



New Visions

Insights on Air Mobility and Economic Growth

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Indiana SATS Consortium
1000 Airport North Office Park, Suite A
Fort Wayne, IN 46825
<http://www.indianaSATS.com>

SATS and the New Generation of Jets

By Colleen Turner

The Small Aircraft Transportation System (SATS) envisions a new world of on-demand, point-to-point, affordable jet travel that has the potential to increase productivity throughout the nation, expand economic development to smaller communities and improve the overall quality of life. Today, if you live in Bloomington and need to attend a meeting in South Bend, you can't do it in one day. In the not too distant future, however, you will be able to hail an air taxi at the Monroe County Airport, attend a two-hour morning meeting in South Bend and be home in time for a late lunch in Bloomington. Just imagine.

One of the driving forces behind this revolution in air travel is a new generation of jets. At the National Air Transportation Association conference that I recently attended in Las Vegas, a panel of luminaries that included executives from the four leading manufacturers of these new jets couldn't agree on an appropriate name for them. Should they be called personal jets, very light jets, entry level jets, minijets or professional jets? Although there was no conclusion reached at the conference, all of the manufacturers strongly agreed that they should not be called microjets. I prefer to think of them as new age jets; however, the term currently in vogue in aviation trade publications is very light jet, or VLJ. The first of the VLJs are expected to be certified by the FAA and delivered to customers in 2005.

Although there is no single authoritative source that defines a VLJ, I believe that most of them have a maximum take-off weight of 8,500 pounds; carry up to eight people; and cost from \$850,000 to \$2.4 million. As a result of publicly funded NASA investments in aircraft technology over the last decade, VLJs will incorporate the following enabling technologies:

- New turbine engines with revolutionary thrust-to-weight and cost metrics
- Advanced communications, navigation and surveillance capabilities and a sophisticated flight management system with vast improvements in cost and reliability
- New approaches to crashworthiness
- Streamlined composite airframe manufacturing techniques
- Onboard terrain awareness warning systems
- Ice protection technology
- Full authority digital engine control (FADEC) to minimize workload and optimize engine performance
- Graphical weather information in the cockpit
- Simplified software-based flight controls
- Airborne Internet communications

Although there are currently more than ten contenders in the race to certify and build a VLJ, I'm going to focus on the six manufacturers who have gained the most traction in this exciting new market niche in the aviation industry.

Safire Aircraft Company

<http://www.safireaircraft.com>

Safire Aircraft Company, based at Miami's Opa-Locka Airport, was established in 1998 by Michael Margaritoff, a successful German entrepreneur. His long-held vision was to develop a new generation light jet that would offer individuals, corporate flight departments, fractional ownership and charter operations jet performance at a very affordable price. The company currently employs over 100 people.

Finishing a prototype, achieving first flight, and certification – these are only a few of the steps Safire must take between now and delivering the first Safire Jet in 2006.



Cessna Aircraft Company

<http://mustang.cessna.com>

Cessna Aircraft Company is the only long-established aircraft manufacturer to enter the VLJ market. It is the world's leading producer of general aviation aircraft, currently employs 9,700 worldwide, and is a subsidiary of Textron Inc. Cessna Aircraft Company was founded in 1927 by Clyde Cessna and its headquarters are in Wichita, Kansas. Cessna unveiled its VLJ, the Citation Mustang, in September 2002.



Eclipse Aviation

<http://www.eclipseaviation.com>

Eclipse Aviation was founded in 1998 by Vern Raburn to develop a new class of jet aircraft. In founding Eclipse, Vern Raburn leveraged more than 25 years as a technology executive and entrepreneur who helped spark the information technology revolution and shape the course of the high technology industry. The goal of Eclipse is to bring the word "personal" into aviation, making it possible for commercial air passengers to move directly between cities on a quick, affordable and convenient basis. Eclipse Aviation is a privately held company located in Albuquerque, New Mexico at Sunport International Airport, has raised \$325 million in funding and currently has 275 employees.



Adam Aircraft

<http://www.adamaircraft.com>

George F. "Rick" Adam, Jr. founded Adam Aircraft in 1998 and serves as Chairman of the Board and Chief Executive Officer. Adam Aircraft is located in a southeastern suburb of Denver, Colorado at Centennial Airport and has over 300 employees. It is privately held and its largest outside investor is Goldman Sachs. The company uses computer-aided design, rapid prototyping, advanced manufacturing techniques and carbon composite materials to produce very high-performance aircraft at attractive prices.



Avocet Aircraft

<http://www.avocetprojet.com>

Avocet Aircraft LLC, a Westport, CT-based company, was founded in 2002 by a group of aerospace industry investment bankers and a team of leading aviation industry executives to develop the Avocet ProJet with Israel Aircraft Industries. Israel Aircraft Industries (IAI) is globally recognized as a leader in commercial and military aerospace. For fifty years, IAI has been successfully designing, engineering, manufacturing and certifying aircraft for customers throughout the world. IAI designed, certified and currently manufactures a family of super-mid-size business jets for Gulfstream Aerospace.



Diamond Aircraft Industries

<http://www.midatlanticdiamond.com>

Diamond Aircraft Industries is a worldwide operating composite aircraft manufacturer with offices in major centers across North America, Europe, Japan, England, Austria, South Africa and Australia. The company employs over 500 people, and has produced over 2,500 aircraft.

Diamond Aircraft Industries (Canada) is the largest general aviation manufacturer of single engine aircraft in Canada, and the third largest in North America. It announced its entry into the VLJ market in January, 2003.



The following table provides specifications for each of the aircraft based on information provided by the manufacturers.

New Generation of VLJs

	Safire Jet	Citation Mustang	Eclipse 500	Adam A700	Avocet ProJet	Diamond D-Jet
Max cruise speed	380 knots	340 knots	375 knots	340 knots	365 knots	315 knots
Max operating altitude	41,000 feet	41,000 feet	41,000 feet	41,000 feet	41,000 feet	25,000 feet
Full-fuel payload	967 lbs.	800 lbs.	710 lbs.	725 lbs.	720 lbs.	880 lbs.
Range (nautical miles)	1,300 nm	1,300 nm	1,280 nm	1,400 nm	1,200 nm	1,320 nm
# of seats	Six	Six	Six	Six	Six	Five
# of engines	Two	Two	Two	Two	Two	One
Takeoff distance	2,500 feet	3,120 feet	2,155 feet	2,950 feet	3,000 feet	2,372 feet
Max takeoff weight	6,250 lbs.	8,200 lbs.	5,640 lbs.	7,000 lbs.	7,160 lbs.	4,750 lbs.
Anticipated price	\$1.4 million	\$2.4 million	\$1.2 million	\$2.0 million	\$2.0 million	\$850,000
Anticipated certification	2006	Late 2006	Early 2006	Early 2005	Late 2006	Early 2006

The new VLJs are expected to sell for significantly less than Cessna's CJ1, which at \$4.2 million is the least expensive new business jet available today. They are also expected to have direct operating costs of less than a dollar per mile, approximately 55 to 60 percent of the CJ1's operating costs. At the National Air Transportation Association conference, Mike McConnell, Vice President, Sales and Product Support, Eclipse Aviation, stated that the projected operating costs of the Eclipse 500 would be only \$0.69 per mile.

Industry experts predict strong demand for this new generation of jet. At the Indiana SATS Consortium's inaugural meeting last February, Dr. Bruce Holmes, Associate Director for Aerospace/Vehicle Systems Integration at NASA's Langley Research Center, stated that the combined orders of all of the VLJ manufacturers could be as much as \$5 billion. Honeywell, a manufacturer of engines and avionics, estimates that as many as 8,000 general aviation aircraft powered by advanced small turbines

will be required to satisfy buyer demand over the next 10 to 15 years. Other forecasters predict that numbers in the range of 6,500 to 10,000 units will be sold from 2006 through 2020.

Many researchers at NASA as well as experts in air transportation anticipate that the VLJs' advanced technologies and substantially lower operating costs per mile will enable safe and affordable commercial air travel to over 3,000 underutilized airports throughout the nation; Indiana has 60 of these underutilized airports.

Think about the impact that this new revolution in air travel will have on small communities like Warsaw, Logansport, Lafayette, Portland, Marion, Frankfort, Richmond, and Huntingburg when VLJs become a familiar site at their airports and their airports become an integral component of our nation's air transportation system. Just imagine.

Indiana SATS Consortium to Host Meeting in September

The Indiana SATS Consortium will be holding its next meeting on Wednesday, September 15, 2004 at University of Notre Dame. The keynote speaker will be Dr. Albert-László Barabási, the esteemed Emil T. Hofman Professor of Physics at the University of Notre Dame and noted author of *LINKED: The New Science of Networks*. In *LINKED*, Dr. Barabási states that "the rapidly unfolding science of networks is uncovering phenomena that are far more exciting and revealing than the casual use of the word

network could ever convey." The air transportation system is essentially a network.

Join us to learn more about how the Small Aircraft Transportation System (SATS) will result in a more distributed air transportation network that relieves the congested hub and spoke transportation network and ushers in an era of unconstrained air mobility and increased productivity.

Indiana SATS Consortium

President

Mike Loomis
mike@indianaSATS.com

Vice President

Bob Wearley
bob@indianaSATS.com

Secretary-Treasurer

Ralph Marcuccilli
ralph@indianaSATS.com

Liaison-Academia

Wayne Unsell, Ph.D.
wayne@indianaSATS.com

Economic Advisor

Morton Marcus, Ph.D.
marcus@indiana.edu

Newsletter Editor

Colleen Turner
colleen@indianaSATS.com