Biofuels Envisioned For Commercial Tourism Mothership

By Jim Lane, Editor and Publisher, Biofuels Digest *[1]*

Construction commences this month in Truth or Consequences, New Mexico, on the $198 million Spaceport America, a vertical launching pad and runway facility that will be home to the Virgin Galatic spacecraft offering commercial space tourism flights for $200,000.

Sir Richard Branson's Virgin Fuels is developing biofuels that can be used to power the mothership—dubbed Eve—that will launch the spacecraft from the stratosphere, while the SpaceShipTwo spacecraft will be designed to run on biobutanol. Branson is an investor in Gevo, a development-stage company making butanol from cellulosic feedstocks.

The Virgin Galactic team recently completed successful test flights for the mothership flying on conventional kerosene, but the spacecraft system has not yet received Federal Aviation Administration commercial flight certification, though Virgin has received 300 reservations from scientists James Lovelock and Stephen Hawking, among others. Each flight is aimed to reach 109 KM in altitude, just past the 100-KM Kármán line that the Fédération Aéronautique Internationale marks as the barrier between Earth's lower atmosphere and space.

Branson confirmed that the carbon cost of each flight would be less than a round-trip flight between London and New York on a conventional aircraft. Meanwhile, the spacecraft system, while undergoing tests next year, will carry National Oceanic & Atmospheric Administration instruments designed to measure carbon dioxide, methane and other greenhouse gas concentrations in the upper atmosphere.

Ethanol & Rocketry

Ethanol gel has been proposed as a rocket fuel for hybrid engines that use a liquid oxidizer and a solid fuel. In fact, ethanol was the fuel for the V-2 missile developed by Wernher von Braun in World War II, as well the Redstone rocket that carried Alan Shepard and Gus Grissom, the first two American astronauts.

NASA & Biofuels

Officials at NASA have proposed an algae-based solution for the production of biofuels in closed plastic bags, which would be filled with sewage that the algae would use as a feedstock to produce algal oil. NASA says that the proposal addressed a major limitation of closed bioreactor systems on land, which is water storage and temperature control, in addition to land acquisition. The semi-

permeable membranes “allow fresh water to flow out into the ocean, while retaining the algae and nutrients,” using a technology that NASA is testing for use in long-duration space flight.

“The algae will feed on the nutrients in the sewage, growing rich, fatty cells. Through osmosis, the bag will absorb carbon dioxide from the air, and release oxygen and fresh water. The temperature will be controlled by the heat capacity of the ocean, and the ocean’s waves will keep the system mixed and active,” says NASA researcher Jonathan Trent.

Biodiesel, Rocketry & Mars Exploration

Researchers at Flometrics have reported the possibility of growing oilseed crops on Mars for rocket fuel, after a test of B100 biodiesel in a Rocketdyne LR-101 engine showed comparable burn characteristic to RP-1 kerosene. The test was carried out in a General Dynamics/Convair Atlas missile based on a six-second burn, and B100 developed an 820-lb. thrust compared to 840 for RP-1.

Following the test, Flometrics said that it would proceed with a B100-powered rocket launch.

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