



**K**AYRROS IS A GLOBAL PLATFORM THAT DRAWS on satellite images to measure everything from deforestation to methane emissions with a level of precision that sounds almost like science-fiction. The platform analyzes data and images from satellites across virtually all sensors available—including radar, hyperspectral and 3D. In addition to emissions, it can follow the progress of natural resources and movements of industrial equipment using a combination of satellite imaging, geolocation and computational analysis.

Antoine Rostand, the company's co-founder and CEO, spoke with Brunswick Partners Alex Burnett and Brian Potkowski of the firm's global Climate Hub about the potential of such technology to usher in a new era of transparency on climate change and nature.

**Kayrros uses data from satellites including the ESA's Sentinel-1, above, which monitors Earth's environment. Below, Antoine Rostand speaks at COP26 in Glasgow in 2021.**



**What drew you to energy, climate and satellite-based geo-analytic technology?**

I've been in the energy space since the very start of my career. On my first day at work, I was in Libya and the US under President Reagan started bombing in retaliation for actions suspected on the part of then-leader Muammar Gaddafi. So that was a powerful lesson for me in how energy and geopolitics are interlinked. [Gaddafi was believed to be using his nation's oil revenue to fund international terrorism.] So it seemed clear to me when it came to climate that we needed to challenge the way that politics, money and energy are organized to make real progress.

At Kayrros, I wanted to do something new. We found a way to use satellites, cloud computing and machine learning to provide quality data to decision makers. They've been driving toward the energy transition in the dark; we wanted to provide light.



# BIRD'S EYE VIEW

**You were recently recognized by the *Financial Times* as one of its “Tech Champions” for 2022. Can you tell us about your technology and how it is being used?**

We use more than 10 constellations of hundreds of individual satellites, including satellites managed by the European Space Agency, NASA and commercial satellites. These provide daily images, which we use for three main purposes. First, we measure CO<sub>2</sub> and methane across the major sources, such as oil and gas, cement, minerals and steelmaking, which account for as much as 60% of emissions. We know where these are coming from and can allocate emissions at an asset level, company level or state. We can also see whether they are increasing or diminishing.

Second, we model physical risk from wildfires, for example, or droughts or floods. We can provide

Satellite-based tracking of CO<sub>2</sub> and methane emissions represent the dawn of a new era for business transparency, says **ANTOINE ROSTAND**, CEO of tracking platform Kayrros.

that information to states, insurers or asset owners to adapt to climate change.

Third, we track the energy mix. We can see how much solar capacity is being built, how much oil is being produced or whether there's been a switch from coal to gas. By using this data and deploying cloud computing, artificial intelligence and machine learning we can, for the first time, measure greenhouse gases, physical risk and physical infrastructure.

**This technology seems to have implications for a number of critical stakeholders, from companies to consumers, governments to investors.**

It will simply mean that the necessary information is available. Governments will be able to use it to make decisions. Investors will be able to use our tools for due diligence to deploy capital and engage with companies based on their provable environmental impacts and risks. Fund managers can better decide allocations to equities or bonds based on verified metrics.

**We have seen a surge of sustainability-linked bonds from financial institutions. Some have come under scrutiny for “greenwashing.” How can your technology build trust in this market?**

We can help investors and consumers see the difference for themselves. For example, if you create a green bond or a sustainability-linked instrument, they will be able to trust this information and apply a true value to climate action—we have the technology to make sure that money that is supposed to be green, actually is.

This should translate into greater confidence for the buyer of the bond and lower borrowing costs for the issuer, ultimately helping make the transition cheaper to finance for everyone.

**We're speaking just after COP27 in Egypt. What's your sense of the progress from COP26 to now?**

For us, the main achievement of COP26 was the global methane pledge, signed by 130 countries to collectively reduce emission by at least 30% by 2030. Methane is a much more powerful greenhouse gas than CO<sub>2</sub> and represents almost half of short-term global warming. So, if we stop methane leaks today, we will have an immediate impact on the global warming happening.

But there has been very little progress. Countries are emitting methane at the same rate as before the pledge and we still see the same number of “super-emitters.” I'm a father of four and seeing us collectively fail to do relatively easy things is frustrating.

### Are there differences between what's being reported and the methane emissions you are measuring?

There are discrepancies. Generally, for both states and companies, we see methane emissions of between three and 10 times those being reported. But this is a complex issue, because the way companies report is driven by regulations based on “emissions factors” and not actual emissions. Satellite information is the only way to actually measure and guarantee that what has been reported is accurate, for companies as well as regulators. So there's clearly an issue of re-baselining. The US is moving in this direction, and we hope that the EU will follow. We want to work with government agencies and academia to make the data public.

The good news is that methane emissions from oil and gas production and industry, as opposed to agriculture, occur at a relatively limited number of sources. We have the technology to fix it, and it's relatively easy to do so, particularly emissions from the fossil fuel industry. Most emitters could reduce their methane emissions by 30% or 40% in less than a year. The global methane pledge could be achieved in one year, rather than six or seven. And we are starting to see some action. The US's Inflation Reduction Act is finally going to put a penalty on methane leaks. This will move the needle when it's implemented. Here, the EU needs to do more.

### We've seen a strong focus on nature and biodiversity, alongside growth of the carbon market and offsets as a means of meeting climate goals. What role could satellite technology play here?

On forestry, we now have the ability to track, in real time, tree by tree. We can see how many have been planted and how fast they are growing—an unprecedented transparency. We can also monitor the carbon offsetting market, which forms the backbone of many net-zero strategies. We can see that some firms are doing a very good job, while others are buying cheap, low-quality offsets that are not producing the benefit they report. And for nature-based solutions, we can use a combination of satellites and blockchain technologies to ensure that there is a public ledger, so there's no double-counting of carbon credits.

### What about greenhouse gas emissions from power generation and industry?

We can now track all power plants in real time, whether in the EU, US, India or China. In the EU and US, emissions are generally quite well known, but in India or China this often isn't the case. We can

“Most emitters could reduce their methane emissions by **30** percent or 40 percent in less than a year.”

**ALEX BURNETT** and **BRIAN POTSKOWSKI** are Partners with Brunswick's global Climate Hub, in the firm's London office. Alex joined the firm from Shell, where he designed and oversaw the implementation of Powering Progress, the company's first codified strategy for being purpose-led. Brian focused on decarbonization strategy and policy for the investment firm Riverstone Holdings, where he served as Vice President.

measure the actual CO<sub>2</sub> of the power being generated. The same is true for large industrial emitters. We will be able to track, measure and then calculate the CO<sub>2</sub> emissions of the products that consumers buy. For example, we can probably get 80% of production emissions for a new car, because we can track emissions from the steel and aluminum production. This is important because sometimes when we feel good about decreasing our emissions, we are simply importing emissions produced in the production of goods and services from countries where there are fewer regulations. For governments, greater transparency in this area presents significant opportunities in terms of pricing and taxing carbon emissions.

### What about governments that want to support jobs, but limit the negative impact on nature?

We can help governments too. Today, we are tracking hundreds of farms in Indonesia and Brazil, where we know exactly whether or not they are fulfilling their commitments linked to REDD+ [a framework inspired by the UN for forests] or green finance. Once we can verify and differentiate between good and less good actors, we can create reliable sources of income for farmers who reduce deforestation. I visited the Ivory Coast recently and I can tell you that people don't deforest for fun; they do it because they need food and income. We are talking with the government there about using our technology to prevent deforestation, but also to identify land that could be used for food or other economic activity.

### We have seen a trend toward transparent non-financial reporting. What is this going to mean for how companies report and communicate?

Transparency is coming. People will know what impact companies are having, and being fully transparent will be a way to differentiate yourself in the market. Today, they report according to existing regulations. They are not intentionally minimizing what they report, but they are using emissions factors to calculate emissions, rather than actually measuring those emissions.

When regulation requires satellite-based measurement, things will really change. It's not law yet, but it's the direction of travel for the EU and the US. Then the narrative will be out of companies' hands. It's going to completely change the way companies think about communicating on the environment. Companies should prepare themselves by seeing what others will see. Leading companies will take this leap of faith and embrace transparency, but it's going to be difficult for companies that wait too long. ♦