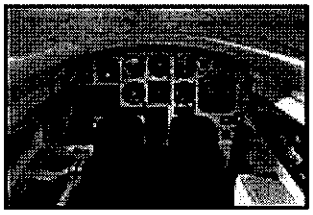
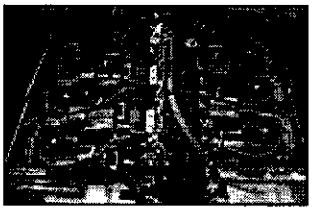
PHONE 310.391.0179
FAX 310.391.8645
3025 AIRPORT AVENUE
SANTA MONICA, CA 90405

Berkut's cockpit visibility and comfort are unmatched by any of today's canard pusher aircraft or its tractor configured side-by-side competitors. Two large canopies arch high above you and your passenger, furnishing you with spacious seating and an excellent view. Ride quality is enhanced by a wider cabin and longer fuselage–the biggest in its class. Interior noise levels (and resulting pilot fatigue) are dramatically lowered with molded and sealed canopies.

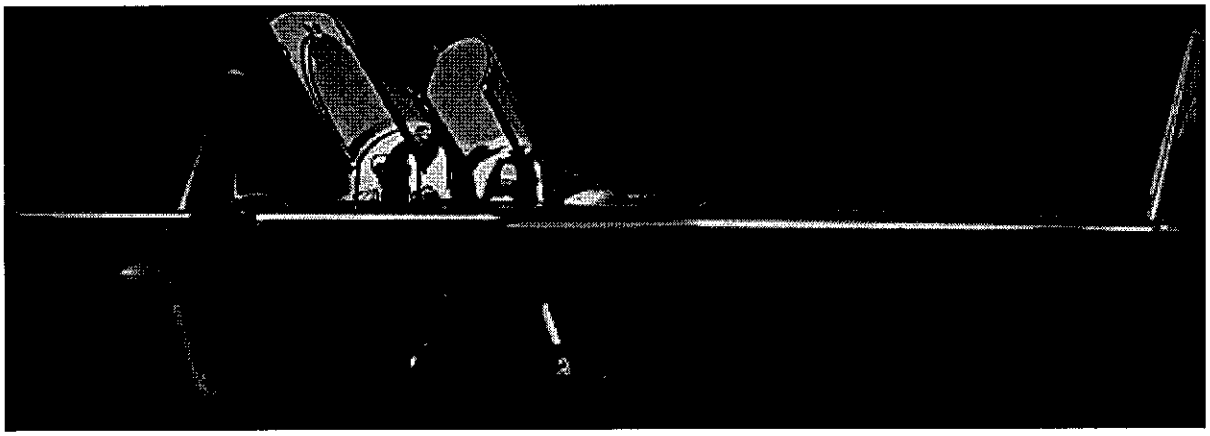


Power is provided by a 180-to-300 horsepower, parallel valve, Lycoming IO-360 or IO-540, enhanced by Klaus Savier's electronic ignition and specially designed fixed pitch propeller.



Berkut combines state of the art, molded composite design with the efficient, agile and predictable handling qualities of the classic Rutan canard pusher. With a 2000 nautical mile range at altitude, Berkut Engineering has created a personally crafted airplane without peer, for the pilot who does not wish to compromise. The 300-mph Berkut consists of over 100 molded components with a fit and finish unprecedented in the industry.

Four models of Berkut are available: Berkut 360 and 540 with retractable gear and the Berkut FG 360 and Berkut FG 540, a fixed-gear variant of the original Berkut.



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As is the case with many new beginnings, the start of Dave Ronneberg's career in aviation began with a painful catalyst, the death of an older brother. In an attempt to cope with it, he decided to reach outside of himself and fulfill a childhood wish of designing his own airplane. It started as the typical school-boy combination of Spitfire/Mustang look alike using wood. Drawing on his modeling skills, he tried his hand at lofting and built a small model with some degree of success. The four-year project began as kindergarten work and progressed to a college thesis at the end.

Through this process, Ronneberg learned how to gas weld, prep and bond wood, laminate glass, and correctly use aviation hardware, among other skills too numerous to mention. By using a VariEze manual to reverse engineer, he began to understand the intricacies of composite fabrication and design. During this time, Dave was hired by Thomas Aberle of Aberle Custom Aircraft and manufactured Starduster II wings. Working with Aberle for two years, Ronneberg gained invaluable experience in rag, tube, metal, and wood construction and engine assembly techniques.

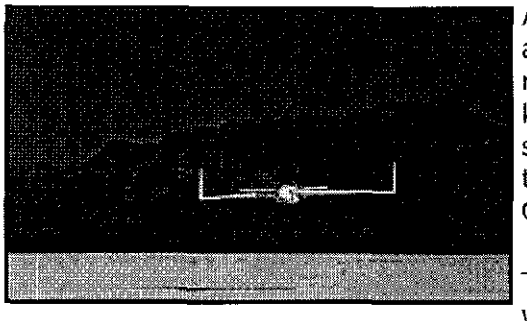
When Aberle moved his business from the LA area, Ronneberg and a friend, Arnold Dutton, then began building two VariEzes. Just after the canards were complete, word came out that the Long-EZ was available. A trip to Mohave ensued and Ronneberg bought the second set of Long-EZ plans ever sold. So the two VariEzes became Long-EZs.

From 1980 to 1983, working with his clients, Dave built three Long-EZs. In early 1983, Dave was employed by Dick Rutan for construction of Voyager. In 1984, he returned to Santa Monica and continued building Long-EZs. Liberally sprinkled amongst these projects were movie programs, cars, tooling jobs, and a stint with California Microwave manufacturing Remotely Piloted Vehicles, all the while gaining the experience necessary to evolve the Long-EZ into a moldable, manufacturable kit aircraft.

In 1987, Ronneberg started fulfilling his dream. Sam Kridell, head of Shuttle Design for North American Rockwell, used a Cray supercomputer to produce a set of full-size templates of the fuselage and bulkheads that Dave had designed over the previous five years. Using these templates, a full-size model of the fuselage was built, however the project was shelved for two years while funding was acquired.

Birth of Berkut

In 1989, construction began on the prototype bird, now called the Berkut. The model of the fuselage built in 1987 was 12" longer, 3.5" wider, and provided 4" more headroom than the Long EZ. These features were retained in the prototype Berkut. This airplane would emerge with fully retractable gear, designed by Shirl Dickey designer of the ERacer. Ronneberg acquired the rights to use Shirl's gear in the prototype and future Berkut kits and now produces the gear himself after Dickey stopped production. The prototype Berkut utilized a Lycoming IO-360 180-hp engine bumped up to 205 hp. Light Speed Engineering's Klaus Savier designed the electronic ignition.



As a side note, Berkut builder Glenn Waters installed a stock 180-hp Lycoming in his Berkut 360 as a requirement of the Popular Flying Association (PFA-kind of a cross between our EAA and FAA). With this stock engine, Glenn is seeing speeds well in excess of those in the prototype with the bumped-up engine. Glenn has a very clean, beautiful airplane.

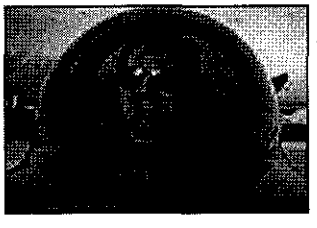
The Berkut differs from the EZ in a number of other ways. The canopy of the Long EZ is one piece whereas the Berkut canopy is two pieces, a canopy for each person much like a fighter jet. This was incorporated to eliminate the effect of shrinkage of a canopy this size at colder temperatures, affecting the fit and seal of the canopy. The Berkut ailerons are 6" longer than on an EZ and have a 3/4" larger chord at upper surface the hinge line and 7/8" larger chord on the lower surface. The lower winglets have been eliminated by incorporating them into the wing on the Berkut. The strakes (the triangle portions between the fuselage and wing) have a convex upper surface instead of the flat surface found on the EZ.

The Berkut also makes use of carbon fiber in the design. Carbon fiber is found in the canopy frame, wing skins and spar caps, main spar caps, and canard skins and spar caps, longerons and cowls. Carbon fiber was chosen because it is four times stiffer and one-and-one-half times stronger than fiberglass by weight. The use of carbon fiber in the Berkut prevents unwanted torsional flexing in the wing, making for a much more rigid structure with no weight penalties. This, combined with the larger ailerons, also makes for a roll rate double that of a Long EZ.

The prototype Berkut was completed in the summer of 1991 and flown to Oshkosh. The reception was outstanding but Ronneberg was not ready to sell kits just yet. He used the next year to acquire financing, tooling, and materials necessary for producing kits, as well as writing a construction manual. At Oshkosh 1992, orders were taken for kits and deliveries began in January of 1993.

Races, Shows and a 540

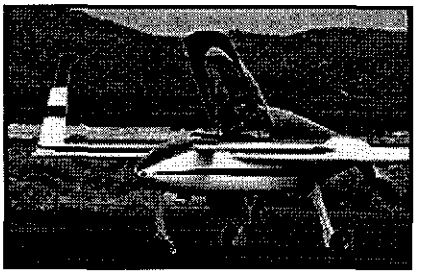
The Berkut has had its share of race wins beginning with the prototype in July of 1992. Berkut placed first in the Jackpot Nevada EZ Bash, coming in at 240.96 mph. In 1993 at Sun n Fun, the Berkut finished first in the Class 2A race, averaging 247.19 mph from a standing start. And finally, the prototype Berkut finished its racing career where it all began, in Jackpot, Nevada placing first once again in the Unlimited Class with a speed of 245.45 mph. It also won Jackpot Races in 1996, '97 and '98.



In addition to races, Berkut entered the exciting world of air shows. The Berkut made its air show debut in Santa Ynez in the Spring of 1993. At the controls was Commander Rick Fessenden, company test pilot and ex-military F-18 pilot. Some of the most spectacular air show performances ever seen were performed by Rick who put the aircraft through its paces. Rick's performance may be seen on the Berkut video. The Berkut in air shows ended in August of 1995, when during a sustained 9G turn, Fessenden apparently experienced G-loc and did not recover. The aviation community lost a great man.

The first IO-540 was proposed for a Berkut in 1996 by a builder. It required the construction of a new engine mount, engine mount ears and new cowls by Ronneberg. This led to the IO-540 being offered as an option for the Berkut. Shortly thereafter an IO-540 was installed by

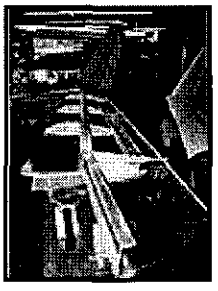
Ronneberg and Misha Kasyan, whose airplane has graced the covers of many magazines in its Air Force Flight Test neon orange paint. Subsequently the IO-540 became a more popular installation on the Berkut and is now offered as the standard engine configuration, though the IO-360 is still an option for those not needing quite as much horsepower.



Berkut flew its first Reno Air Race in 1999 and finished second in the Silver Class behind a fast Glasair III and ahead of six other Glasairs, with a winning speed of 261.7 mph. The airplane was equipped with a 308-hp Lycoming IO-540 built by Ron Monson of Performance Aero Engines and turned a Klaus Savier fixed-pitch prop. Dave Ronneberg piloted the aircraft to its outstanding finish and found Berkut's excellent, unrestricted visibility to be a significant advantage throughout the race.

An All-molded Airplane

The late 1990's and early 2000 have seen improvements to the Berkut kit and components. A few highlights include redesigned landing gear constructed in-house that is also used in Shirl Dickey's ERacer. The biggest accomplishment has been the completion of tooling for molded canard and wings with winglets attached. The only foam in the airplane are the canard and wing tips. This combination not only comes in weighing less than a conventional foam wing, but stronger and faster to build. The airplane now incorporates over 100 molded components and has the best fit and finish found in any airplane in the kit industry.



Berkut Engineering, with company principals Dave Ronneberg and Vicki Cruse at the helm, promises the best Berkut kit production and company management the airplane has ever seen. 'The Berkut has seen some hard times, but we are determined to bring the airplane the audience it has deserved for a long, long time.'

The Future

To be announced at Sun n Fun 2001, is the fixed gear Berkut, known as the Berkut FG. After several requests for a fixed gear version, Ronneberg has configured the airplane to accept conventional Long-EZ gear. The only changes to the Kit occur in the C kit and accessory packages. Installation manuals, construction videos, and an addition to the drawing set are available.

Berkut Engineering is also working with new and exciting engine options involving the IO-360 and IO-540 that will be announced as further details are available.

A Note about the previously announced Four Place Berkut

In 2000, Renaissance Composites chose to announce a four place Berkut. The airplane is still under development. We have no information to provide about this project at this time.

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I have no homebuilt experience and average mechanical ability. Should I even attempt to build a Berkut?

Certainly! Our detailed instruction manual, coupled with approximately 60 hours of video instructions provides our builders with information complete enough for even a novice. We also have a builder's support network via email where builders can converse with each other and we are always available to answer questions via phone, fax, or **email.**

If you are not sure you want to build a Berkut but would like to try one of the kits, we recommend the canard kit. This kit is $2990 plus crating and shipping. The tasks you will do on the canard will give you a good representation of the processes and techniques used throughout the rest of the kit. As with each of the Berkut kits, you'll receive the assembly manuals and videos to go with them.

How large a person will the Berkut accommodate?

One of our builder's, a 6'8" 280-lb man, chose the Berkut because it was the only plane he could fit in. The Berkut can accommodate a wide range of pilots. The rudder pedal placement is set by the builder depending on their leg length and the pedal placement may be moved to accept pilots shorter or taller than the builder. The pilots seat is adjustable during the build process by changing its angle to accommodate taller people. Seat height and seat back placement are set with the exception of the seat angle, and cushions are often use to fine tune the height at which the pilot, and passenger, sit.

Once a deposit on a Berkut has been made, how soon will I receive my first kit?

Upon receiving a 10% kit deposit, the information and assembly instruction manuals, videotapes and drawings for the kit you purchased are sent out. The information manual includes an education section, information on working on composite materials, and how to set up your workshop. The assembly manual includes the assembly instructions for the kit you intend to purchase. Prior to manufacturing your kit, we request an additional 40% of the kit cost.

While we are manufacturing your first kit, you will be setting up your workshop and studying the manuals and tapes, so you will be able to begin building as soon as you receive your kit. The lead time for the kits can vary from four to eight weeks, depending on inventory and demand. We will keep you informed as to the progress of manufacturing your kit and subsequent delivery date. Upon completion of your kit, we require payment of the remaining 50% and the crate charge prior to shipping of your kit.

How long will it take to build my Berkut?

Depending on the builder's experience, we estimate anywhere from 1500 to 2000 hours. If a builder can work 20 hours per week, he should be able to complete the project in about one and one half to two years. This of course also depends on how meticulous you choose to be. An Oshkosh winner will likely take more than 2000 hours to complete.

What is not included in my Berkut kit?

Not included with the purchase of the kit is the engine, propeller, prop extension, avionics, upholstery, and paint. The kit manifest includes a comprehensive list detailing what is and what is not included with each kit.

Why don't you include hardware with the kits?

We used to do this, however unless we buy in quantity we don't get a discount and the hardware arrives in bulk to be counted for each kit. This takes a lot of time on our part and raises the cost of the kit to you. After asking some of our current builders what they thought, we decided to make this an item the builder would purchase. You as a builder can shop around for the hardware for better pricing, ordering only what you want when you need it. We provide you with a comprehensive list of the items you will need. We have also done this with other items easily obtainable by the builder so you can purchase what you want when you need it.

What engine do you recommend and how much will one cost?

We recommend aircraft engines only - no automotive; specifically the parallel valve Lycoming IO-360 (180-hp which can be modified to 205 hp) or the parallel valve Lycoming IO-540 (260 hp modified to 300 hp). Approximate prices are as follows:

IO-360	
1/2 run out	$6000-9000
Rebuilt	$14,000-$18,000
New from Lycoming	$36,000
IO-540	
1/2 run out	$7,000-12,000
Rebuilt	$17,000-$21,000
New from Lycoming	$46,000

We have worked closely with an engine rebuilder in the Los Angeles area and highly recommend him and his company. We can direct you to him or help you with any choices you may have.

Is a Lycoming my only engine choice? Why?

We have designed the Berkut around the Lycoming, an engine we know to be reliable and proven. There are no other engines currently available that meet those criteria. In order for us to recommend any new engine, we would want to test it before we make any recommendation to a builder. Any new engine installation would require a new mount and new cowls, something a builder is
unlikely to want to tackle.

We are frequently asked about using a turboprop. There is no turboprop in existence that will both work on a Berkut and for which a pusher prop has been designed. There are a few small turbines in development, though none for a pusher at this time. Should this become a viable option, we will take a closer look at it.

There are a number of factors involved when recommending a new engine for the airplane, including installation, reliability, its affect on the CG of the airplane, etc. When we are presented with a viable engine that has been installed on an airplane, and not just shown on an engine stand at a show, wemay consider it. Until then, we will recommend no engine other than a Lycoming IO-360 or IO-540.

What prop do you recommend? Can I use a constant speed prop?

Klaus Savier of Light Speed Engineering (**www.lightspeedengineering.com**) has designed a composite, carbon fiber prop specifically for the Berkut. This prop may be purchased directly from Light Speed Engineering or through us. Current prices as of January 2001 for the Berkut 360 prop is $2340 and for the Berkut 540 prop is $2590. With the 540 Berkut Engine, it is necessary to use the Light Speed Engineering Electronic Ignition.

The use of the Electronic Ignition advances the timing of the engine substantially, causing the completion of the burn in the cylinder to be far more complete than with a magneto. As a result of the firing occurring at a different point and completing the burn in the cylinder, the peak temperature of the exhaust is reduced thereby preventing the damage to the propeller that would occur without the use of the Electronic Ignition.

Hypothetically, the installation of a constant-speed prop is possible on a Berkut but it has never been done. It is possible to use a constant speed prop on the 360, but the cost is significantly higher than a fixed-pitch prop and an appropriate crankcase which allows for a governor to be mounted near the prop flange must be used. A constant-speed prop would cost $6000 to $9000 and add significant weight at the aft end of the airplane. This can be nullified by moving the battery to shift the CG. While the climb rate would be higher, there would be a compromise at the top end unless you were able to get the pitch of the blades optimized for speed at the top end. This would result in a minor compromise of the acceleration during takeoff, but probably not substantial. Unlike the Light Speed prop, there would be more maintenance required for a constant-speed prop. We also understand new developments are happening in the area of constant-speed props for pusher airplanes and have not ruled this out for application to the Berkut, however at this time we would recommend the fixed-pitch prop.

A constant speed propeller is not an option for the Berkut 540 due to weight and CG limitations.

How easy is it to learn to fly a Berkut?

We have to admit, flying Berkut is unlike flying any other general aviation airplane, but in most ways it is easier. A Berkut pilot must get used to the effects of a highly efficient wing and a low frontal area which means a much higher glide ratio and a dead idle final approach. Most pilots tend to over control at first - the stick requires no more than a light touch from the web of the hand and the plane is very responsive. Most people have to unlearn their general aviation aircraft tendencies of large movements that require a lot of force. There is no adverse yaw or P factor, so you don't need to touch the rudder pedals except on takeoff and touchdown. G forces are directly proportional to the amount of aft pressure applied to the stick and your G tolerance.

Is Berkut suited for grass field operations?

No, we only recommend landing and taking off on hard surfaces. Landing on the main gear is doable and relatively safe, however when lowering the nose wheel to the grass surface problems may begin. A gopher hole, divot, or other minor surface imperfection could damage the nose wheel fork. The landing roll will be very short on grass; inversely, the takeoff roll would be extended to an unacceptable distance. Overall the airplane was *designed for improved surfaces only. Gravel and rocks from rough surfaces may also* damage the propeller.

Does Berkut need to be kept in a hangar?

Application of a UV protective primer is mandatory for Berkut and when used with the right paint, provides complete UV protection for the aircraft. Exposure to the elements will tend to degrade the paint - just as it would for any metal or fabric airplane. We require the top surfaces of the wings, strakes and canard be painted white and the fuselage and winglets be painted a light color. Trim of any color may be applied. Berkut doesn't need to be hangared any more than any other general aviation airplane. Since Berkut is constructed of composites, corrosion of primary load-bearing structures is never a concern.

Can I buy the plans and assembly manual for the Berkut separately, without purchasing the kit itself?

The Berkut is not a plans-built airplane and the plans provided for assembly only and will not allow you to build the airplane. We will however sell the plans strictly for reference so you know what you will be building and assembling. The price of these plans is $500 and will be deducted from the C kit price should you decide to purchase the entire kit. The assembly manuals may not be purchased. The airplane cannot be built without the pre molded parts manufactured and supplied by us.

What is the total price of the Berkut estimated to be?

A minimal airplane, complete with a day/VFR panel with used radios and a 1/2 run out engine for approximately $90,000. Depending on the engine, avionics, paint, upholstery, and additions you wish to add the price can go up significantly from there. In fact, we have one builder who spent more on avionics than on the entire cost of the kit and accessories.

[redacted]

Is a four-seat Berkut available?

No, a four-seat version of the Berkut is not available at this time.

[redacted]