SCALED COMPOSITES

Rutan Aircraft Factory, Inc

Scaled and Rutan Aircraft Factory

Manned Research Aircraft Projects

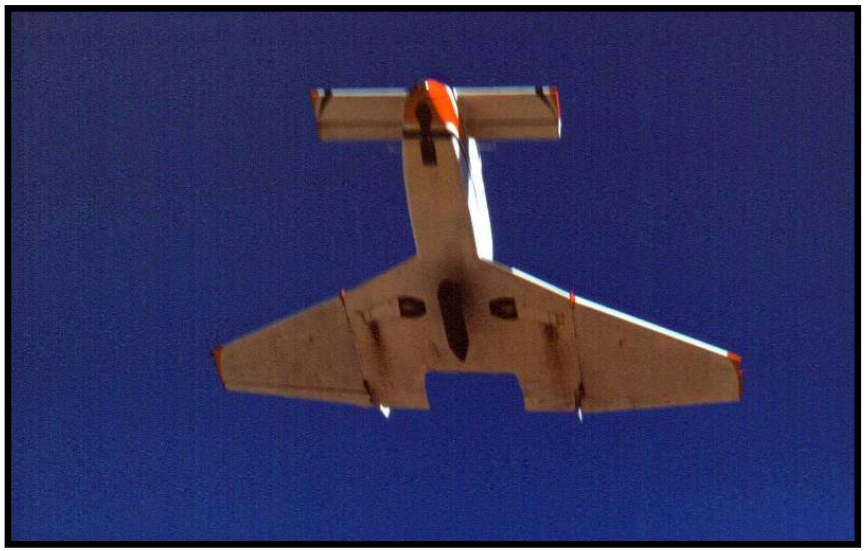
And Other Un-manned Projects

Rutan Aircraft Factory
Business Notes

- Founder-Owned and Operated for 12 years, from 1973 to 1985. Continued until 2002 for builder-support Primary business – homebuilt aircraft
- Developed Eighteen Manned Aircraft Types:
  - Sixteen Concepts and Designs were done in-house
  - Thirteen were Company-funded research programs
  - Fourteen were flight-tested in-house, accident-free
  - One (NASA AD-1) had a Government customer
  - One (NGT-Fairchild) had an Aerospace Prime customer
  - Seven were marketed to the public
- Business was small and consistently profitable
- The last one was post-retirement, flown in 2015

Rutan Aircraft Factory Manned First Flights

#1 VariViggen Homebuilt Model #27 N27VV
Chapter 20 First Flight by Burt Rutan - May 1972



←Léo Chagnes MICROSTAR France. With SP outer wings

Marketed VariViggen plans and Special Performance plans for home-building 1973 to 1985.

Rutan-Designed Manned First Flights

#2 Jet version of BD-5, BD-5J N5BD
Chapter 18 First Flight by Les Berven - July 1973

At Bede Aircraft in 1973, Burt was assigned design responsibility for the Jet project. Different systems from the propeller BD-5s: Propulsion, MicroTurbo TRS-18, including new thrust attenuator & Air-Oleo landing gear.
Fully wet, 17-ft span wing.

Rutan-Designed Manned First Flights

#3 BD-5T. Training Simulator for the BD-5 program.
Chapter 18 First Flight by Burt Rutan - February 1974.

In-House name: "Truck-a-Plane"

At Bede Aircraft in 1974, Burt was assigned design and development responsibility.
Two of these systems were built in 1974.
Plan was for each Bede dealer to own one.

Rutan Aircraft Factory Manned First Flights

#4 VariEze Proof-of-Concept Model #31 N7EZ
First flight by Burt Rutan - May 1975 Chapter 22

Rutan Aircraft Factory Manned First Flights

#5 VariEze Homebuilt Model #33 N4EZ
First flight by Burt Rutan - March 1976

O-200 engine

N4EZ is now in Smithsonian Air & Space museum, Hazy/Dulles

Marketed plans for home-building 1976 to 1985 Chapter 22

Rutan Aircraft Factory Manned First Flights

#6 Quickie Homebuilt Model #54 N77Q
First Flight by Burt Rutan - November 1977

Single-place
Onan 18hp GPU engine. 100 mpg.

N77Q is now in the Seattle Museum

Chapter 22

Sold design to QAC, they marketed it as a homebuilt kit

Rutan Aircraft Factory Manned First Flights

#7 Power-Augmented Ram Landing Craft PARLC Wing-ship
Customer, US Navy Chapter 25 First Flight 1977

Two TRS-18 turbojets on 2-axis pivot.

Chapter 25

Burt Rutan-designed, to Navy loft. Built at Ames Industrial Corporation.
Tested by U S Navy at Lake Pend Oreille, Idaho.
Inspired by Russian Ekranoplan wing-ship projects.

Rutan Aircraft Factory Manned First Flights

#8 Defiant Push/Pull twin Homebuilt Model #40 N78RA
First flight by Burt Rutan - June 1978 Chapter 24

Burt has more pilot-time in this twin-engine prototype homebuilt than in any other airplane.

N78RA is now in Hiller Museum, San Carlos

Marketed plans for home-building 1984 to 1985

O-320 engines

Rutan Aircraft Factory Manned First Flights

#9 Long-EZ Homebuilt Model #61 N79RA 1st Flight Sept 1979

The most popular
RAF Homebuilt.

Chapter 22

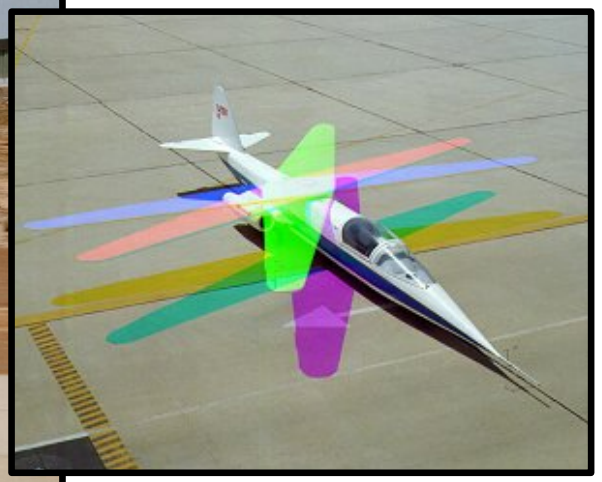
Marketed plans for home-building 1979 to 1985

Rutan Aircraft Factory Manned First Flights

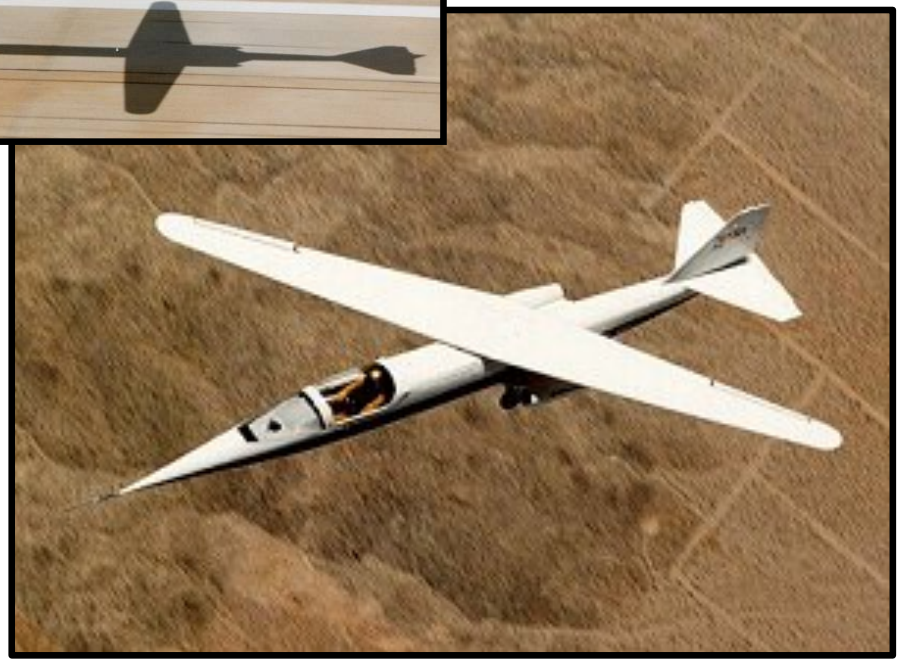
#10 NASA AD-1 Scissor Wing Model #35
NASA Ames/Dryden First Flight December 1979

Chapter 25

Designed by Burt Rutan.
Built by Ames Industrial Corp.
Flight tested by NASA/Dryden.
Last flight was Oshkosh demo.



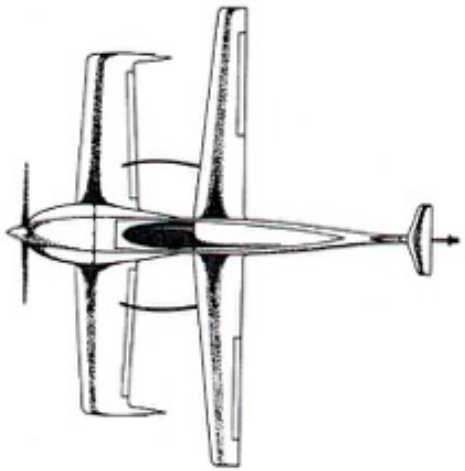
Model 35 is now in Hiller Museum, San Carlos

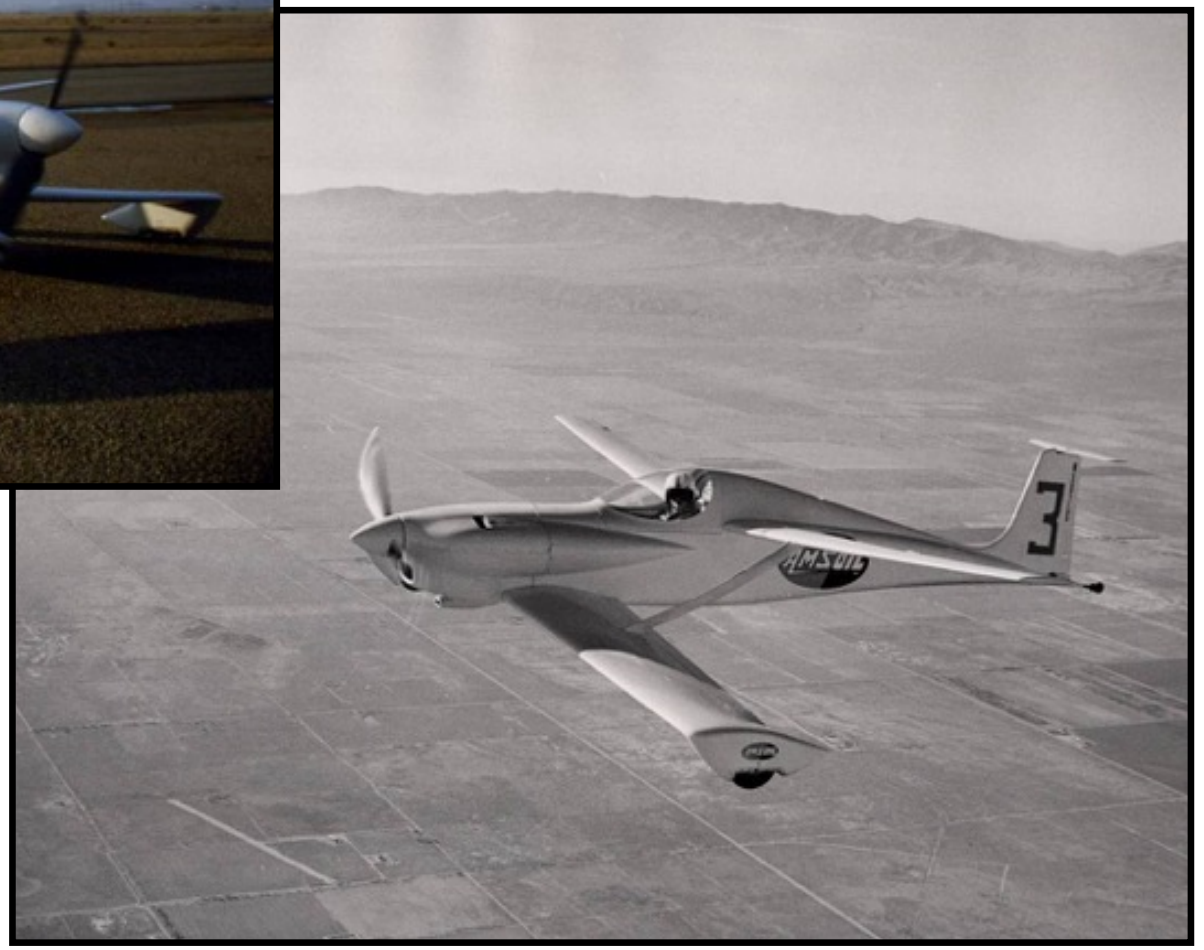


Rutan Aircraft Factory Manned First Flights

#11 Amsoil Biplane Reno Racer Model #68 N301LS
Chapter 26 First Flight August 1981

Rutan-Designed
Built & Flight tested by Mortensen.
Crashed during Reno Air Race,
No injuries.





Rutan Aircraft Factory Manned First Flights

#12 Next Generation Trainer Model #73 N73RA
Customer Fairchild Republic First Flight September 1981 Chapter 27

62% - scale, single-place.
Full-Scale is 2-place for USAF training.
Intended to replace the USAF T-37.

N73RA is exhibited in Long Island's Cradle of Aviation Museum.

Designed by Burt Rutan.
Built by Ames Industrial Corp.
Flight tested by RAF at Mojave.

Rutan Aircraft Factory Manned First Flights

#13 Grizzly STOL Model # 72 N80RA Four-Place bush-plane
First Flight January 1982 In-House, not marketed Chapter 28

N80RA is now at EAA Museum.

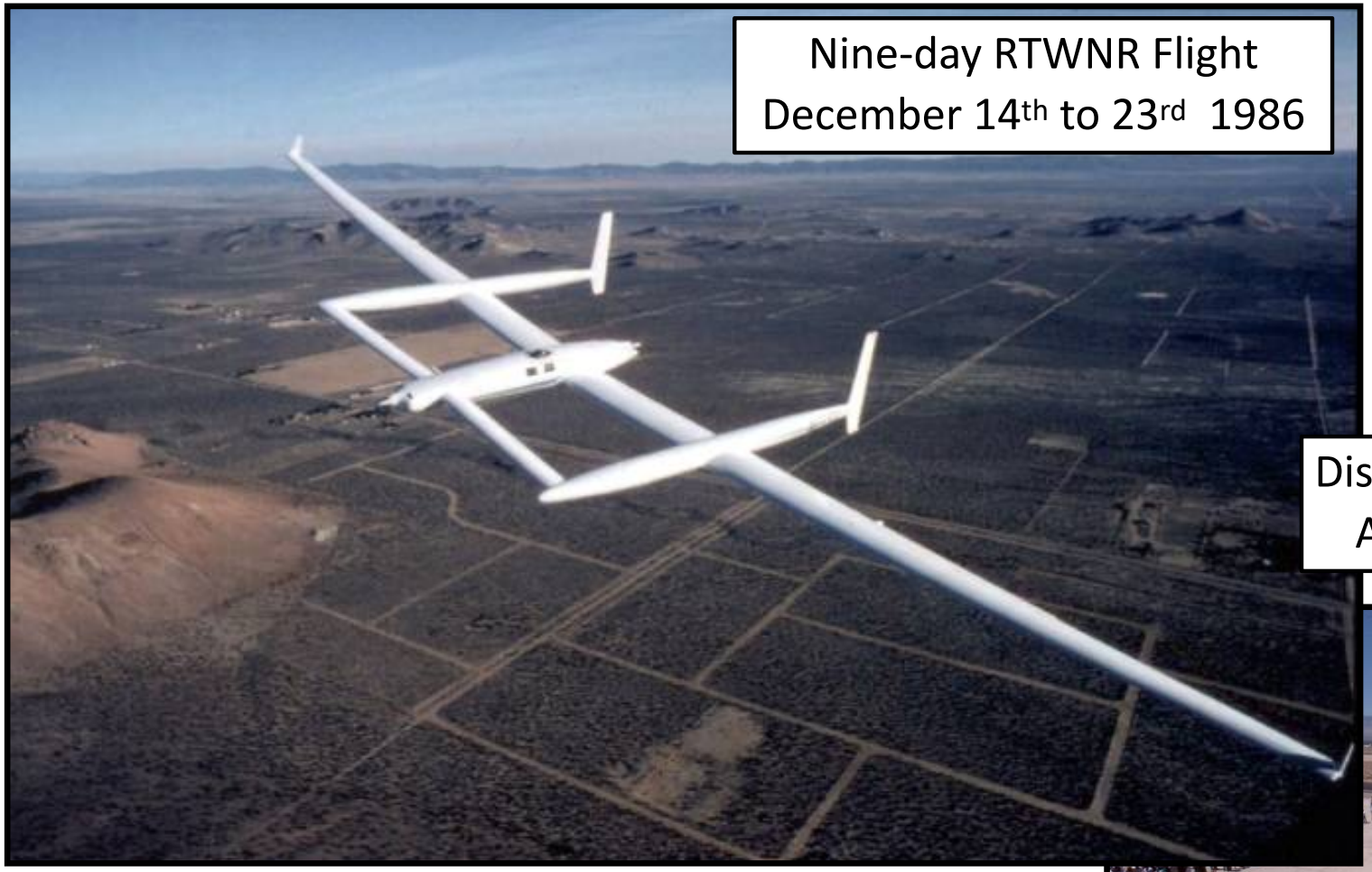
Rutan Aircraft Factory Manned First Flights

#14 Solitaire Model #77 Self-Launch sailplane
N81RA First Flight May 1982 Chapter 28

Marketed plans and kits for home-building 1983 to 1985.
Self-launched or towed by RAF Grizzly

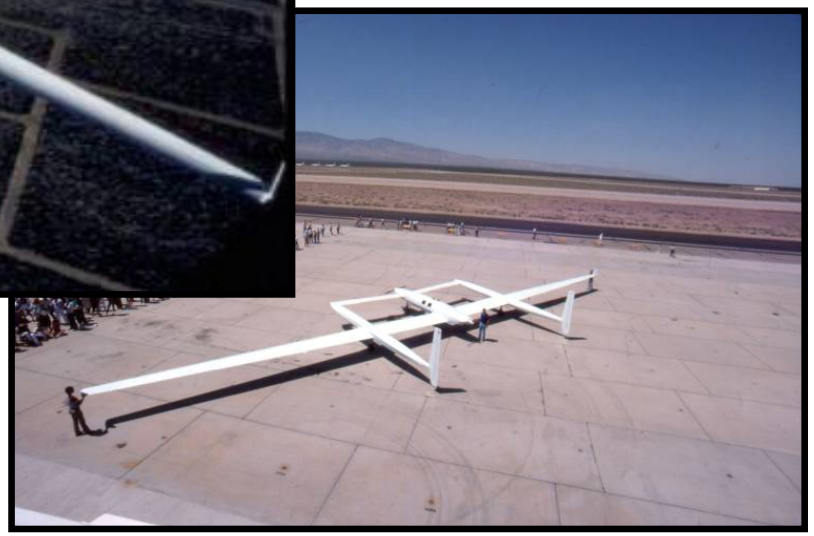
Rutan Aircraft Factory Manned First Flights

#15 Voyager RTWNR Model #76 Voyager Aircraft
N269VA 1st flight June 1984 Chapter 29



Nine-day RTWNR Flight
December 14th to 23rd 1986

Displayed at Smithsonian
Air & Space Museum



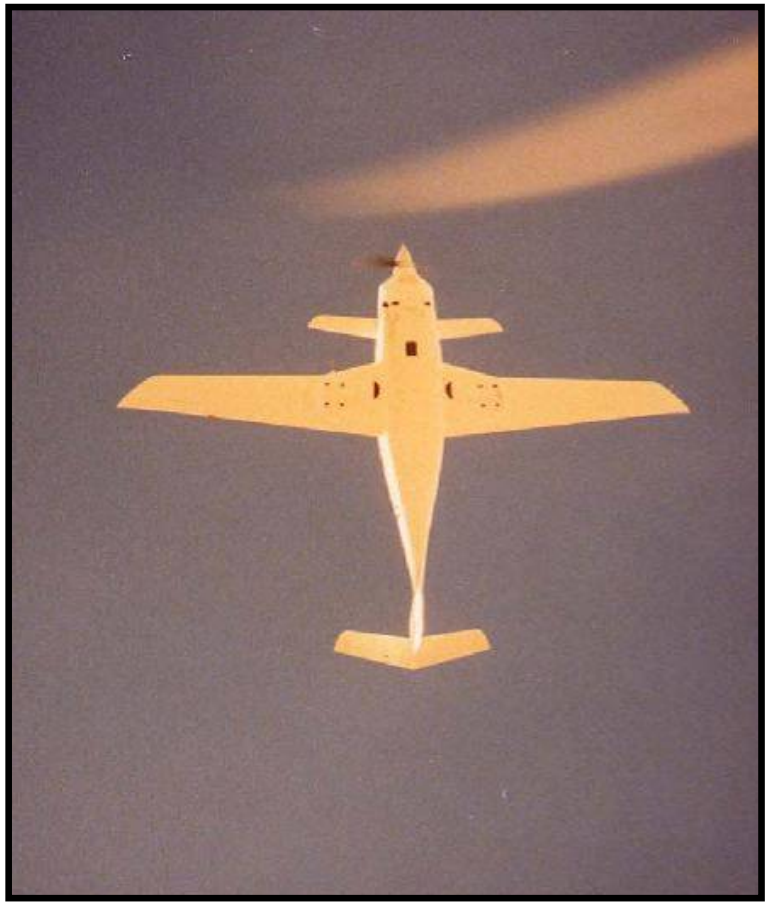
Designed by Burt Rutan.
Built and flight tested by RAF and by Voyager Aircraft.
World's first Round-the-World-Non-Refueled flight.

Rutan Aircraft Factory Manned First Flights

#16 Catbird Model #81 N187RA 1st flight January 1988
Not marketed. Operated after 2010 by Zach Reeder

"World's Most Efficient" - CAFE Foundation.

TIO-360 engine Chapter 30.



Rutan Aircraft Factory Manned First Flights

#17 Boomerang Model #202 N24BT 1st flight June 1996
5-place Chapter 24 Operated after 2010 by Tres Clements

World's safest general aviation aircraft.
TIO-360 engines 265-knot cruise 2,100 NM range

Burt's personal aircraft. In-house, not marketed

Rutan Aircraft Factory Manned First Flights

#18 SkiGull Model #375 N375BT First Flight November 2015
49th Manned Research Aircraft Post-retirement project Chapter 78

Design/build/test in North Idaho

Scaled Composites
Business Notes

- Founded in 1982. Aerospace Research and development.
- Developed 31 Manned Aircraft Types:
  - Concepts and Designs developed in-house for 26 Types
  - Two Types developed to customer's detailed loft
  - Four were company-funded research programs
  - 25 were flight-tested in-house; no major accidents
  - Six Types for U. S. Government customers
  - Five Types had a Prime Aerospace customer
  - Five Types had a Foreign customer
  - None were marketed to the public

Scaled Composites: Manned First Flights

#1 Microlight Model #97 N97ML Chapter 45
For Lotus Motors/Colin Chapman First Flight, January 1983

Scaled Composites: Manned First Flights

#2 Starship 85%-scale Proof-of-Concept Model #115 Chapter 34
Customer, Beechcraft N2000S First Flight August 1983

PT-6A Turboprop engines

Destroyed by Beechcraft

Scaled Composites: Manned First Flights

#3 Predator Crop-duster Model #120 N480AG
Customer, ATAC Chapter 45 First Flight September 1984

Eight-cylinder IO-720 engine

←Original low-aspect-ratio Canard

Crashed by customer after delivery
No injuries

Scaled Composites: Manned First Flights

#4 CM-44 Model #144 N935SC Customer, Calif Microwave
Chapter 36 First Flight February 1987

Scaled Composites: Manned First Flights

#5 ATTT/SMUT Proof-of-Concept transport Model #133
N133SC Customer, DARPA First Flight December 1987

PT-6A Turboprop engines

Program was to research a solution to the failed 1999 Iran Hostage Rescue attempt.

62%-scale Chapter 36

Scaled Composites: Manned First Flights

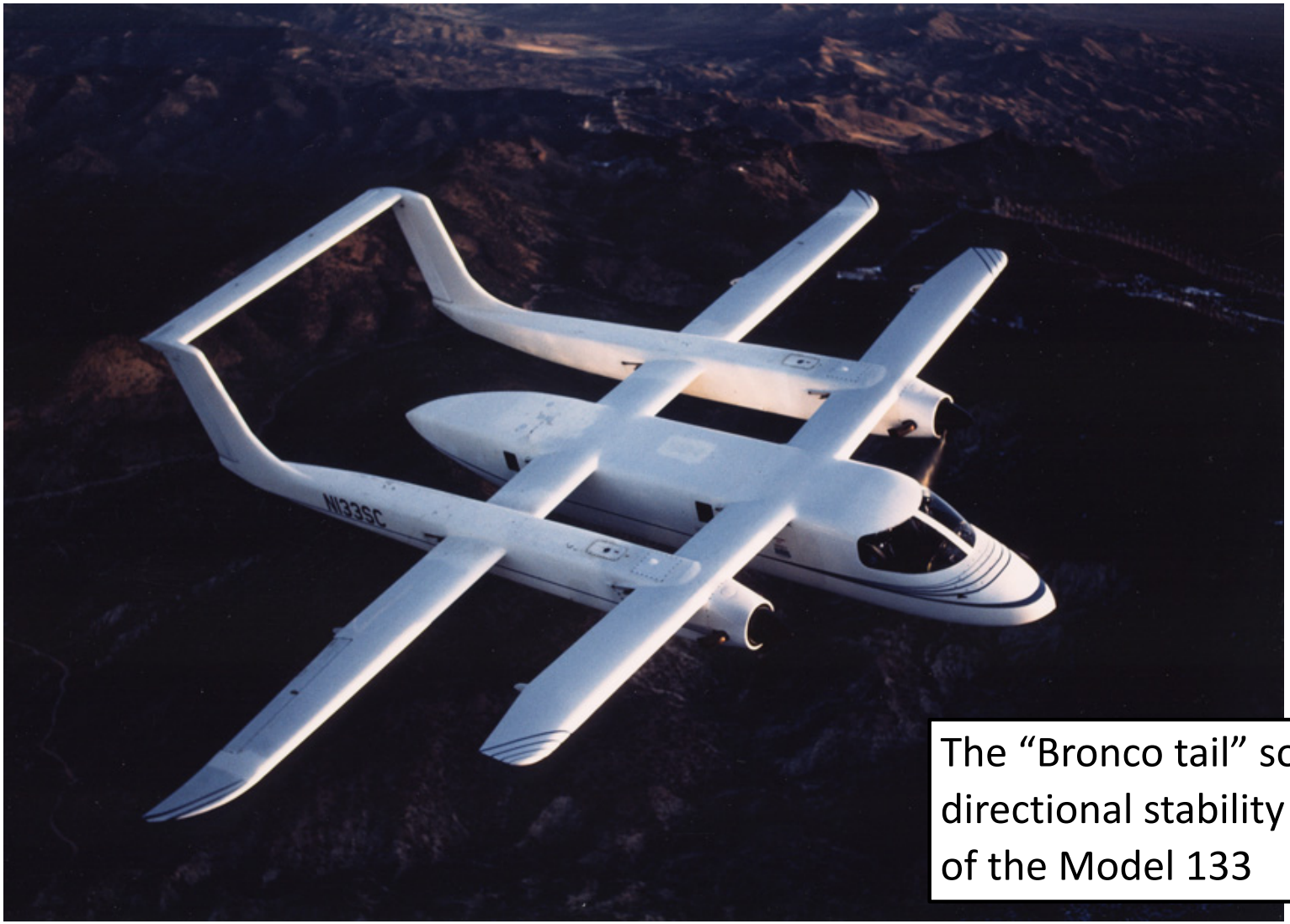
#6	Triumph BizJet	Model #143	N143SC
Customer, Beechcraft		First Flight July 1988	

First flight was also
The first flight of the
Williams FJ-44 engines

Chapter 38

Scaled Composites: Manned First Flights

#7 ATTT/SMUT 62% Scale POC Model #133B N133SC
Chapter 36 Customer, DARPA First Flight December 1988



PT-6A engines

The “Bronco tail” solved the directional stability problems of the Model 133

Scaled Composites: Manned First Flights

#8	ARES/LATS Light Attack	Model #151	N151SC
In-House, no customer	Chapter 36	First Flight February 1990	

Scaled Composites: Manned First Flights

#9	Lima I	Lexus V-8 engine flight test	Chapter 39
Customer, Toyota		First Flight April 1990	N78AE

Scaled Composites: Manned First Flights

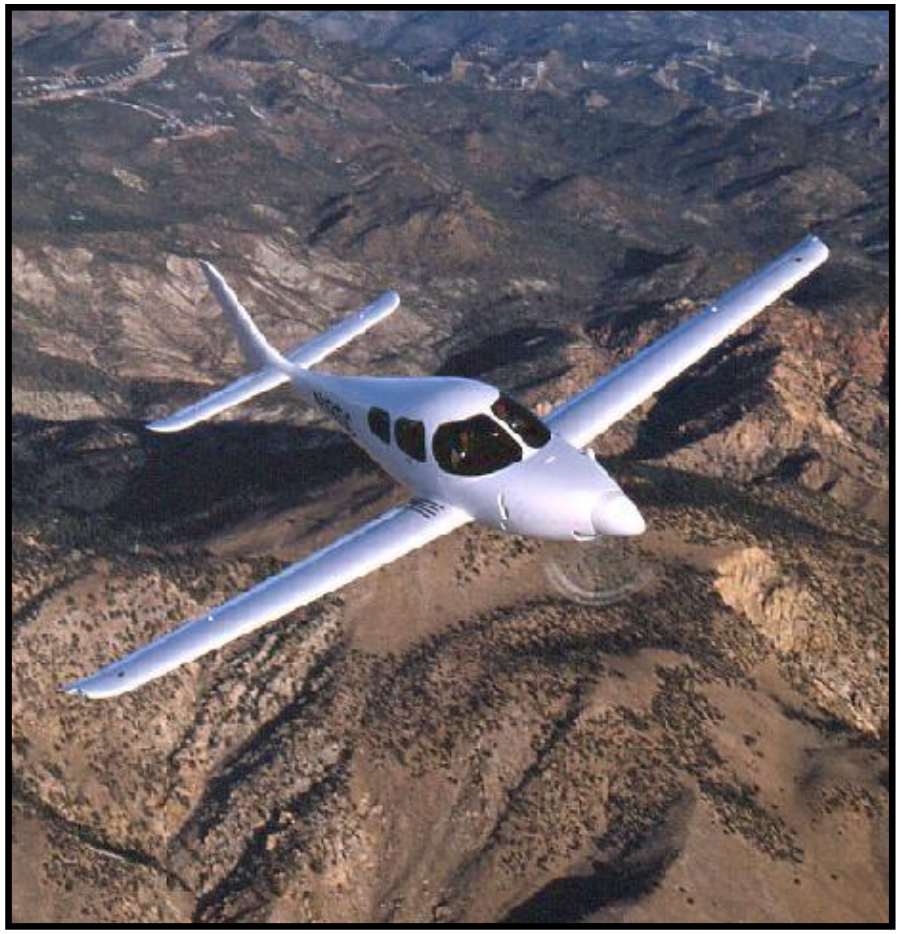
#10 Pond Racer Nissan VG-30 GTP engines Model #158 N221BP
Customer, Bob Pond Chapter 47 First Flight March 1991

Design by Burt Rutan
Built by Scaled Composites

Engine install & flight test:
Voyager Aircraft Corp

Scaled Composites: Manned First Flights

#11	Lima II	4-place, quiet/smooth	Model #191
N191SC	Customer, Toyota	First Flight November 1991	

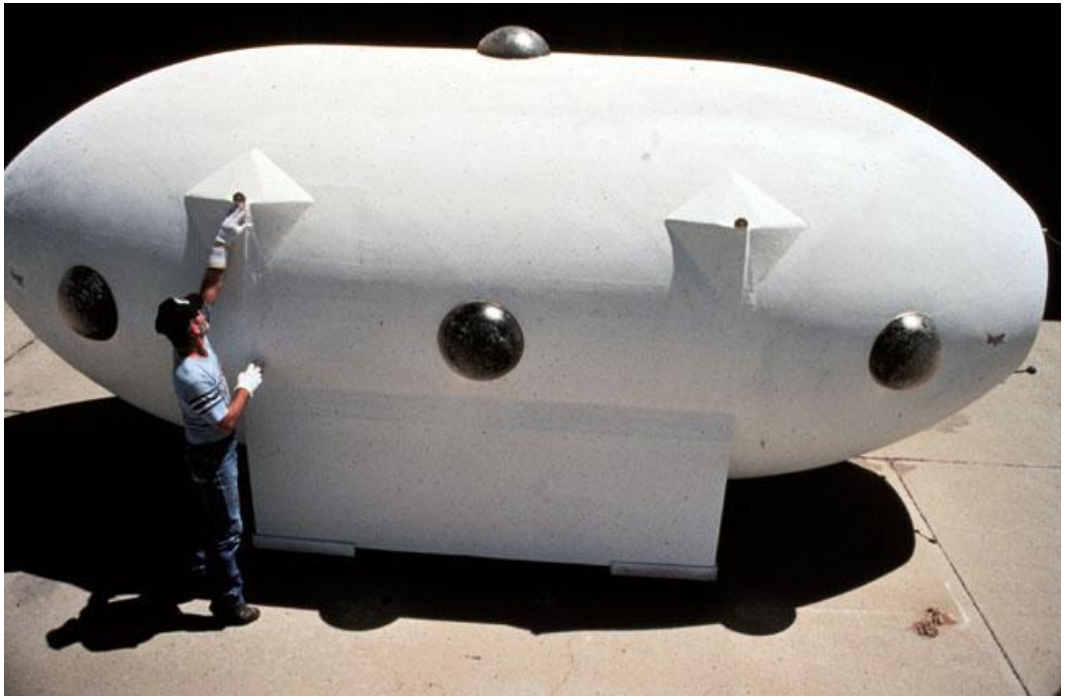


Automotive engine Lexus V-8

Chapter 39

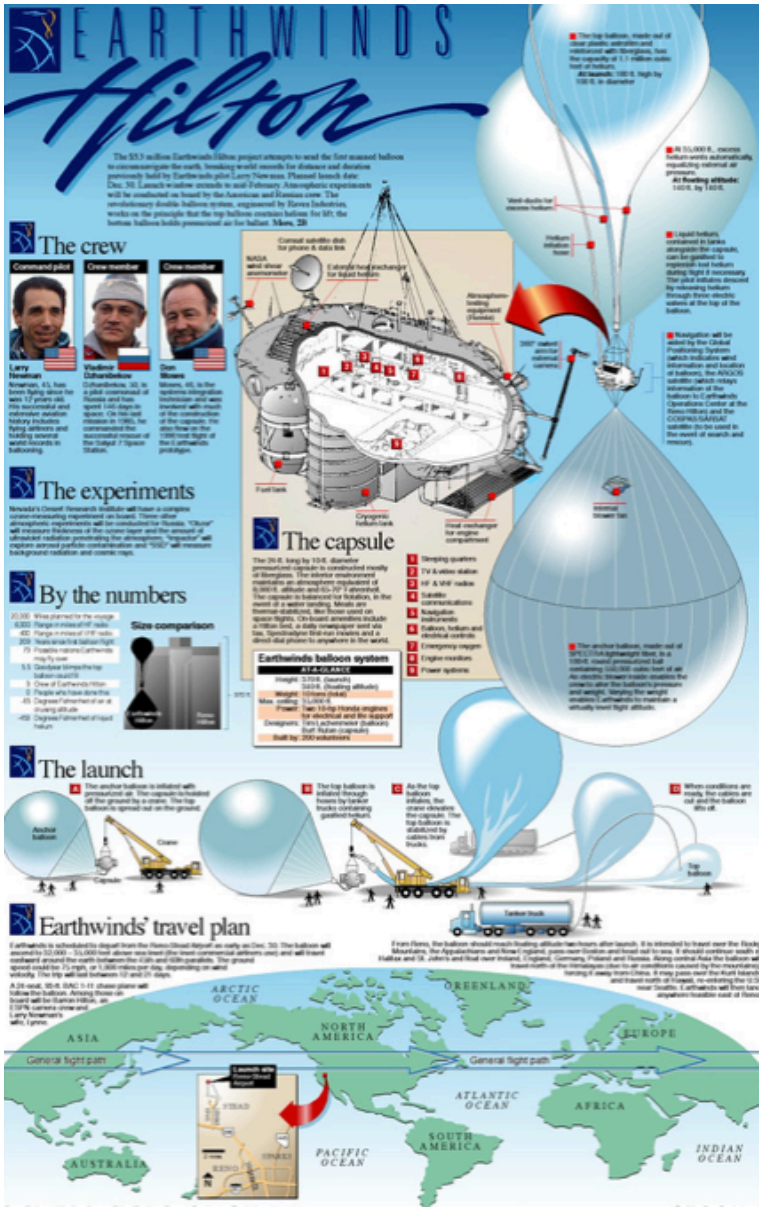
Scaled Composites: Manned First Flights

#12 EarthWinds Gondola Model #181 Chapter 46
Round-the-World Short first flight, November 1991



Three-person pressurized Gondola
Designed by Burt and built by Scaled

Pressurized lower air anchor
balloon extends endurance



Scaled Composites: Manned First Flights

#13	Raptor D-1	Model #226	N62270
For Government/DOE	Chapter 36	First Flight May 1993	

High-Altitude Unmanned UAV
Initial flights with safety-pilot

←Testing the autopilot

Scaled Composites: Manned First Flights

#14	Jet LEZ Vantage/ FJ107	Model #61B	First flight Aug 1993

Proprietary

Scaled Composites: Manned First Flights

#15 Raptor D-2 Model #226B N22720 For Government/ DOE
Chapter 36 First Flight August 1994

High Altitude Unmanned UAV
Initial flights with safety-pilot

Scaled Composites: Manned First Flights

#16 Vantage Single-engine BizJet Model #247 N247VA
Customer, VisionAire Chapter 38 First Flight November 1996

Scaled Composites: Manned First Flights

#17 V-Jet II Model #271 N222FJ Chapter 38
Customer, Williams International First Flight April 1997

Designed for the FJX-2
high-bypass engines

Prototype flown with
Cruise Missile engines

Scaled Composites: Manned First Flights

#18	Global Hilton Gondola	Model #257	For Voyager Aircraft

Chapter 46

Failed Round-the-World attempt January 1998

Scaled Composites: Manned First Flights

#19 Proteus Model #281 Wyman Gordon July 1998

Scaled's highest flight-time aircraft.
5,000+ flight hours with many payloads

Chapter 43

Flew above 64,800 feet altitude

Scaled Composites: Manned First Flights

#20	Roton ATV	Customer, Rotary Rocket N990RR	1st Flight Mar 1999

Propulsion: Four peroxide rockets (one on back for Yaw control).

Chapter 42

Currently on display at Mojave Air and Space port

World's tallest helicopter.

Scaled Composites: Manned First Flights

#21 Adam 309 Model #309 Proof-of-Concept tech demonstrator
Customer, Adam Aircraft N309A Chapter 39 First Flight March 2000

TSIO-550-G engines 6-place

Customer developed and certified a Model A500, based on this POC.
They sold some, then went bankrupt.
Burt had tried to get them to instead develop a production Boomerang.

Scaled Composites: Manned First Flights

#22	Rodie	Model #61-C	Proprietary	Chapter 36	Aug 2001

Proprietary

Scaled Composites: Manned First Flights

#23 TAA-1/Budgie To demo composite manufacturing methods
Chapter 39 Customer, Toyota N72TA First Flight - May 2002

Aerodynamic shape designed by customer. Other companies built wing and fuselage.

Scaled designed/built tail and all systems, and then conducted all flight tests.

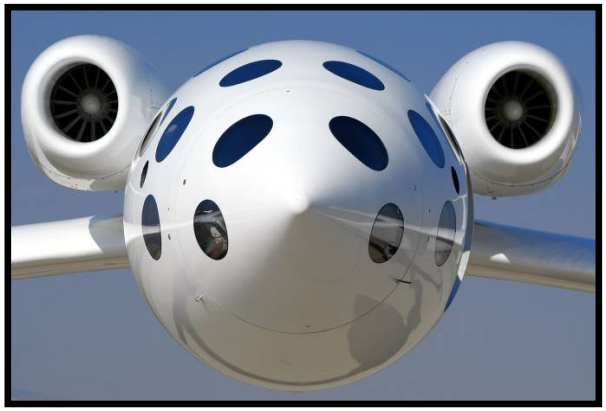
Engine IO-360 with single power lever.

Four place. The planned TAA-2 was to be retractable landing gear.

Scaled Composites: Manned First Flights

#24 White Knight Launcher for SpaceShipOne Model #318
N318SL Customer, Paul Allen First Flight - Aug 2002

Also carried/launched other payloads for other programs



After-burning J-85 engines

Chapter 35

Scaled Composites: Manned First Flights

#25 SpaceShipOne Sub-Orbital, 3-place spaceship Model #316
N328KF Chapter 35 Customer, Paul Allen First Flight - Aug 2003

Flew three of the world's five manned space flights in 2004

Propulsion: In-House developed hybrid rocket motor.

Milestone: First non-Government Manned spaceship.
Displayed at Smithsonian Air & Space Museum.

Scaled Composites: Manned First Flights

#26 GlobalFlyer Single-place RTWNR Model #311 N277SF
Customer, Marathon/Steve Fossett First Flight - March 2004

Chapter 44 Williams FJ-44 engine

Flew three Non-Refueled World flights.
Distance record for longest non-refueled Flight.

Displayed at Smithsonian Hazy/Dulles

Scaled Composites: Manned First Flights

#27 Pulse-Detonation LongEZ Model #61PD N90EZ
Customer, U. S. Air Force Chapter 36 First Flight - 2007

Displayed at USAF Dayton Museum

Propulsion Research

Customer-provided propulsion system.

The loudest engine ever.

Scaled Composites: Manned First Flights

#28	T-Tops/WhiteKnightTwo	Proof-Of-Concept prototype
Model #348	N348MS	Customer, Virgin First Flight - Dec 2008

Chapter 51

Launcher for SpaceShipTwo.
POC Prototype delivered to customer 2012

Scaled Composites: Manned First Flights

#29 FireBird/OldSchool POC Model #355 N355SX
Chapter 36 Customer, Northrop First Flight - Feb 2010

Scaled Composites: Manned First Flights

#30 SpaceShipTwo Proof-Of-Concept for commercial space program
Model #339 N339SS Customer, Virgin First Flight - Oct 2010

POC Prototype crashed after Burt's retirement. Cause - co-pilot error.

In-House Hybrid Rocket Motor

Chapter 51

← Sir Richard Branson & Burt at SpaceShipTwo rollout

Scaled Composites: Manned First Flights

#31 BiPod Hybrid flying car Model #367 N367DF
Chapter 53 In-house, no customer First Flight - March 2011

Tests were done only for phase 1. Flights were wheel-launched — no propellers.

Phase 2 (hybrid propulsion system) was not done by Scaled.

Moved BiPod to North Idaho in 2017

One day someone at Mojave airport rounded up the interesting airplanes on the field and arranged them like the SETP Logo*. Ten of the airplanes are Rutan designs.

A photo taken straight down from a helicopter got this great result.

* The SETP Logo

THE SOCIETY
OF EXPERIMENTAL TEST PILOTS

List in Chronology Order, all 49 Burt Rutan Manned Designs
Numbered by date of first flight
Page 1 of 2

1 VariViggen for RAF. First flight May 1972
2 BD-5J jet for Bede Aircraft Corp. First flight July 1973
3 BD-5T trainer for Bede Aircraft Corp. February 1974
4 POC VariEze for RAF. May 1975
5 VariEze homebuilt for RAF. March 1976
6 Quickie homebuilt for QAC. November 1977
7 PARLC for U S Navy. ~ December 1977
8 Defiant twin homebuilt Burt personal. June 1978
9 LongEZ homebuilt for RAF. September 1979
10 AD-1 Scissor-Wing POC for NASA. December 1979
11 Amsoil Biplane Racer for Mortensen. August 1981
12 NGT U S Air Force POC for Fairchild Republic. September 1981
13 Grizzly Bush-Plane for RAF. January 1982
14 Solitaire Self-Launch Sailplane for RAF. May 1982
15 Microlight for Lotus Motors/Colin Chapman. January 1983
17 Starship POC for Beechcraft. August 1983
18 Voyager Round-the-World Non-Refueled **Milestone** in-house. June 1984
19 Predator Crop-Duster for ATAC. September 1984
20 CM-44 for California Microwave. February 1987
21 ATTT/SMUT 62% -scale hostage rescue aircraft for DARPA. December 1987
22 Catbird 5-place single-engine for Beechcraft. January 1988
23 Triumph BizJet for Beechcraft. July 1988
24 ATTT Bronco tail for DARPA . December 1988
25 ARES/LCBAA Light-Attack for Scaled in-house. February 1990

List in Chronology Order, all 49 Burt Rutan Manned Designs
Numbered by date of first flight
Page 2 of 2

26 LIMA-1 Lexus engine flight development for Toyota. April 1990
27 Pond twin-engine Unlimited Reno Racer for Bob Pond. March 1991
28 LIMA-2 four-place Gen-Av single-engine for Toyota. November 1991
29 EarthWinds RTW anchor-balloon gondola for EarthWinds. November 1991
30 Raptor D-1 unmanned/manned boost-phase intercept for DOE. May 1993
31 Jet LEZ proprietary. August 1993
32 Raptor D-2 for DOE. August 1994
33 Boomerang 5-place twin for Burt personal. June 1996
34 Vantage single-engine BizJet for VisionAire. November 1996
35 V-Jet II POC for Williams International Sam Williams. Also see Pronto/Eclipse-500. April 1997
36 Global Hilton RTW gondola for Voyager Aircraft. January 1998
37 Proteus multi-mission high-flyer twin turbofan in-house. July 1998
38 Roton Rocket Helicopter world's-tallest helicopter. March 1999
39 M309 push-pull recip twin-engine for Adam. March 2000
40 Rodie Model 61-C proprietary. August 2001
41 TAA/Budgie four-place single-engine for Toyota. May 2002
42 White Knight-1 SpaceShipOne launcher for Paul Allen. August 2002
43 SpaceShipOne 1st Non-Government Manned SpaceShip **Milestone** for Paul Allen. August 2003
44 Global Flyer/Capricorn RTW non-refueled turbofan for Marathon. March 2004
45 Pulse-Detonation LEZ for USAF. First flown 2007
46 WhiteKnightTwo/T-Tops four-turbofan SS-2 launcher for Virgin Galactic. December 2008
46 Old School/Firebird single-recip POC for Northrop. February 2010
47 SpaceShipTwo POC for Virgin Galactic. October 2010
48 Bipod electric flying-car in-house. First flight March 2011
49 SkiGull Amphibian research prototype for Burt. First flight November 2015

Some Other Scaled Projects

Un-Manned or Non-Flying stuff

1 Scarab Model #324 turbojet reconnaissance drone for Teledyne Ryan, Including 40-ship 1st block production. 1985
2 Stars & Stripes hard-wing catamaran racing sailboat for Sail America, America's Cup Challenge. May 1988
3 Searcher drone prototype for Israeli Aircraft Industries. December 1988
4 TFV towed-flying-vehicle for Loral. July 1989
5 PLADS/RockBox troop-infiltration system for Lockheed. November 1989
6 OSCAR/Pegasus wing+tail air-launched-to-orbit for Orbital Sciences Corp. Including all production. April 1990
7 SU25 1⁄4 scale ROAR rocket-on-rope for Sandia National Laboratories. April 1991
8 Ultralight Show-Car for General Motors. January 1992
9 Eagle Eye POC Demonstrator tilt-rotor UAV for Bell Helicopter. June 1993
10 DC-X/ATV Delta Clipper vertical-takeoff-landing rocket UAV for McDonnell Douglas. August 1993
11 Z-40 BladeRunner 40-meter wind turbine for Zond. April 1994
12 FreeWing Full-Scale (also FreeWing sub-scale) tilt-body STOL UAVs for FreeWing Aerial Robotics. October 1994
13 Comet Orbital Reentry capsule for Space Industries (lost on launch failure). October 1995
14 X-38 Model #276 crew-return-vehicle-demonstrator for NASA. Scaled built three. March 1998
15 Fuji mini shuttle POC & HSFD
16 Seekers drones for International Systems. ~ early 2002
17 X-47 Pegasus M326 POC — carrier-suitability for Northrop. February 2003
18 K-0 first-stage of 2-stage-to-orbit launch system for Kistler Aerospace. ~September 1995

LEGO® models, by Burt's son Jeff. See asbricker.com. Includes the enormous Stratolaunch.
The Stratolaunch program was contracted by SCALED after Burt's retirement.
For 20 years, while Burt was at SCALED, he designed many preliminary versions of this proposed aircraft.
All models shown here in the same scale, nicely illustrating the size of Stratolaunch,
the world's largest aircraft by wingspan.