

# Burt's Homebuilts

A Burt Rutan Presentation  
EAA Chapter 1441  
Sandpoint Idaho  
May 17<sup>th</sup>, 2023



# Why canards?

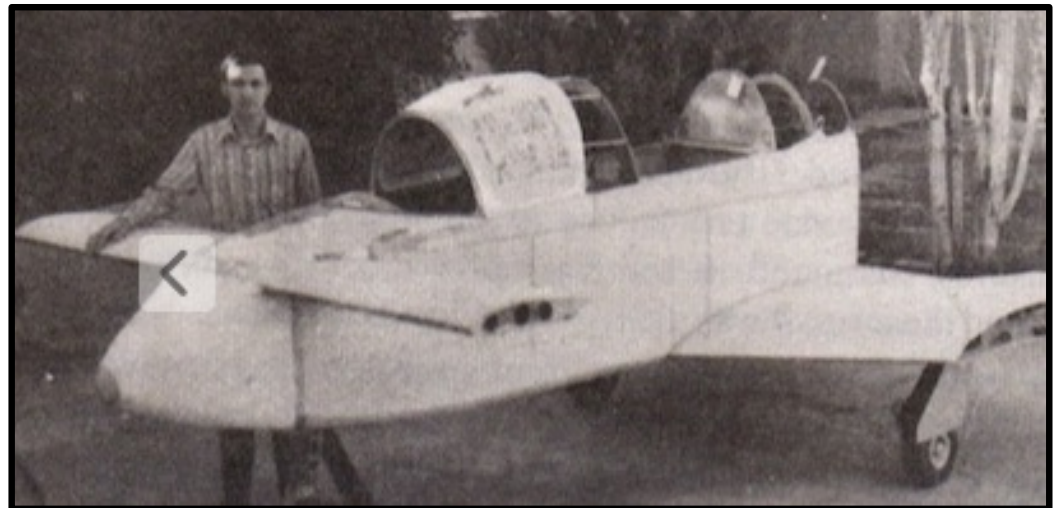
Burt's first inspiration - SAAB Viggen - the most advanced fighter in the mid 1960s

- Safety – Natural stall-limiting
- Stable, no fly-by-wire
- Fixed, Loaded Canard
- Supersonic
- STOL using thrust reversing. Operates on roads.



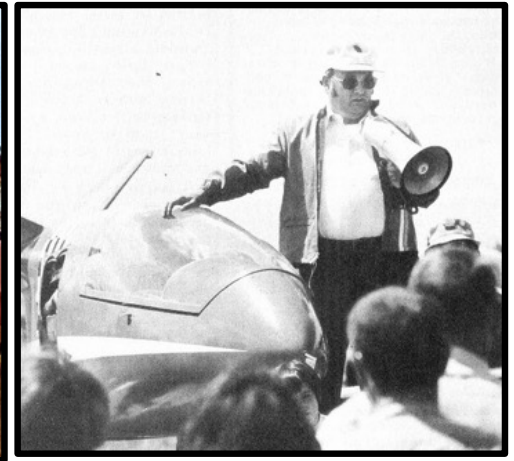
Detailed story in  
BRAB Chapter 17

First job after college – Flight testing USAF aircraft 1965 to 1972.  
Joined EAA Chapter 49 in Lancaster, CA.  
Then built the VariViggen, my first homebuilt aircraft.

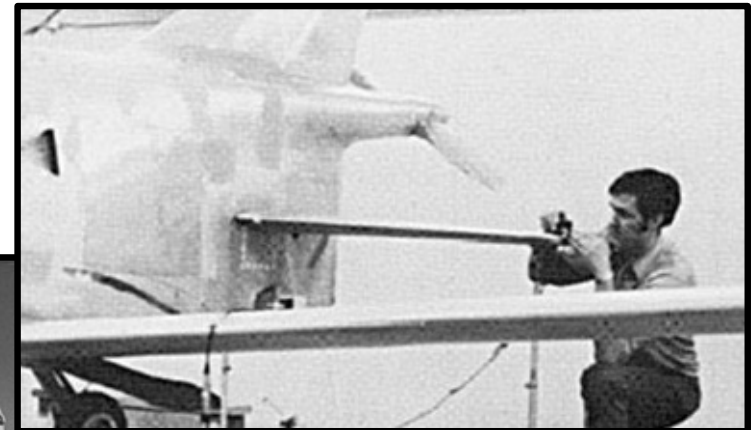




Leaving Edwards, 1972  
To Bede Aircraft, Kansas.  
Just for a fun break.  
“I will be back in a year”



Burt's 3<sup>rd</sup> homebuilt  
design. The Jet BD-5J





# First Entrepreneurial Company Rutan Aircraft Factory Founded in 1974

Sixteen aircraft types. Seven home-built aircraft were marketed to the public.





The first Mojave RAF building ->



Formation of six RAF Designs  
A real Formation with PhotoShop tweaking





## There were three EZ types



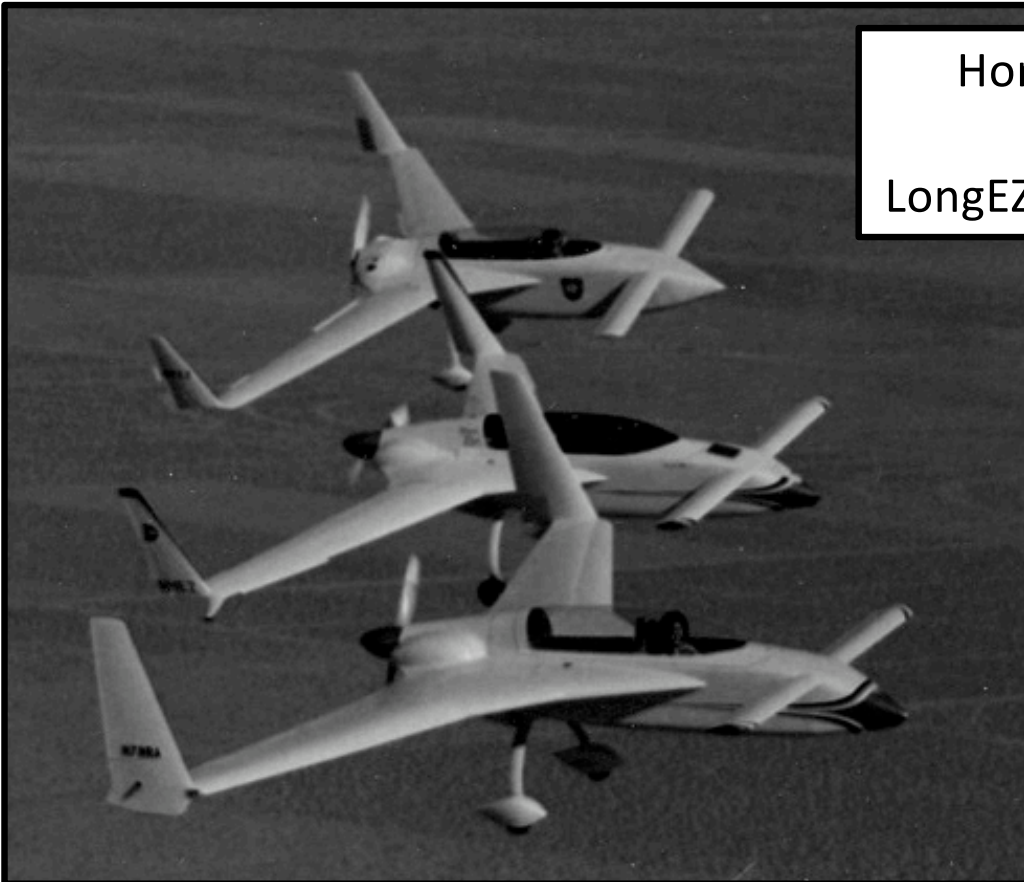
### Rare photos of All Three EZs together:

1975 - Proof-of Concept, VW-powered

1980 - Homebuilt LongEZ, Lycoming O-235

1976 - Homebuilt VariEze, Continental O-200

There was also an early version of the LongEZ with poor flying qualities that was flown to Oshkosh in 1979. Its configuration was abandoned, rebuilt as the Homebuilt LongEZ.



Homebuilt VariEze is 15% larger than POC.

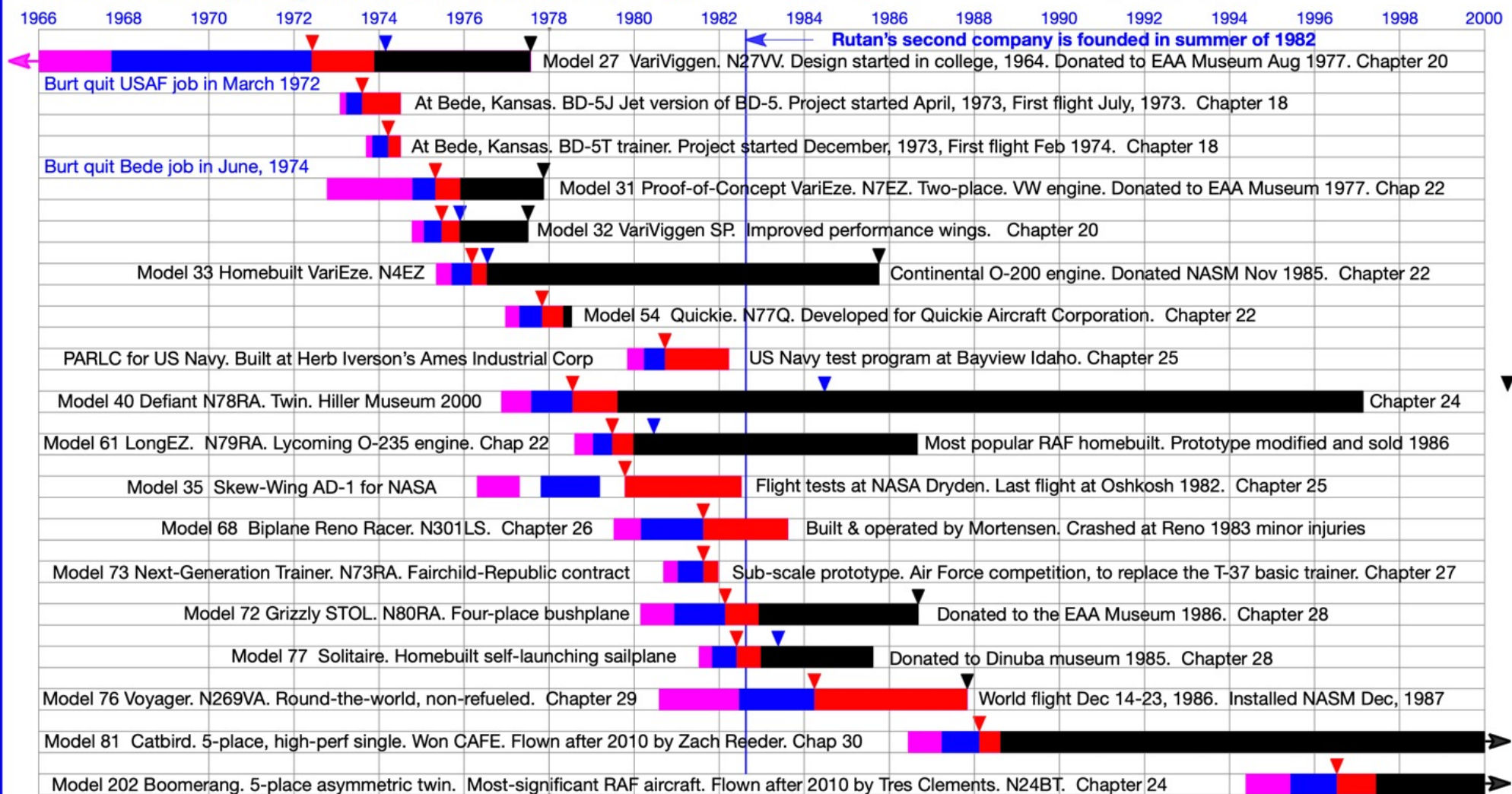
LongEZ is 15% larger than the Homebuilt VariEze.

<- Only known photo of all three EZs flying in formation.

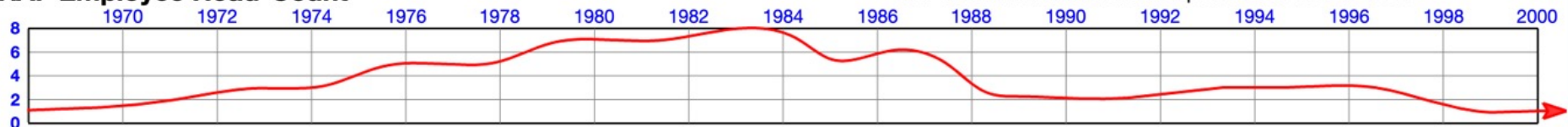
This is a real formation - Dick taught us the formation skills.

# Rutan Aircraft Factory Manned Aircraft

Model 375 SkiGull (first flight 2017) is not shown. See Chapter 78.



## RAF Employee Head-Count



Sixteen Aircraft Types. Only 7 were marketed to the public. Never more than 8 employees.



# The RAF "Saturday Demos"





Mojave 1978 – Dick 40<sup>th</sup>  
Burt 35<sup>th</sup> – 27 Homebuilts,  
25 VariEze, one VariViggen, one Defiant



Mojave 1988 - Dick 50<sup>th</sup>, Burt 45<sup>th</sup> - 42 Homebuilts



Mojave 1998 - Dick 60<sup>th</sup>, Burt 55<sup>th</sup> - 80 Homebuilts



Birthday Party  
every 5 years

Coeur d'Alene 2018 - Dick 80<sup>th</sup>, Burt 75<sup>th</sup> - 13 Homebuilts



Next Birthday Bash:  
KCOE July 8<sup>th</sup>, 2023  
Dick 85<sup>th</sup> Burt 80<sup>th</sup>



Counting only the unclassified Manned aircraft that were flight-tested, the current total is 49 aircraft types.

For details see BRAB Chapter 82

Want to see them all, flash-card style?

Here goes, don't blink .....

## Rutan Aircraft Factory Manned First Flights

#1 VariViggen Model #27 Homebuilt First flight May 1972



Construction start in 1968





#2

Bede Trainer – 'Truck-a-plane'

First flight 1972



### #3 BD-5J - Jet version of the BD-5A/B

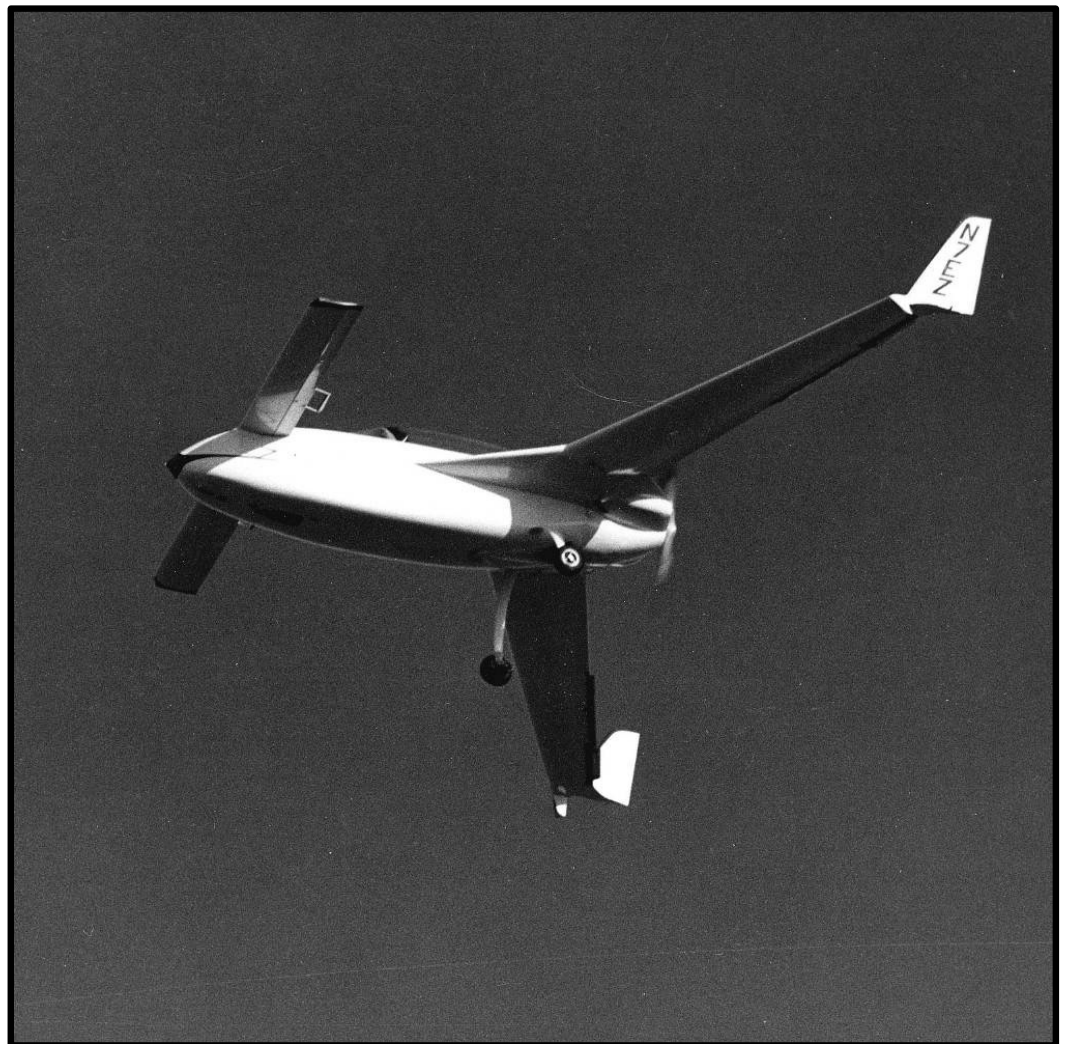
First flight 1973





## Rutan Aircraft Factory Manned First Flights

#4 Proof of Concept EZ VW engine Model #31 May 1975



## Rutan Aircraft Factory Manned First Flights

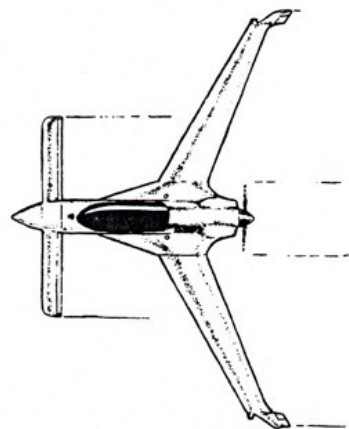
#5      VariViggen SP      Model #32SP      Homebuilt      July 1975





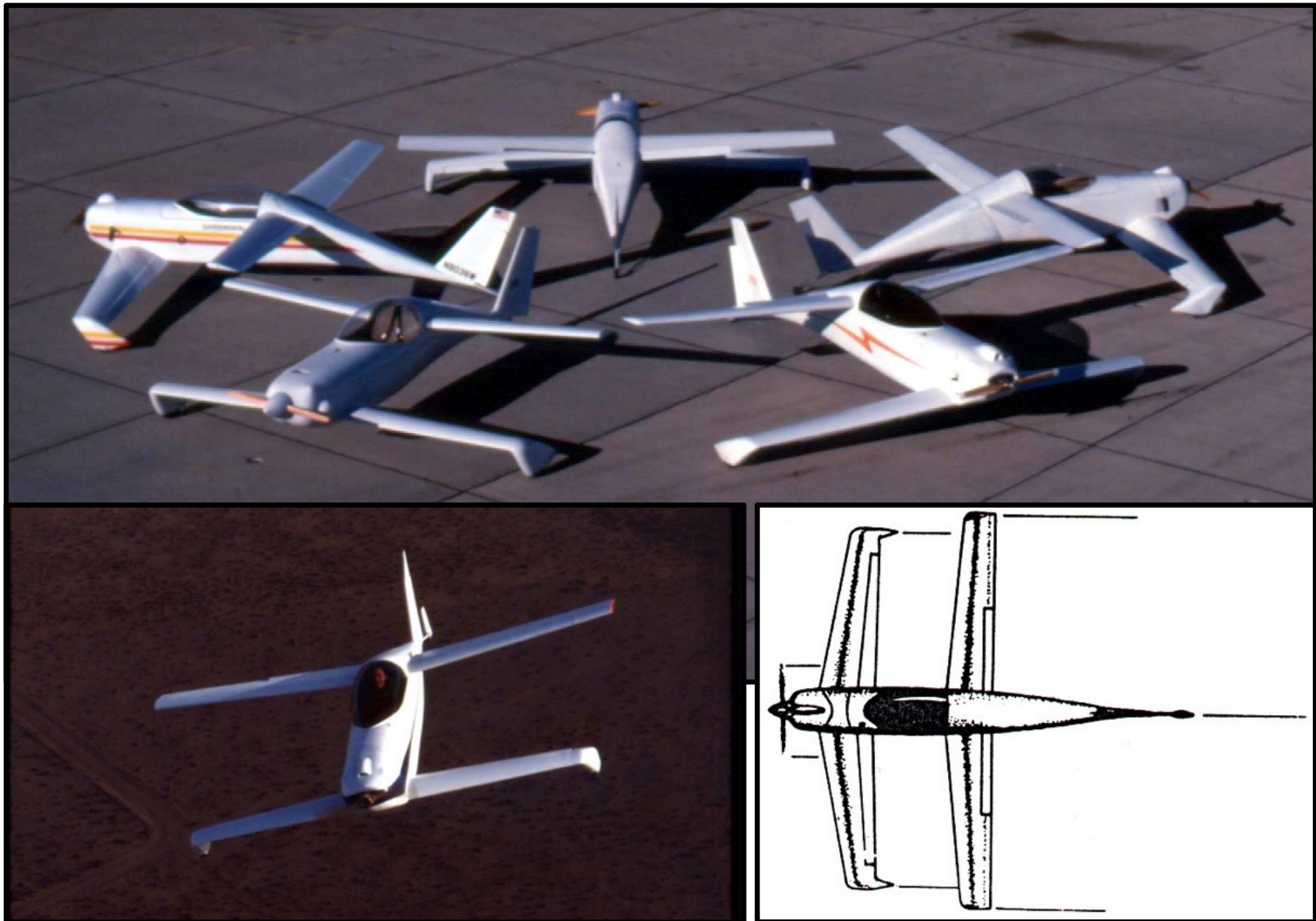
## Rutan Aircraft Factory Manned First Flights

#6 VariEze Homebuilt Model #33 First Flight March 1976



#7 Quickie Homebuilt Model #54 First Flight November 1977

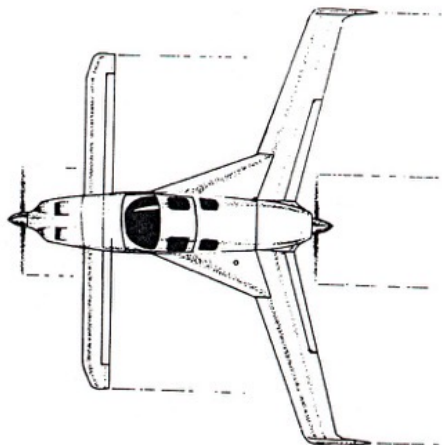
Marketed by QAC





## Rutan Aircraft Factory Manned First Flights

#8 Defiant Homebuilt Model #40 First Flight June 1978





# Rutan Aircraft Factory Manned First Flights

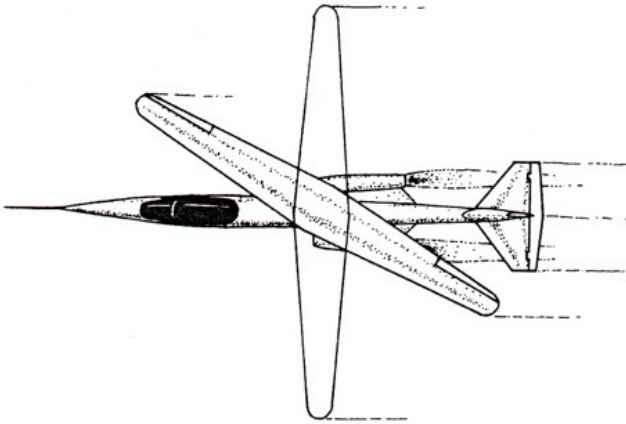
#9 Long-EZ Homebuilt Model #61 First Flight June 1979



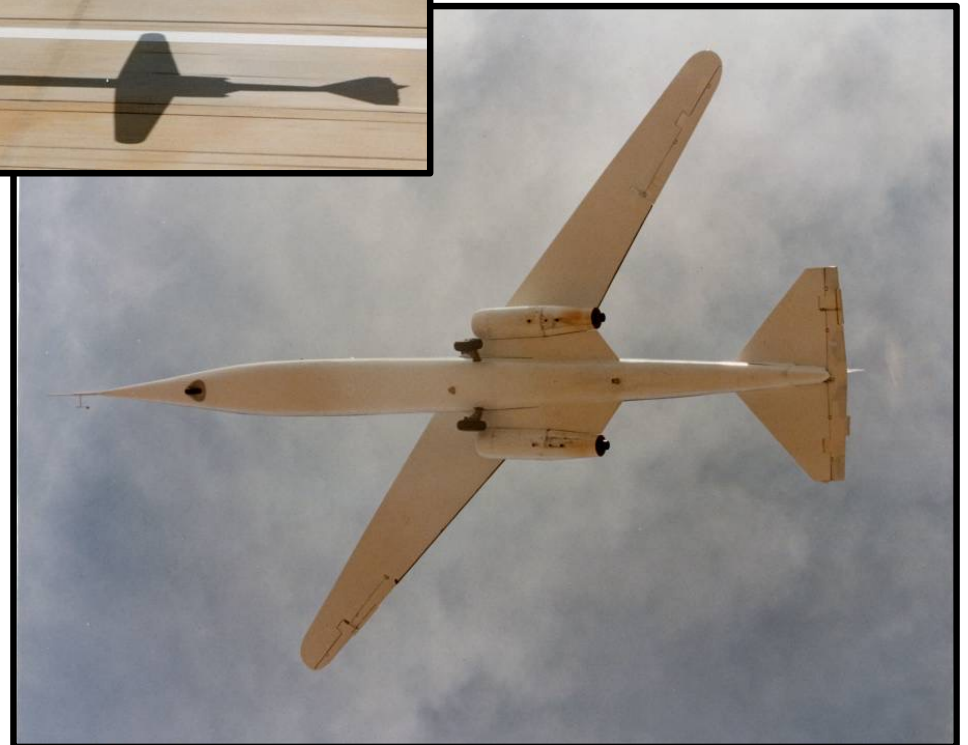
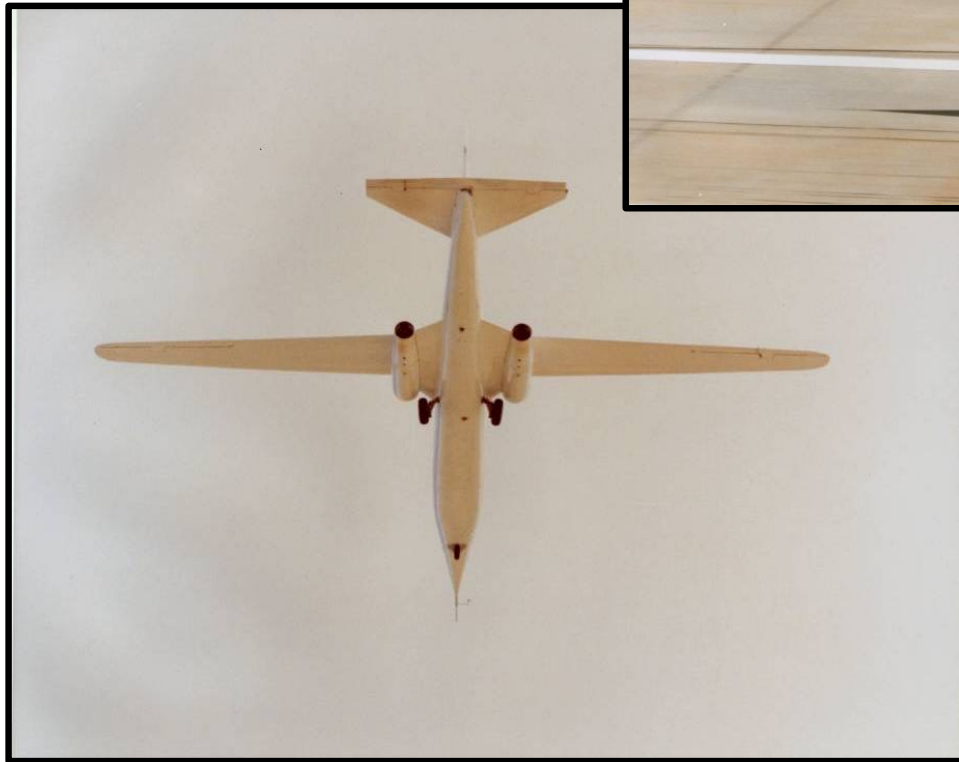


## Rutan Aircraft Factory Manned First Flights

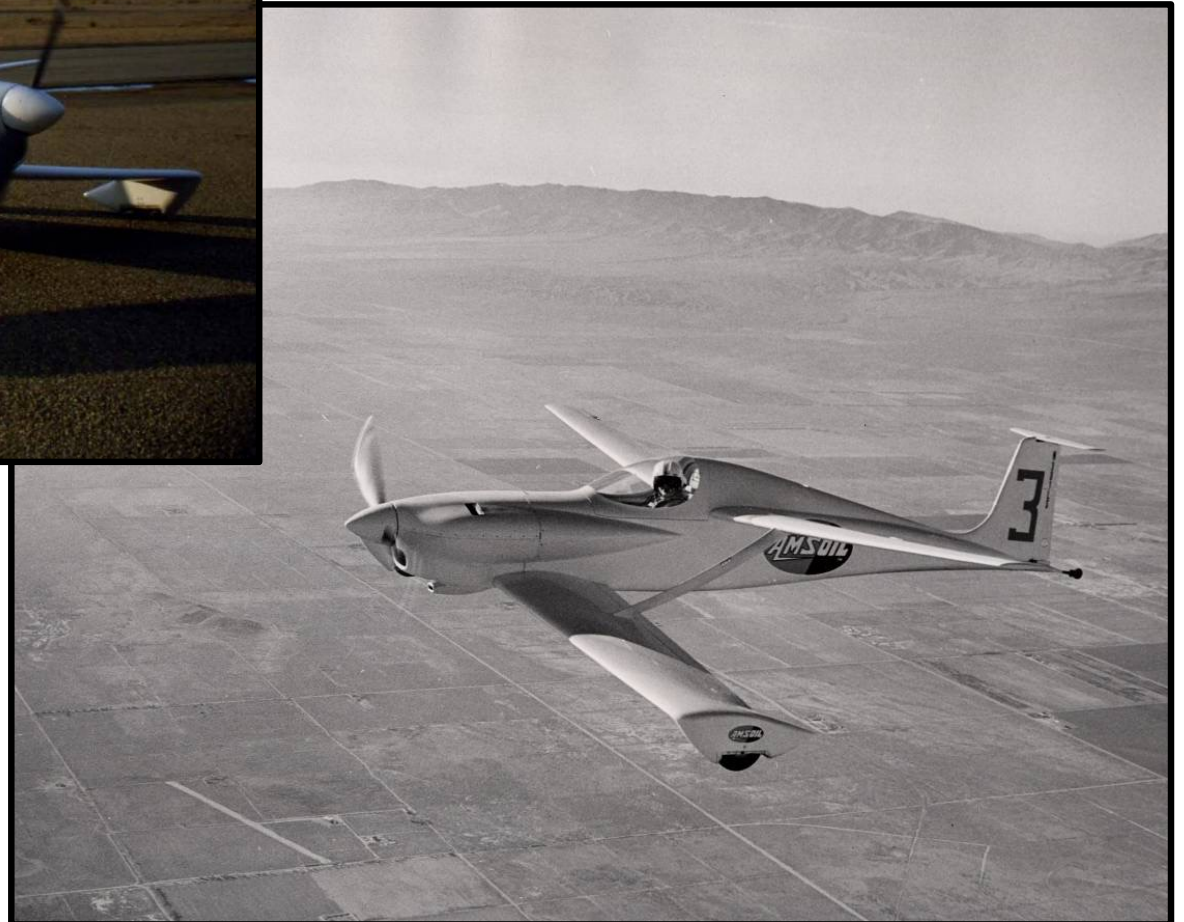
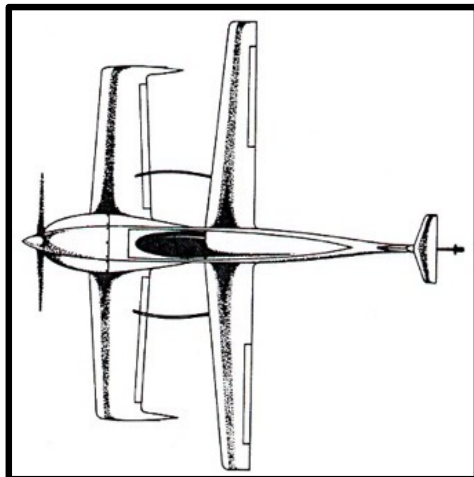
#10    AD-1    Model #35    NASA    First Flight December 1979



- Proof of Concept
- 15% scale of a transonic airliner



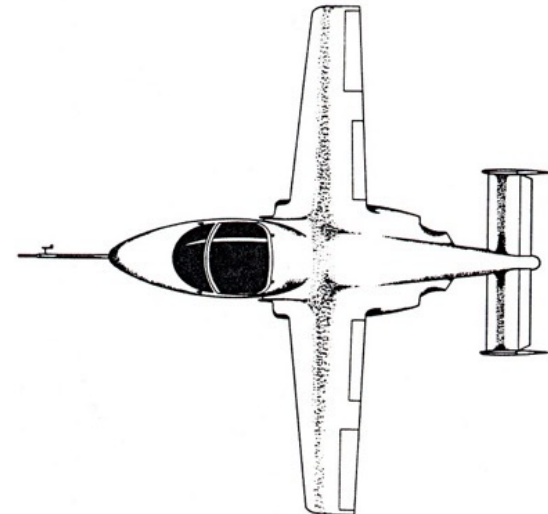
#11 Amsoil Biplane Racer Model #68 Mortensen August 1981





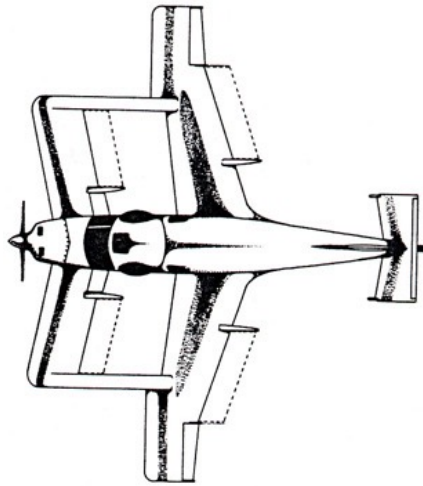
#12 Next Generation Trainer Model #73 Fairchild September 1981

- Proof of Concept
- 62% scale



# Rutan Aircraft Factory Manned First Flights

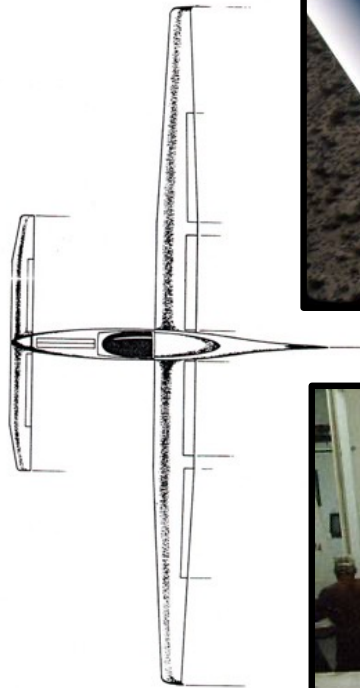
#13 Grizzly STOL Model # 72 RAF First Flight January 1982





## Rutan Aircraft Factory Manned First Flights

#14 Solitaire Homebuilt Model #77 First Flight May 1982





## Scaled Composites: Manned First Flights

#15 Microlight Model #97 Lotus Motors January 1983





## Scaled Composites: Manned First Flights

#16 StarShip POC Model #115 Beechcraft August 1983

- Proof of Concept
- 85% scale



## Rutan Aircraft Factory Manned First Flights

#17	Voyager	Model #76	VAI	First Flight June 1984
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Voyager flew nonstop, non-refueled around the world in December 1986





## Scaled Composites: Manned First Flights

#18 Predator Crop-duster Model #120 ATAC Sept 1984



## Scaled Composites: Manned First Flights

#19 CM-44 Model #144 Calif Microwave February 1987





## Scaled Composites: Manned First Flights

#20    ATTT (SMUT) Model #133    DARPA    December 1987

- Proof of Concept
- 63% scale



## Rutan Aircraft Factory Manned First Flights

#21	Catbird	Model #81	RAF	First Flight January 1988
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## Scaled Composites: Manned First Flights

#22 Triumph Model #143 Beechcraft First Flight July 1988



Light-Light Business Jet.  
Williams FJ-44 engine.

**BEFORE** the Cessna  
Citation-Jet



## Scaled Composites: Manned First Flights

#23	ATTT SMUT BT	Model #133b	DARPA	Dec 1988
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## Scaled Composites: Manned First Flights

#24 ARES Light Attack Model #151 In-house February 1990



## Scaled Composites: Manned First Flights

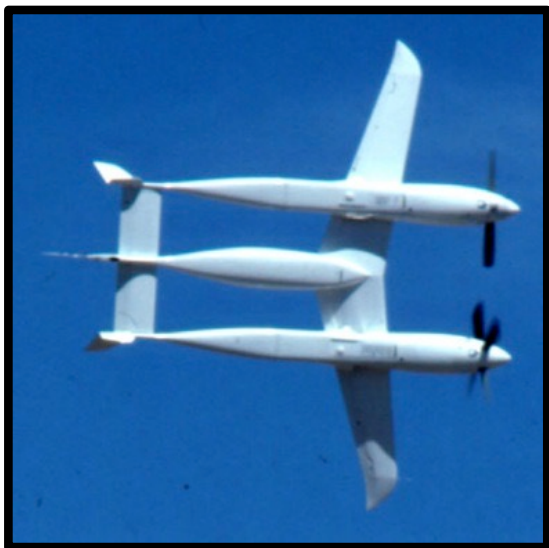
#25	Lima 1	Lexus engine test	Toyota	April 1990
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## Scaled Composites: Manned First Flights

#26      Pond Racer      Model #158      Bob Pond      March 1991



## Scaled Composites: Manned First Flights

#27	Lima 2	Model #191	Toyota	First Flight November 1991
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## Scaled Composites: Manned First Flights

#28 EarthWinds Gondola Model #181 First Flight November 1991



## Scaled Composites: Manned First Flights

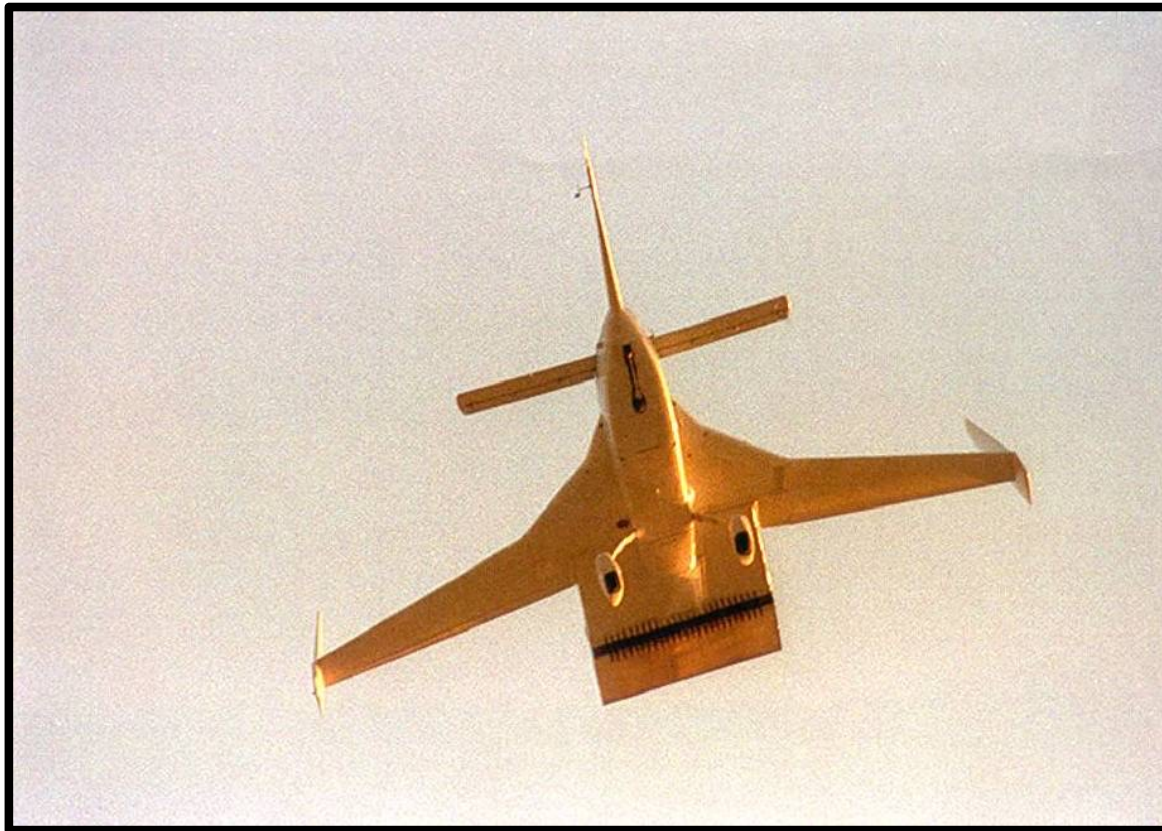
#29 Raptor D-1 Model #226 DOE First Flight May 1993





## Scaled Composites: Manned First Flights

#30	Jet LEZ Vantage/ FJ107	Model #61B	Aug 1993
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## Scaled Composites: Manned First Flights

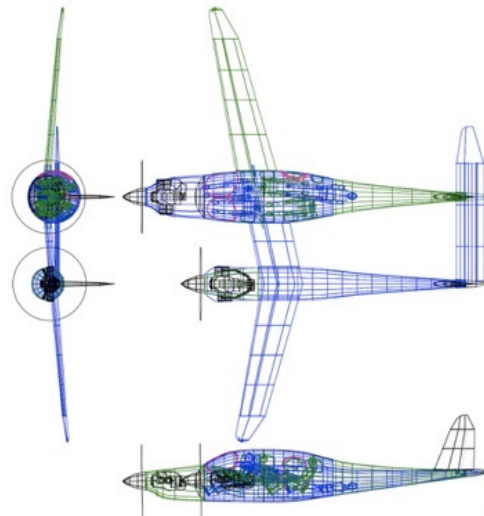
#31	Raptor D-2	Model #226B	DOE	August 1994
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# Rutan Aircraft Factory Manned First Flights

#32 Boomerang Model #202 For BurTonya First Flight June 1996



## Scaled Composites: Manned First Flights

#33 Vantage Model #247 VisionAire First Flight November 1996





## Scaled Composites: Manned First Flights

#34 V-Jet II Model #271 Williams International April 1997



## Scaled Composites: Manned First Flights

#35 Global Hilton Gondola Model #257 Dick Rutan Jan 1998





## Scaled Composites: Manned First Flights

#36 Proteus Model #281 Wyman Gordon July 1998



## Scaled Composites: Manned First Flights

#37	Roton ATV	Rotary Rocket Corp.	First Flight March 1999
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## Scaled Composites: Manned First Flights

#38	Adam 309	Model #309	Adam Aircraft	March 2000
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## Scaled Composites: Manned First Flights

#39	Rodie LEZ	Model #61-C	Proprietary	Aug 2001
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Proprietary



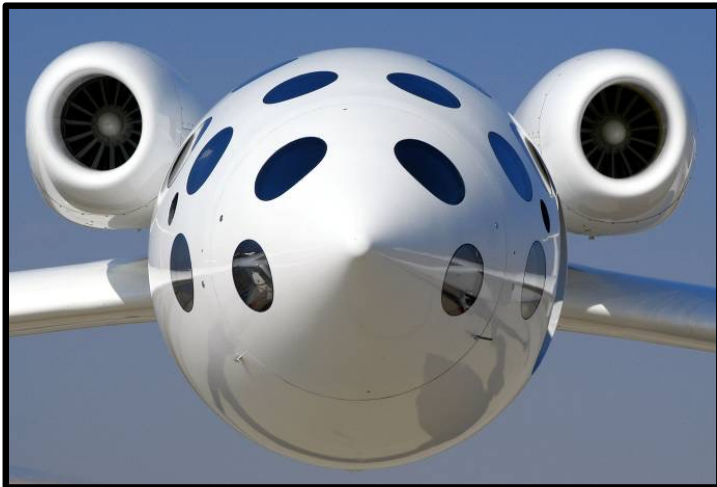
## Scaled Composites: Manned First Flights

#40	TAA-1	Budgie	Toyota	First Flight May 2002
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## Scaled Composites: Manned First Flights

#41	White Knight	Model #318	Paul Allen	Aug 2002
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## Scaled Composites: Manned First Flights

#42 SpaceShipOne Model #316 Paul Allen Aug 2003



## Scaled Composites: Manned First Flights

#43   GlobalFlyer   Model #311   Marathon/Fossett   March 2004





## Scaled Composites: Manned First Flights

#44

Pulse-Detonation LEZ Model #61PD

2007



## Scaled Composites: Manned First Flights

#45 WhiteKnightTwo Model #348 Virgin Galactic Dec 2008





## Scaled Composites: Manned First Flights

#46 Old School Model #355

Northrop

1<sup>st</sup> flight Feb 2010



## Scaled Composites: Manned First Flights

#47 SpaceShipTwo Model #339 Virgin Galactic October 2010





## Scaled Composites: Manned First Flights

#48 BiPod flying car Model #367

In-house

March 2011



## Rutan Aircraft Factory Manned First Flights

#49 SkiGull Model #375 Rutan Designs Idaho First Flight Nov 2015





## Burt's current projects

- Designs in work, not yet built:  
Model 397, Mini Voyager – Race around the world with one stop to refuel.  
Model 400, Extreme Aerobatic ShowPlane.
- BRAB, Burt Rutan Autobiography.  
[burtrutan.com/home/brab](http://burtrutan.com/home/brab)

# BRAB Sections (1 of 3):

## **SECTION 1 — YOUTH AND EDUCATION 1943 TO 1965**

- 1 FAMILY — MOM & POP — GROWING UP WITH DICK & NELL
- 2 SEVENTH DAY ADVENTIST SCHOOLS AND SOCIAL LIFE — 1ST MOVIES
- 3 INSPIRATION — OVERHEAD B-36 FORMATION & VON BRAUN ON DISNEY
- 4 MODEL AIRCRAFT — COMPETITIONS — LOCAL, WAM & AMA NATIONALS
- 5 FLYING SOLO IN THE 1950S — THE ILLEGAL FLIGHTS, AERONCA 7-AC
- 6 FIRST PUBLIC SCHOOL — THREE YEARS AT DINUBA HIGH SCHOOL
- 7 COLLEGE — CAL POLY & CAL TECH SPACE TECH SUMMER INSTITUTE
- 8 MEETING MY HERO — WERNER VON BRAUN

## **SECTION 2 — US AIR FORCE FLIGHT TEST 1965 TO 1972**

- 9 FIRST POST-COLLEGE JOB — SEVEN YEARS TESTING USAF AIRCRAFT
- 10 MILITARY AIRCRAFT IN 1965 — THEN DECADES OF DISAPPOINTMENT
- 11 TRI-SERVICE VSTOL TESTING — XC-142A, XV-5A, X-22A, X-19 & P-1127
- 12 WAR FIGHTING — C-130E LAPES & VOLUNTEERING FOR VIETNAM
- 13 THREE F-4 PHANTOM PROJECTS — SPIN WITH GENTRY & A-7A EVAL
- 14 WORLD TOUR - BRIEF USAF F4 PILOTS — THE SETP WALK-WEST FILM
- 15 F-15 TEST PLANNING — FOUR MONTHS IN ST LOUIS & A NEW FAMILY
- 16 LEAVING THE BEST JOB IN USAF — CAN I SURVIVE AS MY OWN BOSS?

## **SECTION 3 — HOME-BUILT AIRPLANES 1968 TO 2005**

**17 SOLUTION TO STALL DANGER DROVE BURT'S CAREER & FIRST INSPIRATION**

**18 BEDE AIRCRAFT — TAKING 'A YEAR OFF' IN KANSAS 1972 TO 1974**

- 19 RUTAN AIRCRAFT FACTORY — MOJAVE - THE BUILD-IT-YOURSELF BUSINESS
- 20 FIRST RAF AIRCRAFT — VARIVIGGEN, MY FRONT SEAT IN A FIGHTER
- 21 DEATH RACE 2000 MOVIE — MY END RUN AROUND FRANK TALLMAN
- 22 COMPOSITES REVOLUTION — THREE SIZES OF EZ'S AND A QUICKIE
- 23 WORLD TOUR & SATURDAY DEMOS — TEACH HOMEBUILT COMPOSITES
- 24 REINVENTING THE LIGHT TWIN — DEFIANT AND BOOMERANG
- 25 GOVERNMENT CUSTOMERS — NASA AD-1 AND NAVY PARLC
- 26 RENO RACER — AMSOIL BIPLANE
- 27 AN AEROSPACE PRIME CUSTOMER — NEXT-GENERATION TRAINER
- 28 FOUR-PLACE BUSH PLANE & A SELF-LAUNCHING SAILPLANE
- 29 AVIATION MILESTONE - VOYAGER — UN-REFUELED ROUND-THE-WORLD
- 30 WORLD'S MOST EFFICIENT — CATBIRD & THE CAFE COMPETITION
- 31 OSHKOSH — 48 YEARS AT THE WORLD'S LARGEST CONVENTION
- 32 HISTORY OF WINGLETS AND SHEARED WING TIPS**



## BRAB Sections (2 of 3):

### **SECTION 4 — SCALED COMPOSITES 1981 TO RETIREMENT IN 2011**

- 33 SCALED COMPOSITES - ONE-STOP SHOP FOR AEROSPACE RESEARCH
- 34 HUGE CHALLENGE FROM BEECHCRAFT - STARSHIP
- 35 FIRST NON-GOVERNMENT MANNED SPACE PROGRAM - WK & SS1
- 36 MILITARY - SMUT, ARES, RAPTOR, PD, FIREBIRD, M61B&R & CM-44
- 37 ORBITAL SCIENCES - AIR-LAUNCHED PEGASUS COMPONENTS
- 38 BUSINESS-JETS - TRIUMPH, SAM WILLIAMS' V-JET II AND VISIONAIRE
- 39 LIGHT AIRPLANE PROTOTYPES — TOYOTA LIMA+BUDGIE & ADAM M309
- 40 STARS & STRIPES - DENNIS CONNER & AMERICA'S CUP CHALLENGE
- 41 NORTHROP X-47A AND NASA X-38
- 42 DCX - FLOWN 25 YEARS BEFORE ELON MUSK & ROTARY ROCKET
- 43 HIGH-FLIERS PROTEUS AND TIER II+
- 44 ANOTHER NON-REFUELED ROUND-THE-WORLD FLIGHT - GLOBAL FLYER
- 45 ULTRALIGHT FOR COLIN CHAPMAN/LOTUS & A CROP DUSTER
- 46 AROUND-THE-WORLD BALLOON GONDOLAS
- 47 RENO UNLIMITED RACER FOR THE BILLIONAIRE, BOB POND
- 48 EAGLE EYE UAV FOR BELL HELICOPTER
- 49 SCARAB, SEARCHER, ROAR, ZOND, BONE, FREE-WING, TFV & PLADS
- 50 GENERAL MOTORS CONCEPT CAR — ULTRALITE
- 51 HELPING SIR RICHARD BRANSON WITH HIS VIRGINITY - WK2 AND SS2
- 52 TRAGEDY AT THE ROCKET TEST SITE
- 53 BIPOD - WHERE IS MY FLYING CAR?
- 54 MONTROSE - TECH WORKS, AN ATTEMPT TO ESCAPE THE DESERT

### **SECTION 5 — LEADERSHIP LESSONS LEARNED 1972 TO 2021**

- 55 MANAGING AND INSPIRING INNOVATIVE/CREATIVE PEOPLE
- 56 REACHING OUTSIDE — WORLD LECTURES, THE SECOND JOB
- 57 GROWING SCALED — THE FIVE SCALED EQUITY HOLDERS
- 58 PERFECT FLIGHT SAFETY VIA "QUESTION, NEVER DEFEND"
- 59 AIR FORCE SCIENTIFIC ADVISORY BOARD — THE TWO, 5-YEAR STINTS
- 60 FIGHTING REGULATORS — THE FAA/AST SPACESHIP LICENSE CHAOS
- 61 ACCIDENTS & PRODUCT LIABILITY — A UNIQUE DEFENSE METHOD
- 62 IMPORTANCE OF INVOLVING YOUR FAMILY

### **SECTION 6 — MEETING FAMOUS PEOPLE**

- 63 HEROES, STARS, BILLIONAIRES AND THE OLD ROCKET GERMANS
- 64 ACADEMY OF ACHIEVEMENT — SUPER ACHIEVERS & VALEDICTORIANS
- 65 SETP — MIXING WITH THE WORLD'S FINEST TEST PILOTS
- 66 BEING A FRIEND OF PAUL & THE FOUR PAUL ALLEN PARTIES

## BRAB Sections (3 of 3):

### **SECTION 7 — IMPORTANT LIFE EXPERIENCES**

- 67 MY GREATEST CHALLENGE — HEART HEALTH
- 68 THE FIVE ROMANTIC RELATIONSHIPS
- 69 RUSSIAN WING-SHIP PROJECT — GETTING ARRESTED IN MOSCOW
- 70 GOLF-SHACK, TITANIC, COOL-HAT, PRO-AMS, ARNOLD & THE 2010 OPEN
- 71 TRAVEL AND EXPLORING
- 72 PILOTING AND E-TICKET AT DIZZYLAND — ENSTROM COAST-TO-COAST
- 73 HOMES — DESERT PYRAMID, EV-1 & PETS — WINGLET AND STARSHIP
- 74 HOBBIES — PYRAMID FABRICATION AND YOUNGER DRYAS IMPACT

### **SECTION 8 — AFTER SCALED. 2011 TO 2021**

- 75 FINALLY ESCAPING THE DESERT — OPPOSITE SCENERY IN NORTH IDAHO
- 76 THE BIG QUESTION — WHAT DID I ACCOMPLISH?
- 77 THE FAILED ATTEMPT TO RETIRE
- 78 THE SKIGULL FAILURE — THE 49TH MANNED RESEARCH AIRPLANE
- 79 RECONNECTING WITH BROTHER DICK AND ENTIRE FAMILY
- 80 COLLECTING STORIES/MEMORIES — MUSEUMS & INTERVIEW OLD FRIENDS
- 81 SCALED COMPOSITES AFTER RUTAN — STRATOLAUNCH BOARD

### **SECTION 9 — DESIGNS, EDUCATION, AWARDS, PRESS & HOBBIES**

- 82 MANNED AIRCRAFT — 49 FLOWN IN 43 YEARS & UNMANNED PROJECTS**
- 83 THE HUNDREDS OF PRELIMINARY DESIGNS THAT NEVER FLEW
- 84 EDUCATION, AWARDS, PATENTS & HONORARY DEGREES**
- 85 PRESS COVERAGE, NEWSPAPERS, MAGAZINES, MOVIES & TV
- 86 THE JEFF/ANGEL QUILT SHOWING 59 AIRCRAFT**



# Hand-off to Brother Dick

