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## **C1Po2A-02: Overview of GTL's composite cryotank development**

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Over the last twelve years, Gloyer-Taylor Laboratories (GTL) has been developing and testing a series of ultra-lightweight composite cryogenic propellant tanks in a range of sizes (16" dia to 63" dia) and form factors (cylinders and spheres). These cryotanks have been validated to deliver 75% mass reduction compared to equivalent state-of-the-art cryotanks.

For example, GTL's 48" dia x 96" long composite cryotank [83.1 cu ft, 26.6 lb (44.3 lb with skirt extensions), Weight/volume = 0.32 lb/ft<sup>3</sup> tank only] remained leak-tight through 18 cryo-thermal pressure cycles with liquid nitrogen with 7,500 micro-strain in the cylinder section and showed no sign of degradation from testing. While GTL initially focused on launch vehicle and spacecraft applications using liquid oxygen (LOX) and liquid methane (LCH<sub>4</sub>), recently GTL expanded our efforts to include liquid hydrogen (LH<sub>2</sub>) for emerging hydrogen electric aircraft and LH<sub>2</sub> space vehicles. GTL is now developing all-composite, vacuum-jacketed, LH<sub>2</sub> dewar-tanks that provide hydrogen weight fractions in the 60% to 80% range including composite dewar shell, multilayer insulation, and inner tank.

In this paper, GTL will provide an overview of GTL's composite cryotank development efforts and associated testing.

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