NASA Facts

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23681-0001

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Affordable Alternative Transportation
AGATE—Revitalizing General Aviation

"AGATE is visible evidence of the commitments of NASA, the FAA, and the industry and university community to two important endeavors: first, to revitalize U.S. general aviation, and second, to reinvent government along the way…The AGATE Consortium represents the dawning of a new era for NASA and industry in terms of the ways we do business together. Together, we are undertaking a challenge neither of us could accomplish apart."

— NASA Administrator Daniel S. Goldin
AGATE Press Conference, July 1995

The challenge for the Advanced General Aviation Transport Experiments (AGATE) consortium is to create a Small Aviation Transportation System (SATS) as an alternative to short-range automotive trips for both private and business transportation needs. For example, using small aircraft would allow business executives to travel to three plants 250 miles apart in a single day—drastically cutting back travel time. The SATS will make many time-sensitive short-haul trips more affordable for business, medical, public safety and recreational pursuits.

The creation of the AGATE Consortium in 1994 is changing the face of general aviation-related aerospace. The NASA-led consortium, born out of an effort to stem the gradual decline of general aviation in this country, is playing an instrumental role in the forging of new alliances between government and interested parties, including vital non-profit contributors.

AGATE increases the availability of light aircraft to more people, in more weather, to more places.

The AGATE Consortium is a unique partnership between government, industry, and academia established to develop new ways of reviving the troubled general aviation industry. The partnership is the product of two years of government-industry collaboration. The consortium, comprised of representatives from each partnership sector, has been formed to give the revitalization effort formal structure. It will also leverage and focus resources for higher risk efforts with higher payoffs.

The Decline of General Aviation

General aviation (GA)—all flying except the military services and commercial airlines—has fallen from its position of economic prominence in the late 1970s to record lows today. American GA aircraft production numbers are down from 18,000 in 1978 to 954 as recently as 1993 (an all-time low).

The average general aviation aircraft flying today is about 30 years old. Flight deck technologies currently in use, date back as late as the 1950s, and piston propulsion technologies have remained unchanged for the past 40 years.

Regulatory restrictions and liability claims have also taken their toll, driving up prices and causing some businesses to file for bankruptcy. American GA manufacturers have spent $3 billion over the past 15 years on product liability claims alone.

The Prescription for Change

Approximately 70 U.S. aviation-related organizations and companies including NASA, the Federal Aviation Administration (FAA), private industry,

academia, and non-profit organizations are striving to reverse these negative trends. Together, this consortium will work to develop safer, more affordable aircraft and user-friendly flight systems that promise to improve pilot training and simplify operations in and near congested airports.

A significant first step toward an effective partnership was taken in the spring of 1995, with the first meeting of the AGATE (Advanced General Aviation Transport Experiments) consortium. The consortium is directed by the head of the general aviation office at the NASA Langley Research Center, Dr. Bruce A. Holmes. Langley has been designated as the lead NASA research center for the general aviation program.

AGATE Consortium

The AGATE consortium consists of three categories of members from 31 states, 40 principal members from industry, 6 associate members from industry and universities, and 30 supporting members from universities, industry and non-profit organizations. A total of 10 universities have joined AGATE. It is one of the larger membership consortia in the United States.

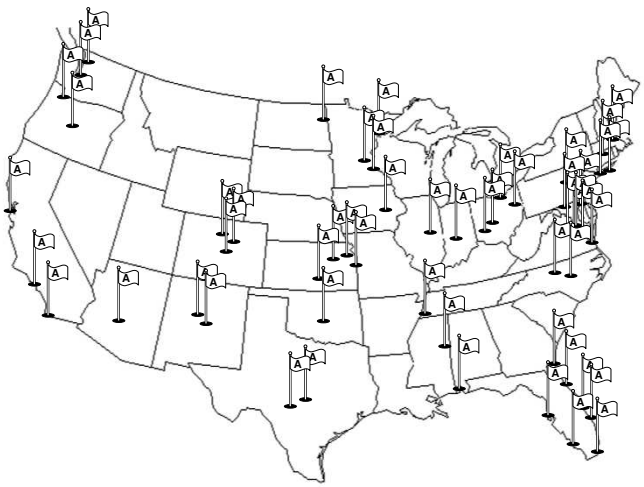
The purpose of AGATE is to enable market growth for inter-city transportation in small aircraft. AGATE aims to make single-pilot, light airplanes more safe, affordable and available as a viable part of the nation's transportation system. AGATE targets trips of 150 to 700 miles — round trips that are too far to complete in a day and too short to efficiently use the hub-and-spoke system.

Next-generation general aviation cockpit with single lever power control. The system will utilize a computer that provides up-to-date weather reports, the latest in airways and facilities information, and map displays that point out restricted areas, terrain hazards, airports, and airspace conditions.

The consortium resulted from a meeting between NASA administrator Daniel S. Goldin and industry representatives at the Experimental Aircraft Association Convention in Oshkosh, Wisconsin, in 1992.

AGATE management, as a joint government-industry effort, was initiated in response to the Clinton Administration and Congress' commitment to "reinventing government." The AGATE members share resources and risks to make the market "pie" bigger for everyone. Leadership is also shared. Costs are shared 50/50 between government and industry. The focus is on commercializing advanced concepts through joint ventures in order to produce greater results.

76 Members in 31 States



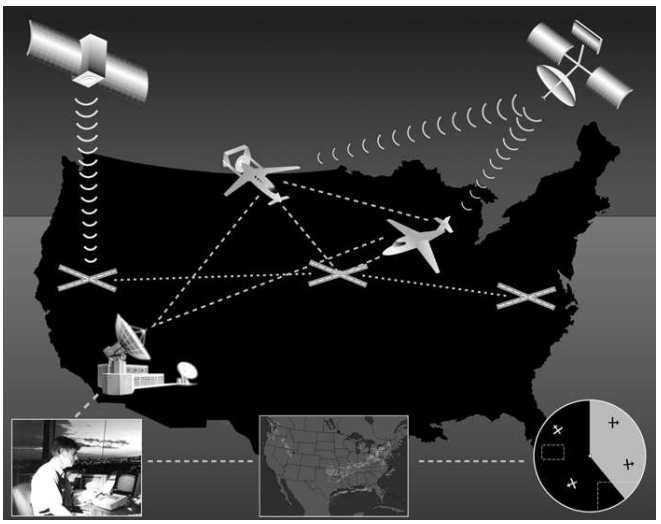
Map showing nationwide locations of principal AGATE members

The forming of the consortium is also welcomed by the FAA."General aviation is an integral part of the air traffic system architecture. AGATE is in the right place at the right time to support modernization of the system for GA," said Dr. George F. Donohue, FAA associate administrator for research and systems acquisition.

The consortium operates under a unique Space Act process called the Joint Sponsored Research Agree ment (JSRA). Research conducted under a JSRA eliminates many of the burdensome and time-consuming operations of the federal acquisition regulations. The consortium, according to Holmes, is unique in the sense that it serves as a "blueprint" to map out the GA revitalization effort. It provides industry with more flexibility and gives it the opportunity to take greater risks with higher payoff, faster speed of technology transfer, control of proprietary and shared technologies, and reduced cost and more efficient use of scarce research and development resources.

AGATE Aims and Objectives

AGATE promises to foster revenue growth and job creation in the areas of manufacturing, sales, training, service, support and operations industries within the U.S. small airport infrastructure. The program focuses on the development of new GA technologies including bad weather flight and landing systems, complete with graphic displays of weather and guidance information; emergency coping and avoidance measures that use on-board systems to support decision-making; traffic avoidance systems; systems that reduce the flight planning workload and enhance passenger safety; and systems designed to improve passenger comfort, aircraft performance and efficiency. The success of AGATE will be measured in terms of increases in pilot population, flight hours, airport utlilization and new aircraft deliveries.



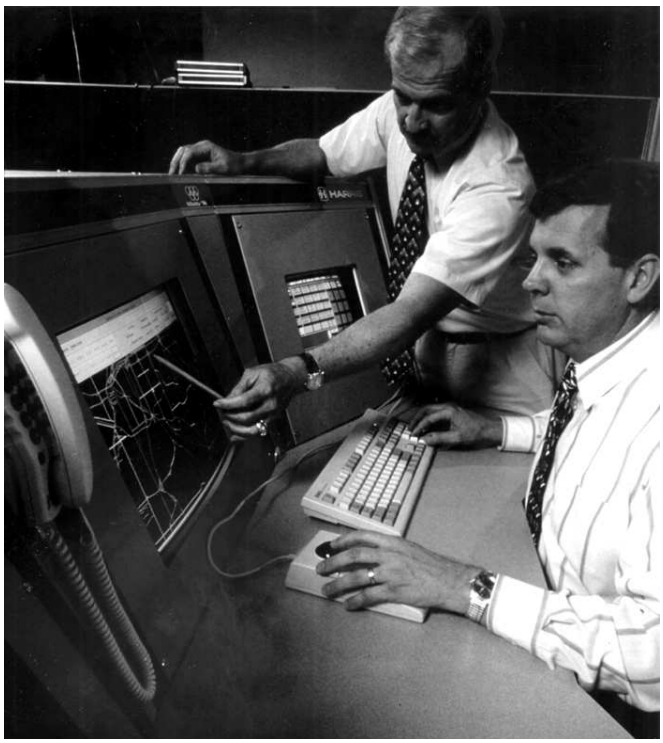
AGATE Free-Flight operating environment increases airspace and airport access, safety, and all weather reliability

An Olympic Challenge

The 1996 Summer Olympics in Atlanta offer a rare opportunity to evaluate technologies being developed as part of AGATE and, in the process, help transport goods and provide public safety services by helicopter during the July 19 through August 4 Games.

AGATE consortium members are contributing to a government-industry initiative known as the Atlanta Short-haul Transportation System (ASTS), (now called Operation Heli-Star). The ASTS program is responsible for fostering both air and ground transportation during the Olympics and integrating the two into one efficient transportation system.

AGATE computer-based training devices save time and cost for instrument flight proficiency.



Air traffic managers monitor AGATE-equipped helicopters over Atlanta during the 1996 Centennial Olympic Summer Games for the safe and efficient transport of high-value cargo and security, emergency, and safety personnel.

AGATE is providing the special airborne equipment and ground monitoring stations that enable the ASTS program to operate safely and efficiently. AGATE's participation in the Atlanta Olympics is managed by the AGATE flight systems industry team led by NASA Langley Research Center.

Up to 50 helicopters equipped with AGATE-designed avionics will participate, proving communications, navigation and surveillance concepts — some integrated in flight for the first time. It is expected that more than 1,400 hours of flight data on operational use and human factors will be collected during the Olympic Games.

Most of the critical flight operations will be conducted in "uncontrolled" air space outside Atlanta's radar coverage area, hence the need for predetermined flight pathways. While flying over concrete highways on the ground, selected helicopters will fly electronic "highways in the sky," shown on an onboard computerized map of the Atlanta area. The composite image will be generated on the helicopter using an onboard database and replicated on ground consoles. The pilot sees GPS-based position updates provided via digital radio data links.

This technology effort will aid participating pilots in the safe and efficient conduct of their missions and additionally benefit ground personnel by indicating the precise location of aircraft to facilitate their timely deployment to satisfy high priority transportation and emergency response needs during the Olympics.

Powerful Help for AGATE

A new General Aviation program for FY '97 is expected to compliment the efforts of the AGATE consortium. It is the NASA General Aviation Propulsion (GAP) Program, led by the NASA Lewis Research Center in Cleveland, Ohio. This government-industry effort will lead the way to modern, affordable, user-friendly propulsion systems of the future.

NASA and Small Businesses Working Together

NASA recognizes the role that small, entrepreneurial general aviation (GA) business can provide to the revitalization of GA in the United States. NASA's Small Business Innovation Research (SBIR) Program and Small Business Technology Transfer Pilot Program (STTR) play a major supportive role to AGATE. The programs offer small businesses the opportunity to transfer NASA and other government funded research and technology into the marketplace. Projects that lie within the NASA mission and that can be deployed and commercialized in the marketplace compete for funding. The SBIR/STTR GA programs seek technical innovations that support the NASA GA mission, serve the nation's efforts in revitalizing the GA industry, and lead to the economic benefits for the United States. Since 1993, NASA has awarded 65 Phase I and 22 Phase II SBIR/STTR awards related to GA in excess of $18 million to approximately 50 GA companies. The NASA GA office encourages companies that are awarded NASA SBIR or STTR contracts to discuss partnering with the AGATE consortium associate members.

An overview of the NASA SBIR/STTR programs and their most recent solicitations are accessible on the WWW URL http://nctn.oact.hq.nasa.gov/SBIR/SBIR.html. Lists of past winners are also available at this site.

University Participation

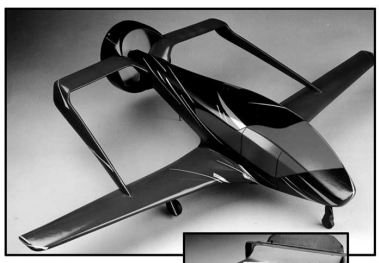
In presenting the awards for the first General Aviation Design Competition held last year, NASA Administrator Dan Goldin cited the value of engaging U.S. engineering students in "innovative design education in general aviation" and encouraging universities to be partners in creating "a small aircraft transport system for the nation."

NASA and the Federal Aviation Administration are joint sponsors again this year for the annual general aviation design competition for students and engineering universities. The contest has cash awards and will challenge teams of undergraduate and graduate students—working with faculty advisors—to design small aircraft transportation systems, including aircraft, training, and airspace related ground systems.

Teams should address design challenges in one or more of the following six technical areas: integrated cockpit systems; propulsion, noise and emissions; integrated design and manufacturing; aerodynamics; operating infrastructure; and unconventional designs such as aircars. For purposes of the competition, general aviation aircraft are defined as fixed-wing, single-engine, single pilot, propeller-driven aircraft.

All design projects will receive critical evaluation and feedback. Faculty and students are encouraged to plan now to incorporate this design challenge into fall 1996 design classes and projects. Involvement of industry advisors is encouraged, as is participation of women and minorities on design teams.

The competition is coordinated for NASA and the FAA by the Virginia Space Grant Consortium. New guidelines will be available in August, 1996. Interested faculty and students may request guidelines from: Virginia Space Grant Consortium, 2713-D Magruder Blvd., Hampton, Va. 23666. Requests may be faxed to (804/757) 865-7965.



For more information about NASA General Aviation topics, contact:

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1996 AGATE Consortium Members Include:

GLOBAL AIRCRAFT
CIRRUS DESIGN
Allison Engine Company
CAASD
CORYPHAEUS
RTI RESEARCH TRIANGLE INSTITUTE
NCAR National Center for Atmospheric Research
ARNAV Systems, Inc.
UND AEROSPACE UNIVERSITY OF NORTH DAKOTA
EMBRY-RIDDLE AERONAUTICAL UNIVERSITY
Piper
KESTREL Aircraft Company
GAMA
Raytheon Aircraft
TEXTRON Lycoming
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AIR SAFETY AOPA FOUNDATION
General Aviation Manufacturers Association
Beech
Hawker
THE OHIO STATE UNIVERSITY
NIAR National Institute for Aviation Research
IDI INNOVATIVE DYNAMICS, INC.
Rockwell Avionics
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Williams International
isdi Impact Dynamics Incorporated
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VIGYAN
Cessna A Textron Company
Mississippi State UNIVERSITY Raspet Flight Research Laboratory
NavRadio Corp.
Mid-America Consulting Group, Inc.
SEAGULL TECHNOLOGY, INC.
Trimble THE GPS SOLUTION
BFGoodrich Aerospace Ice Protection Systems Division
UNITED TECHNOLOGIES HAMILTON STANDARD
MOONEY The Personal Airliner

Advanced General Aviation Transport Experiments (AGATE) Membership

The AGATE consortium consists of three categories of prospective members from 31 states—39 principal members from industry, 23 associate members from industry and universities, and 22 supporting members from universities, industry and non-profit organizations. It is one of the larger membership consortia in the United States. Business policies, strategies, and priorities for the AGATE consortium is being provided by the AGATE Executive Council.

AGATE Alliance (Government)

NASA General Aviation Program Office
Bruce Holmes
(Manager)

FAA General Aviation and Vertical Flight Office
Rick Weiss
(Manager)

(Industry)

Raytheon Aircraft
Steve Hanvey
(Executive Council Chairman)

Cessna
Dennis Dungan
(Executive Council Vice-Chairman)

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Dean Vogel
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ARNAV
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Teledyne Continental Motors
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Small Aircraft Manufacturers Assoc.
Paul Fiducia
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