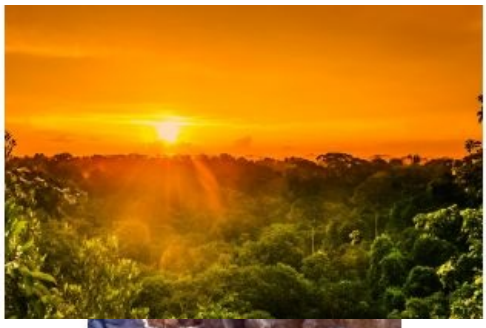
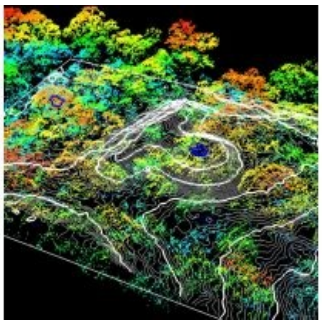
Q&A WITH CHRISTOPHER FISHER, EARTH ARCHIVE

Creating a Digital Twin of the Earth





An unprecedented scientific effort to Lidar-scan the entire surface of the Earth before it's too late... that's how Christopher Fisher, the founder of the Earth Archive, describes his initiative. He started the Earth Archive based on his experience of using remote sensing technologies in Mexico and Honduras. His aim is to better understand the causes and consequences of urbanism and environmental change.

Can you explain more about what the Earth Archive project encompasses?

As you know, the Earth is changing rapidly and we have a limited time to document it, as it exists now, before it's too late. The Earth Archive hopes to promote the 3D scanning of the entire land surface of the planet, but we are starting with the areas that are not going to get done in time. The initial focus is on the Amazon and areas of North America. We hope to help create an open-source digital twin, both to better combat the climate crisis and also to act as a permanent legacy for future generations. The data is like a Swiss Army knife – it can act as an accelerator for both science and industry. We hope to have the same sort of impact that declassifying the GPS signal had, or open-sourcing the Landsat record.

What data acquisition technology is being used to map the Earth and how is all the resulting big data handled?

At the moment we are focusing on airborne Lidar – from a helicopter or fixed-wing aircraft. Unmanned aerial vehicles (UAVs or 'drones') that are available to the general public do not have the capacity or range for the currently scanning technology. The amount of data is obviously huge. However, this is similar to other major acquisition programmes globally. At the moment, the Earth Archive mission is to provide the data as .las or .laz files only, which is the current industry standard for Lidar, rather than visualizing the data ourselves. I imagine that the data will ultimately be treated and visualized in a multitude of ways.

The objective of the Earth Archive is to build a virtual, open-source digital twin of our Earth which is accessible to all.

What is your response to sceptics who express doubts about the feasibility of the Earth Archive project?

The only sceptics so far have been focused on costs. In terms of feasibility, massive 'scaling up' will definitely need to happen but we have received surprisingly little opposition. We have had impressive and immediate positive response from industry and have received many donations of time, equipment and other resources.

You plan to map the Earth's surface in stages. The next stage is to scan the entire Amazon basin. What's the current status of this?

We have the necessary infrastructure, logistics and corporate buy-in to map the entire Amazon. We have a rudimentary structure in place for all nine countries that encompass the Amazon, and the basic permissions we need. We hope to begin scanning late in the autumn of 2021 or early 2022. As you can imagine, COVID-19 has had a major impact on our planning. This will be an exciting venture, since this part of the planet is one of the last unexplored places on Earth, so we look forward to discovering and exploring unknown ancient cities and cultures.

In view of your professional background as an archaeologist and professor of anthropology, what are your own expectations of mapping the Amazon in this way?

One interesting thing for me as an archaeologist is that we will be able to demonstrate how densely settled the Amazon was at the time of

contact and how humanized the landscape was. This is a major question in the prehistory of the region, and it's something that we can help elucidate. As we all know, the Amazon rainforest plays a crucial role in the Earth's climate. However, few people are aware it has an incredibly rich indigenous history. On top of this, this region boasts a remarkable level of ecological diversity. Sadly, we see it vanishing before our eyes. Today, we have the ability to digitally preserve landscapes – very high-resolution Lidar enables archaeological, anthropological and conservation studies and provides essential information to help advance sustainable development. I am also sure it will bring us groundbreaking revelations of the Amazon's astounding past.

Who stands to benefit from the Amazon map and from the Earth Archive project as a whole?

We are hoping to help level the playing field in terms of access to data, to help create equity in access to high-quality geospatial recourses. The Earth Archive is set to provide a comprehensive baseline database of the Earth's surface, and everything on it, at a high resolution (equivalent to at least 25cm pixels) that is accessible to as many as possible. In a nutshell, the ultimate goal of the Earth Archive is to create a digital planet as a gift for future generations.

Further Reading

www.theeartharchive.com

About Chris Fisher

Chris Fisher is an archaeologist, National Geographic Explorer and professor of anthropology at Colorado State University, USA. He has performed fieldwork throughout Latin America, Europe and North America. His work is featured in the *New York Times* bestselling book called *The Lost City of the Monkey God* by Douglas Preston. Fisher founded the Earth Archive to better understand the causes and consequences of urbanism and environmental change.

Chris Fisher, the founder of the Earth Archive.