

GEO Earth Observations for Health (EO4HEALTH) Initiative and GEO Health Community of Practice: Focus on Predicting Water-related Pathogens

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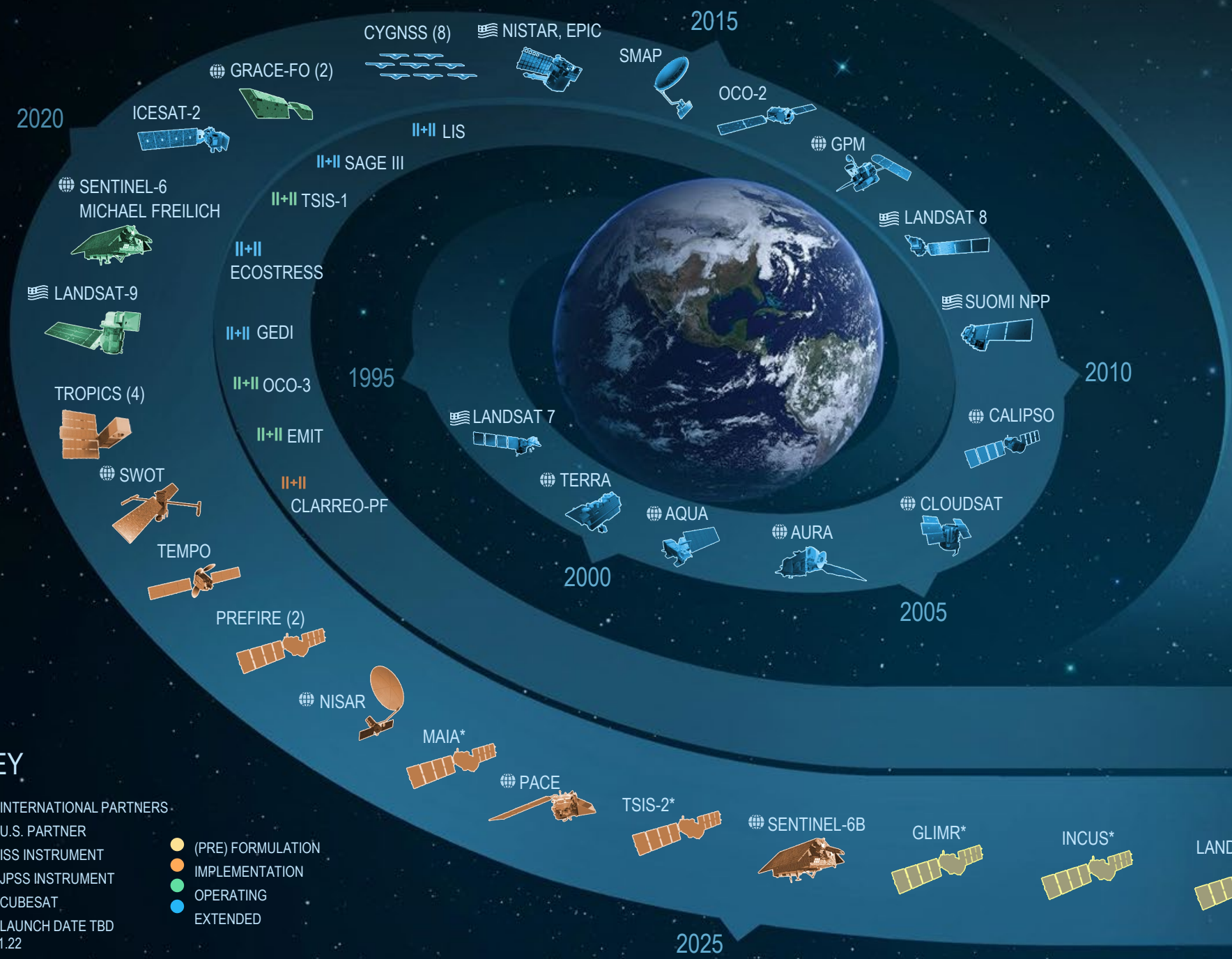
Helena Chapman, NASA (USA)

March 20, 2023





EARTH FLEET



INVEST/CUBESATS

- CIRIS 2023
- NACHOS 2022
- CTIM 2022
- NACHOS-2 2022
- SNOOPI* 2022
- MURI-FO* 2022
- HYTI* 2023

JPSS INSTRUMENTS

- OMPS-LIMB 2022
- LIBERA 2027
- OMPS-LIMB 2027
- OMPS-LIMB 2032

ISS INSTRUMENTS

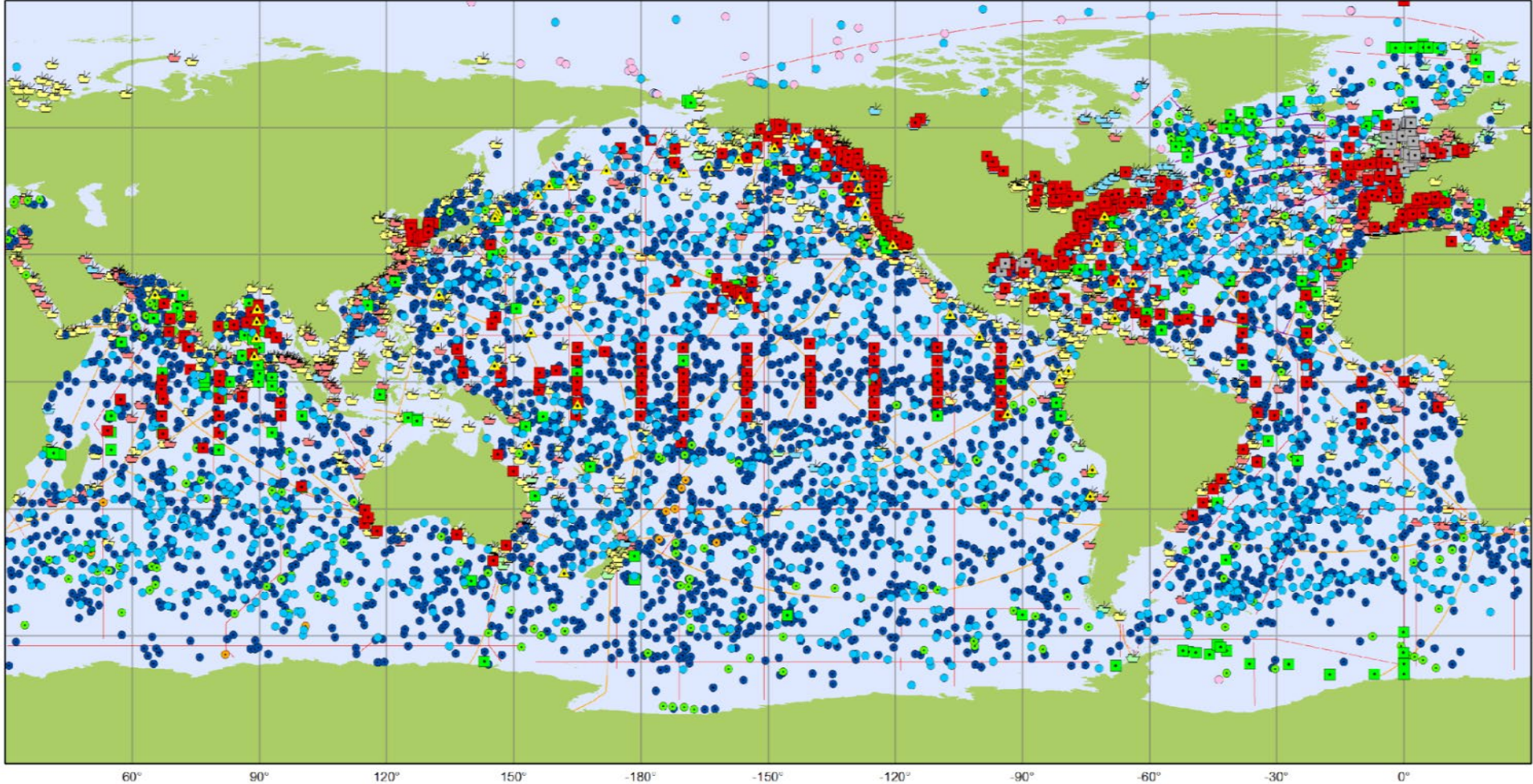
MISSIONS

KEY

- INTERNATIONAL PARTNERS
- U.S. PARTNER
- ISS INSTRUMENT
- JPSS INSTRUMENT
- CUBESAT
- LAUNCH DATE TBD
- (PRE) FORMULATION
- IMPLEMENTATION
- OPERATING
- EXTENDED

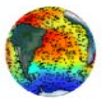
Ocean Observing Systems and sensors allow us to monitor trends and changes in the global ocean...

and provide actionable information to protect health and economic vitality



Main in-situ Elements of the Global Ocean Observing System

Argo	DBCP	OceanSITES	SOT	ASAP Radiosondes (7)
● Argo (3758)	● Surface Drifter (1442)	■ Platforms (331)	🤖 VOSclim-Automated (103)	— SOOP XBTs (46)
● Deep-Argo (16)	■ Fixed Platform (104)	GO-SHIP	🚢 VOSclim-Manned (354)	
● Bio-Argo (275)	● Ice Buoy (29)	GO-SHIP (61)	🤖 VOS-Automated (147)	
	■ Moored Buoy (474)		🚢 VOS-Manned (1161)	
	▲ Tsunameter (46)			



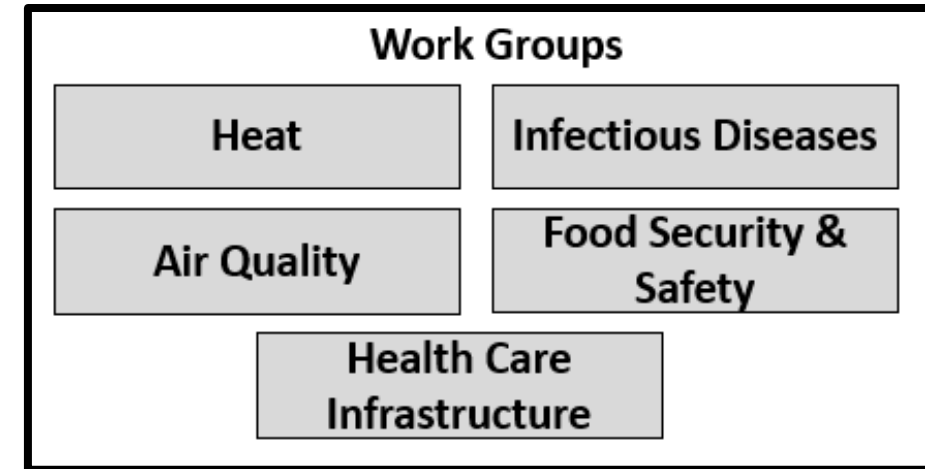
Improving Health Decision-Making Using Environmental Observations

Global network of governments, organizations, and observers, who seek to use Earth observation data to improve health decision-making at the international, regional, country, and district levels

Community Teleconferences
AGU Fall Meeting (USA)
GEO Symposium & Week
AmeriGEO Week

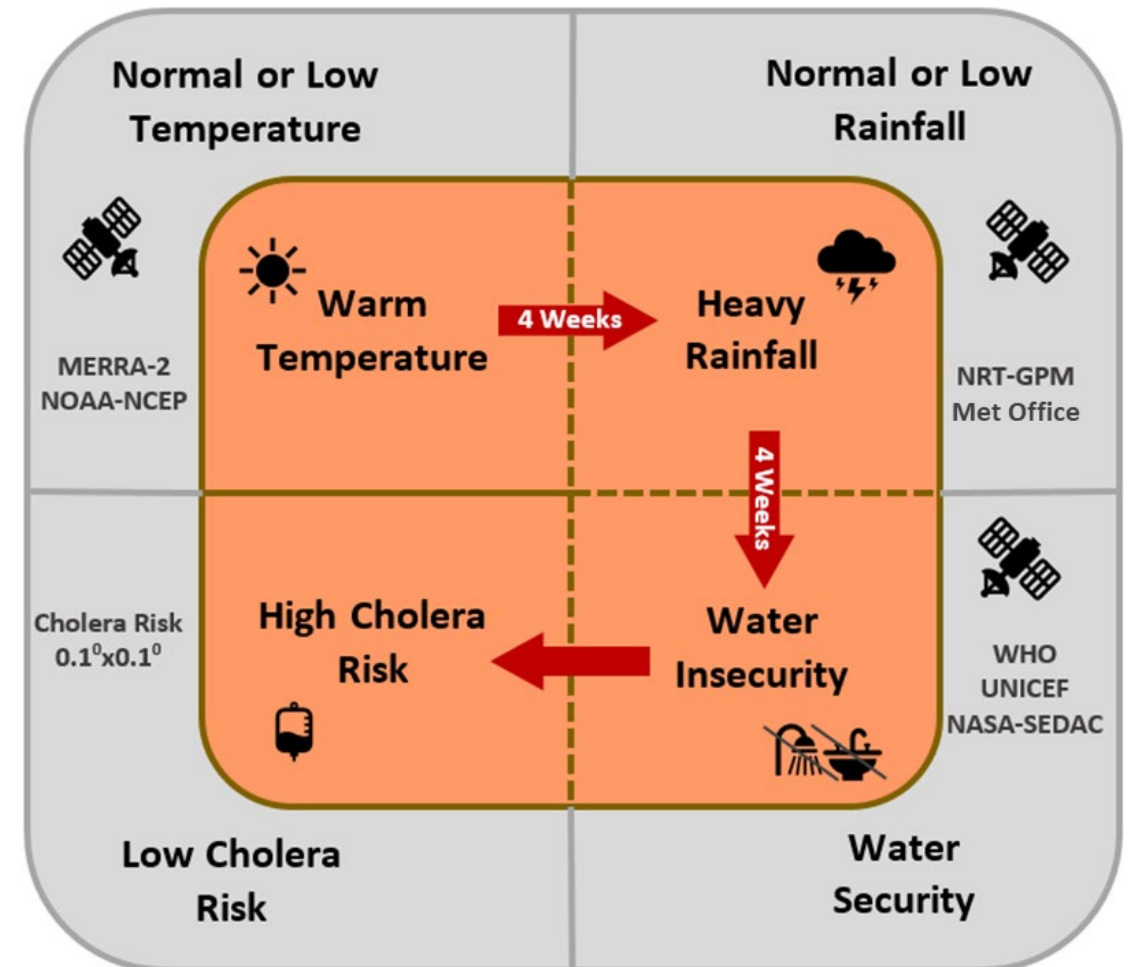


GEO GROUP ON
EARTH OBSERVATIONS
GEO WORK PROGRAMME 2023-2025
SUMMARY DOCUMENT
VERSION 3 - DECEMBER 2022



Forecasting Risk of Cholera Outbreaks at Global Scales

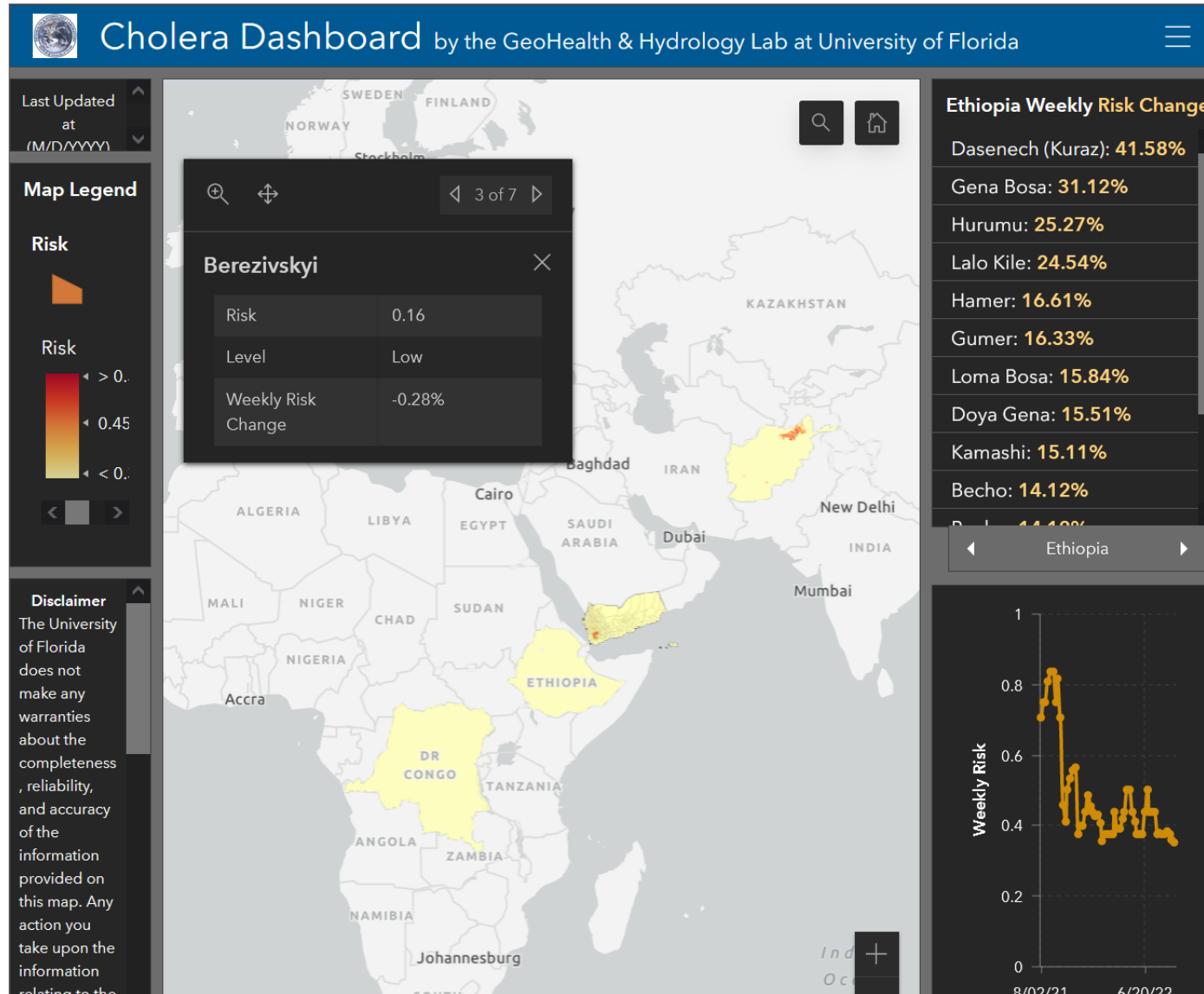
The team aims to synthesize the **role of hydrological, climatic, microbiological, and sociological processes** to provide an early warning to vulnerable human populations through innovative use of technology and partnerships with authoritative decision-making end-users



Warm temperature= above climatological average temperature
Heavy rainfall= above climatological average precipitation
Water insecurity=lack of access to water and sanitation access
High cholera risk=probability of cholera greater than 50%

Vibrio Prediction Hub

GeoHealth & Hydrology Lab at the University of Florida



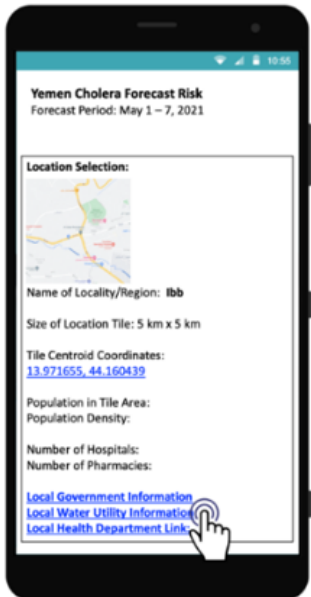
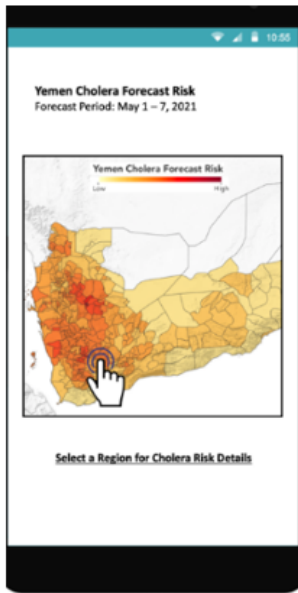
Contact details for Cholera Prediction Consortia for Choleraprediction_users@lists.ufl.edu

<https://vibrio-prediction-ufl.hub.arcgis.com/>

Ongoing Work: Android App

Framework Development

Android Studio



API request to UF
Cholera Trigger Risk
Cholera Transmission Risk
Population Density
Relief Camps
Water Access Points
Human Mobility

API request to Google

Google Earth Layer:

Elevation
Transportation Network
Satellite Rainfall
Water Resources
Hospitals
Pharmacies
Water Access Points

Static Information Tiles

What to do when cholera risk is high?
Native language support (through End Users)



Esri Eastern Africa, KADDB, Openwar... Powered by Esri



Ability to use precise location to filter data in the map



Provides local information on Cholera risk and nearby hospitals



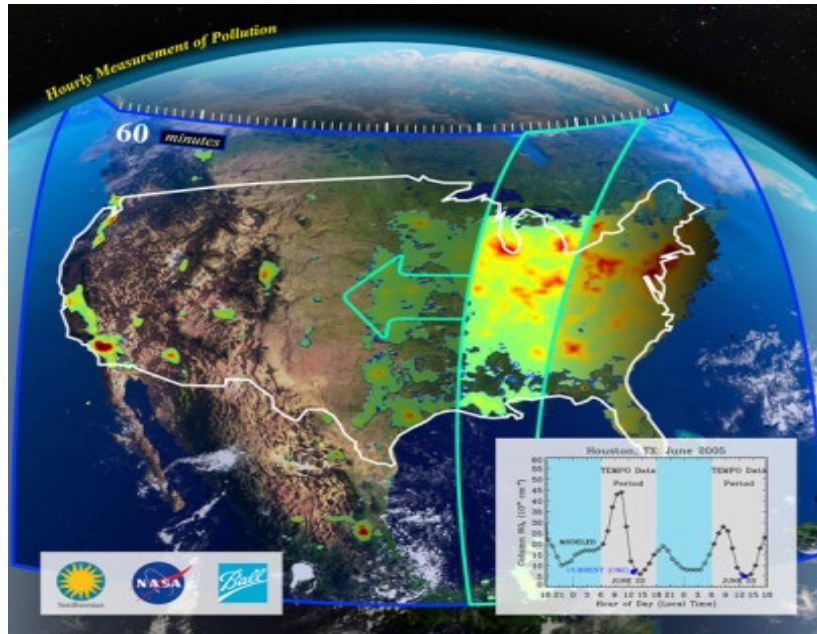
Directions to nearest hospital when user clicks on features



Results-focused layout

Earth Venture Instrument-1:

Tropospheric Emissions: Monitoring of Pollution (TEMPO)



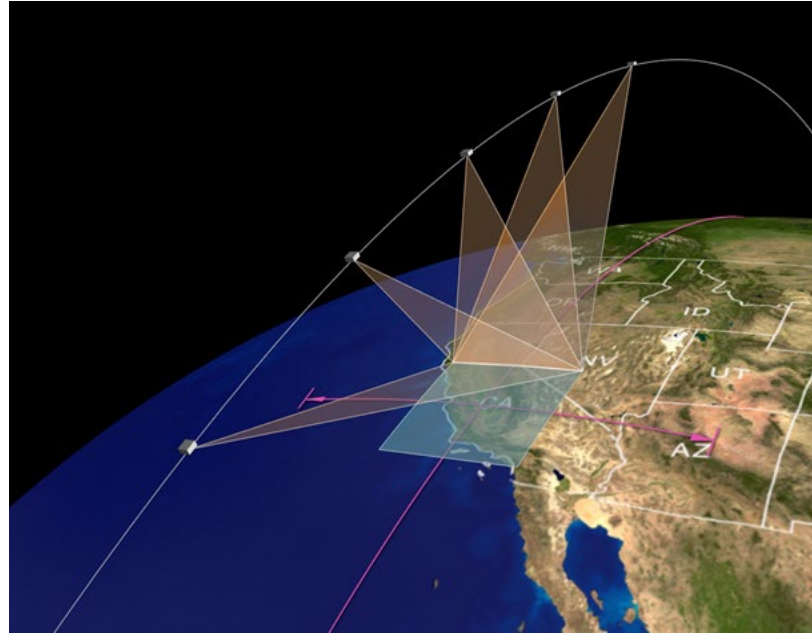
“Monitoring the air we breathe, hour by hour”

Credits: TEMPO website

- ❖ **TEMPO is a pathfinder to using hosted commercial payloads from GEO.**
- ❖ Collects tropospheric pollution observations from geostationary orbit: Ozone, NO₂, CH₂O.
- ❖ Forms a global air quality constellation in GEO with Copernicus Sentinel 4 and Korean GEMS.
- ❖ Instrument delivered in 2018; Launch expected April 2023.

Earth Venture Instrument-3:

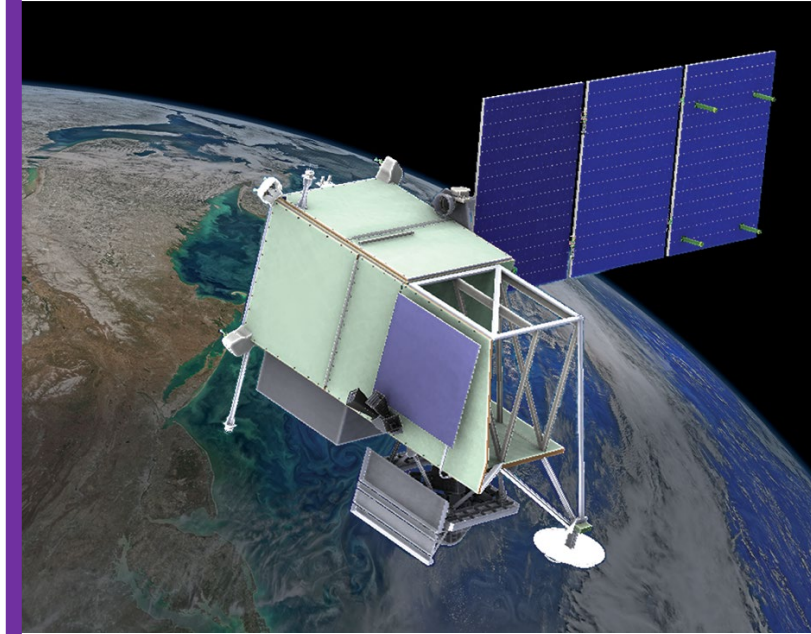
Multi-Angle Imager for Aerosols (MAIA)



Credits: MAIA website

- ❖ **MAIA represents a sentinel partnership between NASA and epidemiologists/health organizations on a satellite mission.**
- ❖ Assesses linkages between different airborne PM types and adverse birth outcomes, cardiovascular and respiratory disease, and premature deaths.
- ❖ Will measure particle types, sizes, concentrations, and geolocation of atmospheric aerosols.
- ❖ Launch expected circa 2024.

Plankton, Aerosol, Cloud, ocean Ecosystem (PACE)



Credits: PACE website

- ❖ **PACE's Ocean Color instrument will be the most advanced for observing ocean color in NASA's history.**
- ❖ Assesses ocean color, aerosol, and cloud data records for Earth system and climate studies.
- ❖ Multi-angle polarimeter to measure the particle sizes and compositions of atmospheric aerosols and ocean color.
- ❖ Launch expected circa 2024.

Contact Us

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