NASA Science Mission Directorate
Earth Science Division
Applied Sciences Program

Improving Malaria Decision Support with Earth Observations

NASA Award # 80NSSC19K0192

Program Area (Health and Air Quality)

Program Review– September 19, 2022

Applied Sciences– Project Summary

- Project Title: Improving Malaria Decision Support with Earth Observations
- Project PI: John Beck
- Solicitation under which the project funding was awarded: ROSES 2017 A.39 Health and Air Quality
- **Project Summary:** Researchers at UAH) in collaboration with the Centers for Disease Control and Prevention (CDC) and NASA propose to improve malaria control decision making in sub-Saharan Africa by developing and deploying a technology for incorporating the latest NASA Earth observations for surface temperatures, precipitation, and vegetation health into a widely used health management platform titled District Health Information Software 2 (DHIS2).
- Geographic Scope: Global
- Geographic Focus: sub-Saharan Africa
- Societal Benefit Area(s): Human Health
- Earth observations / models / technologies applied: Surface temperatures, precipitation, and vegetation health.

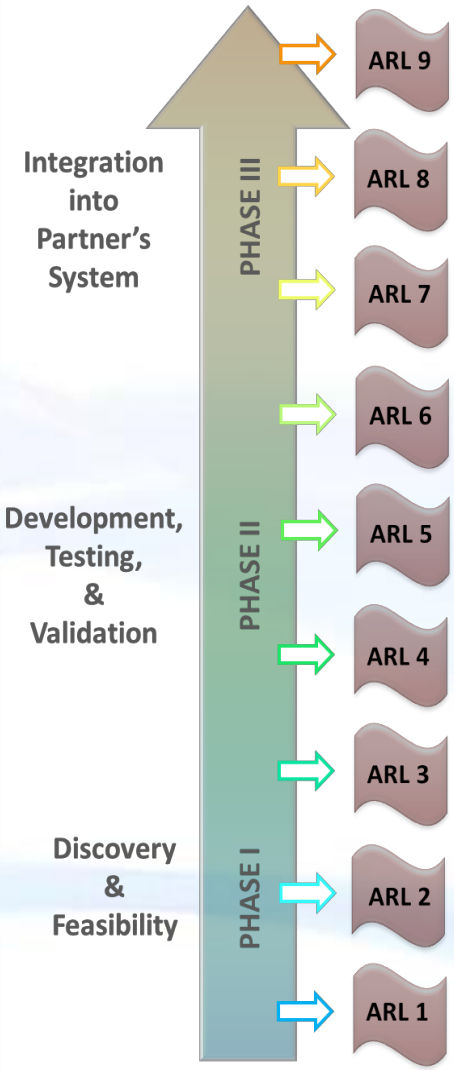
Project Partners

Role	Name	Affiliation Organization	Organization Type
Co-I	Jeffrey Luvall	NASA/MSFC	Federal Agency
Co-I	John Painter	CDC	Federal Agency
Co-I	Udaysankar Nair	UAH	State Agency
Co-I	Todd Berendes	UAH	State Agency

End-Users / Stakeholders

Organization Name	Organization Type
World Health Organization (WHO)	Global Organization
Centers for Disease Control and Prevention (CDC)	Federal Agency
Africa Country Ministries of Health	Other
University of Oslo	Education
University of South Carolina	Education

Performance/ARL

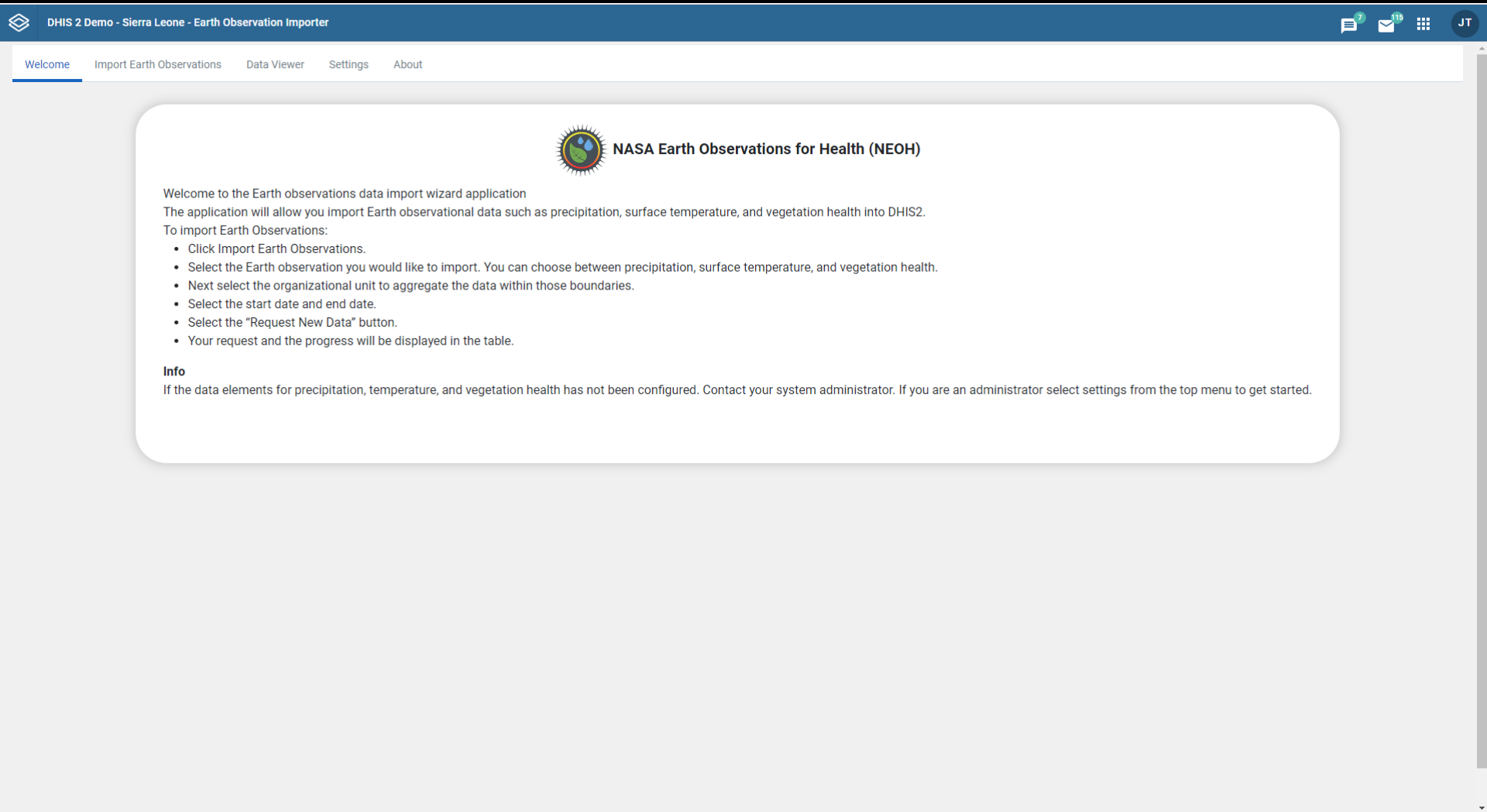


- Start-of-Project ARL = 3 *(11/16/2018)*
  - **We estimated that the starting ARL for this project was a 3**. We based this evaluation on three factors: 1) Components of DHIS2 had been tested and validated by independent users, 2) we conducted a simple feasibility study that assessed the potential viability of modifying the DHIS2 software and we established a proof a concept for the application, and 3) we have a convincing case for the viability of our concept.
- Goal ARL = 9 (sustained use)
- Current ARL = **8** *(09/16/2022)*
  - We have completed version 2.0 of the software and Co-I Painter has successfully tested the application within the DHIS2 application at the CDC. The software is working as expected and the user documentation and training is completed.

Accomplishments / Results

- Developed a **cloud-based system** for retrieving and aggregating IMERG precipitation, MODIS surface temperatures, ECOSTRESS surface temperatures, and MODIS vegetation health data from NASA repositories over input health districts boundaries
- Developed **process for ingesting** Earth Observations into DHIS2's database
- Developed a Earth Observation Web Application that is used by DHIS2 as a plugin for **requesting, importing, and managing** NASA Earth Observation Data
- Developed packaging procedures for distribution of the backend services and the Web Application among partners using a **Docker Image**
- Met with the NASA AppEEARS team at the LP DAAC to negotiate better connections with their system for many of the datasets
- Met with the developers of DHIS2 at the University of Oslo to discuss our project (***discussed EO data ingestion as a future core function***)
- Completed version 2.0 of the web application and the backend cloud process services
- Installed the Earth Observations Web Application at the CDC
- Developed an **API for the backend services** to expose EO data outside of DHIS2
- Created a video demonstrating the web application and its functionality
- Developed a project's webpage on UAH/ITSC research page
- Completed user documentation and installation procedures
- Working on a journal article detailing the project, its methodology, and use cases
- Attended DHIS Annual Conference **(won Honorable Mention in web app contest)**

Improving Malaria Decision Support with Earth Observations – PI John Beck / The University of Alabama in Huntsville (UAH)



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