NASA SBIR Technologies

A Practical Fuel Tank Inerting System for Commercial Aircraft

Martin A Shimko, Creare Inc., Hanover, NH 03755

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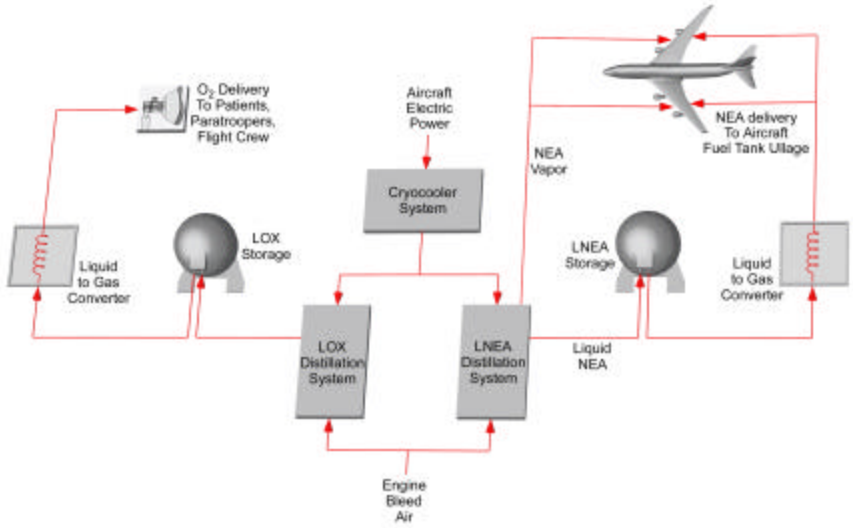
Description and Objectives

SAFTI (System for Aircraft Fuel Tank Inerting) uses miniature cryogenic distillation components to separate the nitrogen and oxygen from engine bleed or cabin air to supply: 1) nitrogen gas for inerting the fuel tank ullage in aircraft and 2) liquid oxygen for the emergency oxygen supply system for passengers and flight crew. SAFTI also produces liquid nitrogen that is stored for later vaporization on the ground to maintain an inert fuel tank ullage even when electric power may not be available to produce gaseous nitrogen. SAFTI is therefore an onboard autonomous system that requires no ground support for operation.

The objective of Phase II is to demonstrate all of the inlet air treatment and distillation system components in a full-scale, working system. This will prepare us for construction of a complete pallet-mounted flight test system. The Phase II work will also consider the key development isuues for both the pallet mounted system and eventual commercialization.



Approach

We plan to build a full-scale SAFTI system that can demonstrate thermodynamic performance and protypical operation in the laboratory. We will demonstrate all key distillation systems. The system will be fully functional with the exception of the cryocooler (we will use LN_2 cooling) and the inlet air compressor (we will use shop compressed air). We will also perform design studies to determine the key issues for palletized flight testing and eventual aircraft integration and commercialization.

Subcontractors/Partners

GEECO of Milforcd, CT is a subcontractor and development partner focussing on the production of the distillation components.

Carleton Technologies of Orchard Park, NY is a commercialization partner focussing on system integration and cryocooler production. They are investing significant manpower in Phase II effort at no cost to the government.

Schedule and Deliverables

The project wiil be completed in 24 months. The project will build a full-scale SAFTI system that will be pallet mounted for easy delivery to NASA. Testing at NASA will require only an LN_2 source for cooling and an inlet air source (41 g/s at 4 bar). The hardware produced on this project will be directly usable on the OBIGGS/OBOGS flight demonsrtation NASA is planning on their 757. An excelerated schedule is possible to coincide with the potential flight test target date of April 2004.

NASA & Commercial Applications

The SAFTI system has a broad range of applications to fuel tank inerting and emergency oxygen supply on both military and commercial aircraft. The SAFTI system is the best approach to fuel tank inerting on large to medium transport aircraft, and we will be well positioned at the end of Phase II to perform a flight test in Phase III. An economic analysis of the expected system cost of implementation and operation on all US commercial aircraft creates an average fare increase of only 60 cents per ticket.