

2019

Collaborative



Founded in 2016, Radiant Earth Foundation is a nonprofit organization whose mission is empowering organizations and individuals with open Al and EO data, standards and tools to address the world's most critical international development challenges.

# ANNUAL REPORT



2019

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## **CEO's Letter**

#### Impacting Global Development with Machine Learning

In 2019, Radiant Earth Foundation refocused its efforts to support people working to address the world's most critical problems with machine learning (ML) on Earth observation (EO).

The increasing supply of EO data from a growing number of geospatial platform providers that offer free data and services to manipulate the data, coupled with the expanding interest and potential real-world impact that machine learning offers, generated a key question:

"How can we empower humanitarian and nonprofit organizations, governments, and others to use geospatial data and ML to answer high-impact auestions?

ML and EO are two complementary domains that can provide faster solutions to more complex problems: From calculating the expected yield of crops in a particular area to predicting the likelihood and extent of a global outbreak for example. However, we found that these technologies are often inaccessible and expensive for many humanitarian and nonprofit organizations. Furthermore, technical practitioners lack access to the high-quality geo- and ground-referenced data that power ML models, and spend

a quarter of their time cleaning and labeling data. To maximize the impact of EO in support of sustainable development activities, we realized just how crucial it is to remove these barriers for humanitarian and nonprofit organizations working on persistent global problems.

Radiant Earth's enhanced machine learning focus will enable us to leverage investments in this field by philanthropic organizations, governments, universities, and the commercial sector, and expand the availability of accurate and diverse training data — the most fundamental requirement to develop machine learning models on Earth observation data. To this end, we successfully launched Radiant MLHub in December to accelerate the adoption of machine learning to help solve global development challenges.

We are pleased with the overall favorable response to our new direction, and are looking forward to expanding Radiant MLHub, cultivating a community of practice around metadata standards around AI and EO, and sharing observations around the best use of EO data in support of the world's most critical challenges.



Anne Hale Meglarere

Founder and Chief Executive Officer
Radiant Earth Foundation





## **LESSONS LEARNED**

Radiant Earth Foundation was founded on the premise that much of the world's best Earth observation (EO) data was difficult to find and even more challenging to use because of access issues, making these valuable assets stranded and underutilized.

With a focus on global development, the Radiant Earth Platform helped users to discover and unlock these imagery assets and the science of remote sensing to meet the community's unique needs and challenges whether it be health, climate change, deforestation, or to support innovation around the Sustainable Development Goals.

In the two and a half years that our team pursued this important mission with the development of the Radiant Earth Platform, we witnessed a dramatic change in the commercial marketplace:

- Cloud-based data storage and computing is standard practice and an integral part of largescale remote sensing projects;
- Artificial Intelligence (AI) and Machine Learning (ML) techniques for EO are rapidly evolving;
- New EO suppliers and service providers appear almost daily;
- Existing commercial suppliers are expanding their services and offerings; and
- Numerous commercial platforms now exist with data richness and functional capabilities well beyond Radiant Earth's Platform offering.

The marketplace evolution prompted Radiant Earth to assess it against the needs and challenges of the global development community, leading to a change in our vision and mission. The major market and technology lessons that directed our pivot follows:



### **Market Lessons**

**LESSON 1:** A rapid growth in the number of geospatial platform providers emerged. Many of them have a free tier for tasks such as visualization of a scene or time-lapse (e.g., Sentinel-Hub and Planet Stories). These services fulfill the requirements of "data visualization" for generic global development community users (~75%). There is no need for Radiant Earth to replicate these services.

**LESSON 2:** By offering the platform during this time of rapid market expansion, Radiant Earth has been seen as a competitor. Going forward,

Radiant Earth must focus on product and service opportunities that avoid commercial competition, and instead, add functionality and increase adoption across the value chain.

LESSON 3: Early on, we neglected to characterize our audience with enough persona fidelity. The GDC is a diverse one; Their interest in, and capabilities to exploit remote sensing data vary, as do the application to a very diverse set of challenges. Trying to serve the needs of a beginner to an expert user on one platform across multiple markets was not achievable. Furthermore, the

,the global development community is both siloed and uncoordinated for data (GDC) sharing and acquisition. Combined with a highly fragmented geospatial market, we continue to see high levels of inefficient approaches to the use of remote sensing data for global development.

**LESSON 4**: The heterogeneity of the GDC concerning the routine uses of EO became evident within a year of the platform launch and highlighted areas where the platform and our strategy for specific users required adjustment. Specifically, we saw that while interest in the platform came from multiple sectors, the capacity

to use and analyze remote sensing data was lower than expected, and users required more support to exploit platform resources fully and to envision "the art of the possible." A significant number of users conflate the visualization of satellite imagery with remote sensing analysis.

**LESSON 5**: Given that these users are best described as late adopters and their use cases are often complex, their needs are best serviced by high touch consulting engagements, an approach that Radiant Earth was not established to undertake.

## **Technology Lessons**

**LESSON 1:** The Radiant Earth Platform was a remote sensing Software and Data as a Service offering, and as such needed to traverse the technology adoption life cycle. The platform appealed to technology enthusiasts, innovators, and early adopters. These three segments generally look to get the latest technology first and seek to influence the future directions of the technology.

**LESSON 2:** The open source platform technology Radiant Earth selected was not well supported by an open source community who contribute new features and functionality regularly. This resulted in a limited software functionality and development momentum, requiring Radiant Earth to be the sole investee in its expansion, and leading to frustration amongst early adopters.

LESSON 3: While we never anticipated reaching a mass market, the issues encountered with the heterogeneity of the global development community, and their missions were impediments to getting pragmatic practitioners in the global development community to adopt the platform. These users have a low tolerance for risk and need to see a clear and immediate benefit to integrating the technology into their workflows.

**LESSON 4:** Just as imagery enables an analysis of the changing environment, these lessons learned represent key data points that we at Radiant Earth assessed to ensure we are responding to the global development community's needs and challenges,

making the best use of philanthropic dollars and pro-actively positioning our work to impact the future.

**LESSON 5:** Numerous organizations are using AI and ML or looking to incorporate it into their business processes and workflows. Being focused on their missions, humanitarian and nonprofit organizations often lack the technical know-how to apply these new technologies.



## **The Pivot A New Direction**

#### Strategic Plan

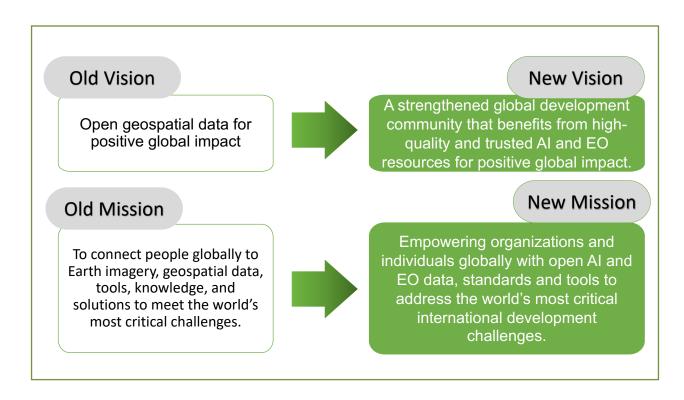
In May 2019, based on the lessons learned, Radiant Earth Foundation refocused its vision and mission on the development of open training data libraries, ML models and technology standards that support the use of EO data for global development. Our pivot is based on the need that exists within the global development community to understand and exploit rapidly advancing artificial intelligence and Earth observation related technologies that can be game-changing for addressing critical and complex challenges such as food security, climate change, urbanization and water availability.

The Radiant Earth Foundation is uniquely positioned to play a leadership role in filling this need. With broad experience as a neutral entity working with commercial, academic, governmental and non-governmental partners to expand EO data and information used in the global development sector, Radiant Earth Foundation recognizes the opportunity that exists today to advance new applications and products through

artificial intelligence and machine learning.

The centerpiece of our work is Radiant MLHub, which was initiated in June of 2018, and formally launched in December 2019. This enhanced focus on artificial intelligence and Earth observation enable Radiant Earth to leverage investments in this field by governments, universities, multilateral agencies, and the non-profit and commercial sectors to expand the availability of trusted, accurate and diverse training data and models, and to focus those resources on global development applications.

Radiant MLHub facilitates a community commons for training data, models, and standards. Designed for and by the global development community, Radiant MLHub encourages an open, collaborative community and demonstrates the principles that have and will continue to guide the work of Radiant Earth.



#### Goals

Radiant Earth has three specific goals, the details of which follows:

## GOAL 1: Fostering an open source "Hub" to discover and access EO training datasets, and AI models

The focus of this goal is to develop and maintain the infrastructure and tools necessary to access and discovery training datasets and ML models. In addition, the metadata connecting models to their underlying training datasets are also developed and maintained.

Other targets this goal include hosting available data and encourage large institutions, governments, and non-profits to contribute or register their data to Radiant MLHub; Leading a sustained community-wide effort to capture image labels for various applications across the Global South; Compiling best practices through a communitybased process to create labeled training datasets from annotation and ground-referencing methodologies; Developing training datasets and models internally where the opportunities present themselves; and Sponsoring high impact data competitions for the global development community to use the Radiant MLHub assets.

# GOAL 2: Cultivating a community of practice to develop standards around AI on EO and expanding interoperability of these tools and datasets

The focus of this goal is to use Radiant Earth's "neutral" position to engage and convene the many sectors working in the industry via code sprints and technical working groups. In addition, Radiant Earth will publish on the outcomes and results of these activities; and offer Technical Fellowships for experts to work with the community to develop these standards.

# GOAL 3. Raising awareness amongst global development actors, data scientists and geospatial professionals on progress and innovation in the AI and EO marketplace

The focus of this goal is to highlight best practices on the use of ML for EO to drive results. Topics will cover data, models, technology, policy, and ethics, as it relates to AI and ML on EO. Radiant Earth will also facilitate the adoption of AI-based geospatial solutions by institutions and organizations in the GDC and provide EO market information that spotlight activities relevant to the GDC to keep up with timely and the quickly evolving EO field through a wide range of channels.

#### **GOAL 1**

Fostering an open source "Hub" to discover and access EO training datasets and AI models

- Publish and share training datasets
- Validate and publish ground-referenced labels
- Foster development and benchmarking of open models
- Sponsor/Organize competitions to develop models
- Develop and maintain infrastructure for datasets, models and metadata

#### **GOAL 2**

Cultivating a community of practice to develop standards around AI on EO and to expand the interoperability of these tools and datasets

- Sponsor Fellowships to support innovative technology standards (e.g. STAC)
- Convening workshops and technology sprints
- Collaborate on training data standards and best practices
- Facilitate development of data interoperability standards

#### GOAL 3

Raising awareness on the innovation in the AI and EO marketplace for global development actors, data scientists, and geospatial professionals

- Publish EO market news
- Highlight best practices on Al & EO to increase the value of their applications
- Disseminate information produced by community of practice
- Convene networking events

# Program Accomplishments

The accomplishments are divided into two sections to reflect Radiant Earth Foundation's refocusing efforts: The period between the beginning of the year and the pivot due to the market friction, and technology limitations (January-May 2019); and, the period since the pivot (June-December 2019).

#### Achievements from January - May 2019

#### **Technology**

- Accommodated 3,091 unique users, with 865 frequent users on the platform, representing nearly 1,300 organizations across nine sectors, and approximately 120 terabytes of satellite, airborne and drone imagery resident on the platform.
- 29 organizations contributed to the geospatial (including Planet, MAXAR (former Digital Globe), Element84, Azavea, Development Seed, The Climate Corporation, and HOTOSM).
- 129 developers external to the Radiant Earth team who have registered for an API key
- Provided 4 Technology Fellowships.

#### Mandela Washington Fellows

- Supported Motswana drone operator, super platform user and 2017 Fellow, Mmoloki Morapedi to not only sharpen his GIS and data analytic skills, but also to strengthen his social enterprise's product line-up, which has served to create linkages with the Botswana Ministry of Agriculture and the University of Botswana.
- Supported 2018 Fellow Awa Thiam funding proposal to UNICEF for a grant to collect groundtruth data, which can support our long-term goal (and the focus of the McGovern grant) to create open, labeled image libraries of African crops.

#### **Community Development and Use Cases**

 Radiant Earth supported the work of the Centre de Recherche et d'Education Pour le Développement (CREPD) in Cameroon, which is conducting a survey of artisanal and smallscale gold mining (ASGM) sites. CREPD's mission is to identify these sites, document and improve labor conditions to protect the workers -many of whom are women and

- children—from the toxins like mercury and cyanide used in ASGM.
- With respect to remote sensing analytics, we had several clear successes with use cases developed to answer a methodological or research guestion. Our work with the Centers for Disease Control and Prevention contributes to the relative value of solarinduced fluorescence versus MODIS-based vegetation indices for vector habitat models. This partnership exposed us to more than 140,000 followers of CDC on social media, which lends to our recognition and credibility both with the scientific community and the general public. A similar effort to model mosquito vectors for the Bill & Melinda Gates Foundation has also contributed to ongoing efforts to improve models of malaria transmission and outbreaks.

#### **Communications and Outreach**

- In conjunction with the Mandela Washington Fellows Program, a geospatial training workshop was held in Kigali, Rwanda.
- Indirect educational support through general and tailored webinars, as well as through Radiant Earth's Insights online publication and social media channels to facilitate the adoption of ML geospatial solutions and inform about the EO marketplace.

#### **CommonSensing Project**

 Successfully led launch activities of the CommonSensing project in Fiji, Vanuatu and the Solomon Islands. The project focused on reducing the impact of natural disasters and increase future food security, through the provision of data critical to financing Climate Change Adaptation. Officially withdrew from the CommonSensing project on May 15, 2019 due to the pivot.

#### **Achievements from June - December 2019**

Radiant Earth Foundation's early strategic efforts to develop Radiant MLHub have been successful. An active and diverse community of practice centered around Radiant MLHub have begun to coalesce.

#### **Machine Learning Training Data**

- Radiant MLHub successfully launched on December 9, 2019 with "crop type" training data for major crops in Kenya, Tanzania and Uganda. Based on multispectral data from the European Space Agency's Sentinel-2 mission, including temporal data captured by Sentinel-2 during the growing season, these datasets contain information on wheat, maize, sorghum and various vegetables, which are supplied by Plant Village, Dalberg Data Insights and the Great African Food Company.
- Microsoft AI for Earth's Chesapeake Bay Land Cover and SpaceNet's Roads and Buildings training datasets are available on Radiant MLHub as of December 11, 2019.
- Conducted a pilot project with Radiant Earth partner IDInsight in India to test the geospatial accuracy of field boundary collection using smart phones vs a high-end GPS device. Analysis of the results of this pilot is guiding our future data collection campaigns.
- Finalized engineering pipeline for a benchmark training dataset of global land cover classes to address sustainable development Goals

#2 (Zero Hunger), #9 (Industry, Innovation and Infrastructure), #11 (Sustainable Community, Cities and Communities), #13 (Climate Action), and #15 (Life on Land).

#### **Community of Practice**

- Supported convening of Analysis Ready Data Interoperability Workshop, and the SpatioTemporal Asset Catalog (STAC) Sprints.
- STAC 0.7.0 released + 0.8.0 early release, and STAC website published.
- STAC Browser for training data is released.
- USGS adopted of STAC pecification for Landsat Collection 2 catalog.

#### **Earth Observation Information and Awareness**

- Monthly EO Market News published.
- Convened a session at the 2019 CGIAR Convention in India on best practices for ground referencing.
- Convened sessions, and participated on various panels at the 2019 American Geophysical Union in San Francisco to demonstrate Radiant MLHub and to generate awareness on EO, ML and the sustainable development goals.



### Radiant MLHub

#### An Open Repository for Geospatial Training

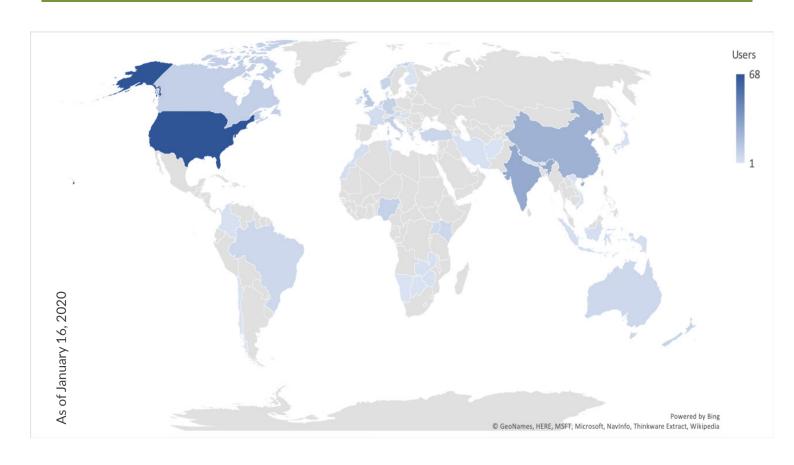
Radiant MLHub is an open digital training data repository. It is designed to encourage widespread data collaboration, and allows anyone to access, store, register and/or share open training datasets for high-quality Earth observations. Shared data and models are accessible via a standardized API, and can therefore move across organizations, governments and sectors in order to unlock new opportunities for data-based insights.

Earth observations are important because it enables various applications such as agricultural monitoring, land cover classification, biodiversity mapping, among others. Coupling it with machine learning techniques can advance these applications, allowing for faster, more efficient and scalable models.

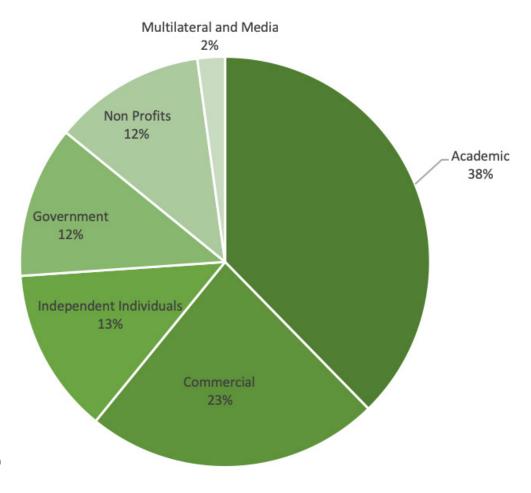
Radiant MLHub is an interoperable solution for sharing training data and is compatible with all commercial and private cloud repositories. One of the great features of Radiant MLHub is that it maps all of the training datasets that it hosts, allowing stakeholders to easily pinpoint under-represented geographical areas from which more training data are needed. It also provides the community with benchmark data to evaluate their own models for accuracy and thereby bringing transparency and trust to applications.

Radiant Earth Foundation's overall goal for Radiant MLHub is to make it **the** primary repository for geospatial training data that can be used for building machine learning algorithms using satellite and aerial imagery.

## Radiant MLHub Users Per Country



## Radiant MLHub Users Per Sector



As of January 16, 2020



### **Washington Mandela Fellows**

#### Keletso Mike Seabo. 2019 Fellow

Through our partnership with the Young African Leaders Initiative Mandela Washington Fellowship, Keletso Mike Seabo from Botswana spent the month of August at Radiant Earth Foundation for the Professional Development Experience portion of his fellowship.

Keletso is a drylands expert with the Government of Botswana in the Department of Forestry and Range Resources. During his fellowship, he focused on remote sensing and its application in vegetation resources management.

Keletso's passion in environmental conservation and management comes from his childhood upbringing in a rural village of Otse in SouthEast Botswana. He grew up collecting firewood for domestic household energy and wild berries with other children. After joining a local primary school environmental club, he realized the local community was unsustainably using the range resources & the distance they had to walk to This led to him studying environmental science of Western Australia.

Today, as the Senior Forest and Range Resources Officer in Ghanzi district, he specializes in vegetation research, remote sensing and GIS, and bushfire and veldt products management. His long Through the fellowship, Keletso was introduced term goal is to use his skills to influence public policy on community participatory management of natural resources for sustainable socio-economic such development of his country.

#### **Impact**

Traditionally, Batswana are highly dependent makers. on livestock production and the industry ranks 3rd contributor to Botswana's GDP. Over the years, the number of livestock has increased and



exceeded the carrying capacity of rangelands, collect firewood & berries was increasing yearly. resulting in overgrazing of nutritious perennial grasses. This has promoted the establishment of at the University of Botswana Academic Services. Woody plants, which are not edible by livestock. He went on to obtain his Master of Science in Many livestock farmers cannot afford to buy feeds Environmental Management from The University for their animals which has significantly affected the quality of animals and lowered profits from sales thus affecting livelihoods. In addition, overgrazing has also changed the natural ecosystem and contributes to the loss of biodiversity.

> to a wide range of remote sensing and GIS applications, as well as operational platforms Sentinel-Hub and Descartes Lab as platform to help him execute his mandate of providing timely data analysis on status of the forest and rangelands in Botswana to policy

#### Awa Thiam, Social Entrepreneur from Senegal

Radiant Earth's 2018 Washington Mandela Fellow, offers Awa Thiam from Senegal, ambition is to improve audiences. In addition, school children's access to healthy foods by the unforeseen benefit of optimizing the supply-chain for primary school our support is that Awa feeding programs. Public schools in Senegal rely is beginning to collect heavily on multilateral food donations (e.g., World ground-referenced data, Food Program) which in turn offer commodities which can support our grown in other countries.

Our Fellow saw an opportunity to help smallholder libraries of African crops. farmers access new markets, lower the cost and improve the efficiency of supply chains using open Radiant Earth's connections with innovators like source imagery and geospatial data. Since Awa's Awa help build our resources and our brand in the fellowship, Radiant Earth has helped her build out developing world while also achieving our mission. her platform and strengthen her business model. We have benefitted through the exposure this

us to new new mission to create training open data



#### **Open Geospatial Technologies Training Workshop** African Leadership University - Kigali, Rwanda

For the second year in a row, Radiant Earth Foundation has conducted an open geospatial technologies training workshop in Africa in collaboration with the Young African Leadership Initiative of the Washington Mandela Fellowship program. The workshop this year took place in Kigali. Rwanda at the African Leadership University from April 23-26, 2019. The program included a Public Lecture with various local speakers, followed by a three-day hands-on training workshop on open geospatial technologies.

The goals of the workshop were (1) to expose more students and professionals specializing in new technologies to open source tools and applications; and (2) to inspire innovators to find solutions for problems facing their own communities, regions, and countries by using and adapting open data.

Kigali was selected as the location due to Sylvia Makario's deep connections in the country, as well as Rwanda's drive to make Kigali a technology hub for the region. Sylvia is a 2015 Mandela Washington Fellow Alumna and Co-Founder of Hepta Analytics, a Kigali -based technology firm specializing in big data

analytics. The African Leadership University was selected as the venue for the public lecture and workshop due to the university's central location, academic setting and mission: Educating the next generation of technology, civic, and business leaders.

390 people in the region applied to attend the workshop. We accepted 40 participants based on their familiarity with geospatial technology, remote sensing, data science, but were not yet experts in the field.

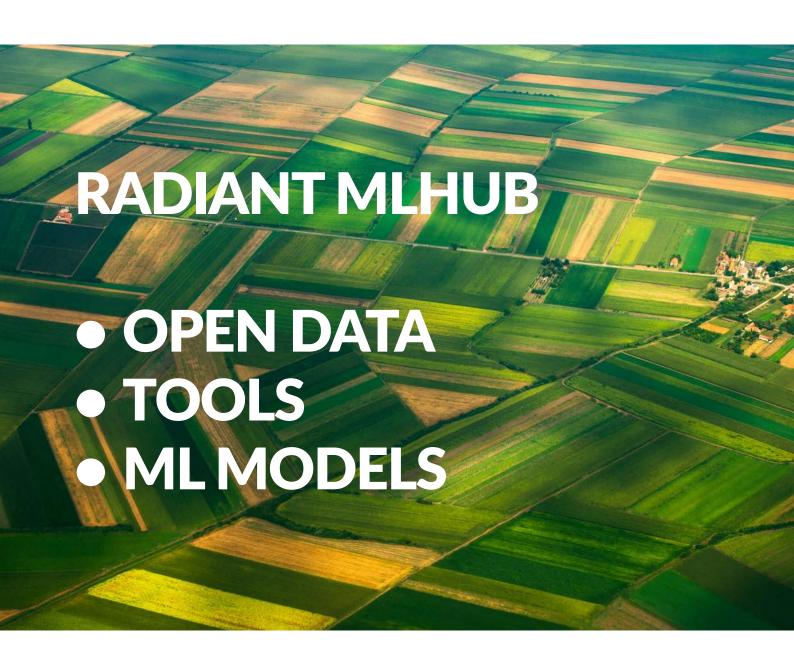


# **Theory of Change**

Radiant Earth's vision and mission are crafted around the notion that AI and EO standards and tools must be readily available and trusted by the international development community if they are to be adopted as a basis for evidence-based decision making.

For trust to occur, data must be open, of high-

quality, and developed through a collaborative process. Only then can the broader community innovate for its desired impact: High-quality data and AI models that are trusted by national, regional and local organizations to drive solutions that benefit poor and vulnerable people, especially in the developing world.



#### **Radiant Earth Foundation Theory of Change**



Assumption

Artificial intelligence and open Earth observations, and the related standards and tools are critical resources to create actionable insights to global problems.

**Impact** 

Poor and vulnerable people in the Global South benefit from improved living conditions and economic opportunity because of actionable insight derived from community access to high-quality open training data and AI models



Outputs

Activities

Input

Practitioners working on global development challenges have high-quality data and products they can trust to support evidence based policies



A collaborative ecosystem with data standards that unlocks vast archives of training data for AI applications



Global development organizations are well informed on EO and AI applications. These organizations become better buyers and practitioners of using the technology to support evidence based decisions.



 Increased availability of high-quality open training data and models

- Enhanced geodiversity of training data
- Improvement in models' accuracy
- Expanding diversity of EO applications
- Academics and practitioners conduct work more efficiently and develop better products
- Benchmarked datasets and models



- · Data harmonization increases
- Improved search functions helping users discover data more efficiently
- Expanded adoption of interoperability standards by data providers
- Practitioners and data users have access to more data sources to generate insights
- · Partnerships for public good increases



- EO and ML principals and methods are widely understood
- Increased awareness of market activities, opportunities, and issues
- Increased use of AI on EO
- More organizations willing to register datasets on Radiant MLHub
- Accelerated use of training datasets on Radiant MLHub



- Publish and share training datasets
- Validate and publish ground-referenced labels
- Foster development and benchmarking of open models
- Sponsor/Organize competitions to develop models
- Develop and maintain infrastructure for datasets, models and metadata



- Sponsor Fellowships to support innovative technology standards (e.g. STAC)
- Convene workshops and technology sprints
- Collaborate on training data standards and best practices
- Facilitate development of data interoperability standards



- Publish EO market news monthly
- Highlight best practices on AI and EO to increase awareness
- · Publish Radiant Insights quarterly
- Disseminate information produced by community of practice
- Convene networking events



Generating and aggregating open training data and model libraries for Al experts and practitioners



Cultivating a community of practice to create interoperability standards and best practices



Raising awareness about EO resources and AI capabilities to support International Development Challenges

# Education and Outreach Activities

Radiant Earth Foundation's education and outreach activities encompassed direct and indirect educational support through thought leadership articles, use cases, EO market analysis, capacity development programs and events, and convenings that are focused on global geospatial users of various sophistication levels.

#### Thought leadership, articles, editorials, interviews

- » Radiant Earth Foundation's 2018 Annual Report Good Wishes for 2019! Anne Hale Miglarese Founder and CEO, Radiant Earth Foundation
- » My 10-Year Challenge: Glacier National Park By Yonah Bromberg-Gaber, Geospatial Data Specialist
- » When your town is burning, every second counts By Glenn Moncrieff, Data Scientist, Fynbos Node, South African Environmental Observation Network
- » How Earth Observations, Cloud Computing, and Machine Learning Enables Global Development Solutions
  - Anne Hale Miglarese Founder and CEO, Radiant Earth Foundation
- » The stage of maturity Earth observation in a new era of space exploration
  By Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation
- » Anne Hale Miglarese of Radiant Earth Foundation presented with the Coastal GeoTools Visionary Award
- » Creating Transparency: How satellite imagery brought awareness to deforestation and illegal mining in a National Park
  - By the SOSOrinoco Team and Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation
- » STAC Extensions and 0.6.2 Release
  - By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- » Awa Thiam: Creating Efficient Sustainable Food Systems with Geospatial Data Q&A with Awa Thiam, CEO, Lifantou and Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation
- » Hamed Alemohammad: Addressing global challenges with models that are faster, more efficient and less expensive to scale
  - Q&A with Hamed Alemohammad, Chief Data Scientist and Louisa Nakanuku-Diggs, Marketing and Communications Manager from Radiant Earth Foundation
- » Join STAC Sprint #4!
  - By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- » Refocusing Radiant Earth Foundation's Efforts to Impact Global Development with Machine Learning By Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation
- » Dreams do come true: STAC Sprint #4 Recap
  - By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- » Exploiting Multi-Region Data Locality with Lambda@Edge By Seth Fitzsimmons, Technical Fellow, Radiant Earth Foundation
- » STAC 0.7.0 Release and New Website
  - By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- » Embracing the New Era of the Digital Revolution for Global Development By Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation

- » Please Help Test STAC spec 0.8.0 Release Candidate 1 By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- Earth Observations and Machine Learning; Two Complementary Technologies
   By Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation
- » Join STAC Sprint #5 + OGC API Features hackathon November 5-7 By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- » STAC: Creating an Ecosystem of SpatioTemporal Assets Azavea By Niki LaGrone, James Santucci and Aaron Su, Data Scientists, Azavea
- » STAC 0.8.0 Release
  - By Chris Holmes, Technical Fellow, Radiant Earth Foundation and Product Architect at Planet
- » STAC: Creating and Ecosystem of SpatioTemperoal Assests Azavea By Niki LaGrone, James Santucci and Aaron Su
- » Creating the Planet's Digital Ecosytem By Hamed Alemohammad, Chief Data Scientist, Radiant Earth Foundation
- » Catherine Nakalembe: Enhancing Agricultural Productivity with Earth Observation Q&A with Catherine Nakalembe from NASA Harvest and Louisa Nakanuku-Diggs, Marketing and Communications Manager, Radiant Earth Foundation
- » The Many Meanings of 'Open' By Anne Hale Miglarese Founder and CEO, Radiant Earth Foundation

#### **Conferences and Workshops**

- » Workshop on Quantifying Error in Training Data and its Implications for Land Cover Mapping, Clark University, January 8-9, Worcester, MA
- » Al for Good Summit, May 28-31, Geneva, Switzerland
- » ICT4Ag 2019 Conference, June 5, Washington DC
- » Computer Vision for Global Challenges workshop, June 16, Long Beach, CA
- » NASA Harvest Conference 2019, June 24-26, Washington DC
- » ESRI User Conference, July 8-12, San Diego, CA
- » ESIP Summer Meeting, July 15-19, Tacoma, WA
- » Harnessing Big Data and AI for Sustainable and Inclusive Agriculture at Chatham House, July 30-31, London, UK
- » Satellite Data Interoperability Workshop: Analysis Ready Data Interoperability with Planet and Radiant Earth Foundation, August 5-7, Menlo Park , CA
- » MERL Tech, September 5-6, Washington DC
- » 2019 CGIAR Big Data in Agriculture Platform Convention, October 14-18, Hyderabad, India
- » 2019 Grand Challenges Annual Meeting, 28-30 October Addis Ababa, Ethiopia
- » Location Powers Workshop, November 13-14, Mountain View, CA
- » 2019 AGU Fall Meeting, Dec 9-14, San Francisco, CA

#### **Educational Events and Webinars**

- » 2nd GEO AWS Earth Observation Cloud Credits Programme Webinar, March 19.
- » Taught 40 students and young professionals mapping using OpenStreetMap and geospatial data analysis using Radiant Earth Foundation's platform, April 22-27, Kigali, Rwanda
- » USGS CDI AI/ML Collaboration Area Monthly Webinar, October 8

#### **Code Sprints**

- » STAC Sprint #4, San Francisco, June 4-6
- » STAC Sprint #5 + OGC APIL-Features Hackathon, Washington DC, November 5-7

## **Our Team**

#### **Board Members**

- » Anne Hale Miglarese, Board Chair, Chief Executive Officer, Radiant Earth Foundation
- » Jerry Johnston, Specialist Leader, Location Intelligence Practice, Deloitte
- » Sanjay Kumar, Chief Executive Officer, Geospatial Media & Communications
- » Peter Rabley, Venture Partner, Omidyar Network
- » Margie Sullivan, Chief Executive Officer, Sullivan Strategy
- » Kass Green, President, Kass Green & Associates

#### Staff

- » Anne Hale Miglarese, Chief Executive Officer
- » Hamed Alemohammad. Chief Data Scientist
- » Louisa Nakanuku-Diggs, Marketing and Communications Manager
- » Yonah Bromberg Gaber, Geospatial Data Specialist
- » Alando Ballantyne, Geospatial Machine Learning Engineer
- » Kevin Booth, Geospatial Developer

#### **Fellows**

- » Chris Holmes, Technical Fellow
- » Yang Chen, Technical Fellow
- » Brookie Guzder-Williams, Technical Fellow
- » Seth Fitzsimmons, Technical Fellow
- » Keletso Mike Seabo, Mandela Washington Fellow

"Deep learning is poised to accelerate geospatial analysis workflows, but we're not there yet. The most important way to 'move the needle' is to make curated, labeled training data available to get the machine learning community working on these problems, and to allow for standardized evaluation of algorithms. Radiant MLHub is a huge step in this direction."

- DR. DAN MORRIS Program Director Microsoft AI for Earth Program

# Thank you to all our Partners & Funders

#### **Data Providers**

- » Plant Village (Kenyan crops)
- » Dalberg Data Insights (Ugandan crops)
- » Great African Food Company (Tanzanian crops)

#### Training Data Registered on Radiant MLHub by Partners

- » Microsoft AI for Earth (Chesapeake Bay Land Cover training data)
- » SpaceNet (Roads and Buildings training data)

#### **Funders - Operational**

- » Omidyar Network
- » Bill & Melinda Gates Foundation
- » The Patrick J. McGovern Foundation
- » Schmidt Futures
- » NASA, Earth Science Data Systems Program
- » The International Research & Exchanges Board

#### Funders - Analysis Ready Data, and the SpatioTemporal Asset Catalog

- » Astraea
- » Azavea
- » Capella Space
- » Development Seed
- » Element84
- » EOX IT Services GmbH
- » KBR
- » L-1 Standards and Technology, Inc
- » Labsphere, Inc
- » Planet
- » Radiant Earth Foundation
- » The Climate Corporation
- » Urthecast

