

**BBC**

**NEAR-DEATH EXPERIENCES** *WHAT REALLY HAPPENS*

# Science Focus

IT'S GETTING HOT IN HERE

*The search for a*  
**THEORY OF EVERYTHING**

*The ethics of*  
**NAZI RESEARCH DISSECTED**

*Can our brains*  
**DEAL WITH ECO-ANXIETY?**

**RACE TO**

# WE'VE

**WHAT WE'LL  
DISCOVER ON  
EARTH'S  
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**Dr Egbert Edelbroek** scientist and entrepreneur

## Horizons

# Quest for the first space baby

**The first child could be born in space within 15 years, says Dr Egbert Edelbroek, founder and chief executive of SpaceBorn United, a research organisation dedicated to making that happen**

### WHAT'S THE MOTIVATION FOR DELIVERING BABIES IN SPACE?

It's one important piece of a larger puzzle of learning how to live and reproduce in space.

Within 15 years we expect a space-born baby. And a space-conceived baby will definitely happen even quicker, in around five years, because that's much easier and it has fewer ethical implications.

The upcoming space tourism sector is expected to become a magnet for crazy rich people, and also for nations in this new space race to grab the unique achievement of having the first naturally conceived baby in space, and baby born in space. And that would be unethical in many ways, and medically, there would be many risks that we'd have to prevent. So before that we have to tackle this [ethical] problem. We have to do that research.

It could also increase awareness for the importance of space exploration, and contribute to the ambition of NASA and the big space agencies to have permanent human settlements on other planets, the Moon, Mars, etc.

That's pretty pointless without learning how to reproduce in space.

The big space agencies cannot address this question because they are funded by taxpayer's money and it's ethically delicate. So they explicitly want the focused companies to address these issues. And that's why we are doing this.

And your question is, of course, about the most sensational ambition that we have. But we have to work step by step. Our focus is on bringing IVF technology to space as a first step.

### IS THE END GOAL IS TO LEARN HOW TO SUCCESSFULLY REPRODUCE IN SPACE?

Yes. To learn about all the different stages, and even in different areas of space. On Earth, we're protected by the planet's magnetosphere, and on the Moon there is a lot less protection, and on Mars it is non-existent.

### BY THE TIME YOU'RE READY TO FLY PREGNANT WOMEN INTO SPACE TO GIVE BIRTH, IT WOULD BE BEYOND EXPERIMENTING, RIGHT? IT WOULD BE SAFE?

Exactly. Experimenting suggests relatively high failure risk. And that is not an option for something delicate like this. That would never be accepted by any ethical conditions for good reason. We need to ensure that the total risk involved in this mission will be less or similar to childbirth on Earth. The experts we work with are convinced that we can do that in 10 to 15 years.

### WHEN AND HOW WILL YOU SELECT PEOPLE TO GIVE BIRTH IN SPACE?

We have extremely elaborate set of selection criteria to make this as safe as possible; age is one of the criteria. But we haven't started recruiting yet as we do not have a clear time window.



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**“We need to ensure that the total risk involved in this mission will be less or similar to childbirth on Earth”**

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If we knew that it was going to happen in two years, then we could start this recruitment. If, say, Jeff Bezos [founder of aerospace company Blue Origin] said, “This is an urgent priority, here’s a billion dollars,” then we can do a lot of parallel research, and then we might be able to do this within a few years and in an ethically acceptable way.

But that will probably not be the case. So, it might take 12 years or 15 years. And as long as that time window is so open, it’s useless to give people false hope. So our focus is on the first steps to IVF in space, which will already take some four to five years. And then we move up further steps and as soon as we’re ready for that step [giving birth in space], and we know more about all the details, only then we

can start recruiting. It’s encouraging to have people who want to sign up.

#### **SO YOU ALREADY HAVE WOMEN WHO ARE INTERESTED IN DOING THIS?**

We are having discussions with people who would be interested to participate. We want to learn as much as possible about their perception of risks, but also their needs, in a psychological way, so we can address those issues.

We didn’t have to find them. They found us. They just sent us emails and they say, “We’re interested. Can you give us more information?” We explained that we’re not recruiting because it’s not our focus yet. We understand that the media is especially interested in this, and that’s fine and we should reach a lot of people with

that as well. But it’s not a timed plan.

#### **HOW DO YOU STUDY REPRODUCTION IN SPACE WITHOUT ACTUALLY SENDING PEOPLE UP THERE?**

There is so much knowledge and expertise already based on animal models, but also on the basis of knowledge about human physiology on Earth. Part of our research is in designing missions and following developments such as the space tourism sector and the spacecraft that have a low gravity profile. A lot of information is just open and it’s about combining all those insights. You don’t need to have a physical lab for those mission designs, you just have to talk to people who have been dealing with all of those domains.

Of course, our research will imply studying cell samples inside our research platform. If we are re-engineering IVF technology then we have to build a prototype and test it and validate it with animal cell samples and eventually with human cell samples, but for that we need additional funding and we’re working on that.

We work with a growing group of some 80-plus international experts in biomedical space technology, ethical issues, legal issues, space law issues. We are not fixed to our hometown in the Netherlands. I visit the US, Germany and the UK. Experts are from all over the world. We are hoping to collaborate with Asgardia, the first space nation, as our ambitions overlap.

#### **DR EGBERT EDELBROEK**

*Egbert is chief innovation and strategy officer at Spaceborn United ([spacelifeorigin.nl](http://spacelifeorigin.nl)).*

*Interviewed by science writer Mićo Tatalović.*