Topic 2c - Blockchain - enabling greater trust in the data

People are now asking for provenance of the data. Where does this information come from? Can we trust in where the information has come from, and can we trust what we have in front of us? This is now really important when we think about technologies like distributed ledgers.

Blockchain is one of these really exciting buzzwords that are going around the industry at the moment. No one's fully sure about what the full potential of this technology might be. We're starting to see some early indications that it might be useful, for example, around provenance of metadata that's associated to the satellite data itself.

So for example, this is associated with, where was the satellite data downlinked from? Where was it processed? What are the different processing steps that have actually happened to it? Who's the data been in the hands of? All of these sort of questions, blockchain is perfect for. But what we don't know yet is what the full, maximum potential of this could be.

But it's really important to think about security in its broader sense, not just blockchain but when we think about cryptography, as well. People are really interested in understanding and wanting to know that the data they're looking at is secured and hasn't been changed from point A to point B. And there's multiple technologies to do that, not just blockchain.

One of the key essential new things which blockchain does, it brings the capability of not only handling a technical procedure via a computer code but also to transmit and transfer value in a very secure and very legally secure way. And that's something which is new, which is not possible today in the same way with the internet.

This aspect of that you can, within a very secure environment, transfer value, can track things which are unchangeable, is a very key element. And therefore, for us, the smart contract aspect that you are able to do computer programs. When you run those computer programs-- and this could be in a decentralised way-- you securely do everything from steering processes, computer processes, to transferring the payment for those processes. This is the key why we do it.

And I think the geo applications are of a specific characteristic. Because they are highly multidimensional. You have the three coordinates. You have different times, so multi-temporal. You have different types of sensors. You have different suppliers, so you have very complicated revenue sharing schemes.

And so it's the application. It's the development of those smart contracts. The underlying blockchain protocol is, for us, an infrastructure which is kind of interchangeable. So we could switch from one to another blockchain. That's not where we put the effort. It's really the application, the smart contracts, which is the key of our concentration.

A couple of changes in Earth observation can be addressed with a decentralised infrastructure. A decentralised infrastructure is based on distributed ownership. So it's not owned and controlled by a single party or small consortium. It's basically set up, operated, and governed by a huge group of parties. And this adds an additional trust layer.

It's trust in terms of selling access to the assets, owning the assets. So assets can be dynamically owned by a large group of stakeholders. And also, it's adding trust in terms of we are sharing the assets.

So when it comes to Earth observation for situation awareness, for analytics, weather predictions-- and that's what share economy does-- everyone can now access a space asset to access this in a specific timeline at a specific date for a specific purpose, which means everyone has access to this, not the big intelligence agencies, not the big government agencies, not the big corporates. It's now affordable for everyone to access it.

In addition, can I trust the data where they're coming from? Can I trust the authenticity of the assets? Can I trust the integrity of a machine learning algorithm that's interpreting the data? What is the reputation of the machine learning algorithm?

In this distributed ownership infrastructure, I can exactly put the reputation of a machine learning algorithm that's doing image recognition, image analysis, for situational awareness, for example. I have to take a decision. I have to start an expensive emergency rescue action. And I would probably only do it if I can trust the data plus the findings of the machine learning algorithm. And for that reason, it's important that the distributed ownership provides an additional trust layer.

Having said this, it's not super complex, what's possible to retrofit existing systems. What I mean is to blend in a decentral infrastructure into an existing satellite image processing, image recognition infrastructure to get all the benefits of a decentralised system. So we are blending a couple of technologies. It's primarily internet of things, blockchain, a whole lot of modern cryptography-- because we would like to make it secure-- and machine learning. Because we would like to harvest some insight out of the infrastructure.

So we are blending these technologies. And I think what has happened in recent years is that a majority of technologies are now at the tipping point to go beyond proof of concept, to go beyond field test, for mass adoption. And that's, I think, the reason why it's very nice opportunity now to integrate technologies and develop entirely new business models.