

".....I have no clear understanding whether life exists or not."

NordiSpace's Baard Kringen talks with Malcolm Fridlund, Project Scientist for the Corot-project and Study Scientist for the Darwin project.

Corot has found the first exoplanets, says Malcolm Fridlund, a hot gas planet like Jupiter. The project team has received a very large quantity of data from Corot, but all information is not completely interpreted as of yet. However, all systems are working well and the project team has chosen to view the discovery as a demonstration of the satellite's capacity, and therefore published the discovery.

What will happen now – more investigations of this body, or look for new planets?

When an exoplanet is found, the position will be accurately detected and further investigations can be carried out with other types of satellites or at ground based systems, while Corot will look for new objects. A scientific organization for more detailed investigations of interesting candidates has been established.

The information Corot provides is the planet's size, and the distance from the star. Additional information from telescopes on Earth, spectrographs or similar instruments can also provide information about the mass of the planets. This is all Corot can carry out, and when they are finished, Corot starts looking for new exoplanets. When Darwin becomes operative we can study the planets more detailed.

Corot is a pioneer instrument – it is the first space mission which is especially designed for this type of investigation and today we have no idea how many exoplanets in fact exist. Corot provides possibilities to see smaller planets than before, but today we do not interpret data like this. However, there are several candidates. The sensitivity of Corot is thirty to forty times better than the best telescopes on the ground, so in the future

we may detect planets similar in size as Earth, but that is a little bit further away in the future.

The next step is Darwin, and you have been engaged in this project for several years. Is this project progressing according to schedule?

The aim with Darwin is to study the planets in details, and in this case, Earth- like planets, not only find them. This investigation needs new technology, technology it has taken several years to develop. Where we are going, it will be like trying to observe a candle sat right next to a glaring modern lighthouse from a distance of 1000 kilometres. We have the different technologies; the next step is to combine this to a realistic flight model. We know we can do it, and we are convinced we know how we can carry it out.

The next step is to find a place for the project in the time- and financial plans. After that we must find financial sources, and that happens in competition with other planned missions, and at last we can set a launch date. With that in mind we have a schedule for the period of 2016 – 2022 which is in progress, and we hope Darwin becomes one of the missions to be launched within this period. It is a long time-frame, but the next mission for investigating exoplanets, the American Kepler will be launched in the period of 2008 – 2009, operative to 2015-16 and thus will fill the gap. After that we must have Darwin ready for launch, hopefully around 2020.

After Darwin, what will happen?

At this time, as it is for most ideas, everything depends on what Darwin will find. If Darwin finds clear indications of life at some planets like Earth, undoubtedly even larger and more advanced missions to follow up the discovery will be built. However, at that time the year might be 2030. If Darwin finds nothing, it will take long time before new missions will look for other life in the Universe.

What about Gaia?

Gaia is another type of mission. This satellite will work within astrometry, which means measure movement in stars influenced by planets around the stars, and thus find new planets. In addition, it is a survey mission, meaning the satellite

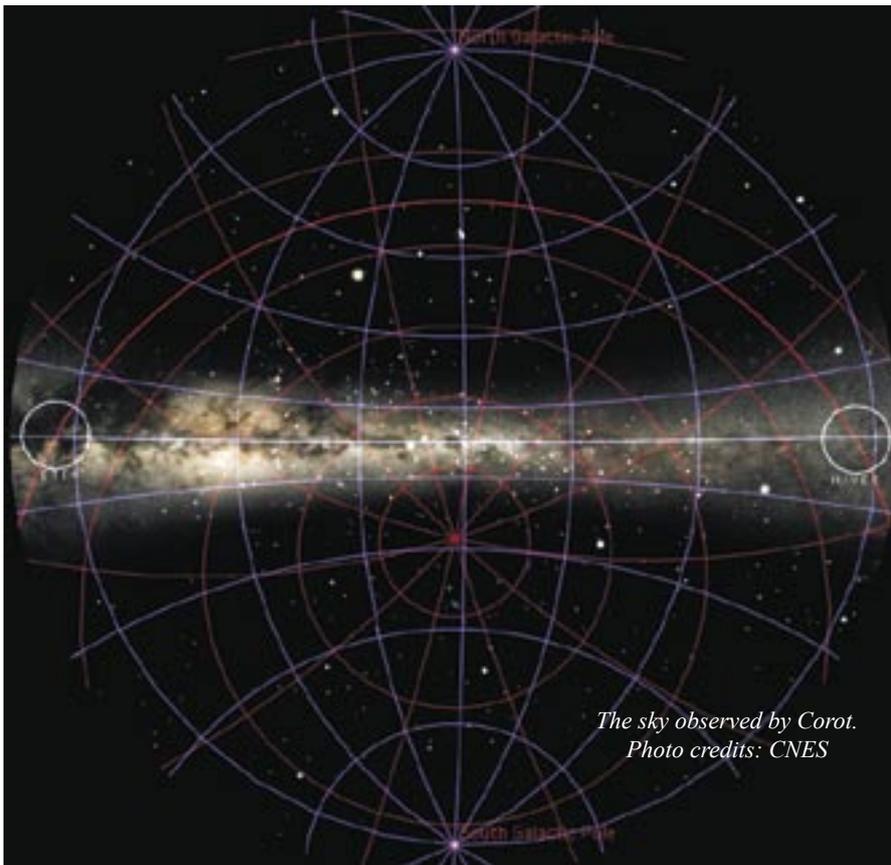
will search over the whole space. Searching among millions of stars, the mission will provide a very good statistic, but cannot find planets lesser than the Neptune/ Saturn size. The satellite has also

other tasks, and is not directly included in searching for Earth-like planets.

You have worked with such programmes for several years. Why do you participate? Do you believe that alternative life exists out there?

I participate in these programmes because I consider that to be a very important scientific question, and I have no clear understanding whether life exists or not. We still do not know for certain how

"Corot is a pioneer instrument – it is the first space mission which is especially designed for this type of investigation"



Malcolm Fridlund

Malcolm Fridlund, Project Scientist, for the Corot mission and Study Scientist for the Darwin mission.

Born in Stockholm, Sweden, 1952 and has worked at ESTEC for the last twenty years

PhD in Astrophysics, University of Stockholm; two years at the Groningen Space Research Laboratory, on project BIRAP, which observed star forming regions from a balloon. Research-fellowship at ESTEC, 1988, in star formation.

Fridlund began working with exoplanets back in 1994. The first time at a preparatory project that led to Corot, later also at the study project, which hopefully will lead to launch of Darwin.

In the work as scientist and study-manager Fridlund works partly as a scientist, partly as an administrator and some times also as a technician.

life was formed on Earth, and it has been a long and complicated process.

A part of the answer is possibly found by looking for other planets and for alternative life. For me, that is very challenging to work within such programmes, but I have not a prejudiced opinion about whether such life exists. Of course, statistically, one might argue that for obvious reasons, life must exist

On Earth, for example, life arose very soon after our planet was formed. However, for three billion years after that, cells just sat in rock pools creating crude copies of themselves. It took billions of years before anyone, or anything, invented sex, or went on to evolve into what became our ancestors. Based on this, you can say that there is a good chance that we will find life out there. But, as for highly

".....it may be the special conditions on Earth that make it the only planet where life can exist."

on other planets, however, on the other hand, it may be the special conditions on Earth that make it the only planet where life can exist. It is difficult to predict the future with regard to at all planets, or to find out what makes Earth special compared to other planets, however, most are so far away that it may take new thousands of years before we can find them. Nonetheless, we now slowly move forwards trying to uncover the truth. Possibly Darwin can provide more answers to these questions.

evolved intelligent life, the chances are very small.

Thus, the first and most important aim is to find a form of life, enabling us to convince others that some kind of life exists out there. We are looking for nitrogen, because all forms for life secrete nitrogen, but that gives all from bacterium to intelligent beings. The first question therefore is to establish if there is life out at all, and next, what kind of life.

