THE NEW LIGHT JETS

Prepared for

Charles M. Schulz-Sonoma County Airport
Master Plan Update
Community Advisory Committee

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Presented by

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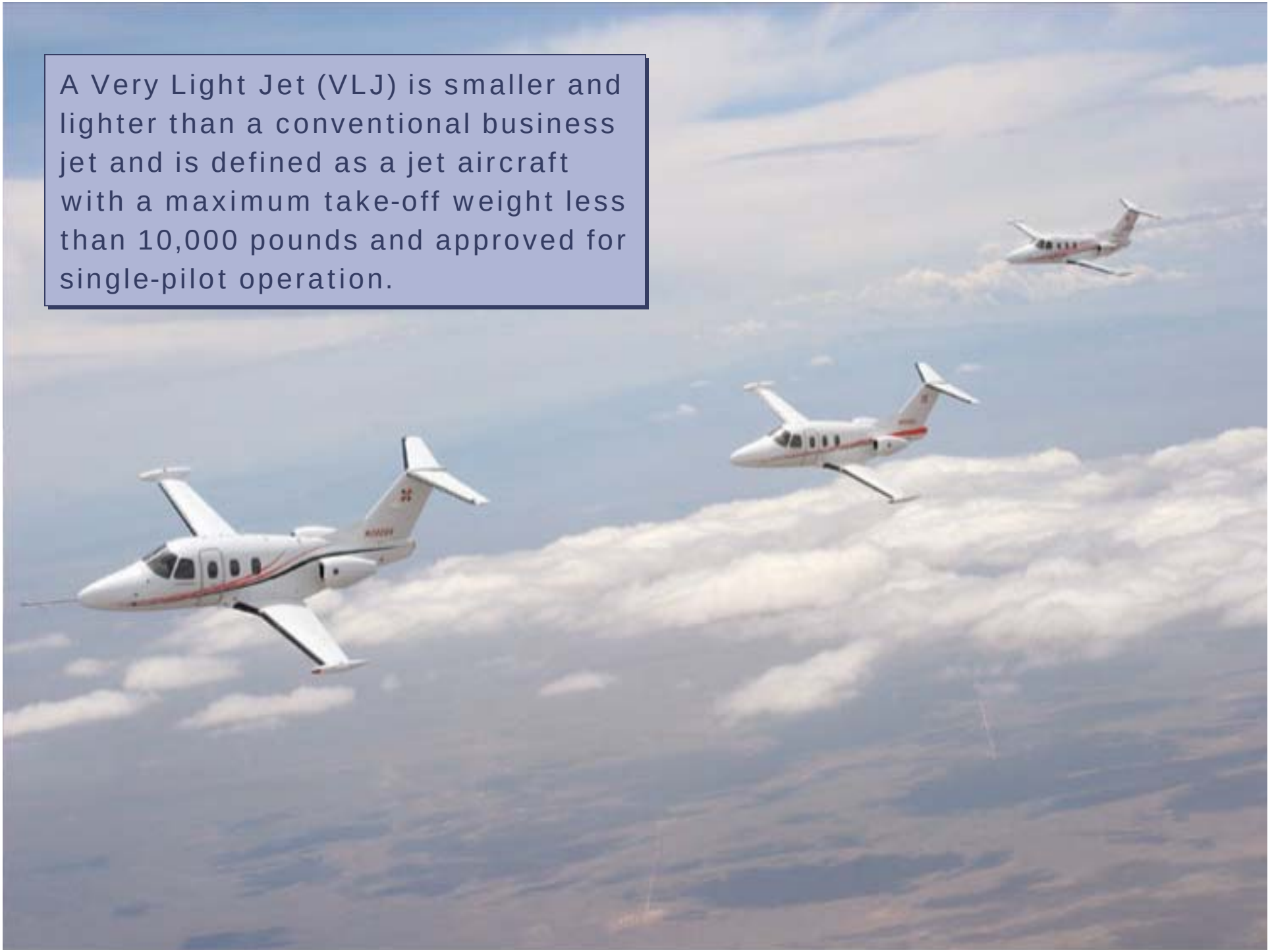
MEAD & HUNT



A Very Light Jet (VLJ) is smaller and lighter than a conventional business jet and is defined as a jet aircraft with a maximum take-off weight less than 10,000 pounds and approved for single-pilot operation.

Currently in various stages of development, these aircraft feature advanced avionics with glass-cockpit technology (video displays instead of dials). Seating between three and seven passengers, the VLJ is likely to be economical to operate and will be able to takeoff and land on short runways (down to 2,500 feet), providing flight services to airfields not currently used by business jets.

VLJs are expected to open up a new air travel market that could lead to "on-demand" air taxi services due to their anticipated low operating costs. However, the viability of the business models to launch these services is the subject of some debate among industry experts.

Joining the Jet Set

Aviation's Newest Acronym: VLJ

BY ED STEPHENS, JR

LAS VEGAS IS a city of heads—but calculated—assholes, and there's no better way to describe aviation's nascent Very Light Jet (VLJ) industry. The VLJ revolution, and it is a revolution, was visible at the National Business Aircraft Association's (NBAA) annual convention, which saw about 30,000 industry pros per day bellying up to over 1,000 exhibits in the Las Vegas Convention Center from October 12 through October 14, 2004.

Oh, what a woot for the little guys. Amid all the weight woe, the ponderous corporate monoliths and the usual heavy hitters, the terms "private pilot" and "owner/pilot" were buzzing from one end of the center to the other. Yes, little jets are big news, which means that owner/pilots aren't just crumbs under the table in the business jet industry, but are now front and center as a main course.

The old boast that private flying is a way around the airline cattle cues is, finally, going to meet most of its promise. The near future is shaping up—and up, and up—into the jet routes, airports measured in percentage of Mach (yeah, buddy!), digitized avionics that would put many airliners to shame, auto pilots, even auto throttles and serious IFR capability for serious point-to-point transportation.

The term VLJ is a new one, reigning the industry's favor over "microjet" and "personal jet," so it looks like we've got another clunky abbreviation added to our lexicon. There is no definitive definition of VLJ, but think small: six seats, single-pilot capable and about 9,000 pounds as a rough upper limit, though that weight might balloon a bit.

Two of the three top VLJ contenders are bold, entrepreneurial startups: Eclipse Aviation, of Albuquerque, New Mexico, and Adam Aircraft, of Englewood, Colorado. Both were founded by computer software magnates, so aviation is enjoying an echo from the computer technology boom.

Meanwhile, industry Goliath Cessna is in the VLJ business as well; that's an easy move for Cessna since it's already the largest player in the business jet industry.

The Eclipse 500

When history writes about the VLJ revolution, it will be the little Eclipse 500 that is cited as the shot heard round the world.

The Eclipse is the brainchild of founder and CEO Vern Raburn, who is an experienced pilot and part of the early Microsoft cadre. Eclipse has rolled with the punches and survived an abrupt change of course in the engine realm from Williams International to Pratt & Whitney Canada. Some things in aviation haven't changed since the days of the Wright Brothers, and pioneering aircraft are just funny looking anchors until they find pioneering engines to drag them out of the mud. That's evolution, baby.

Raburn expects FAA certification of the Eclipse 500 in the first quarter 2006, and they've already pre-sold their production clear into the first


Where did the VLJs come from?
✈ AGATE
✈ SATS

Advanced General Aviation Transport Experiments (AGATE) (1994)

"Turn left at cloud 109"

The NASA-led AGATE consortium, designed to stem the gradual decline of general aviation, is a unique partnership between government, industry, and academia established to develop new ways of reviving the troubled general aviation industry.

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.

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

Small Aircraft Transportation System (SATS)

The Small Aircraft Transportation System (SATS) is a joint research project between the FAA and NASA, along with local airports and aviation authorities. It is designed to facilitate transportation between small general aviation airports using small aircraft as an alternative to traditional airline travel.

The small aircraft transportation vision is a safe travel alternative freeing people and products from transportation system delays by creating access to more communities in less time.

The first VLJs are expected to enter service late this year.

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The Eclipse 500, the first of the VLJs to receive FAA type certification, is capable of cruising at 370 knots (425 mph) with a 1,300 nautical mile (1,495 statute mile) range with 6 (5+1) occupants. It has a 41,000-foot ceiling that will enable it to avoid most severe weather. It is of standard aluminum and spar construction (other VLJs are of composite materials).

Provisional Certification: 7/06
Type Certification: Late 2006
Est. Cost: $1,520,000
Customer Orders: 2,500 (250 US air taxi)

Eclipse 500

The Cessna Mustang, among the first VLJs to enter flight testing, is capable of cruising at 340 knots (390 mph) with a 1,300 nautical mile (1,495 statute mile) range with 6 (5+1) occupants. It also has a 41,000-foot ceiling that will enable it to avoid most severe weather.

Cessna Mustang

Certification: 9/06
Est. Cost: <$2,500,000
Customer Orders: 250

The A700, currently undergoing flight testing for FAA type certification, is capable of cruising at 340 knots (390 mph) with a 1,400 nautical mile (1,610 statute mile) range with up to 8 (7+1) occupants. It also has a 41,000 foot ceiling.

Certification: 1Q 2007
Est. Cost: $2,100,000
Customer Orders: 342
(66 Owner/276 Fleet)

Adam Aircraft A700

The HondaJet, currently undergoing development and flight testing, is capable of cruising at 420 knots (480 mph) with a 1,100 nautical mile (1,265 statute mile) range with up to seven (6+1) occupants. It also has a 41,000-foot ceiling.

Certification: 2009 - 10
Est. Cost: $3-4,000,000
Customer Orders: 0

HondaJet


The Safire Jet was undergoing flight testing. It is capable of cruising at 380 knots (435 mph) with a 1,300 nautical mile (1,500 statute mile) range with 6 occupants (5+1). It also has a 41,000 foot ceiling.
shelved
Certification: ??
Est. Cost: <$1,400,000
Customer Orders: N/A
Safire Aircraft Jet


The single-engine D-Jet is designed for the owner-flown market and is limited to 25,000 feet—the ideal altitude for short-medium stage lengths. Flight testing will begin in 2006. The aircraft is designed to cruise at 315 knots (360 mph) with a 1,174 nautical mile (1,350 statute mile) range with 4+1 occupants.
Certification: 2Q 2008
Est. Cost: $1,380,000
Customer Orders: Unknown
Diamond Aircraft D-Jet

The ProJet is capable of cruising at 365 knots (420 mph) with a 1,200 nautical mile (1,380 statute mile) range with 6 (5+1) occupants. It also has a 41,000 foot ceiling.

Certification: Unknown
Est. Cost: $2,000,000
Customer Orders: Unknown

Avocet Aircraft ProJet

The Phenom 100 is Embraer's approach to the VLJ market. The Phenom 100 is capable of cruising at 380 knots (435 mph) with a 1,160 nautical mile (1,330 statute mile) range with 8 (7+1) occupants. It also has a 41,000 foot ceiling.

Certification: 2Q 2009
Est. Cost: $2,750,000
Customer Orders: 250+

Embraer Phenom 100

On-Demand Air Taxi

On-Demand Air Taxi services marries two advanced technologies: Very Light Jet (VLJ) aircraft, which can seat four or more passengers and operate at half the cost of today's larger business jets; and sophisticated computer databases that can determine the most efficient ways to route those aircraft to pick up customers.

“As a new class of ultra-light jet aircraft join the fleet of thousands of other business and general aviation aircraft, we hope to provide a convenient and common interface to these assets at a price comparable to first-class airline service.”

Chris Stevens
President, Penguin Airlines

Areas of Controversy

PRO

- Potentially large owner-operator and on-demand markets
- Costs comparable to used twin-engine aircraft (Beech Baron) and small business jets (Citation)
- Latest technologies (Glass cockpits, low noise emissions)
- Access to small, out-of-the way airports

CON

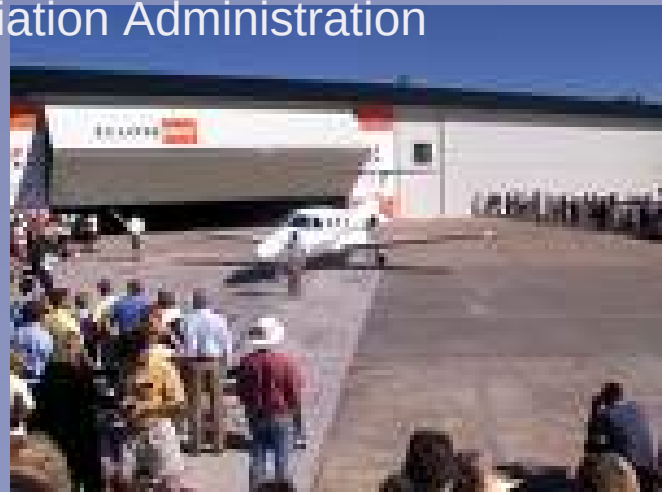
- Bias against startup companies
- Market instability (“9/11”)
- Price escalation (manufacturing and insurance costs)
- Capitalization (bases and planes)
- Non-revenue (deadhead) trips
- Commercial airspace interactions (speed and pilot proficiency)
- New challenges for small airports (fuel and support services)
- 4-6 Seats (small cabins/no toilets)

Noise Characteristics

“Eclipse 500 Emerges as Quietest Jet Aircraft in History”

“Revolutionary jet exceeds stringent Stage 4 requirements”

OSHKOSH, WI — July 27, 2006 — Today Eclipse Aviation, manufacturer of the revolutionary Eclipse 500 very light jet (VLJ), announced that the Eclipse 500 is the quietest jet aircraft. In addition the Eclipse is quieter than virtually all multi engine turboprop and piston aircraft. The Eclipse 500, which is designed to land at much smaller airports around the world, has exceeded the industry’s most stringent noise requirements as set forth by the International Civil Aviation Organization (ICAO) and used in Federal Aviation Administration (FAA) testing.



Noise Characteristics, cont'd

The Eclipse 500's low noise emissions are well under the cumulative noise level standards required to meet ICAO Stage 4 requirements. Under the ICAO standard an aircraft must have a cumulative noise level that is 10 dB lower than the Stage 3 standards to be considered Stage 4 compliant. The Eclipse 500 has achieved a cumulative noise level 50.9 dB below Stage 3. Below is a chart showing the ICAO requirements for Stage 3, Stage 4 and the Eclipse 500 certification noise testing.

	Lateral (SL)	Fly Over (TO)	Approach (AP)	Cumulative
Stage 3 Noise Level Requirements (EPNdB)	94.0	89.0	98.0	281.0
Stage 4 Noise Level Requirements (EPNdB)(Proposed)	92.0	87.0	96.0	<271.0
Eclipse 500	**79.2**	**68.8**	**82.1**	**230.1**

Noise Characteristics, cont'd

Eclipse Aviation engineers completed additional Eclipse 500 noise testing using the same measurement standards that turboprop and piston powered aircraft are tested under. This process differs from jet aircraft noise testing as it uses different techniques to capture a representative noise sample. In this testing, the Eclipse 500 proved significantly quieter than almost all high performance piston aircraft and turboprops. Below is a comparison.

Jet (J), Turboprop (TP), Piston (P)	TO (Est. dBA)	APP (Est. dBA)	
Cessna Citation Encore (Twin J)	58.3	83.0	Currently rated quietest twin jet during TO
Mitsubishi MU300 Diamond I (Hawker 400XP) (Twin J)	71.9	77.2	Currently rated quietest twin jet on APP
Cessna 525 CJ (Twin J)	60.3	81.7	
Cessna Citation I (Twin J)	67.3	77.7	
Learjet 31 (Twin J)	68.9	82.9	
Piper PA-42 Cheyenne (Twin TP)	70.3	77.1	
Beech Super King Air B200 (Twin TP)	68.8	77.8	
Beech Baron 58 (Twin P)	65.1	73.3	
Cessna 421C (Twin P)	61.0	74.0	
Cirrus SR22 (Single P)	73.6	63.8	
Piper PA-46-31P Malibu (Single P)	70.0	63.9	
Beech Bonanza A36 (Single P)	67.8	64.0	
Eclipse 500 (Twin J)	**54.9**	**72.8**	

Air Traffic and Airspace Interactions of VLJs

- Conservatively, there may be 4,500 VLJs in GA fleet by 2016 (FAA)
- More business aircraft will be flying IFR, adding to ATC workload (Eurocontrol)
- Inexperienced low-time pilots operating at high altitudes in high-density and congested airspace will create delays in an already overtaxed ATC system (Chief Pilot)
- Mixing a 370-kt VLJ with larger commercial aircraft flying at 470 kts between FL 330 and FL 410 won't work. The VLJs will be given a lower flight level resulting in increased fuel burn and shorter range (Chief Pilot)

Air Traffic and Airspace Interactions of VLJs

- Remember the “V-tailed Doctor Killer.” High performance and minimal pilot proficiency are a recipe for disaster (Chief Pilot)
- Over the short-term (5-10) years the impacts of VLJs on the ATC system would not be great, except at certain “critical” airports, such as ATL, ORD, JFK, LAX, SFO and others where capacity is an issue (MIT and Virginia Tech)
- Ideally, VLJs would seem to be best suited for operations between outlying areas and reliever airports in large metropolitan areas
- VLJs will be coming to airports with little or no business jet traffic in the past. Although quiet, VLJs may require that traffic patterns be extended for low performance aircraft resulting in an increased overflight and noise potential

Questions