



To: **National Science and Technology Council
Aeronautics Science and Technology Subcommittee**
Re: Updated Call for White Papers
Date: August 14, 2007
From: Joseph Feord
Munro & Associates, Inc.
1749 Northwood Drive
Troy, Michigan 48084
Phone: (248) 362-5110 ext 206
Email: jfeord@leandesign.com

Enabling the Birth of a New Transportation System and a Desperately Needed New Economic Boom to the American Way of Life

America was built by entrepreneurial spirit. Determination, desire and hard work were common threads in the expansion West of our great Nation. Devoid of fear from lawsuits, great strides in innovation, invention and industry were realized. The covered wagon gave way to rail. The Model-T brought new mobility and commercial opportunity to *every* American. Mighty American industry was key to victory in the two World Wars. Commercial airline travel opened up new frontiers as the US set the standard for comfort and convenience.

How quickly progress can change. Innovation and advancement are stymied by fear from litigation and years of regulation. It is safe to speculate that if the automobile were invented in today's litigious US market, there would be no cars. Innovation and progress have given way to off-shore cheap labor and goods and the short-term personal gain of a quick buck. Now America is experiencing stagnant growth as a world economy levels the water in current technology.

America needs a new frontier. We need a revival of inward US manufacturing and economic opportunity. We need to take advantage of our ingenuity and national resources to bring new opportunity for growth within our country.

This paper discusses enabling technology and innovation that can:

- ✓ Provide national economic growth, stability and security through air mobility
- ✓ Provide energy efficient propulsion at lower life cycle costs
- ✓ Improve safety in our skies
- ✓ Reduce pollution associated with leaded fuels
- ✓ Open rural frontiers inside our Nation's borders
- ✓ Reduce the burden on our overtaxed infrastructure

From the American Society of Civil Engineers 2005 Report Card for America's Infrastructure, the US infrastructure is in dire straits. With a reported \$1.6 trillion price tag over the next five years to alleviate potential problems, our current system does not address the growing needs of our economy. Poor road conditions cost U.S. motorists \$54 billion per year in repairs and operating costs. Americans spend 3.5 billion hours a year stuck in traffic, at a cost of \$63.2

1749 Northwood • Troy, Michigan 48084

Tel: 248-362-5110

Fax: 248-362-5117

billion a year to the economy and waste 5.7 billion gallons of gas annually. While gridlock on the taxi ways wastes billions of gallons of jet fuel a year, the congestion inside the terminal has forced many back onto the road and in their cars for longer trips than before.

A distributed network transportation system utilizing small aircraft and thousands of existing small airports will open a new frontier and era of prosperity in our country. Point-to-point mobility to and from airstrips closer to our homes and work places at affordable prices will:

- ✓ Enable fast, safe, affordable and reliable transportation
- ✓ Reduce travel time for all Americans
- ✓ Alleviate the congestion from our hub-and-spoke air system
- ✓ Alleviate highway and road congestion
- ✓ Reduce pollution and wasted fuel
- ✓ Foster business to rural communities
- ✓ Deliver manufacturing jobs to Americans
- ✓ Boost the American economy
- ✓ Improve quality of life for Americans
- ✓ Be the necessary system that our future growth demands

To make this a reality we need a mass produced utility workhorse, reliable, comfortable, easy to use, computerized small aircraft with an automated guidance and separation system.

Current road blocks to innovation and progress of a distributed air network system include:

- ✓ Antiquated air traffic control system
- ✓ A voracious litigious society forcing fear and high costs to would be innovators
- ✓ Old regulations that make no sense with some newer technology
- ✓ Stogy, ingrained industry thinking, technology and acceptance

R&D funding should be allocated to address these road blocks. While the US aviation industry was a pioneer in the global market development, it has not re-invented nor invigorated itself as much as other industries have. For answers to these road blocks we can generally look to other industries who have demonstrated far superior capability. The current air traffic control system is equivalent to switch board operators in the early telecom industry. Looking at the current telecom and computer industries that provide every individual 24-7 connectivity today, it is reasonable that the aircraft industry could leverage the same communication benefit and provide every aircraft access to streaming live data. Software logic in use today can be applied to ATC to remove all humans from the loop, including the pilots. The litigious problem can be addressed by looking outside to other cultures. A simple “loser pays all costs” will stop many frivolous attacks. R&D should be directed to address this major inhibitor to innovation and progress.

Munro & Associates, Inc. has spent 20 years bringing new innovative thinking and cross-industry technology to flat-lined companies. In general a common ingredient to mediocrity is the lack of outside infusion and too much of “the way it’s always been done” mentality. Munro changes paradigms and delivers cross-industry transfusions of technology. We need only to look at the automobile industry to see a vast contrast versus aviation. Cars we depend on in our

1749 Northwood • Troy, Michigan 48084

Tel: 248-362-5110

Fax: 248-362-5117

every day life bring reliability, safety, functionality and comfort at an affordable price. Small airplanes today are quite complicated and in many ways very unreliable. Small airplane certified piston engines are shackled to 1960's technology by the regulations in FAR Part 33. High tech modern engines are precluded from this elite club as they lack 1960's parts. About 17 million cars and trucks, but less than 2,000 small aircraft are sold annually in the US. Automotive engines are far more efficient and reliable and burn un-leaded gas. Aviation engines are prone to problems and dump lead into our environment.

In order to bring to life a distributed network of point-to-point air mobility, we need a small airplane with the usefulness of a mini-van and the reliability and dependability of our personal automobiles. To realize this we must invest R&D to examine how we can leverage the technology in design and manufacturing from the auto industry to create a safe, efficient, quiet, affordable and reliable aircraft.

There are four main components to a small aircraft, the propulsion system, the interior, the avionics, and the airframe. Over the last several years, Munro & Associates, Inc. has been systematically evaluating each group. Technology and innovation have confirmed the feasibility for a low cost small aircraft. Quantum leaps in terms of safety, reliability, noise, efficiency and cost can be delivered through the use of technology, materials, processes and innovation that exist today in other industries. Automation and computers can eliminate the years of training required to become a pilot and improve safety in our skies. With funding and improved certification processes, Munro can deliver a useful, affordable and reliable aircraft for public use within 5 years. Manufacturing sites can be constructed similar to auto plants to produce 60,000 units per year. Additional plants can be constructed to accommodate higher demand.

Near term investment dollars should be allocated to converting the current aviation Quality Control certification process to the automotive Quality Assurance process. AIAG standards used by all automakers will provide much higher safety and reliability without road blocks to innovation. This conversion can be accomplished within 5 years. Also, near term R&D should be allocated to exploring advanced manufacturing processes and materials from other industries that can be applied to small aircraft production.

In 5-10 years, a computer based ATC system should be implemented. Pilots will become operators as they monitor aircraft systems. Human controllers will seldom be required. In 10 years, all aircraft must comply with required systems for automated guidance. Humans are statistically the most unreliable part of any system. Safety will be increased dramatically with automation, not to mention our current system can't handle our future requirements.

As thousands or even millions of airplanes begin to operate under computer guidance in the HUGE VOLUME of airspace to distributed locations, noise will be of concern. Munro & Associates is currently testing a new propulsion system that will greatly reduce perceived noise to the neighborhoods. We believe we have a good solution for the near term, but further R&D funding is required to study new ways for noise reduction.

1749 Northwood • Troy, Michigan 48084

Tel: 248-362-5110

Fax: 248-362-5117