

V-Jet II* Model 271

Brief Program Summary

April 2009

Burt Rutan

* AKA Spike



The Sam Williams Plan: Revolutionary Turbofan Breakthrough



FJX vs. conventional turbofan

- Ultra-high bypass turbofan for General Aviation. Efficiency 25+% improvement
- One 20th the cost of conventional
 - 1/10th due omissions and parts count
 - 1/10th due mass production
- Engine weight ~ 2/3 of conventional
- The missing parts in a “one moving part” engine:
 - FADEC – engine is controlled by the Aircraft’ s computer
 - Gears (starter/Gen, fuel/oil pumps – are all integrated to main shaft)
 - Mounts – ring mount fan shroud
 - Fan and turbines single-piece machined forgings
 - Plumbing eliminated via internal integrated design

The Sam Williams Vision: Aircraft Applications for the New Propulsion

- All Categories included:
 - A Turbofan entry-level trainer – The new ‘Cessna 150’ has a 48-lb, 20k\$, 400 lb thrust high-bypass turbofan. Engine change done in 15 minutes.
 - The V-Jet II – twin turbofan personal 4 place. Cost - under 100k\$. Fuel cost - competitive with recip propeller aircraft.
 - Four-engine Business Jets with scaled-up FJX-type engines. Low cost and high efficiency.
 - Airliners with low-cost, ultra-high bypass, low parts-count engines. Engine replacement during gate turn-around

The Goal - In a single generation,
Obsolete propellers, for all aircraft categories

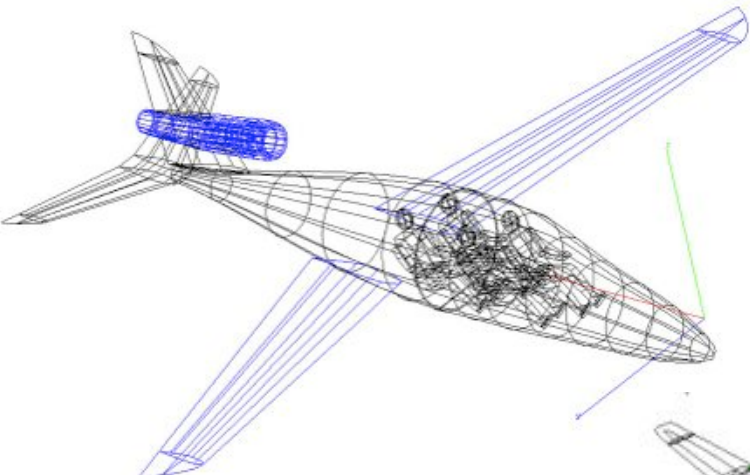
V-Jet Program Timeline

- Sam Williams original concept, forward sweep, spike nose
 - 1985 NBAA convention - V-Jet mockup, sized for FJ44s
- First Scaled Discussions and criteria – Early 1995
 - Mass-production, automotive style, no TC'd aircraft systems
- Scaled Design Study for V-Jet II – May 1995.
- Tiny twin using the future FJX engine concept
 - Scaled helped Williams pitch NASA for GAP propulsion research contract.
- Scaled POC program – contracted in Dec 1995.
 - Start fabrication ~ April 1996
 - First flight April 1997 using cruise-missile engines
 - Oshkosh flight unveiling July 1997
 - V-Jet II never flew with the new FJX engines

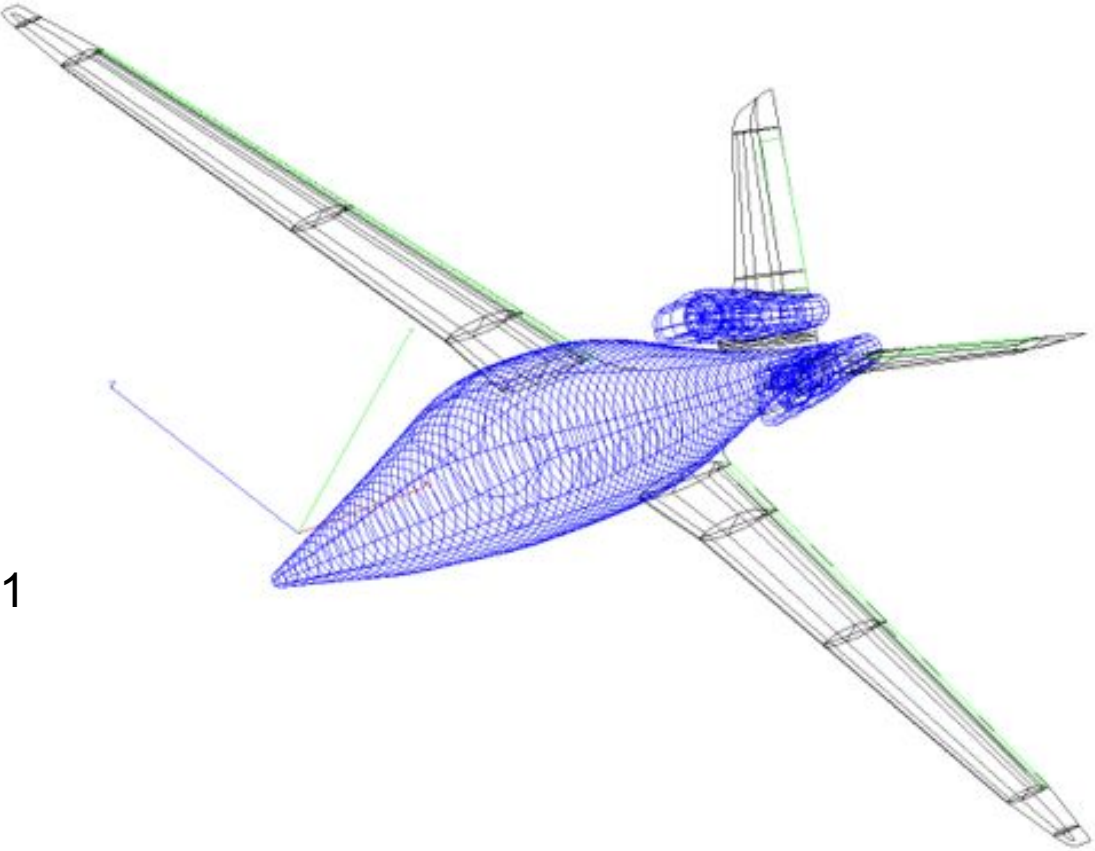
History of the Design's Growth

- ~1994 - Original Concept, Sam Williams
 - FJX engine - 80-lb weight, 700-lb thrust, cost ~ 20k\$
 - Production Goal – Aircraft price ~ 80k\$, 4-place.
- Scaled 1995 Design Study
 - Tight, 5-place cabin, two 85 lb engines, GW = 3,600 lb
- The POC program using Scaled M-271 design
 - Staggered cockpit, 5-place, GW = 3,700 lb (with FJX-1 engines)
- The Pronto Program at Williams
 - Cabin grows ~ 40% by volume, GW ~ 4,400 lb.
- Eclipse Program at Albuquerque
 - Conventional systems and aluminum structure, GW ~ 4,900 lb
 - Williams EJ-22 production engine, still at 85 lb, now too small for Eclipse
 - Weight grows to 6,034 lb at certification with new P & W engines
 - “Just a small Learjet”, none of original revolutionary concepts intact.

Scaled Designs from Concept Study



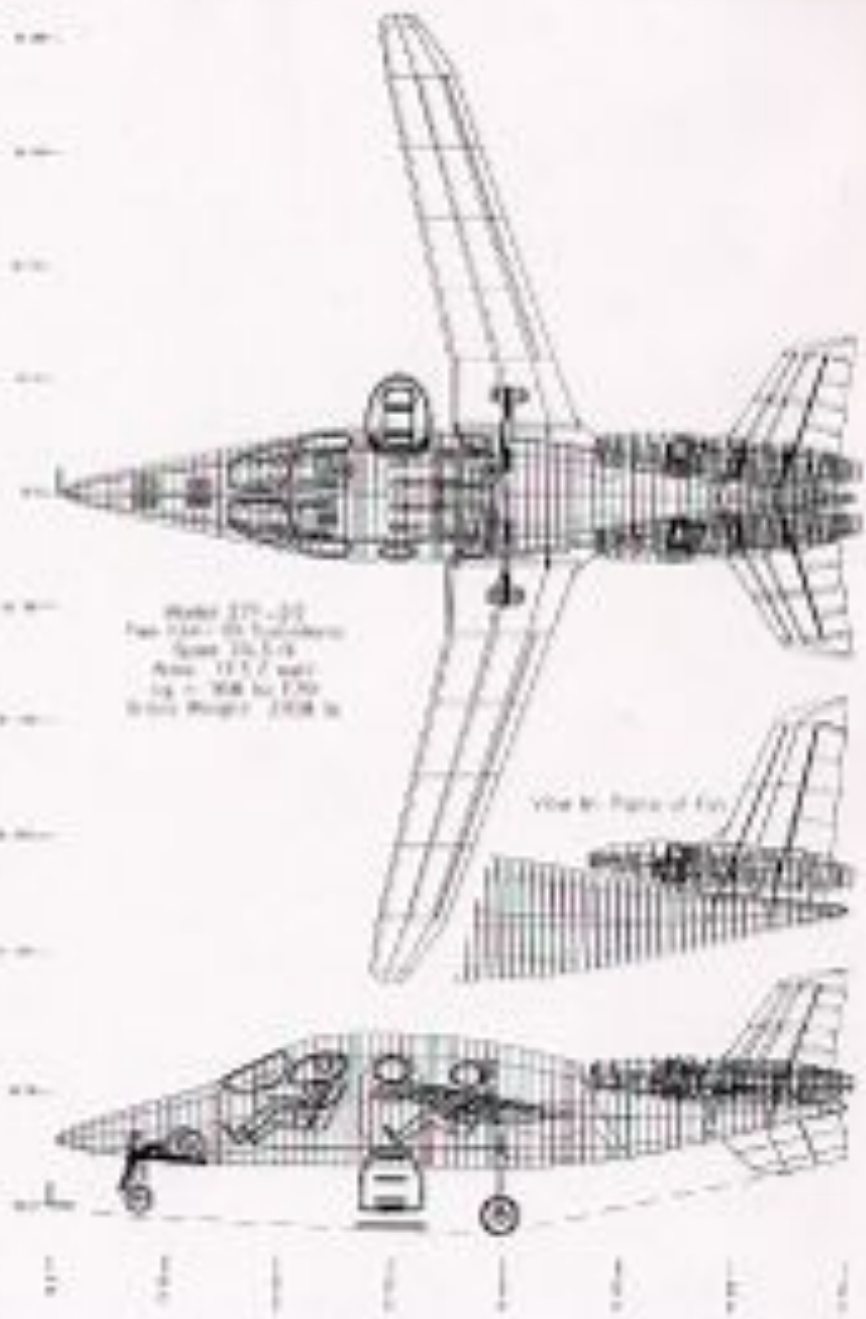
Spike Model 266
Single engine



Spike Model 271
FSW Twin

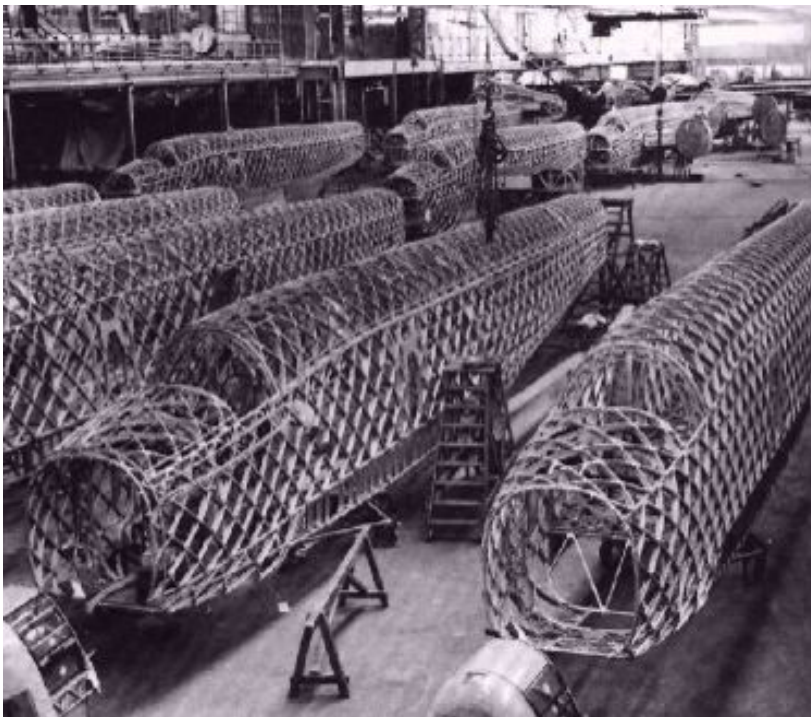


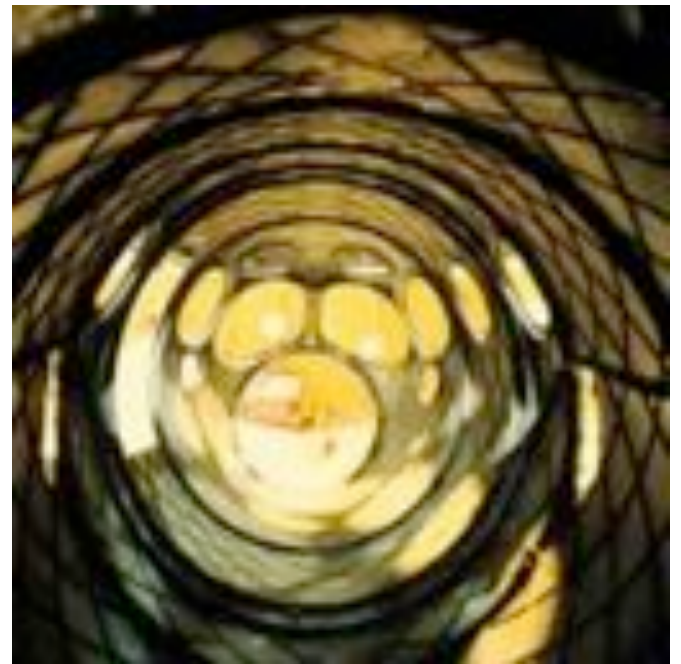
Scaled Composites
M271
2/1/97

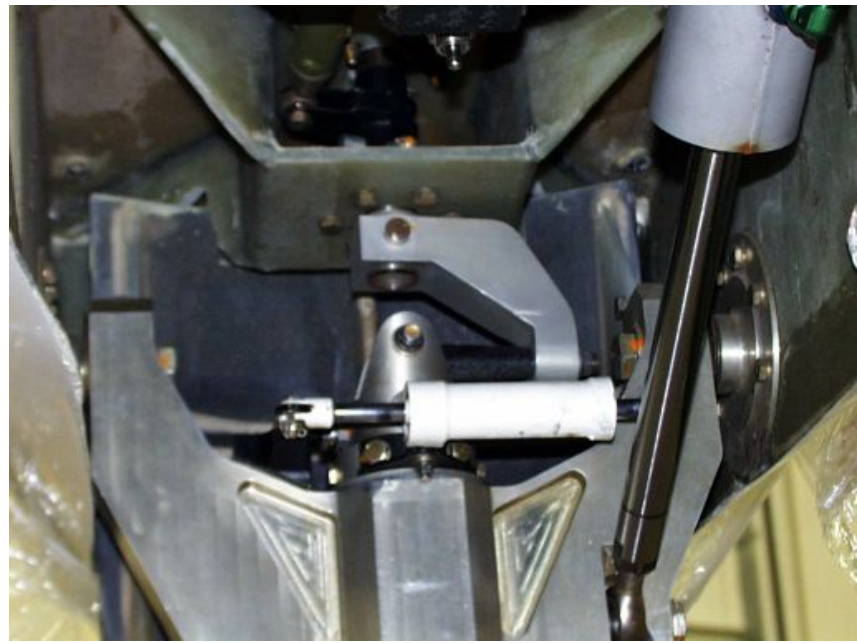


A plan to Replace Sandwich Fuselage Structure with Geodesic Structure

Pioneered by Mosquito and Boomerang



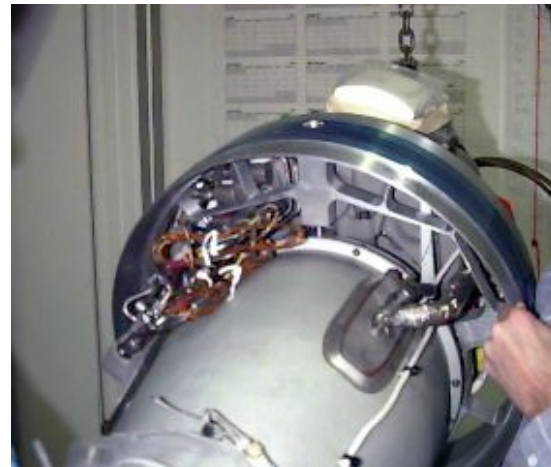




Propulsion Integration



The tiny cruise missile engines installed in nacelles sized for the ultra-high bypass ratio FJX engine design



Six-Bolt Wing Attachment



Static Thrust Measurement



maingear.jpg



loadcell.jpg



nosegear.jpg



setup.jpg



First Flight April 1997







The entire company



The V-Jet II test team

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V-JET 2
Testbed for Small
Turboprops
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Williams V-Jet 2 Experimental Aircraft Will Make its Debut This Week At The Experimental Aircraft Assn.'s Exhibition.