

NASA unveils possible submarine design for exploring liquid methane seas on Titan (w/ Video)

February 12 2015, by Bob Yirka



(Phys.org)—NASA has unveiled at this year's Innovative Advanced Concepts (NIAC) Symposium (and posted a video on Youtube) a possible design for a submersible robot for use in exploring the liquid methane/ethane seas on Saturn's moon Titan. The video and sub design were created by NASA Glenn's COMPASS Team along with some researchers from Applied Research Lab. The call for the design came from workers with the NASA NIAC Program, which of course is tasked

with coming up with ideas for new ways to explore space and the celestial bodies in it.

The sub, which the team has dubbed the Titan Submarine Phase I Conceptual Design, looks reminiscent of early subs on Earth such as those developed for use in the Civil War. The technology onboard, would be anything but old, of course, as it would have to be able to operate mostly autonomously in a very hostile and distant environment.

The most likely place for deployment of the sub would be Kraken Mare—Titan's largest polar sea. Data from probes has found that the sea covers approximately 154,000 square miles with depths as deep as 525 feet. The sea is not idle, either—it has currents and a tide, both of which could make keeping the sub safe from harm a serious challenge. There would also be the problem of communicating with it. The researchers envision a system where the sub surfaces for 16 hours at a time, sending signals directly to Earth (which would take almost an hour and a half to get here). As an undersea vehicle, it would not be able to use solar power either, so the team envisions a radiothermal Stirling generator for propulsion. Also, because of the extreme cold, a special piston driven type of system would have to be developed to prevent freezing of (likely nitrogen) ballast. Though it is still not clear exactly what the sub might be looking for, one sure bet is it would be searching for compounds that might indicate life once existed in the sea or perhaps offer clues as to how life began back here on Earth.

NASA expects some sort of sub might be ready for a journey to Titan by 2040, which would mark the first time such a mission has not been conducted on dry land. To get it there, they envision a winged craft that makes its way to the surface, then sinks beneath the waves on Kraken Mare, leaving the sub to discover what lies beneath.

More information: Titan Submarine : Vehicle Design and Operations

Concept for the Exploration of the Hydrocarbon Seas of Saturn's Giant Moon (PDF) - www.hou.usra.edu/meetings/lpsc2015/pdf/1259.pdf

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