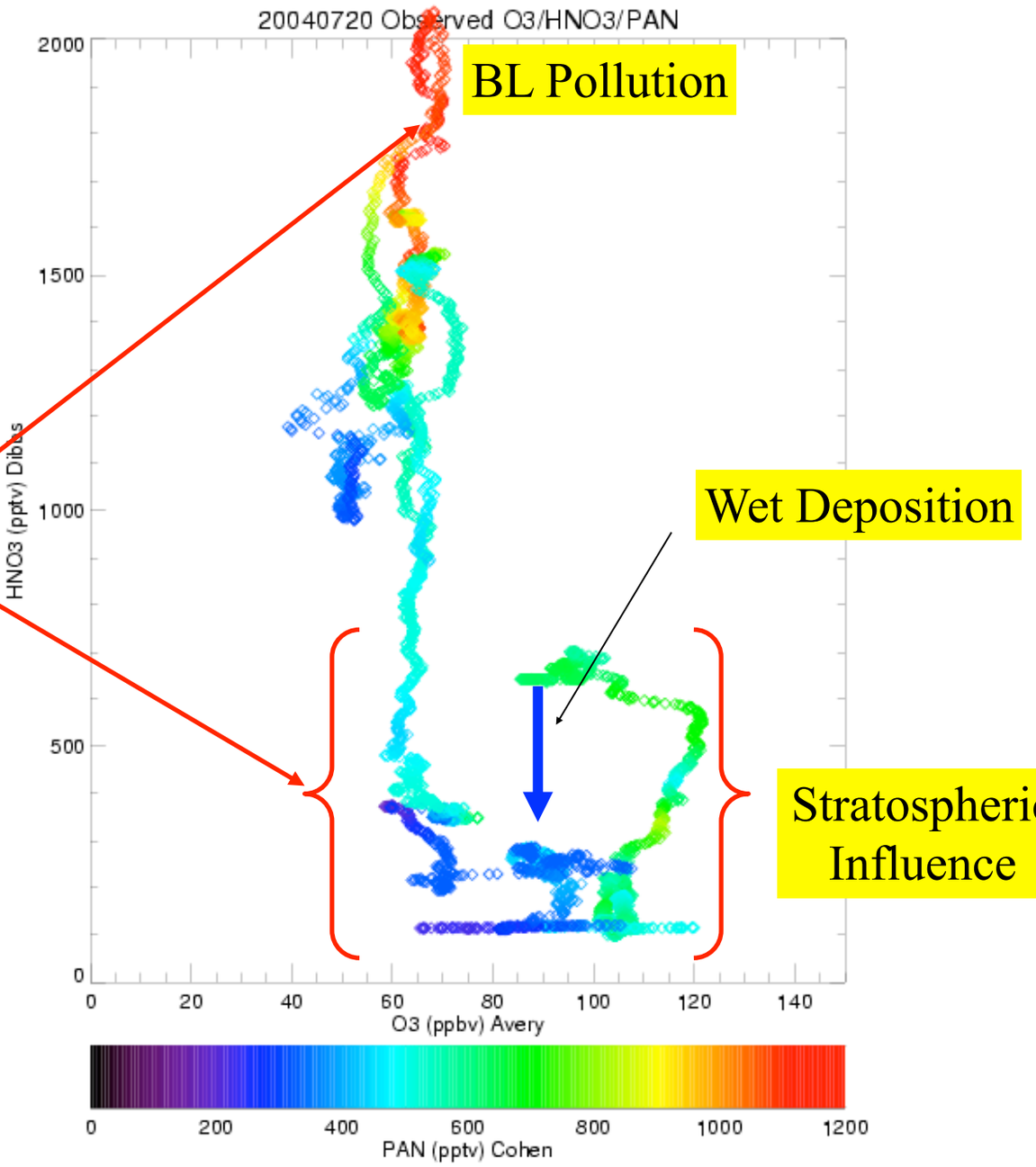

BL Pollution

Wet Deposition

Stratospheric Influence

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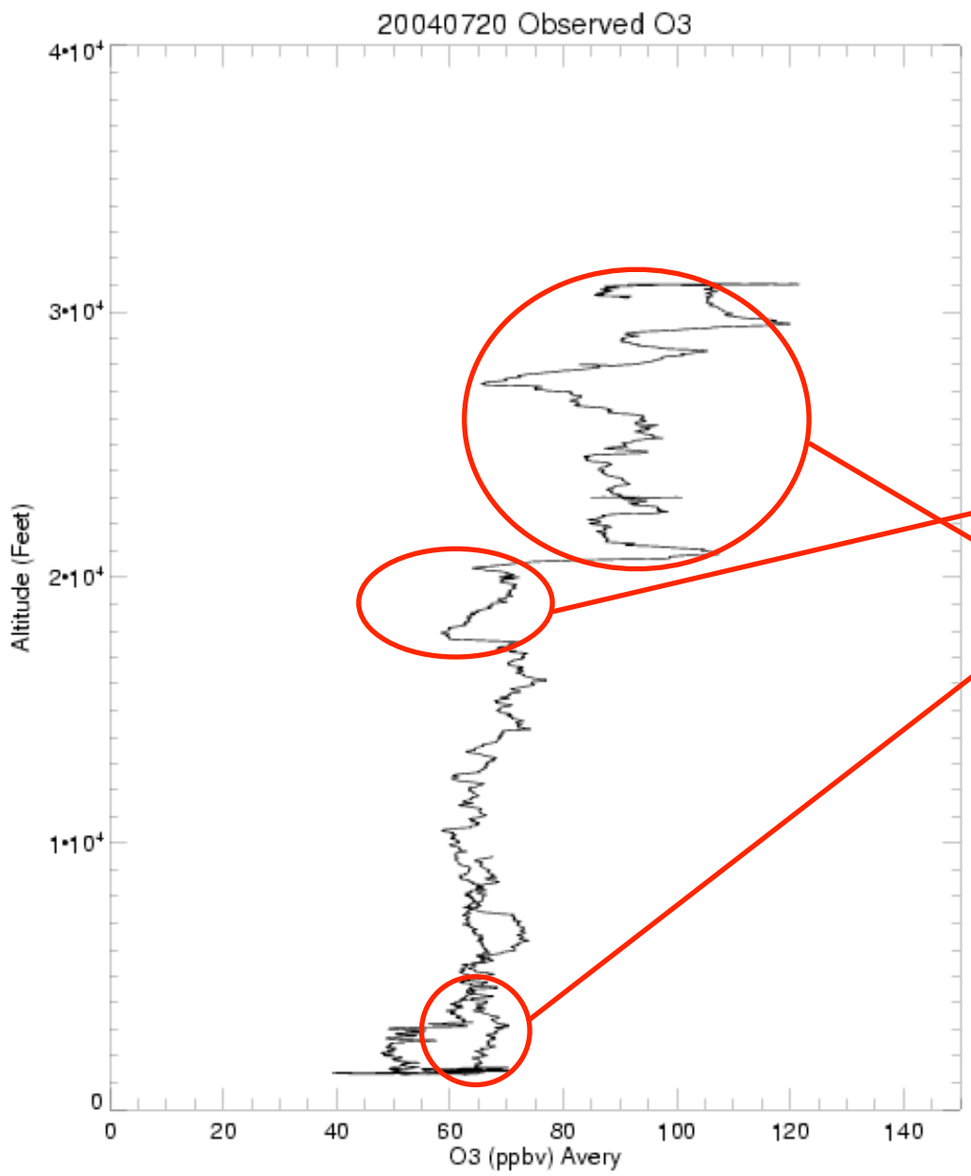
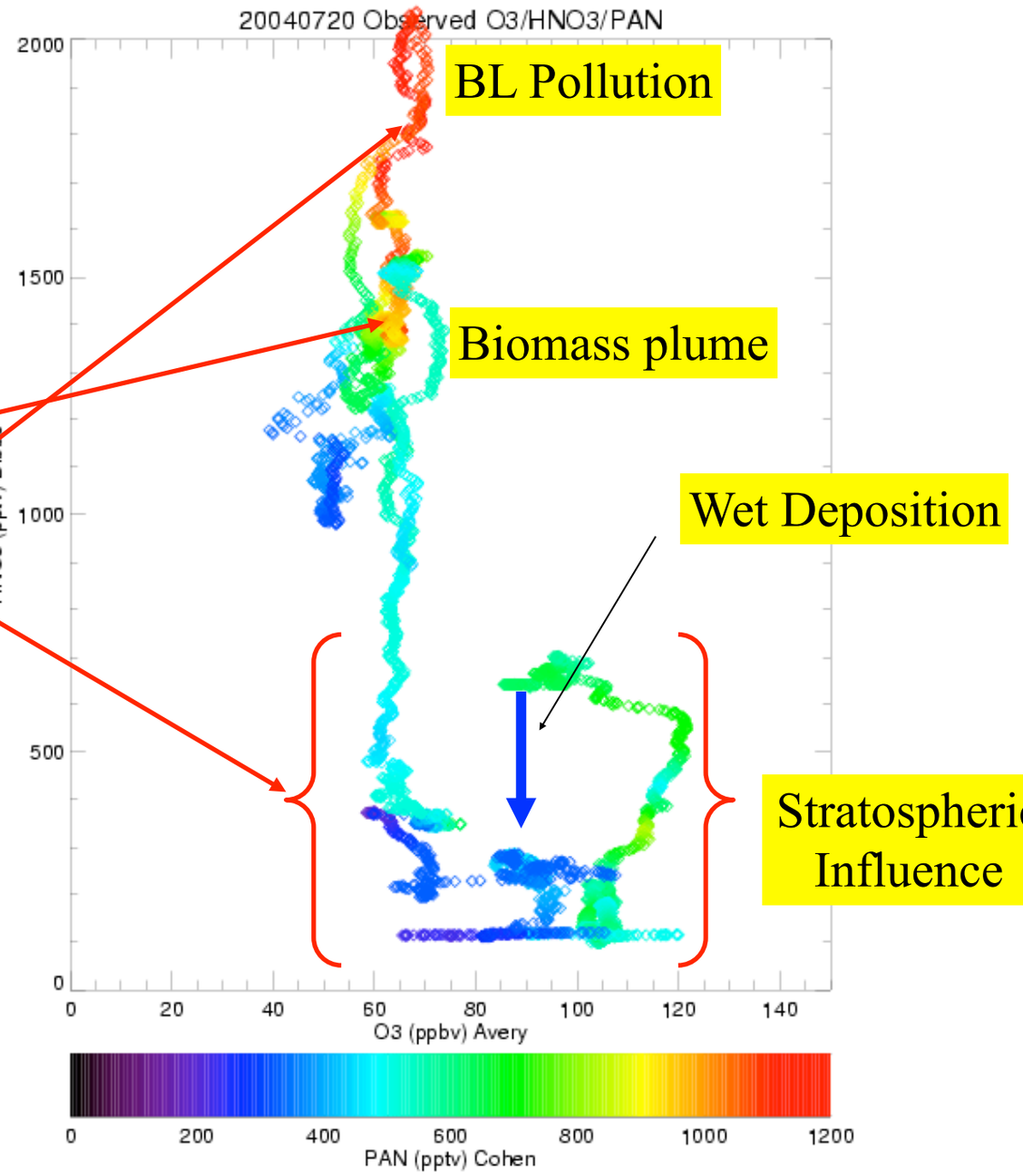




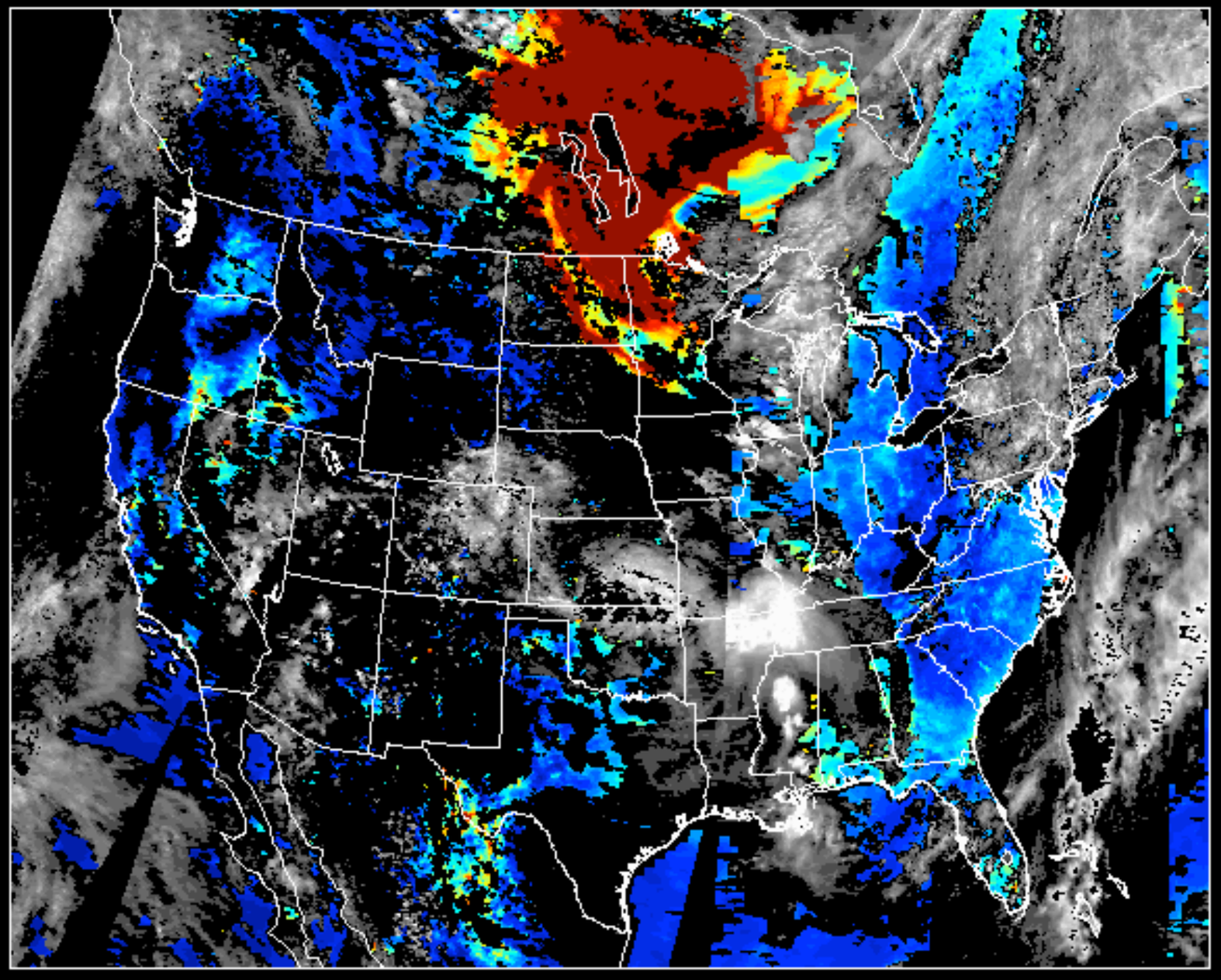
BL Pollution

Biomass plume

Wet Deposition

Stratospheric Influence

MODIS (Terra) 2004 07 16



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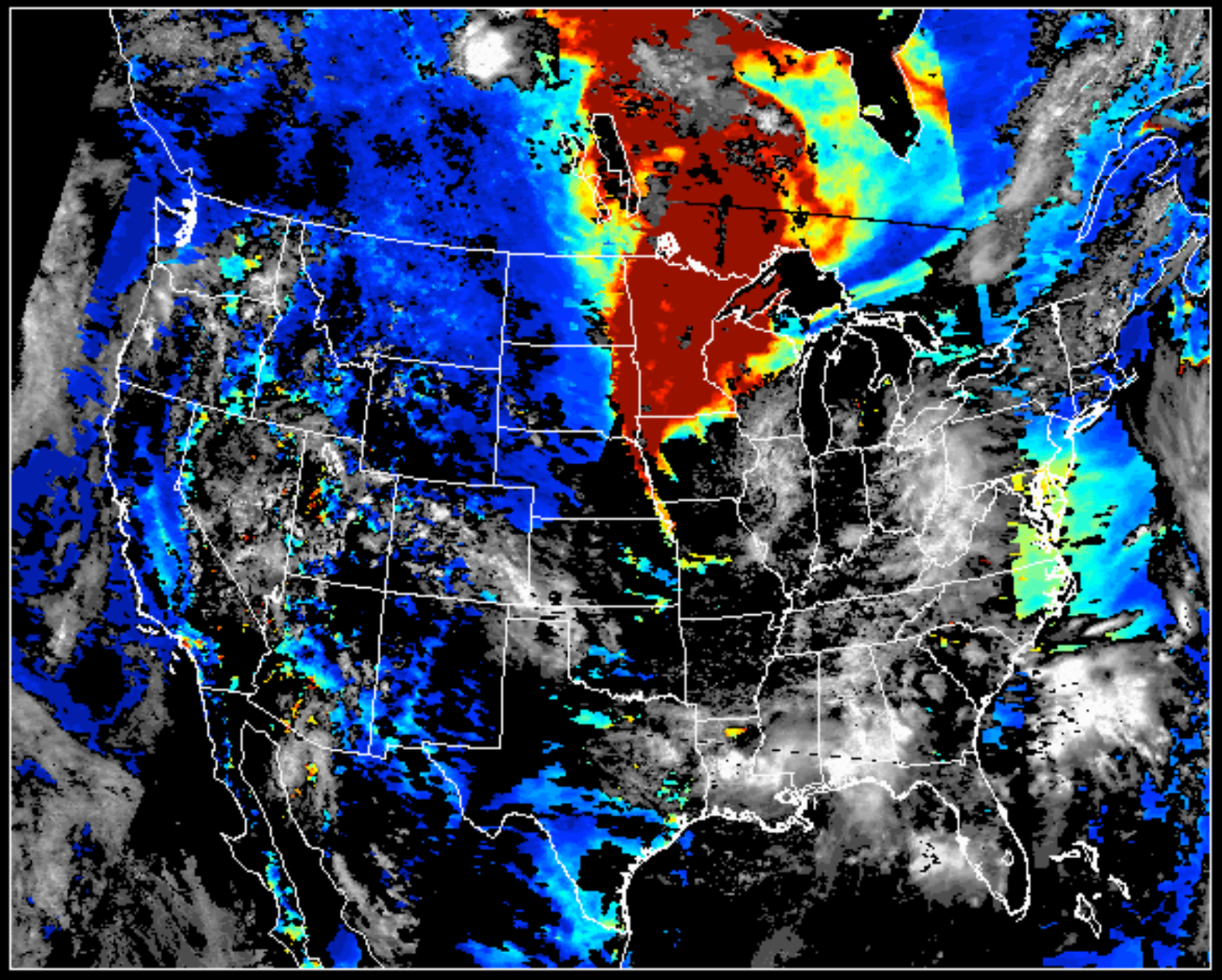
AOD

0 10 20 30 40 50 60 70
COT

MODIS (Terra) 2004 07 17



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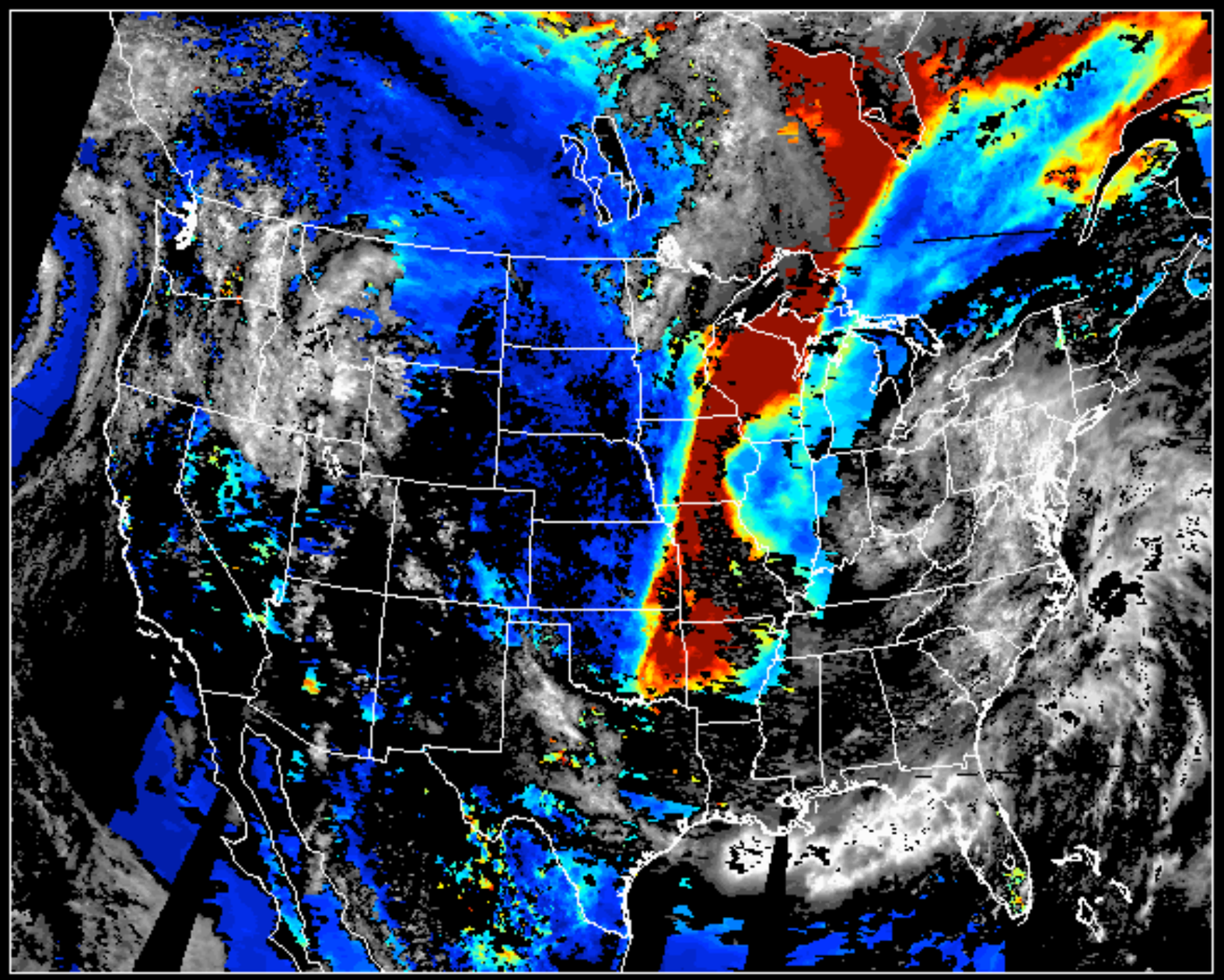

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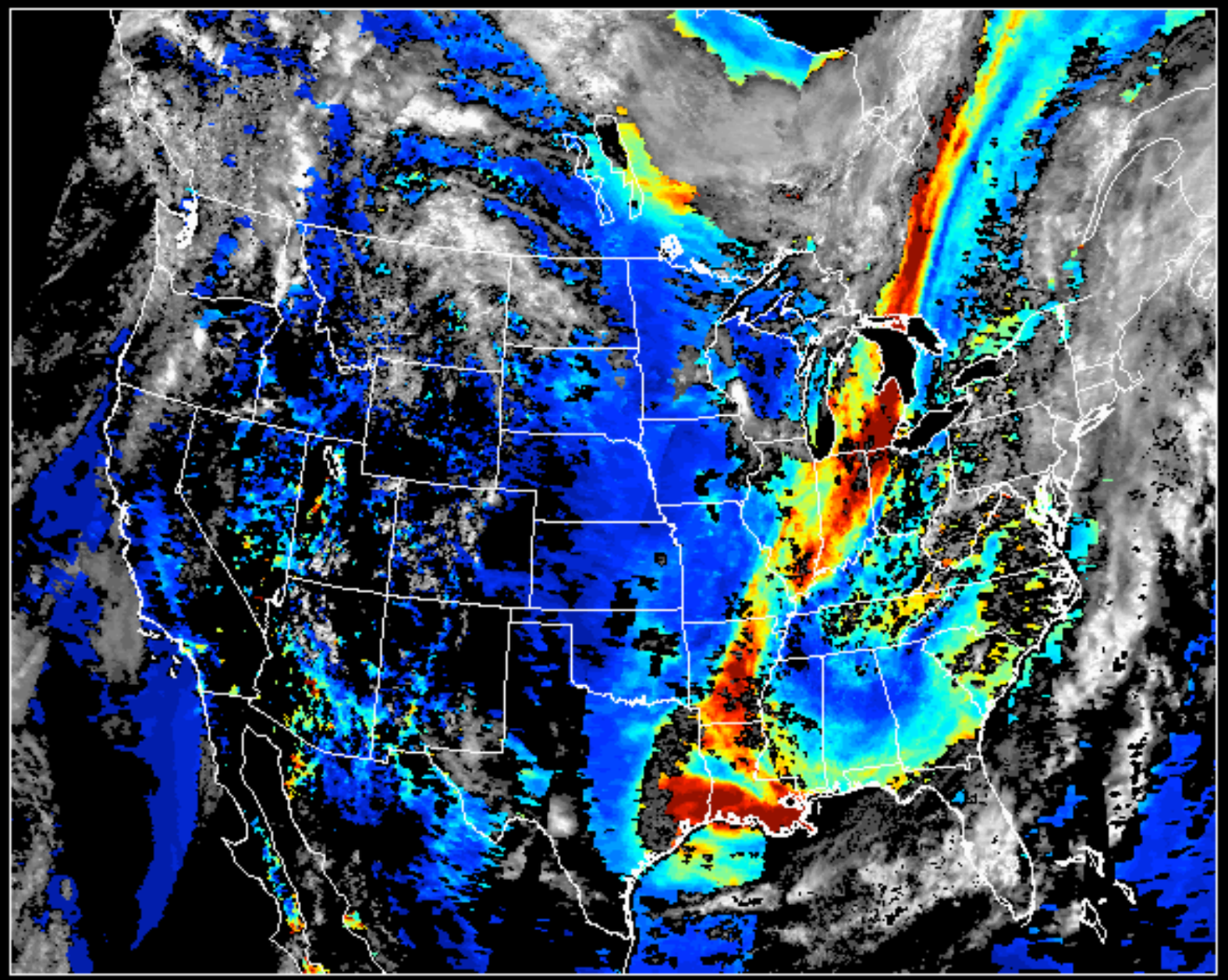

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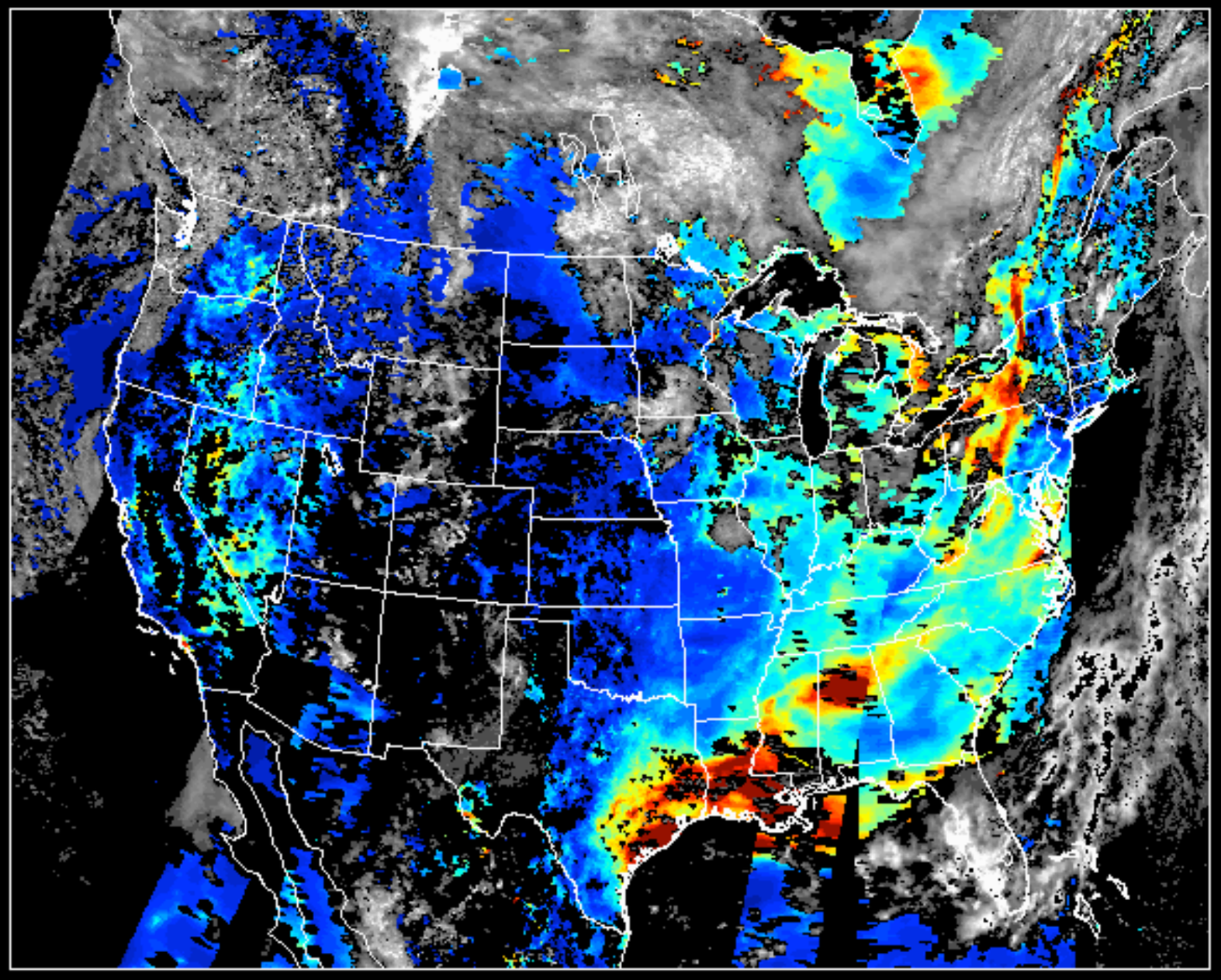

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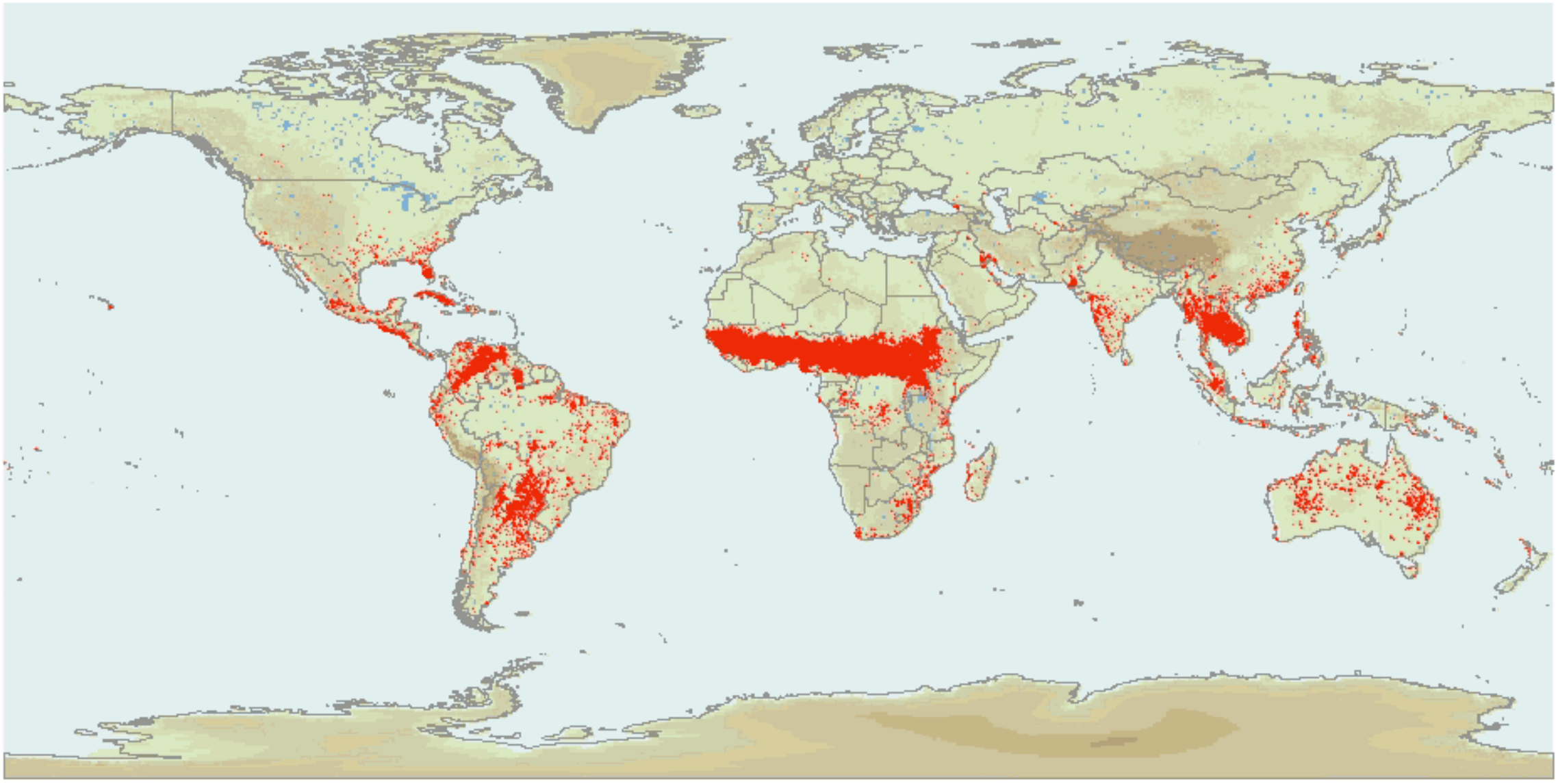
MODIS Rapid Response Fire Detections for 2004



JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

MODIS Active Fire Detections
World Countries

Active fires are detected using MODIS data from the Terra satellite.
Source: MODIS Rapid Response http://rapidfire.sci.gsfc.nasa.gov
Web Fire Mapper http://maps.geog.umd.edu

Friday, April 9, 2010

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Mechanical Development

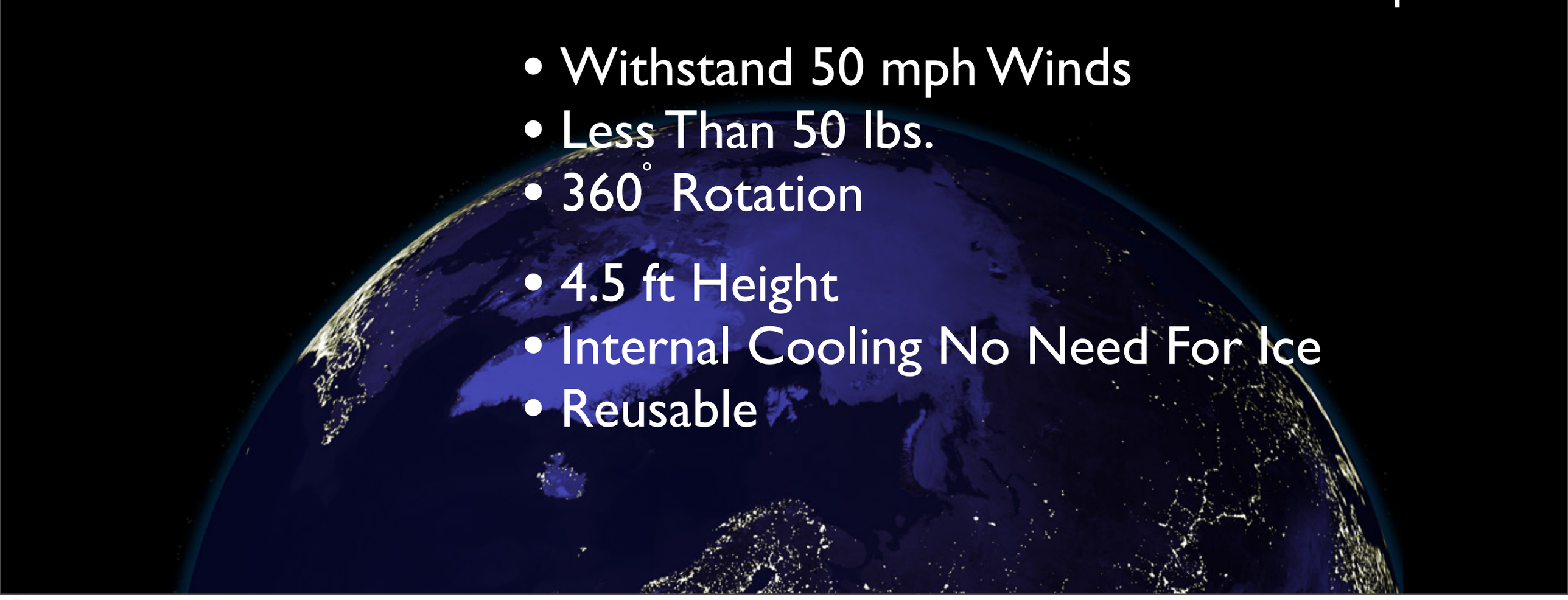
Adrian Haruta

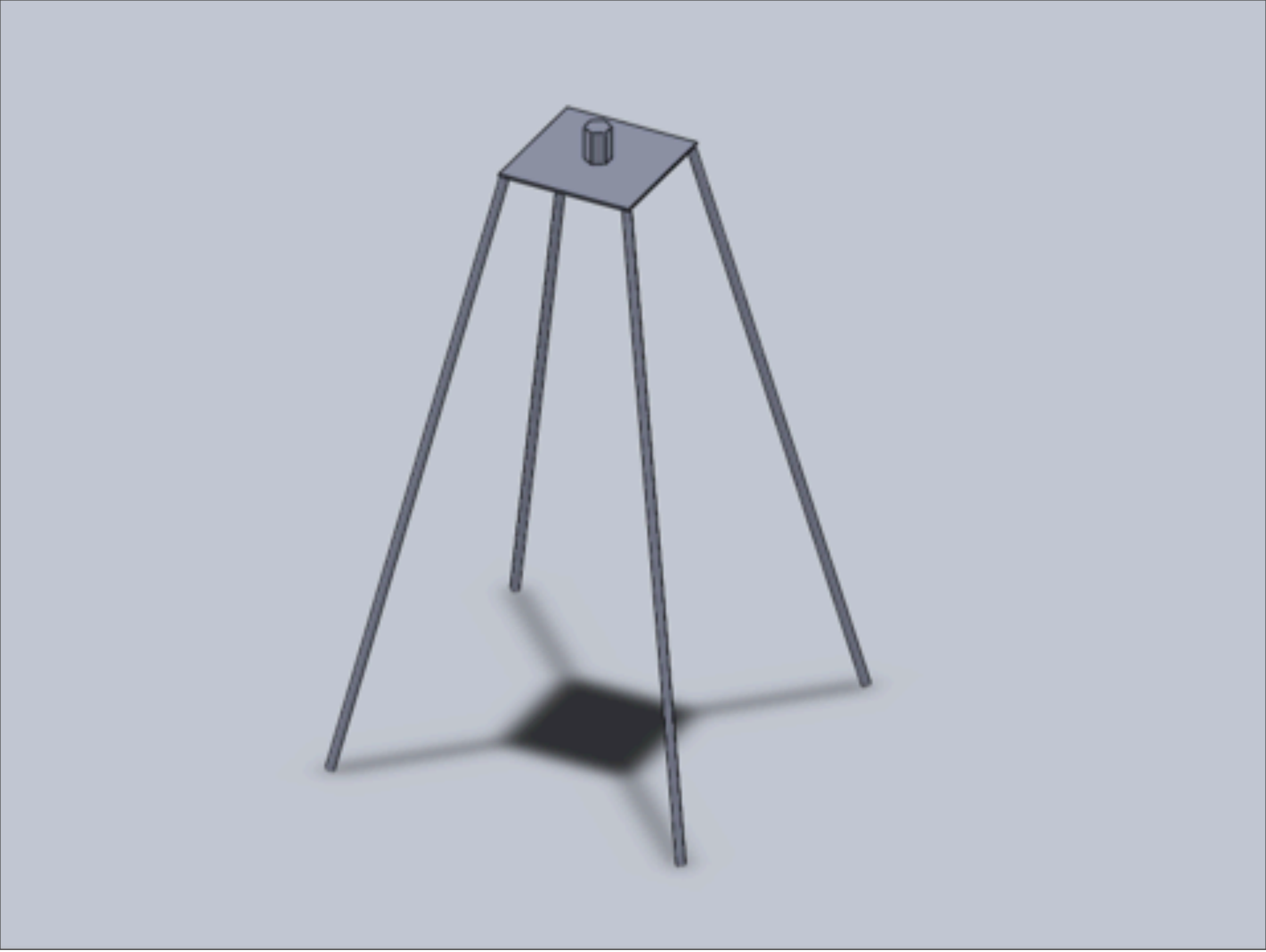
Mechanical Eng. Goals

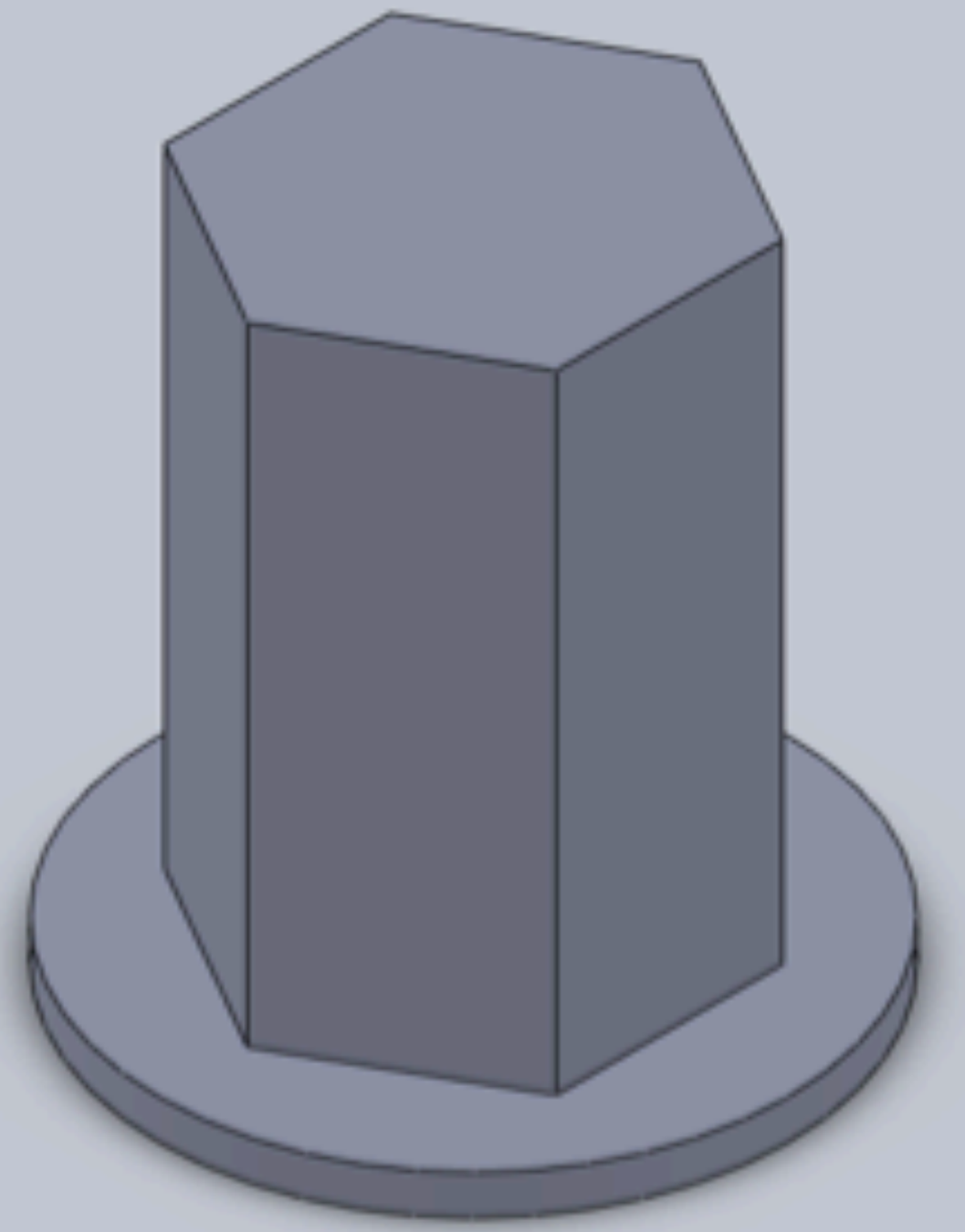
Design Philosophy: Use-Centered Design

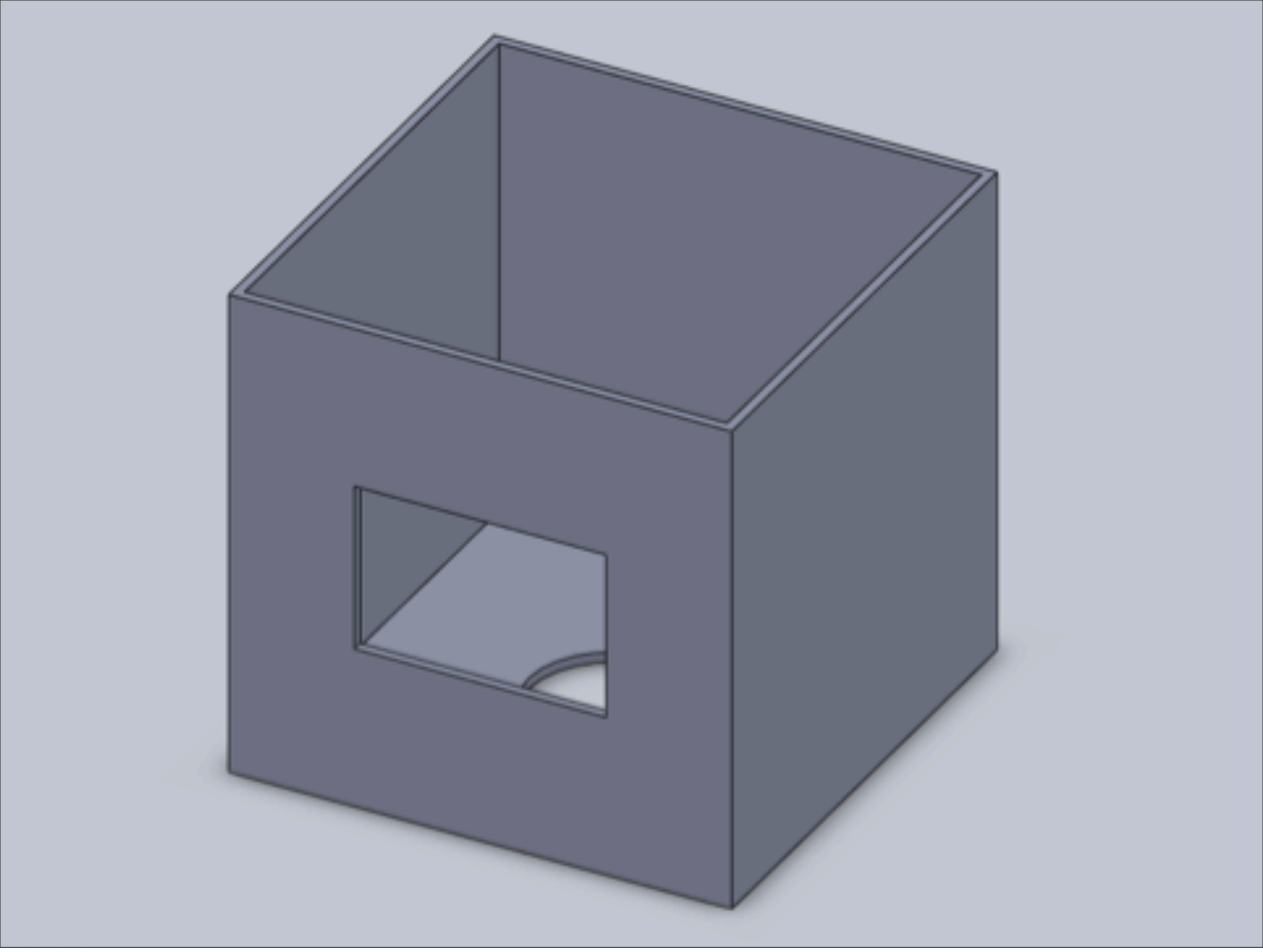
Requirements:

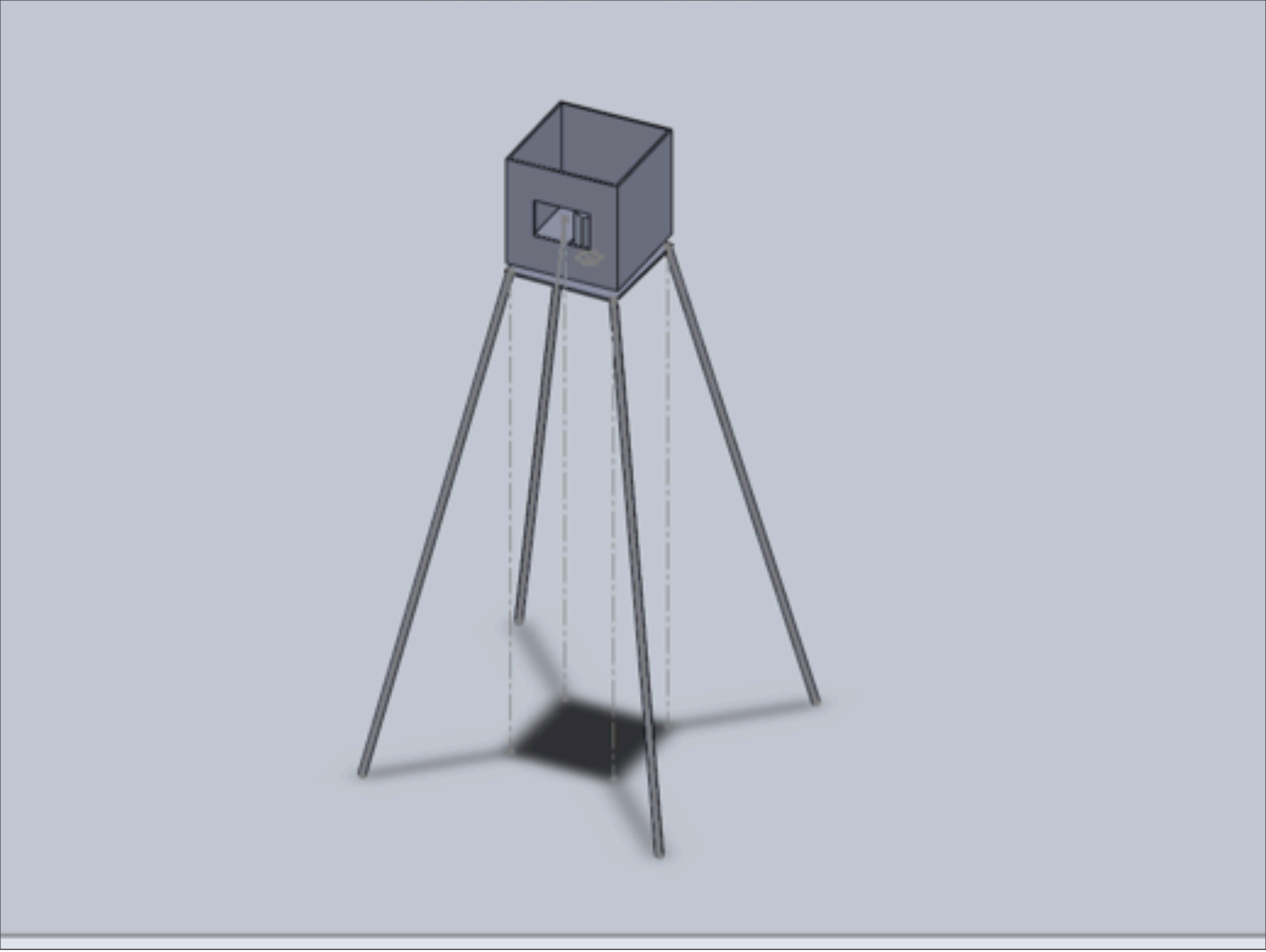
- Protects Camera In 900-1200° C Temps
- Withstand 50 mph Winds
- Less Than 50 lbs.
- 360° Rotation
- 4.5 ft Height
- Internal Cooling No Need For Ice
- Reusable











Electrical Development

John Thomson

Electrical Eng. Goals

Design Philosophy: Simple and Inexpensive (KISS)

Requirements:

- Orient To Fire in ~20 Sec
- Battery:
  - 1 week Standby
  - Continuous 4h
- Maintain Camera Under 50° C
- Turn On When Fire Is 10m Away
- Video Tape IR
- Reuse Costs Under $100

Parts Selection

- Controller: PI for Angular Position
  - Microcontroller: Atmega168
  - Software: Arduino Framework
- Heat Sensing: PIR (Thermopiles)
  - Consumable
- Actuator:
  - Quad Encoded DC Motor
- Power: 12v Lithium Battery

Management

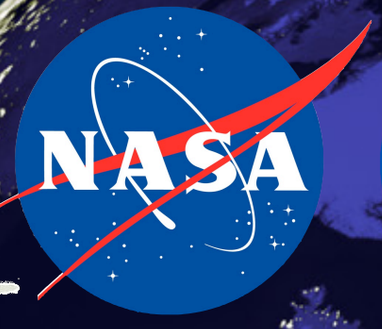
Ramses Alcaide

Cost

- No Budget Constraint
- $3k Personal Goal
- Full Details Online

Schedule

Week	Goals
1	ID Challenges
2	Mech. Modeling
3	Elec. Modeling
4	Mech. Development
5	Integration/Testing
6	Design Changes
7	Redevelopment
8	Testing



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