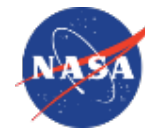MAIA

Associating particulate air pollution with human health

Multi-Angle Imager for Aerosols
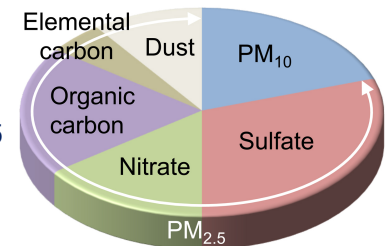
Overview

David J. Diner

NASA Jet Propulsion Laboratory
California Institute of Technology

Objective: Assess the impacts of different size and compositional mixtures of airborne PM on human health

o MAIA integrates data from the satellite instrument, PM surface monitors, and WRF-Chem to generate data products (distributed at NASA LaRC Atmospheric Science Data Center)

o Epidemiological studies will be performed using non-public health records

o Products in development

Level 1 georectified radiance and polarization (250 m grid)
Level 2 cloud mask, aerosol parameters, PM_{10}, total/speciated $PM_{2.5}$
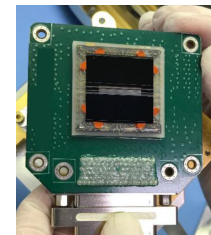Level 4 daily gap-filled PM_{10}, total/speciated $PM_{2.5}$ (1 km grid)

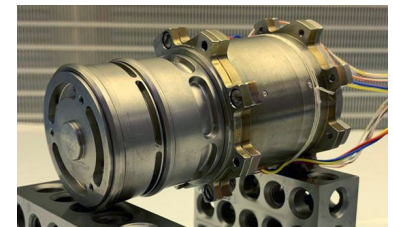o Satellite instrument being built at JPL

UV-SWIR spectro-polarimetric camera
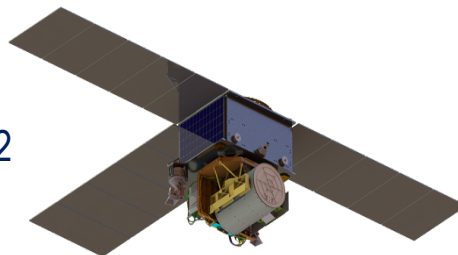
Polarization modulator

Focal plane

Gimbal actuator

o Mission attributes

General Atomics Orbital Test Bed-2 spacecraft

Launch: 2022 (to be confirmed)
Baseline duration: 3 years
740-km altitude sun-synchronous orbit
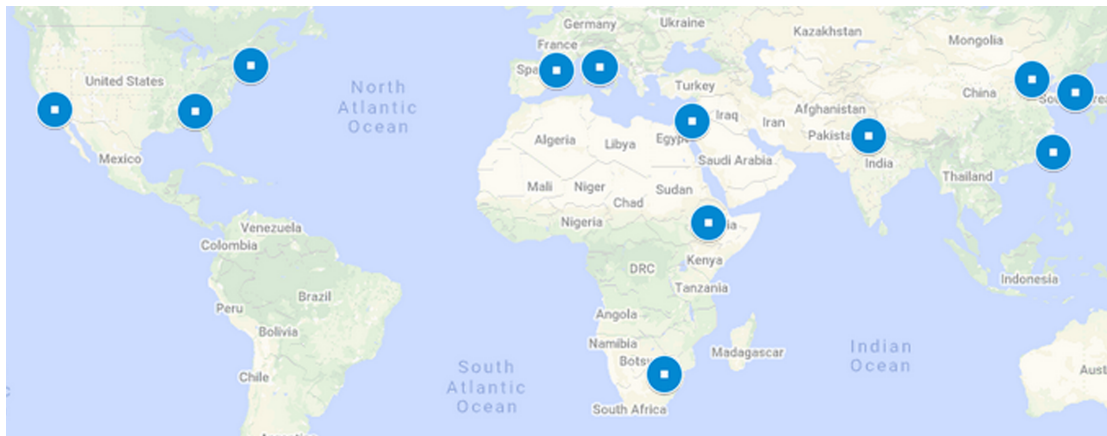10:30 am equator crossing

Speciated PM$_{2.5}$ surface monitor utilization and health studies in the Primary Target Areas

Speciated PM2.5 monitors

- Governmental (CSN, IMPROVE, IDAEA, ARPA)
- Surface Particulate Matter Network (SPARTAN)
- Gov't.+SPARTAN
- Gov't.+Aerosol Mass & Optical Depth (AMOD)
- SPARTAN+AMOD
- SPARTAN+AMOD+aethalometers
- Gov't.+SPARTAN+AMOD+aethalometer

Health studies

Acute	Subchronic	Chronic

Subject to updates

	Acute	Subchronic	Chronic
UnitedStates_SouthernCalifornia	■		
UnitedStates_CentralGeorgia		■	■
UnitedStates_NewEngland			
Spain_Catalonia	■	■	
Italy_Central		■	
SouthAfrica_Gauteng		■	
Israel_CentralNorthern			
Ethiopia_Central	■		
India_Northern		■	
China_Northern		■	■
Taiwan_Western	■		
SouthKorea_Central			