GROUP ON EARTH OBSERVATIONS

GEO HEALTH COMMUNITY OF PRACTICE

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

John Haynes, NASA (USA)
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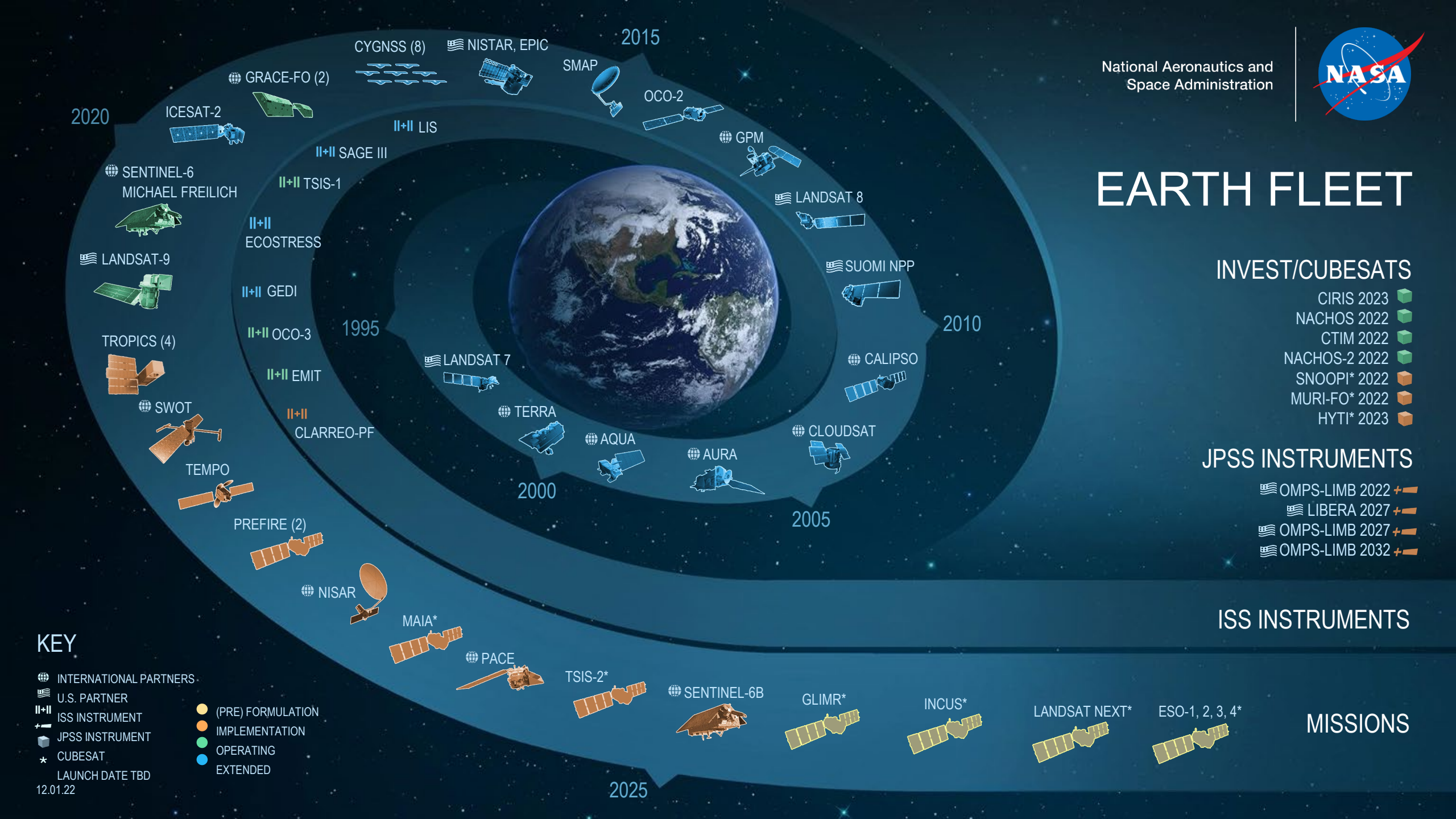
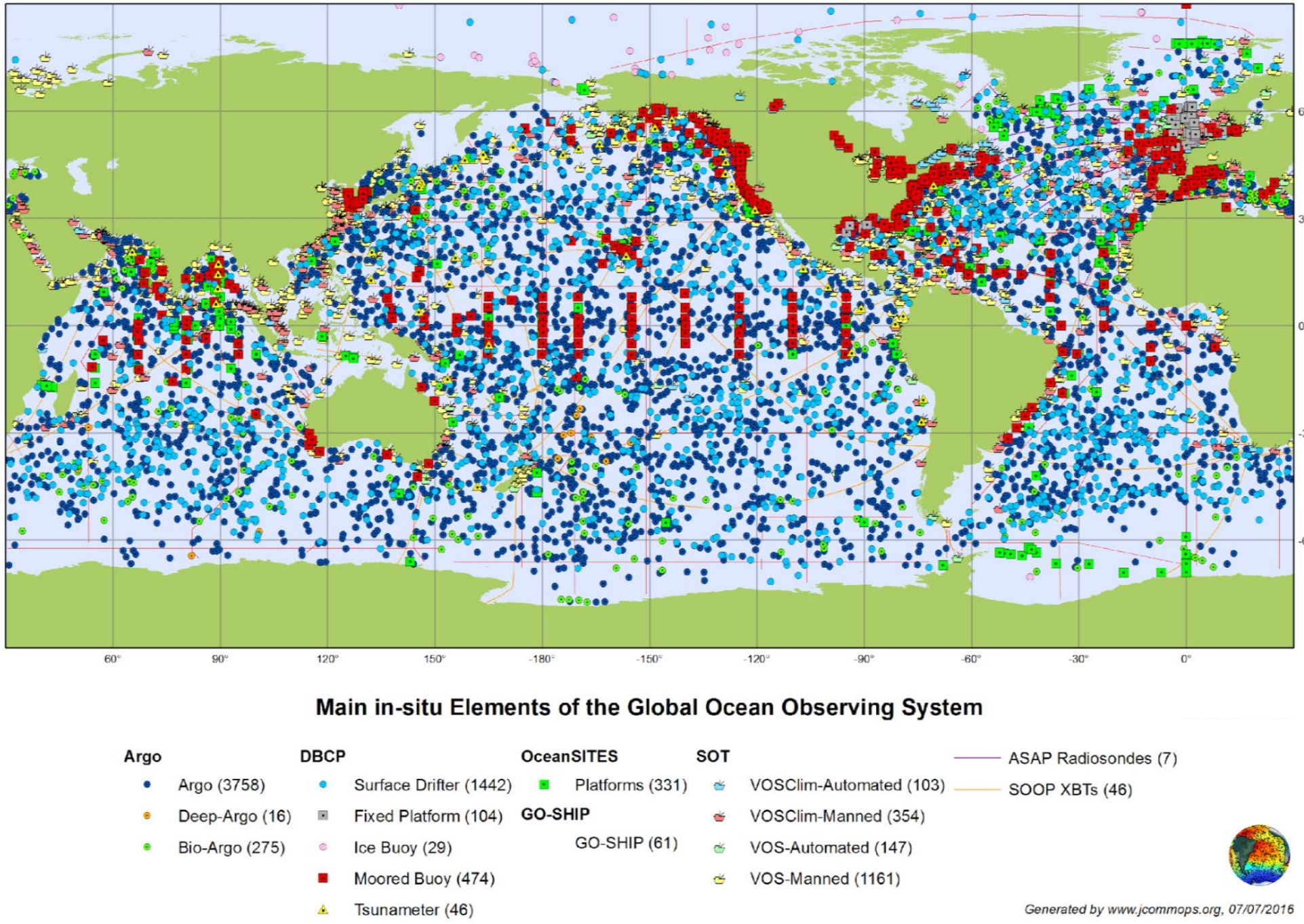
Helena Chapman, NASA (USA)

March 20, 2023


National Aeronautics and Space Administration
NASA
EARTH FLEET
2015
2020
1995
2010
2000
2005
2025
CYGNSS (8)
NISTAR, EPIC
SMAP
GRACE-FO (2)
ICESAT-2
OCO-2
LIS
SAGE III
GPM
SENTINEL-6 MICHAEL FREILICH
TSIS-1
LANDSAT 8
ECOSTRESS
LANDSAT-9
SUOMI NPP
GEDI
TROPICS (4)
OCO-3
LANDSAT 7
CALIPSO
EMIT
SWOT
TERRA
CLARREO-PF
AQUA
CLOUDSAT
AURA
TEMPO
PREFIRE (2)
NISAR
MAIA*
PACE
TSIS-2*
SENTINEL-6B
GLIMR*
INCUS*
LANDSAT NEXT*
ESO-1, 2, 3, 4*
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
12.01.22

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



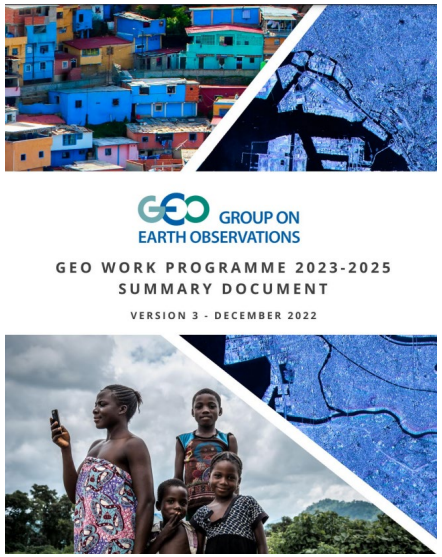
GROUP ON EARTH OBSERVATIONS

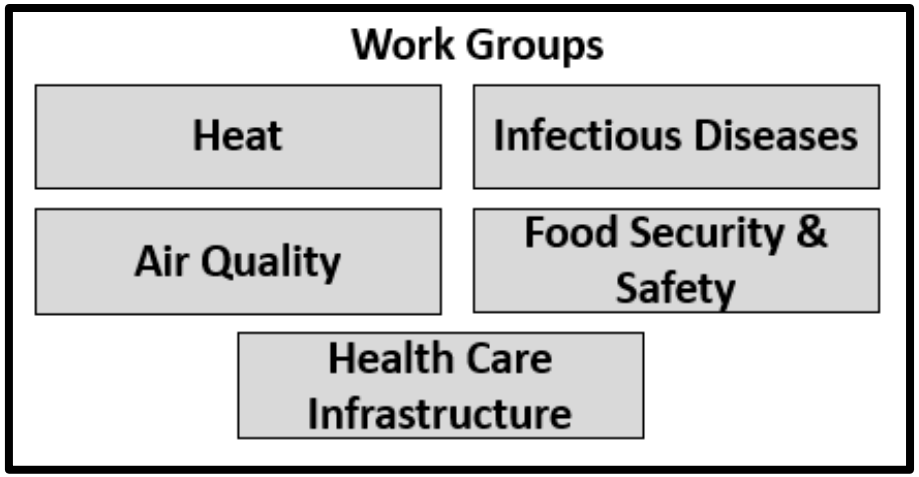
GEO HEALTH COMMUNITY OF PRACTICE

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

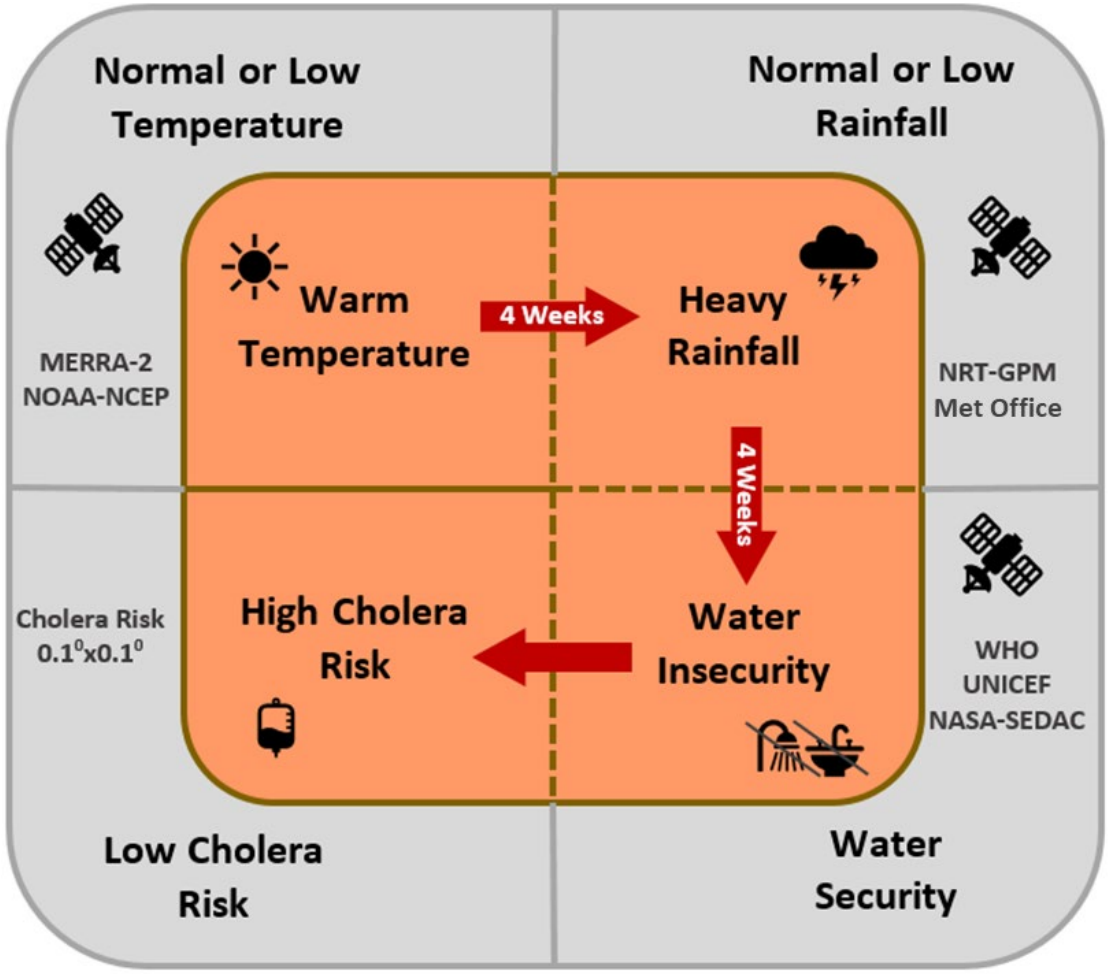




http://www.geohealthcop.org

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

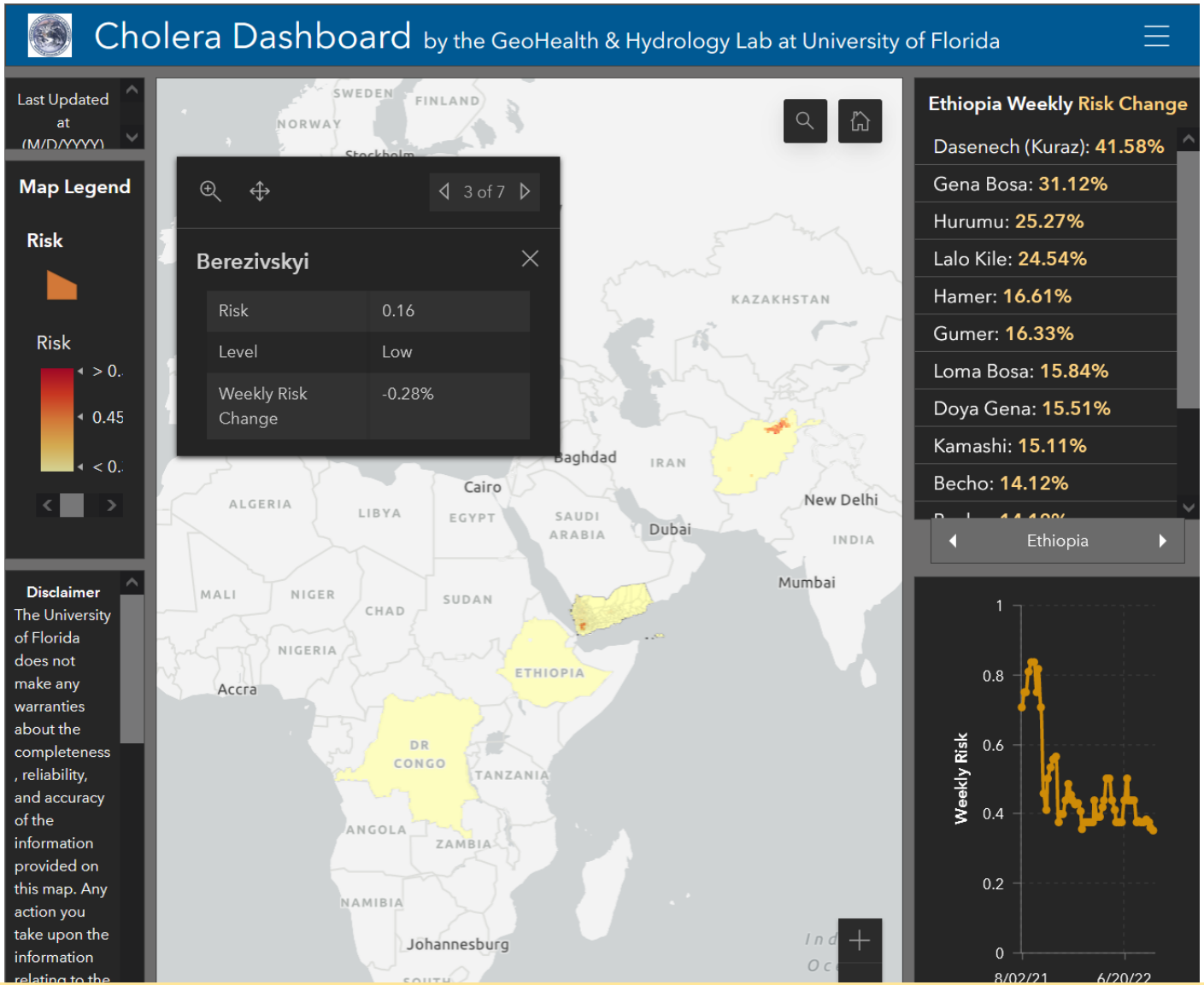


Warm temperature= above climatological average temperature
Heavy rainfall= above climatological average precipitation
Water insecurity=lack of access to water and sanitation access
High cholera risk=probability of cholera greater than 50%

Adapted from Jutla et al. Environmental factors influencing epidemic cholera. *Am J Trop Med Hyg*. 2013;89(3):597-607.

Vibrio Prediction Hub

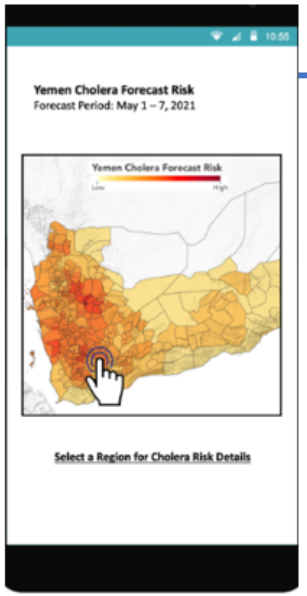
GeoHealth & Hydrology Lab at the University of Florida

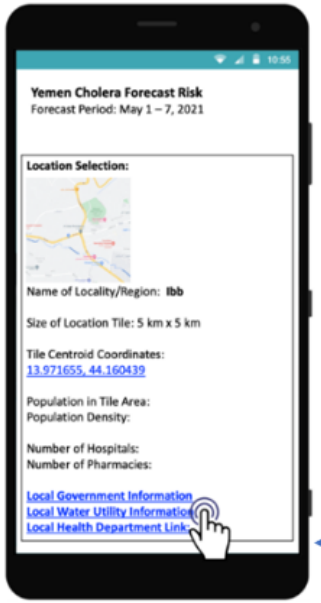


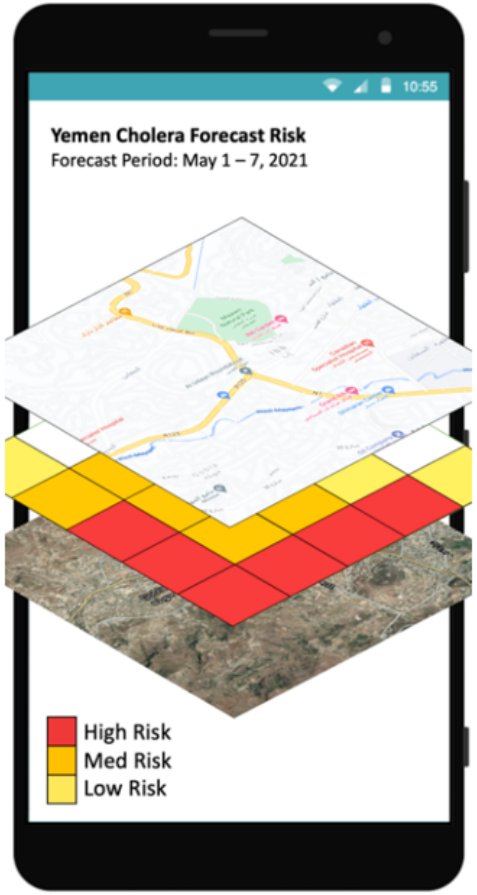
Contact details for Cholera Prediction Consortia for
Cholerapredict_users@lists.ufl.edu

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)

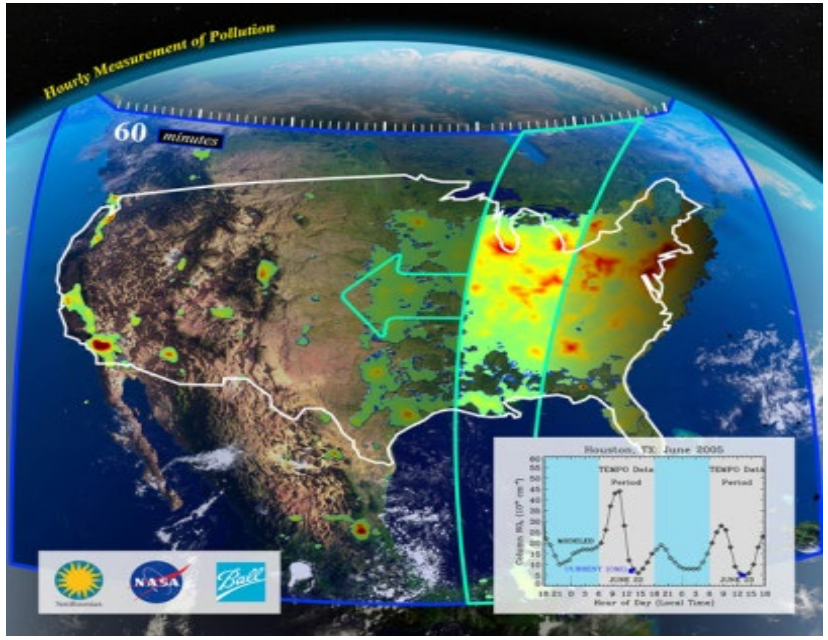
Ability to use precise location to filter data in the map

Provides local information on Cholera risk and nearby hospitals

Directions to nearest hospital when user clicks on features

Results-focused layout

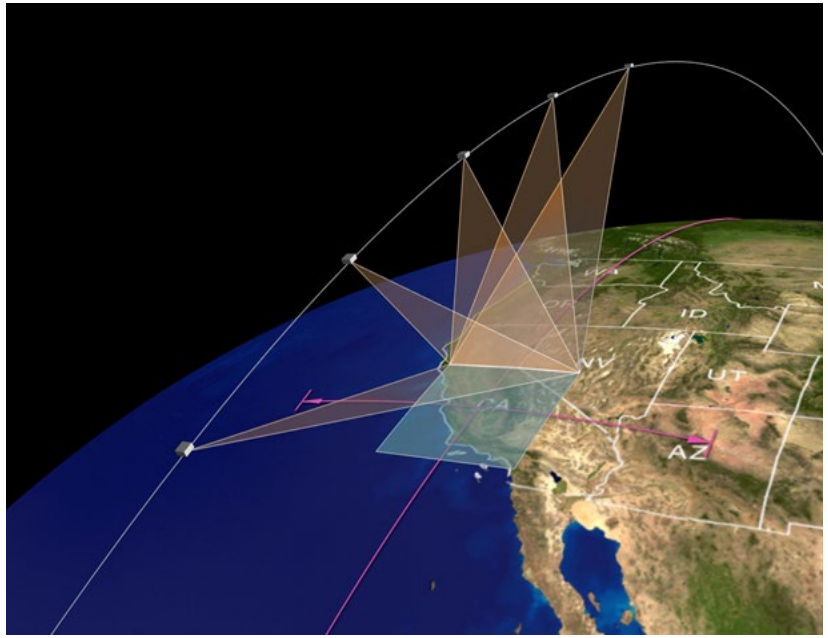
Earth Venture Instrument-1:
Tropospheric Emissions: Monitoring of Pollution (TEMPO)



"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, NO_2, CH_2O.
- Forms a global air quality constellation in GEO with Copernicus Sentinel 4 and Korean GEMS.
- Instrument delivered in 2018; Launch expected April 2023.

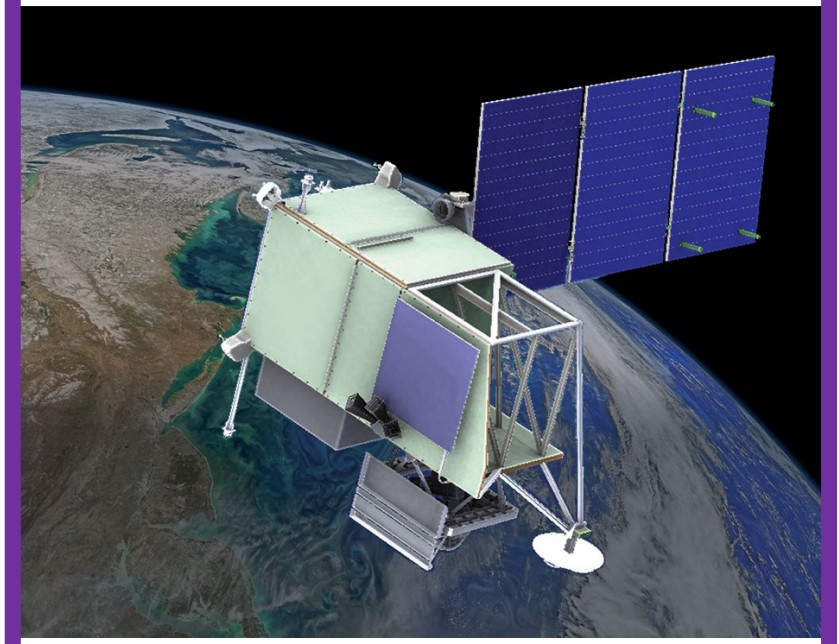
Earth Venture Instrument-3:
Multi-Angle Imager for Aerosols (MAIA)



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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Helena Chapman, helena.chapman@nasa.gov