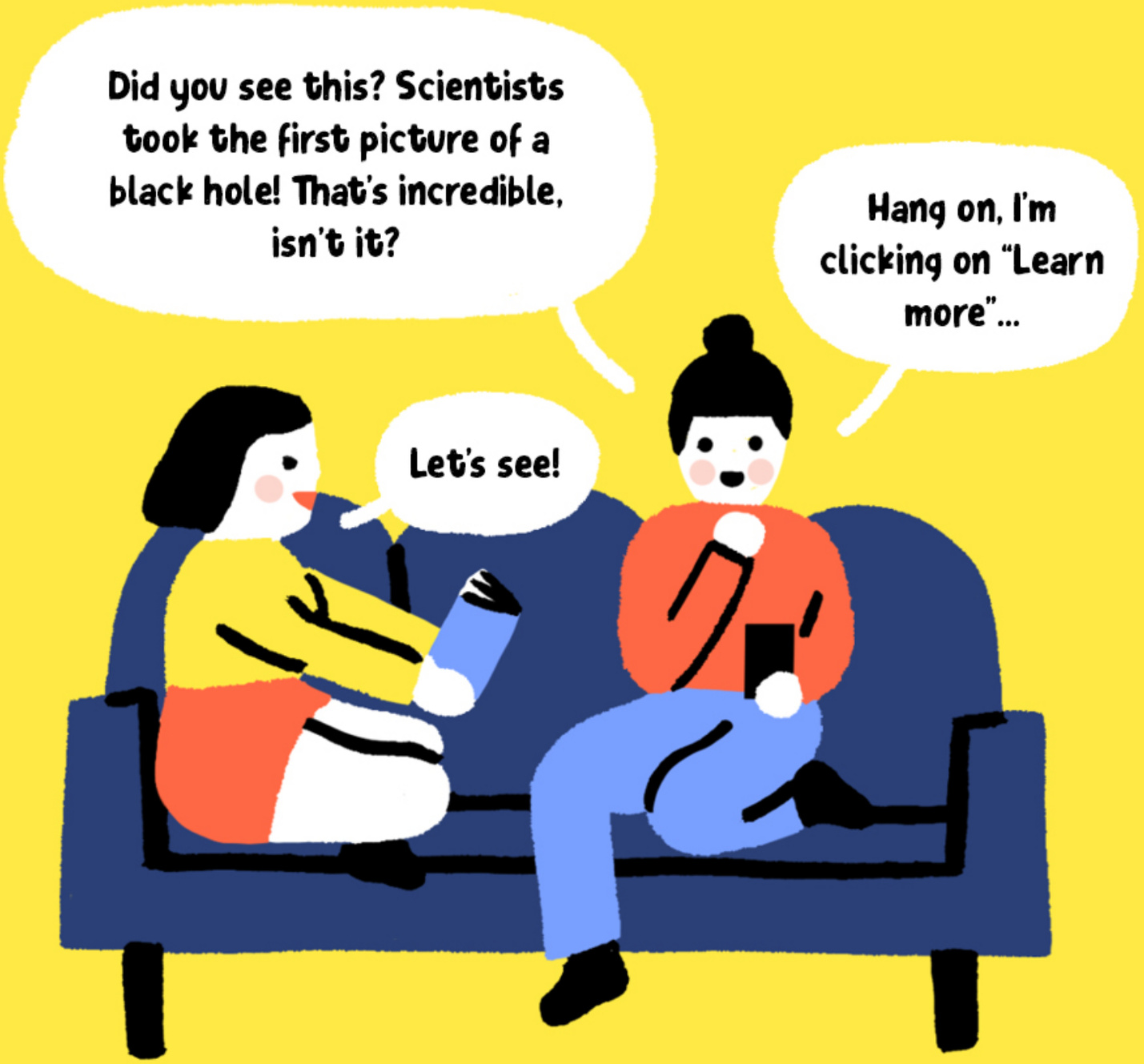
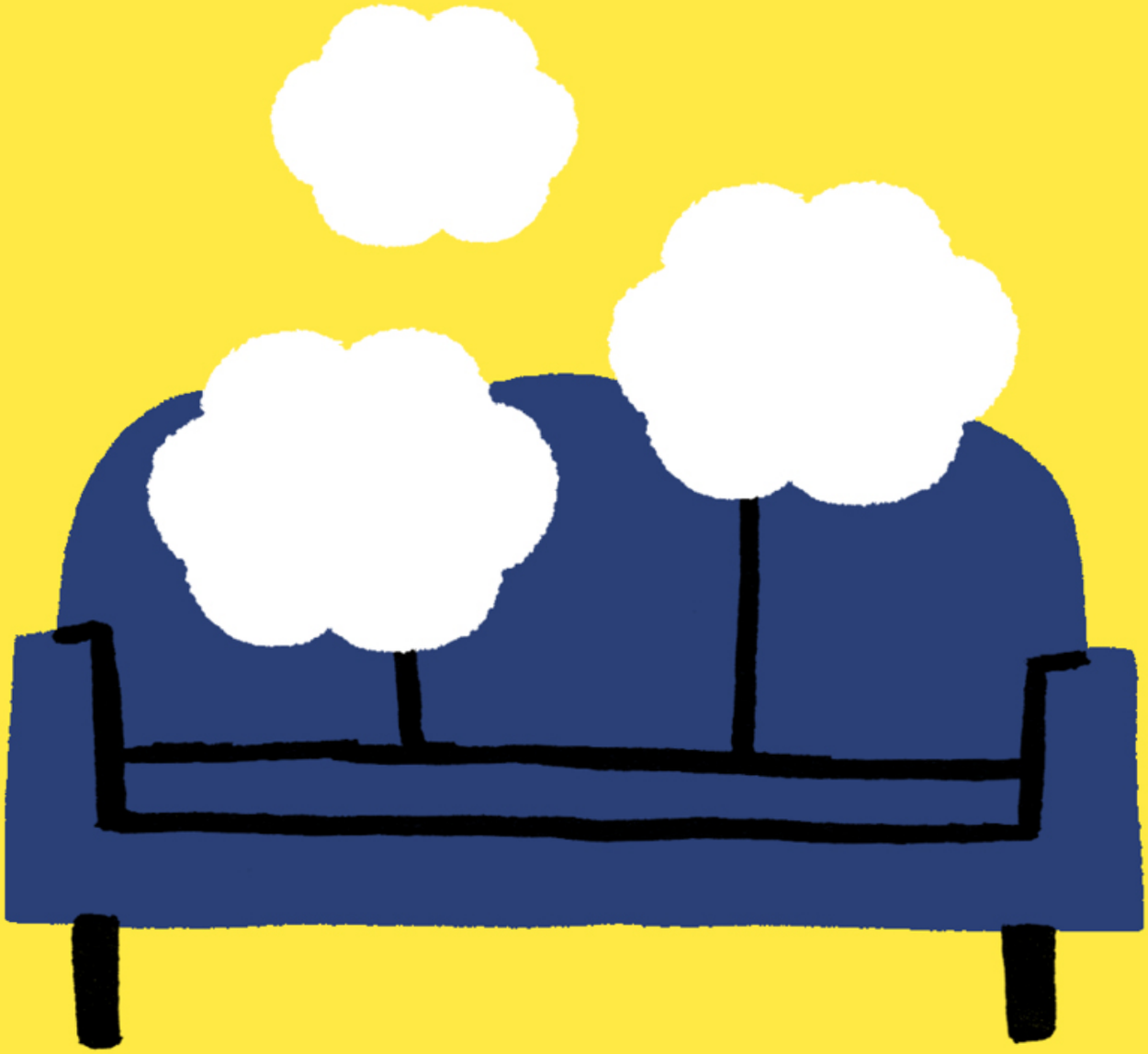
LOOKING DEEP INTO SPACE TO BETTER UNDERSTAND EARTH



Julie Brouant

CURIEUX!

POOF!




Whoa! What happened?
POP!
I think we got teleported into space! Or something was funny in the salad we had for dinner...


Hey girls! So how would you like to learn more about the technology behind the picture?
The picture of the black hole was taken by VLBI (Very Long Baseline Interferometry), using data collected by a network of radio telescopes on several continents. This technique is also used to measure Earth's shape and its orientation in space.
A talking star?
Okay, so it was the salad...
Hmm... Could you say that in English please, Ms Star?


Sorry, I'll try to be clearer: VLBI is a radio astronomy technique that gives ultra-sharp pictures of celestial bodies, especially distant galaxies where huge black holes live. Multiple telescopes observe the same celestial body simultaneously and receive signals at the same time. These signals are then sent to a correlator, which combines the different observations and builds the picture.
Celestial body very far from Earth
Correlator
VLBI can also accurately measure the position and motion of objects in the sky.

However, VLBI is not used just to observe distant celestial bodies. It can also find the position of interplanetary probes, like a sort of space GPS. To correct the probes' trajectory as they approach the planets and bodies in the solar system that they are going to study, for instance. In terms of precision, it's a bit like if we were able to see a tennis ball on the surface of the moon with just the naked eye.

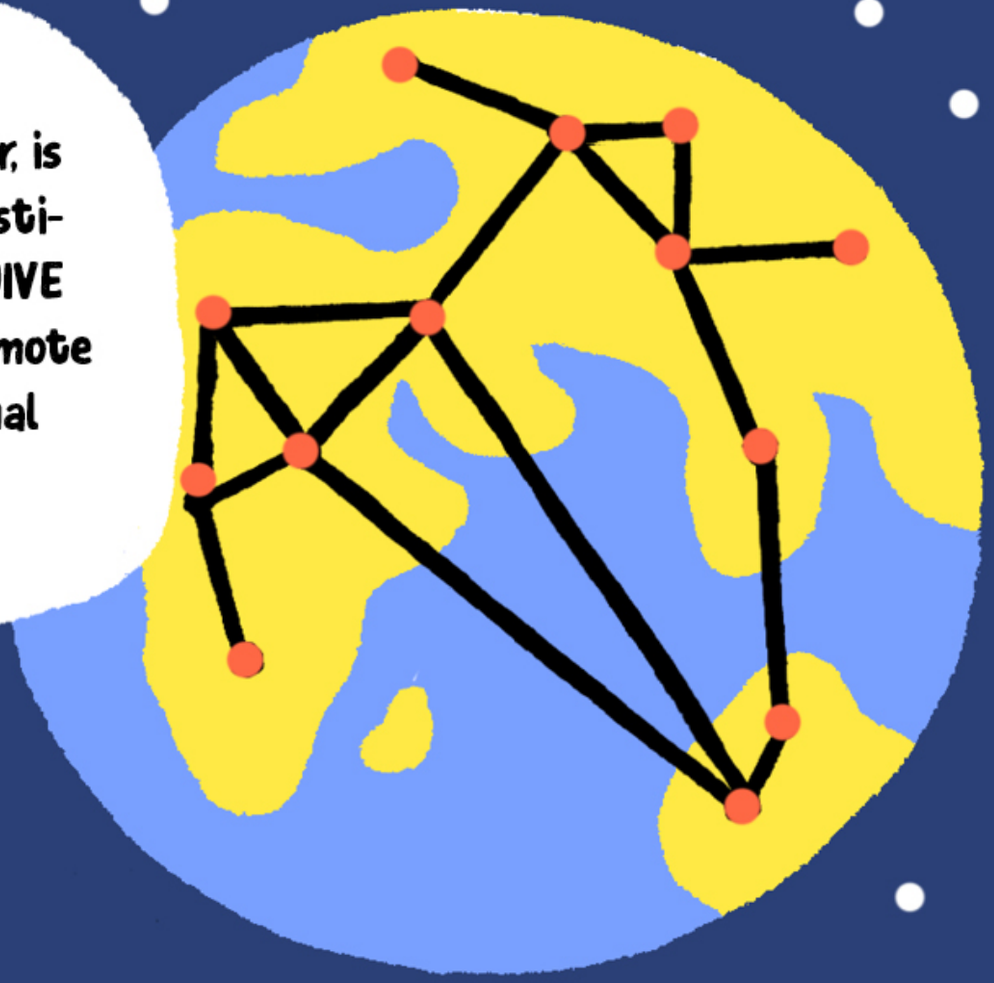

VLBI also helps better understand Earth:
monitoring irregularities in its rotation speed, which are linked in particular to winds and ocean currents,
but also the changing ocean levels, to better understand climate change,
mapping the movement of tectonic plates and studying earthquakes...
VLBI is also useful in everyday life!
The GPS in our smartphones, for example, use VLBI results to take us exactly where we want to go!

VLBI technology has evolved significantly since its beginnings 50 years ago. In 2004, the first demonstration of electronic VLBI took place. The signals captured by multiple radio telescopes were transmitted to the correlator via internet, a now routine method of observation.

By 2030, the SKA (Square Kilometre Array) will be introduced into the VLBI network. SKA will be the world's largest radio telescope, aiming to study the beginnings of life and the origins of our universe. It will produce a data flow greater than all global internet traffic today.

VLBI observes objects at the furthest reaches of space, while offering the opportunity to better understand Earth and analyse what is happening on its surface! But to do this, an international network is essential.

In Europe, JIVE, with its correlator, is the heart of the network. This institute is also behind the JUMPING JIVE project, the goal of which is to promote VLBI technology and international cooperation.



Wooow

I have one last little question...


How are we going to get home now?
Do you think the radio telescopes will find us?
cnrs
JUMPING JIVE
Joint Institute for VLBI ERIC
Mai 2021
Joli mois de l'Europe digital