NASA Planning for Possible Landings on Europa

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Credit: NASA/Ted Stryk

All these worlds are yours except Europa, Attempt no landing there, Use them together use them in peace

Despite that famous cryptic warning in the film 2010: The Year We Make Contact, NASA is planning for a possible attempted landing on Jupiter's moon Europa. This is a mission that many people have been hoping for, since Europa is believed to have a liquid water ocean beneath the icy surface (as well as lakes within the surface crust itself), making it a prime location in the search for life elsewhere in the solar system. Two landers are being proposed which would launch in 2020 and land about six years later.

As stated by Kevin Hand of JPL, ”Europa, I think, is the premier place to go for extant life. Europa really does give us this opportunity to look for living life in the ocean that is there today, and has been there for much of the history of the solar system.”

While the landers wouldn’t be able to access the ocean water which is well below the surface, they could analyze the surface composition with a mass spectrometer, seismometers and cameras. The mass spectrometer could detect organics on the surface if there are any. The landers probably wouldn’t last too long though, because of the intense radiation from Jupiter on the unprotected surface (as Europa has only a very slight, tenuous atmosphere). Accessing any of the water from its ocean or lakes would require drilling deep down, something for a more advanced future mission.

Another mission being considered is a Europa orbiter, which could also launch in 2020. In some ways that might be even better, as it could provide a broader detailed study of the moon over a longer time period. Of course if both missions could be done, that would be fantastic, but budgets will probably only allow for one of them. The lander mission is estimated to probably cost about $800 million to $2 billion, while an orbiter would cost about $4.7 billion.

It might be noted that a return mission to Saturn’s moon Enceladus would also be possible, especially since the water from its subsurface ocean or sea (depending on the various working models of its interior and geology) can be sampled directly from its water vapour geysers, no need to drill down. The Cassini spacecraft has already done that more than once, and has found organics of various complexities, but Cassini’s instruments can’t detect life itself.

Either destination would be exciting, as both are thought to be two of the most likely places in the solar system, besides Earth of course, to be

inhabitable or even possibly inhabited. Everywhere on Earth where there is water, there is life. That may or may not be true for Europa or Enceladus, but we'll never know unless we look.

Source: Universe Today