





EARTHSTAR'S ODYSSEY

Continues

by Dan Johnson

After flying many ultralight and light-sport aircraft, I've found the handling and performance characteristics of Earthstar Aircraft's machines suit me as well as or better than any others. With that said, let me tell you about some significant changes that may thrust this small California company into the mainstream of light-sport aviation.

Mark Beierle created the Thunder Gull series of ultralights after working in the aerospace industry...and being discouraged with the ultralights available in the early 1980s. He was interested in perfecting his designs, so his priority was not producing numerous units. Instead, he wanted to produce an aircraft with classic flying characteristics. Customer response to his machines was excellent, but delivery often stretched into months, even years. To own a prized Earthstar model, you had to have patience. This situation gave another company, Titan Aircraft, a chance to build a similar design, the Titan Tornado, and its business took off while Earthstar remained deliberately small. ▶

When the sport pilot/light-sport aircraft (SP/LA) rule was enacted in 2004, Earthstar initially planned no participation. Building a small number of kits and doing innovative design work on aircraft and engines satisfied Mark. However, some months ago, Mark told me he planned to join the LSA parade. I was surprised! What I didn't know was how this story would unfold.

Joining Cultures

Shortly after the SP/LSA rule was released, I was invited to speak to a gathering of Israeli pilots in their home country. My hosts were Miki Raviv (he prefers to be called "Mike") and Abraham "Kim" Kimchi.

Mike is currently building an RV-7A and Kim built a Long-EZ, but along their aviation paths, each discovered the work of Mark Beierle. Like many pilots before them, they became enthralled with his aircraft. Over several months, a group led by Raviv and Kimchi struck a deal to produce Beierle's designs in Israel and increase production for export to the world market.

Is this a formula for success? No one will know for a year or more. Avicom, the company formed by Raviv and Kimchi, will replicate Beierle's designs as carefully as modern technology will allow. (See "Earthstar Manufacturing in Israel.")

Elegant Simplicity

Early Earthstar ultralights were favored



The Earthstar Odyssey's short 26-foot-span wing belies the performance available. With a stall speed in the low 30's and a top speed approaching 120 mph, the aircraft has a wide speed range, a tribute to Mark Beierle's design acumen.

by many ultralight enthusiasts, but the later two-seat Odyssey and the single-place Gull 2000 brought Mark Beierle's state-of-the-art designs to the world of light-sport aircraft.

Mark's design philosophy is to make the most efficient aircraft he can, one that will use the least amount of fuel while producing the most performance.

While efficiency may be the hallmark of Mark's designs, creature comforts were substantially improved with

With wide doors, entry and exit into the low-slung Odyssey is easy. Lots of windows provide great visibility. Check out the interior of the aircraft to note the staggered side-by-side seating, which allows the aircraft to have side-by-side seating with less frontal area, thereby reducing any performance drains on the two-place aircraft.

the Odyssey and Gull 2000. The aircraft became more comfortable and wider; good news for large American pilots.

The Gull 2000's lean lines show its heritage to the older, tandem Thunder Gull series, but it offers a roomier cabin. The Gull 2000's cabin is approximately two inches wider, with the extra width

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at your hips. Two inches may not seem like much, but it achieves the goal of accommodating many more pilots.

The structure of the Gull 2000 and Odyssey is the same welded steel construction that has always braced the Earthstar designs. The all-metal wings were designed to last. Inside the wing, ribs from spar to leading edge are made of expanded polystyrene, and ailerons are fabric-covered, while the flaps are aluminum.

The Gull 2000's seemingly small wing exhibits remarkable qualities. With only 20 feet of span and 95 square feet of area, it's one of the hardest working wings in light aviation. I say hard working because it doesn't perform like small wing in flight.



SPECIFICATIONS

Avicom Earthstar Odyssey HKS

(Note: All specifications and performance figures provided by the factory. Figures are unverified except as otherwise stated in article.)

Dimensions

Wingspan—26 feet
 Wing area—124 square feet
 Length—18.5 feet
 Height—5.5 feet
 Seating—2, staggered side-by-side
 Empty weight—460 pounds*
 Gross weight—1,000 pounds
 Fuel—10 gallons
 Wing loading—8.1 pounds/square feet
 Power loading—16.7 pounds/hp
 Powerplant—60 hp
 Baggage area—hat rack

Performance

Max speed—120 mph
 Cruise speed—90 mph
 Stall speed—32 mph
 Max rate of climb—900 fpm*
 Takeoff distance—200 feet
 Landing distance—175 feet
 Cruise duration (economical)—3-plus hours
 Cruise range (economical)—250 miles
 Fuel consumption (economical)—about 3.0 gph

*Assumes HKS engine and basic instruments.

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The Gull 2000 I flew a few years back was equipped with the popular Rotax 503 engine, but Avicom's aircraft will use the four-stroke HKS engine that has won many converts.

Two Seats, Four Strokes

The Odyssey is clearly a Thunder Gull. You cannot mistake the lines, especially in profile. Yet, approach the airplane from the front, and it seems wide for an Earthstar design. Fortunately, the added width doesn't produce performance penalties. With speed ranges and capabilities that match the older, tandem Thunder Gulls, the Odyssey offers considerable benefits.

Over the years, Mark made his short-spanned aircraft fly exceedingly well, yet his perfectionist instinct sought tandem efficiency with side-by-side seating benefits. While tandem two-seat aircraft allow pilots and passengers to move around in their seats without bumping into one another, and lateral visibility for either occupant is unrestricted, many pilots prefer to have a student, friend, spouse, or other passenger alongside them so they can observe how their companion is enjoying the flight.

Mark's answer is staggered side-by-side seating, with the right seat a few inches aft of the left. Using that design trick, the interior of the Odyssey provides openness not found in many side-by-side designs. It's my opinion this feeling comes because no one is seated right beside you.

Some pilots dislike staggered seating, and indeed, an instructor will have a harder time closely observing his or her student's face. However, other pilots love the arrangement as it provides each occupant with more shoulder room and better lateral visibility than is possible with direct side-by-side seating.

Another detail that takes some adjusting to is the Odyssey's somewhat floppy, shared joystick. The single control stick has a hinged connection to allow either occupant to fly the plane. In no time, joystick operation becomes comfortable from either seat, but first impressions

Manufacturing Earthstar Aircraft in Israel

Avicom, Earthstar's new partner in building Odysseys and Gull 2000s, has been an importer and distributor of American-made aircraft in Israel for several years, but taking on the manufacturing of an aircraft is a different enterprise. Still, Avicom principles Miki "Mike" Raviv and Abraham "Kim" Kimchi understood that Mark's designs needed and deserved better manufacturing capability. They will accomplish that goal through a partnership with Kanfit Ltd., a well-established aerospace parts and systems manufacturer in Israel.

In May 2005, Mark and his wife, Leslie, visited Israel to evaluate Avicom and Kanfit. After a week of visits and meetings, the American couple took home a Technology Transfer Agreement for review.

On July 18, 2005, the contracts were signed, giving Avicom the manufacturing and worldwide marketing rights to the Odyssey and Gull 2000.

In late July, Mike and Kim flew with Mark from Earthstar's headquarters in Santa Margarita, California, to EAA AirVenture Oshkosh 2005 to become better acquainted with the aircraft and the business. Mike reported, "We took advantage of the many hours spent with Mark to go into the details of the business."

After EAA AirVenture, the two Israeli partners spent a few days with Mark at the Earthstar factory to get hands-on experience with the products and the processes involved in building the aircraft. Back in Israel at the end of summer, the Avicom group started work. A Letter of Understanding was signed with Kanfit, and work continues on the terms and conditions for a final agreement.

In the meantime, Avicom has started to computerize the technical documentation for the aircraft. Its first engineering project is to formalize the construction details of the Odyssey's 26-foot wing. "This is almost done," Mike said, "and we should be working on the fuselage in January 2006."

In parallel to this activity, production setup is taking place. This includes jig and fixture making, subcontracting of parts, procedures writing, and establishing quality control documentation. "All this activity follows the same breakdown into major subassemblies, wing drawings, starting wing production, and general manufacturing setup for the fuselage and empennage. After these tasks are complete, we'll start production," Mike stated.

Avicom's first production batch is slated for 20 aircraft, unless a backlog of orders suggests a larger first production run. Standard equipment, in addition to the HKS 700E engine, will include MGL glass cockpit instrumentation, including a moving map, and a BRS ballistic parachute.

Kits and Ready-to-Fly

While Avicom is focusing on the ready-to-fly market in its production planning, it will also produce Odyssey and Gull 2000 kits, and it plans to encourage their sales as much as possible.

"As far as the certification goes, we have our attention focused on the consensus standards for S-LSA and the Canadian Advanced Ultralight regulation,"



Earthstar owner and designer Mark Beierle works with Abraham "Kim" Kimchi, one of the principals of Avicom of Israel, which will produce Earthstar Odyssey and Gull 2000 kits and ready-to-fly aircraft for world distribution.



The Odyssey's profile is distinctive—inflight or on the ground. Note the center-mounted stick, allowing the aircraft to be piloted from either seat.

sometimes turn off buyers. I recommend flying the design for a short while before making up your mind.

All Earthstar aircraft sit quite low on their gear with firm suspension (air in the tires is about it). The planes are extremely secure on turf, even if you attempt turns at speeds that would tip many light planes. With the Odyssey, I found the nose wheel steering so responsive, it almost feels like you are using a full swiveling tail wheel. Not only is the plane stable on its gear, but it is also precise in its ground handling.

The brakes on the Thunder Gull models I've flown have been powerful, a statement to both hardware and the activating method. The Odyssey's brakes met my expectations. However, because they're actuated via heel pedals, you have to be careful not to drag on them; that's easier to do with heel brakes than toe brakes.

Time to Launch

When sitting at the end of the runway in the Odyssey, checking for traffic was



easy—especially from the left seat. Good visibility was aided by snappy ground handling; you can execute a quick 360-degree turn to establish no traffic conflicts before departure.


The Odyssey I flew some years ago performed brilliantly with a 52-hp Rotax 503 engine, a feat quite difficult (or impossible) for most other two-seaters. Credit for the performance goes to the design's full and smooth enclosure, its marvelously slick wing, and the small overall size of the machine. Install the 60-hp, four-stroke HKS 700E engine, as Avicom will on its Israeli-built aircraft, and the Odyssey's performance should inspire many a hangar-flying tale. I can't wait to fly the Avicom model with the HKS powerplant, even though the climb rate is expected to be closer to 900 fpm with this heavier engine.

During my test flight with the 503-powered Odyssey, Mark told me to limit my flying to 100 mph until a thicker windscreen that could withstand the aircraft's full 120-mph V_{NE} speed was available. Consequently I didn't experience the aircraft's fastest cruise speed, yet it was obvious through my power settings that Odyssey was capable of speeds in that range.

However, what you don't see when you look at the Odyssey's sleek lines

Mark Beierle pre-flights the Odyssey in preparation for the cross-country flight from Earthstar's factory in Santa Margarita, California, to EAA AirVenture Oshkosh 2005. Mark rarely misses Sun 'n Fun, the Northwest EAA Regional Fly-In, or EAA AirVenture...and he flies his aircraft to each show. "Airplanes are meant to be flown, not trailered," Mark says.

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is that it can slow down to the mid-30s before stalling. That's close to a four-times stall speed range—the holy grail of aeronautical design—and Mark accomplished all this with a small, two-stroke powerplant.

The Odyssey controls well at slow speeds, has large “barn-door” flaps and good brakes, and is secure on its gear, all of which contributes to helping practiced pilots make good landings every time.

Yet, as good as the takeoffs and landings are, and as superb as the Odyssey's performance is, its handling in flight may be the strongest attribute of any Earthstar design. In all maneuvers I practiced, from Dutch roll coordination exercises to steep turns to slow flight to cruising at higher speeds, Mark's airplanes exhibit superlative, well-coordinated handling. The harmony between the wing and tail surfaces is as good as I've found in any light aircraft or ultralight. Both aileron roll response and rudder effectiveness earn excellent marks. I come up empty handed trying to find flaws in the handling of the Odyssey.

An Odyssey of Your Own

I've waxed eloquently about the flight characteristics of Earthstar airplanes, and I don't feel I've overstated the case. Fly one for yourself and see. The problem has always been getting a chance to fly an Odyssey or a Gull 2000. There just haven't been enough available.

Mark's dedication to engineering perfection is admirable, but building lots of airplanes for people has been a subordinate task. And, you had to be a kit builder; ready-to-fly Earthstar aircraft haven't been available. That business plan will no longer satisfy buyers in this new age of fully built, special light-sport aircraft (S-LSA). Perhaps that's why I was both surprised and delighted to hear Mark say he would create an S-LSA version of best selling kit-built models.

Avicom, Earthstar's partner in building aircraft, will ramp up production to match demand, and that should translate to many more Odysseys and Gull 2000s plying the skies.

Mike reported. Avicom will hire an aeronautical engineering consultant to help with the approval of its products under these regulatory systems.

Given its carefully laid plans, Avicom expects to start delivering kits in May 2006, with ready-to-fly aircraft one or two months later.

“We do not have a firm price established yet,” Mike stated, “but we are targeting the current Earthstar Aircraft price, plus shipping from the Haifa seaport or the Tel Aviv airport.”

Earthstar sells the Odyssey kit, less engine, for \$16,500 (2005 pricing). Add another \$7,000 for an HKS 700E four-stroke engine plus \$2,500 for an engine installation kit (available from HKS or Avicom) for a total of \$26,000. With paint, a few interior appointments, and basic instruments, the component cost to become airborne will reach \$28,000-\$30,000 or more. Considering the cost of labor and shipping, plus some margin for U.S.-based representatives and S-LSA certification, the price for an Odyssey S-LSA could reach \$50,000. However, at this figure the Avicom/Earthstar Odyssey still represents a good value and an approachable sticker price.

“We will seek to gain our competitive advantage by delivering the same fine aircraft as Earthstar, manufactured in a uniformly high and controlled quality,” stated Mike. Avicom also plans to strive for minimum delivery times, including “possibly from stock,” he added. “There is already interest in our production. We have requests from potential buyers in both the United States and Canada to start accepting orders.”

All light aircraft sold in Israel are imported, so it seems fitting the country should have its own production facility, and Americans will appreciate the greater availability of the Earthstar line, especially in fully manufactured, S-LSA form, so the Avicom/Earthstar partnership should be good for both countries and companies.

For updates and more information about the Avicom/Earthstar partnership, including the projected delivery of kits and ready-to-fly aircraft, visit www.avicom.co.il.

The agreement between Earthstar and Avicom is too new to yield prices and availability, but I have confidence in this marriage. Visit Avicom's website (www.avicom.co.il) to follow its progress in bringing these aircraft to market, both in the United States and around the world.

Until then, a new Odyssey or Gull



Avicom partner, Miki “Mike” Raviv, works on an Earthstar wing. Mike is also building an RV-7A for his personal aircraft (which he purchased prior to acquiring the manufacturing rights to the Odyssey and Gull 2000), so he's accustomed to all-metal construction from building his RV-7A.



Kanfit Ltd., a well-established aerospace parts and systems manufacturer in Israel, will manufacture components for the Odyssey and Gull 2000 for Avicom. Here, Shai Fine, general manager of Kanfit, discusses the project with Mark Beierle.

2000 kit must be your choice. If you're agreeable to building, get in line now; Avicom plans to supply both kits and fully built aircraft—and you'll save some money. For pilots like me who prefer ready-to-fly aircraft, the message is, “Please hurry up, Avicom!” However, the delight of flight in an Odyssey or Gull 2000 will be worth the wait. 