Name of collection

Landing on a Comet: What we found from Rosetta and how we are applying it on Earth

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[MUSIC PLAYING]

On November 12th, this animation should become reality. The Rosetta mission will achieve a first when the Philae Lander touches down on comet 67P/Churyumov-Gerasimenko. As a space scientist working with those who have instruments on board this lander, I'm going to take you through five of the questions I'm always being asked about the Rosetta mission. And I'll be meeting the OU experts who have all the answers.

[MUSIC PLAYING]

I guess it's just the irresistible curiosity of humans. We simply just have to know what's out there, but actually, there are some fundamental scientific reasons to visit a comet too. So why do we bother going to a comet?

Well, we want to go to a comet because it's there. It's an object in our astronomical backyard, and we want to know what it looks like and what it's made out of.

From my own research, I know that comets contain organic material and water. What are we going to learn from Rosetta about this?

We want to know whether the water in the comet has a relationship with water on Earth. And if it does, we then want to study the organics in the comet to know something about the organics that were brought to the surface of the early Earth.

[MUSIC PLAYING]

Harpoons in space, who would have thought? One of the things about this landing is that it's nothing like any other landing to date, on a planet or a moon. So Andy, why do we need harpoons on the Philae Lander?

There are two harpoons on board, and it's the first time it's been used in space because the gravity of a comet is so low. So it's used to attach the lander to the surface.

So are the harpoons just required for the landing sequence?

Not just the landing sequence, but throughout the mission, the comets going to become more active, gas is going to come off trying to push the lander away from the comet. So as to keep it firmly attached throughout the whole of the mission.

[MUSIC PLAYING]

Well, actually, it's not an oven big enough to cook your pizza, but instead a version of a lab instrument that's to heat up samples for analysis. This assignment, where are the ovens on board the lander?

Yeah, there's a number of ovens on the instrument. They're located behind this drill on a circular carousel. And the ovens themselves are these little devices.

Why do we need ovens?

Well, the OU's instrument is a mass spectrometer, and we need to analyze gases. So we take the solid cometary material, pop it into the oven, and heat it up, and we get the gases off that we can analyze.

[MUSIC PLAYING]

The Open University's instrument, Ptolemy, is located inside the lander, and it's actually located in this compartment here. So this is Ptolemy. And the gas from the oven is led via pipe into here for analysis.

[MUSIC PLAYING]

I'm always being asked this question because it's possible that Philae will not land successfully, and that the instruments may be unable to work. But what would happen to the mission then?

The instruments, including Ptolemy, and this is a life-sized version of Ptolemy, are already pre-programmed. And so we will sniff the comet, whatever happens, whichever way we land.

That's brilliant. So how does this Ptolemy model your holding relate to the lab one we're standing next to?

Well, as you can see, it's a miniaturization of this whole system and has very similar functionality. And we've been applying the know how that we developed in producing Ptolemy to several challenges back here on Earth. That's included health care, safety equipment, and also even measuring the quality of our drinking water.

[MUSIC PLAYING]

This could seem like a bit of an overclaim, but is it? We only have to think back to the demise of the dinosaurs who were likely killed off by a comet colliding with the Earth. Could this mission save the world?

Well, not directly, no, but it could indirectly. Comets travel through the solar system all the time. Some of them come very near the Earth. Some might even have hit the Earth in the past.

Now the more we know about comets, their composition, how tough they are, how easily they break up, the better it is. So that we can understand more about deflecting them away from the Earth. It might sound like science fiction, the idea of deflecting a comet, but if the choice is between science fiction and global devastation because a comet hits, what choice do you have.

[MUSIC PLAYING]

[LOGO]