

How Cassini propagated the search for extraterrestrial life

by Lórien MacEnulty

Speculating the existence of life outside of Earth's sphere of influence is, as best, mathematically labyrinthian. It's like trying to cast a trend line with only one data point. The Drake Equation and similar methods, in their variable complexities, offer an indication as to what could be out there, but it's all probability; an educated guess.

The solution, of course, is to gather more data points; to find life, even if it is merely microbial. This ongoing search, while not directly integrated in the mission statement, was incidentally propagated by the Cassini spacecraft before its inevitable demise on Sept. 15.

The Cassini-Huygen's mission, dispatched in 1997 on an extended voyage to the Saturnian system, was a joint endeavor of the European Space Agency (ESA), the Italian Space Agency (ASI), and NASA. The quest sought to "improve our understanding of how giant planets—and families of planets everywhere—form and evolve," according to NASA's goal outline.

As the fourth probe to study the Saturn system, Cassini's perspective usurped the scientific community's understanding of the planet. The craft confirmed that the space between the planet and its rings is virtually empty. The Huygen's Lander found itself on the surface of Saturn's largest moon Titan, whereupon it discovered lakes of methane and ethane. Scientists calculated a nearly perfect alignment of the planet's magnetic field and its rotational axis with data Cassini collected, and catalogued scores of previously cloaked moons.

"In that sense, we know so much more about Saturn now than we did 20 years ago, or

even 15 years ago," said Herbert Folsom, adjunct instructor of astronomy at Drake University.

In an interview, Folsom enigmatically describes Mimas, a heavily cratered moon that looks in a way like the Death Star in Star Wars.

Methane lakes and Imperial space stations: the Saturn system could easily feature in an Orson Welles radio drama. These arguably impressive discoveries adhere well to the initial goal that justified a multi-national investment of approximately \$3.9 billion.

"Another moon, Enceladus, that basically we didn't really even know about...right now, most astronomers think it might be the biggest chance for discovering life in our solar system," Folsom said.

Enceladus (en-sell-uh-duhs) is Saturn's sixth largest moon. In continuation of the Star Wars analogy, think Hoth; the planet is encapsulated in a sheet of ice. The moon's southern region hosts a high concentration of cryovolcanos (ice volcanoes) and spewing geysers. Cassini thus logged evidence suggesting the existence of a subsurface, liquid water ocean beneath the south pole.

"First of all, Cassini was able to image and see those, basically, ice volcanoes, eruptions, and sort of fly through the plume and sample some of the stuff," Folsom said. "And there were hydrocarbons in there. There were the constituents of life."

Indeed, according to a NASA press release, Cassini's Ion and Neutral Mass Spectrometer instrument succeeded in identifying the elemental composition of a flyby sample from one of Cassini's geyser ejections. The gas sample contained almost 98 percent water, one percent hydrogen, and the rest a miscellany of other molecules, such

as methane and carbon dioxide. According to the same report, these factors make up a large majority of the necessities for life as astrobiologists on Earth understand it.

The probability that not one, but two celestial bodies carry independently evolved organisms in one solar system is slim in and of itself. If one extends that to the entirety of the known universe, with its 3,493 catalogued exoplanets orbiting stars in 2,657 exosolar-systems, the conception that life is a rare commodity may find itself utterly dismantled.

"It's the holy grail of astronomy to find life elsewhere in the universe, probably the most significant discovery in all of science," said Dr. Charles Nelson, associate professor of astronomy and astrophysics at Drake University. "The cultural tumult of the notion that alien beings live on another planet and they're intelligent. What kind of god do they have?...Should alien life be discovered somewhere else, the philosophical and religious implications of this, for various sorts of narrow points of view, religiously and faith-speaking, might be turned upside down."

The Cassini-Huygen's mission may not have ventured to space expressly to introduce a bit of existential turbulence in modern philosophy. Perhaps the mission was truly dispatched just to understand the nature of a gas giant. Whatever the case, the 29 nations who invested in the project got more than they bargained for, if only to satiate an inherent and un-sourced curiosity. In this way, Cassini incidentally propagated the search for extraterrestrial life, that holy grail of astronomy. Thus, the search continues. ●

Photo from artists at NASA

An
Incidental
Quest
for
the
Holy
Grail