



From Rome With Certification

SKY ARROW SPECIAL LIGHT-SPORT AIRCRAFT

Above:
LOWERED PREFLIGHT - When you want to inspect the tail of the Sky Arrow, it's surprisingly easy to lower the tail, given the excellent balance over the main gear.

Right:
QUALIFIED IMPORTER - Howard Hawkins has long been associated with the Sky Arrow. He's a CFII instructor who calmly guided me through my first flight in the Sky Arrow.

Left:
SLEEK ARROW - This aerial shot shows the sleek, graceful lines that help lend this aircraft its name-Sky Arrow.
-Photo Courtesy of Pacific Aerosystem



FIGHTER JET - As I sat in this seat, I felt like I had entered a fighter cockpit with controls conveniently arranged all around me. Note open spaces that could accommodate some of today's glass panel screens.

Ultralight pilots may not believe the Sky Arrow has achieved Part 23 certified status the same as a Cessna or Cirrus, but it has done precisely that. This sleek Italian tandem 2-seater earned European JAR/VLA certification and, after careful review, FAA gave its approval under international reciprocity agreements.

That makes the Sky Arrow something like the RANS S-7, which won approval under FAA's last new certification program, Primary category. As a side note, the Kansas company also received its S-LSA airworthiness certificate with less challenge than companies that had not taken the earlier effort.

Therefore, once FAA introduced the Light-Sport Aircraft regulation, few were surprised that the Sky Arrow could win approval. In fact, the aircraft was number 18 out of ranks that have now swelled to 40 new models approved.

Let's forget about FAA approval for the moment and focus on the Sky Arrow's ability to fly much like an ultralight. It may use sophisticated composite construction, but it flies beautifully and at speeds not so different than what you're used to experiencing.

Italian Connection

The Sky Arrow 600 Sport is a tandem seat aircraft designed and manufactured near Rome, Italy by Iniziative Industriali Italiane S.p.A., a company once known as Meteor that manufactured gliders, airplanes, and remotely piloted vehicles starting back in 1947. The Italian name is a tongue twister for Americans, so U.S. representatives just say, "3 I" or "Triple I."

Pacific Aerosystems, based in Southern California, is the name most commonly associated with the Sky Arrow import. They are now joined by Atlanta-based Hansen Air Group, which made its name known to the Sport Pilot community by representing the Tecnam line of light sport aircraft. That relationship was unceremoniously ended by the Italian company who had plans of their own. Since Hansen had long been the Eastern U.S. rep for the Sky Arrow, they threw their familiarity and marketing efforts behind this machine. Already this has increased sales for the tandem aircraft (while the Tecnam brand struggles to achieve its potential).

The Sky Arrow is built almost entirely of carbon fiber in epoxy resin, giving it a strong composite structure with high strength-to-weight ratio. The fuselage is almost entirely made of carbon fiber sandwich in an

epoxy resin matrix.

Kevlar is used in some areas, such as the cabin, where added strength is useful for crashworthiness. The two fuselage halves are bonded together along the vertical plane. Engine and fuel tank attachments have been statically tested in crash landing simulations up to 18 G, reports the factory.

Wing flaps are actuated electrically in the Sky Arrow and can be positioned at 0, 10, 20 and 30°. Ailerons are actuated via aluminum control rods and bell cranks.

An unusual feature of the Sky Arrow is that it can be rigged for hand control only, which makes it useful for pilots who have lost the use of their legs. Hansen Air Group and Pacific Aerosystems have won recognition for this accomplishment and it opens the door of flight to potential sport pilots with



FIVE WAY – The Sky Arrow I flew had this excellent five-point restraint system, where some Sky Arrows have only shoulder and crotch belts. The company feels this is adequate but some feel otherwise.

special needs.

My flight experience came in an 80-hp Rotax 912-powered Sky Arrow; Pacific Aerosystems had recently sold their 100-hp Rotax 912S-powered demonstrator. The 600 Sport model comes equipped with the more powerful engine. On a beautiful San Diego day in December, I went aloft with the company's marketing manager and chief pilot Howard Hawkins, a tall fellow who fit well in the rear seat of the Sky Arrow.

Careful Preflight

Before we took off, Hawkins went through his preflight with my camera and me at his elbow. The walk-around is typical of most light sport aircraft except for a few distinguishing characteristics of the Sky Arrow.

A fuel strainer drain on the left side of the fuselage is hidden under a small cover like an auto fuel door. This is one of many touches that show the effort to achieve a clean exterior.

The Sky Arrow's fashionable T-tail stands rather tall. To inspect it carefully, you can simply pull the plane down by the tail for a closer look. This action takes little force as the Sky Arrow balances well on the main gear. It also has a tailskid to prevent rudder damage from tail inspections, or from deep landing flares.

Italian designers created a removable instrument panel. With two thumbscrews, all the instrumentation is inserted on the front side of the panel, employing a series of nine electrical plugs. If avion-



LEAN TANDEM – An advantage of tandem design is that the fuselage is lean with low drag compared to side-by-side designs. The rear seat is elevated to give better visibility.

ics repair is necessary, you could take your entire Sky Arrow panel to a shop. The top of the panel also comes off so you can get at everything very easily. Ask a mechanic who has struggled under the panel of most general aviation airplanes what he thinks this might save you in repair dollars.

The seats don't adjust in the Sky Arrow but the rudder pedals do, using a white knob at the base of the panel. You pull out the knob to find a series of detents. Despite chair comfort, exceptionally wide pilots simply won't fit in the Sky Arrow. A side yoke and other hand controls are neatly contained in a set of side rails, but these same interior appointments limit the width of occupants. The aft seat offers slightly more width than the front seat.

Regarding the cabin size, Mike Hansen observes, "We like to point out that the 27 to 28 inches of elbowroom gives the same elbowroom per person as a side-by-side aircraft with a 54- to 56-inch-wide cabin." But he agrees, "Yes, the space between the consoles in the front seat *does* limit the butt width to something less than 18 inches wide."

The Sky Arrow I flew was equipped with differential hand brakes on the right front arm rest that allow precise steering at slow speeds. You use them like throttle controls on a twin-engine aircraft. Pilots used to toe brakes may need to do some taxi practice, but the method is at least as easy to learn as toe brakes. However, the Sport 600 is now supplied with more conventional foot brakes.

An engine fuel shutoff is positioned just to the left of the throttle. This handy control also efficiently breaks the electrical circuits, reducing the chance of fire.

An engine baffle control is positioned on the right

side in front of the emergency canopy release. You use it something like cowl flaps on a Cessna or Piper to adjust engine heat. In my cool home state of Minnesota, this is not too pressing, but if you operate in Texas, it might be important. Sky Arrow designers neatly faired the Rotax 912 in a nacelle, but that space can get warm in some climates.

The back seat has full controls including joystick, rudder pedals, brakes, throttle, choke, and starter. Both seats also have a fuel shutoff lever, though we didn't use this control, instead shutting down by switching off the magnetos. On a T-panel between your knees you'll find the intercom controls and a fuse panel.

Baggage can be placed aft of the seat in a hat rack space that can hold 33 pounds, plus you can load another 66 pounds under the seat for a total of 99 pounds of luggage. Some small items can also be put in wing root cavities accessible in-flight from the aft seat. My small camera bag fit in this space nicely. Sky Arrow's 18-gallon fuel tank is also located behind the aft seat.

Up front, two small storage areas are also available in flight. A map box can be seen just above the T-panel and another, about a foot wide and 4 to 5 inches deep, is built into the floor.

Additionally, you have some space underneath the seat, which is confined so stuff can't slip aft. And smaller cavities underneath the side structure (which forms an arm rest) allow you to keep a handheld radio or similarly sized items. On the extreme right side of the panel you have room to store a few maps. The cockpit is snug but cubbyholes are being used effectively.

Viewing the front cockpit, with its many

ergonomically placed levers and knobs, the Sky Arrow begins to feel like a fighter cockpit. I quickly fell in love with it. I wanted to swing the large canopy into position and go fly.

Up and Away

Startup was typical Rotax 912, quick and assuring. After taxiing toward the active runway, Hawkins talked me through a mag check at 3,800 rpm.

Once cleared by the tower, I moved the throttle forward to the stop in one smooth motion and the 912 began our acceleration. Since the Sky Arrow I flew was equipped with the 80-hp Rotax, full-throttle acceleration was a bit underwhelming.

The light sport aircraft with the 100-hp Rotax 912S is said to perform demonstrably better. The effect of 25% more power significantly shortens takeoff roll (to under 500 feet), and boosts climb rate (to more than 1,000 fpm).

Lifting off the tarmac requires only slight back pressure, not even that if you have adequate runway ahead. I estimated the ground run, even with the lower power and heavier Sky Arrow used for my evaluation, was 600 to 700 feet. My takeoff technique was normal without using soft- or short-field techniques. The more powerful Sport 600 model is said to break ground in less than 500 feet.



CLEAN DETAILS - Even the strainer drain is neatly tucked away behind a door similar to the fuel door on your car.



TILTED FORWARD - Initially you don't see any baggage area, but just tilt the aft seat forward to access two large areas.

Normal takeoffs are done with 10° of flaps and rotation comes at around 45 knots (52 mph), depending on loading. As the typical climb speed of 65 knots (75 mph) is also the best glide speed, it would be easy to maintain best glide speed in the event of engine failure.

After stabilizing climb in warm conditions, you shut off the cooling fan switch. You can also turn off the auxiliary fuel pump at that time.

The Sky Arrow's rudder is so powerful you can make a very enthusiastic slip to generate a 2,000-fpm descent rate. Hawkins, a CFII, says he's never run out of rudder. The flaps will prove enough for most situations but being able to hold a controlled high-rate descent can be valuable in some situations.

I performed landings with 20 and 30° of flaps. The airplane is very easy to land as long as you get down low enough to the ground and then hold off. Hawkins complimented my landings but I think most pilots new to the Sky Arrow may also do well. Overall, this is one well-behaved airplane.



TEE TAIL - The high tail of the Sky Arrow follows modern design that favors the T-tail look. It's out of reach but you can lower the plane by the tail for inspection.

Iniziative Industriali Italiane S.p.A. Sky Arrow 600 Sport

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

Specifications

Seating	2, tandem *
Empty weight	840 pounds
Gross weight	1,320 pounds
Wingspan	31 feet 8 inches
Length	24 feet 9 inches
Height	8 feet 6 inches
Wing area	145 square feet
Wing loading	6.1 pounds per square foot
Fuel capacity	26.4 gal.
Certification	Special LSA
Baggage location	aft of rear seat
Baggage capacity	99 pounds, max

* 28-inch cabin width

Performance

Standard engine	Rotax 912S
Power	100 hp at 5,500 rpm
Power loading	15.2 pounds per hp
Cruise speed (75% power)	95 kts. / 109 mph
Never exceed speed	132 kts. / 152 mph
Rate of climb at gross	1,100 fpm
Takeoff distance at gross	470 feet
Landing distance at gross	360 feet

Standard Features: Rotax 912S with electric start, 3-blade prop, ASI, altimeter, VSI, oil temp and pressure, tach, wrap-around canopy, in-flight trim, convenient full shutoff at both seats, mechanical brakes, intercom, hourmeter, stall-warning system, removable aft windows, various aircraft tools, weather-resistant white finish.

Options: Full avionics choices, radio options, cabin heat, additional instruments, disabled pilot kit, and numerous other options.

Construction: Carbon fiber sandwich construction, fiberglass landing gear, steel components. Made in Italy; distributed by U.S.-owned company with East and West Coast representation.

U.S. Importer:

Pacific Aerosystems, Inc.
1870 Joe Crosson Dr., Ste-100
El Cajon, CA 92020
Phone: (619) 631-0462
Fax: (619) 631-0464
e-mail: info@skyarrowusa.com
Website: www.skyarrowusa.com

East Coast Representative:

Hansen Air Group
2600 Cessna Lane
Kennesaw, GA 30144
Phone: (770) 427-6311
e-mail: info@hansenairgroup.com
Website: www.hansenairgroup.com

Manufacturer:

Iniziative Industriali Italiane (Meteor) S.p.A.
Rome, Italy
Internet: www.skyarrow.com



Top Photo:
LEFT SIDE – On the left side of the pilot are controls to open the canopy, adjust carburetor heat, trim, choke, ignition switch, and fuel shutoff.

Bottom Photo:
RIGHT SIDE – The cockpit's right side is dominated with the side yoke (not a side stick) accompanied by differential brakes, cabin heat, engine compartment heat, and emergency canopy release.

Pilot's Report

Flies Like an Arrow

The side yoke brings easy adaptation, at least for me. I have flown a number of aircraft with this configuration so I can imagine a Cessna-only pilot might find it odd at first. But I believe familiarization time is measured in seconds, not flights.

I call it a side yoke as it moves fore and aft like a yoke, but uses a wrist movement rather than wheel turning to effect roll control. The left and right cockpit rails are beautifully positioned to rest your forearm as you work the side yoke or other controls. Most pilots will quickly become comfortable with the cockpit layout.

The Sky Arrow I flew registered climb at 600 to 700 fpm at 65 knots (best rate of climb, or Vy) on a pleasant, cool day near standard atmospheric conditions. Remember an 80-hp Rotax 912 powered this Sky Arrow. Install the 100-hp Rotax 912S and the Sky Arrow would turn into a strong climb performer with climb rates beyond 1,000 fpm.

Overall, the Sky Arrow was a very easy airplane to fly, executing precise turns that should make maneuvering and cross-country flying a joy. It is sufficiently stable for long-distance flights, but maneuvers well enough to qualify for the "sport" in light sport aircraft. Balancing the good news is that you'll travel more leisurely, not zipping along like some LSA. The Sky Arrow cruises at around 100 knots where a few brands reach the 120-knot limit under LSA rules.

Typical cruise in the 80-horse Sky Arrow was about 85 knots (98 mph), though the extra 20 horses in the Rotax 912S will move the plane about 95 knots (109 mph). With either powerplant you can fly another 15 knots faster, Hawkins told me, but you'll start using a lot of fuel.

General aviation pilots and even some ultralight pilots will discover you must lower the nose to remain level to a greater degree than some pilots may feel comfortable doing initially. Combined with the out-front seat of the pilot, general aviation pilots used to more airframe references may need time to acclimatize. Ultralight pilots with experience in Drifters or Kolbs and similar aircraft won't feel the sensation, but those used to sitting under or over the wing will. In compensation, the view from the Sky Arrow's front seat is spectacular.

The trim control is useful but a little quick. Fortunately a gauge shows its position, though it has quite a bit of lag so you must set a position and wait a short time to see if you got the desired results. Manual flaps might avoid this lag but space in the cockpit seems to recommend electrical flaps.

The Sky Arrow power-on and power-off stalls were very modest affairs, occurring at about 40 knots indicated, perhaps a shade less. In all trials in the Sky Arrow I flew, the right wing tended to drop with some suddenness, but rudder power was more than sufficient to control the action.

When the engine is at idle thrust, Sky Arrow can achieve a claimed 12:1 glide, measurably better than most general aviation planes and much better than older ultralight designs.

For some reason, the manufacturer has chosen to *not* provide the emergency canopy release (see in right side cockpit control photo) on the Sport 600 LSA model, where it does offer this feature on the certified version. For my money, I'd like to have that release in case a quick exit was needed.

Is the Sky Arrow for You?

Pacific Aerosystems reports approximately 250 Sky Arrows are flying worldwide with 30 in the USA. The company behind the design is very experienced and seems able to deal with demand so far, says the San Diego distributor.

Like many companies, Pacific Aerosystems reports strong interest in their light-sport aircraft model. Given the Sky Arrow's very benign takeoff and landing qualities plus the durability of its airframe and predictability of its control system, this design should also prove a worthy trainer with full controls in the back.

Although the Sky Arrow's empty weight is higher than many other light sport aircraft, it still provides a reasonable load with a standard 18-gallon, 4-hour-plus fuel tank. With an optional tank of 26.4 gallons (good for more than 5 hours of flight), payload becomes somewhat scarcer.

One of the Sky Arrow's shining qualities is the price. Considering it suffers from exchange rate inflation, as do all European imports, the Sky Arrow is well priced especially given that it is fully fabricated in Western Europe where wages are as high as they are in the USA.

The Sky Arrow in its basic form – with 18-gallon fuel tank, hand brakes, and no radios or other options – is offered ready to fly to Americans for a relatively modest \$66,600. A typical order price is \$75,500, reports Hansen, a figure still well below other LSA's hitting the \$100,000 mark. The higher price includes the Basic Option Package, which includes a Dynon D-10A, Air Gizmo panel mount for Garmin 296/396 (dock only, GPS not included), Garmin SL-40 VHF radio, Garmin GTX-327A transponder, ELT, strobe lights, LED navigation, instrument and landing lights, cabin heat, canopy demist, adjustable engine baffles and auxiliary cooling fans, hand brakes, 18-gallon fuel tank, and baggage containers. For either basic or optional versions of the Sky Arrow, packing and shipping to Atlanta, Georgia, or San Diego, California, is included.

A glass panel built around the Dynon D-180 is in development now and should be available shortly after the first of 2007. Since this SLSA compares well technologically with other modern designs, its prices represent excellent values in today's market.

Even the Department of Justice likes the plane and its prices, with one already purchased and two more on order for their emerging technologies department. San Diego State University and University of Alabama are using Sky Arrows for low-altitude atmospheric research.

PAI and Hansen Air Group naturally welcome the government interest, but one of the most interesting aspects of this bird is the disable pilots kit. Hansen reports, "We've

Pilot's Report



TWO SPACES - Underneath the aft seat is space for 66 pounds of luggage and aft of the seat is room for 33 pounds more. Fuel is also aft of the seat.

reached an agreement with Able Flight, founded by aviation writer Charles Stites, to provide flight training scholarships for disabled persons to learn to fly under the new sport pilot rules. Hansen Air Group will be providing the aircraft - a Sky Arrow 600 Sport equipped with disabled pilot's kit - and the facility for the first two scholarship winners. The scholarship recipients will undergo a 3-week intensive training course sometime around the first of the year."

Readers who would like to know more about Able Flight, check out their Website: www.ableflight.org.

After flying this enjoyable bird and given its reasonable affordability, I predict Sky Arrows will continue to find new American owners. 🐭

DAN JOHNSON has been flying for more than 30 years, logging nearly 5,000 hours in many types of aircraft from hang gliders and paragliders to ultralights, sailplanes and twin-engine general aviation aircraft. Dan is an FAA-rated commercial pilot and CFI whose focus these days is on ultralights and light-sport aircraft. He has flown and photographed more than 250 different models in a writing career spanning more than 25 years. Dan is the 1999 recipient of the USUA Moody Award, and the 2001 recipient of the "Spirit of Flight" Award sponsored by the Society of Experimental Test Pilots (SETP).

A large number of Dan's pilot reports and other informational articles may be found at his Website: www.bydanjohnson.com.

Reprinted courtesy of
**Light Sport and Ultralight
Flying magazine,**

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Report Card

CATEGORY EXPLANATIONS

Design: Cosmetic appearance; Structural integrity; Achievement of design goals; Effectiveness of aerodynamics; Ergonomics.

Systems: Subsystems available to pilot such as: Flaps; Fuel sources; Electric start; In-air restart; Brakes; Engine controls; Navigations; Radio; (items covered may be optional).

Cockpit/Cabin: Instrumentation; Ergonomics of controls; Creature comforts; (items covered may be optional).

Ground Handling: Taxi-visibility; Steering; Turn radius; Shock absorption; Stance/Stability; Braking.

Takeoff/Landing: Qualities; Efficiency; Ease; Comparative values.

Controls: Quality and quantity for: Coordination; Authority; Pressures; Response; and Coupling.

Performance: Climb; Glide; Sink; Cruise/stall/max speeds; Endurance; Range; Maneuverability.

Stability: Stall recovery and characteristics; Dampening; Spiral stability; Adverse yaw qualities.

Special Equipment: Floats; Amphibious flotation; 2-Seater qualities; (when appropriate, and items covered may be optional).

Overall: Addresses the questions: "Will a buyer get what he/she expects to buy, and did the designer/builder achieve the chosen goal?"

DESIGN

PROS - Sleek, composite design in tandem seating configuration. Able to meet Part 23 certification, SLSA was relatively easily achieved. Established company with decades of experience. Sweet, medium-range flying machine with many finished qualities. Fully enclosed Rotax 912 pusher engine.

CONS - The Sky Arrow isn't one of the very lightest LSA available (though it's not the heaviest either). Tandem seating just won't cut it for some buyers. Cruise speeds and climb rates are competitive but unimpressive. Refined to fit LSA; predecessor models have higher gross weight ratings.

SYSTEMS

PROS - As with many SLSA, the Sky Arrow is well equipped with systems: electrically actuated flaps, electric start, differential brakes, choke and fuel shutoff, trim, and avionics systems. Add to that a heat control for the tightly cowled Rotax 912, if used in warm conditions.

CONS - Trim control was a

little sudden, yet cabin space dictates electrical actuation; a slower control would be superior. A trim gauge shows position but lags in reporting. Engine repair access is challenging, fully cowled and up high as it is.

COCKPIT/CABIN

PROS - Comfortable for average-sized occupants. Features supportive arm rails because you use controls on either side. Entry is easy, very much so to front seat and not bad to rear. Tilt seat forward to access baggage area. Panel is very readable and easily accessed from front seat. Aft seat elevated above front for better aft visibility.

CONS - As with most tandem designs, the aft seat has little access to panel controls (though a couple controls are duplicated for the aft seat). Seat belt is normally shoulder belt and crotch belt; no lap belt, which some will find inadequate. Big swing-away canopy could be a handful in some wind conditions.

GROUND HANDLING

PROS - Excellent ground control through nosewheel steering, differential braking, and superb visibility. Precise nosewheel control. Adequate ground clearance for out-landings; also tough gear construction. Brakes were effective to slow and stop the Sky Arrow.

CONS - Aft seat visibility is less (though still pretty open compared to many tandem designs). Hand differential brakes on tested Sky Arrow may seem foreign to some (though foot brakes are now available). Turn radius not particularly tight.

TAKEOFF/LANDING

PROS - Visibility is enormous during all takeoff and landing operations; even back seat is said to be good. Rotation comes quickly at 45 knots (52 mph). Side or forward slips can be done very deeply, creating a fast descent when needed; flaps also very effective. Rudder protected by skid from damage due to deep flares.

CONS - Aft seat not optimal for operations partly because visibility is somewhat less, but also because you don't have full access to or view of instrument panel. Crosswind capability not verified. No other negatives.

CONTROL

PROS - Beautiful light control feel with no sudden behaviors. Dutch rolls went well immediately to steep angles. Good coordination between wing and tail surfaces. All controls were predictable in speed

and rate of response. Excellent slow-flight characteristics.

CONS - While light in feel, roll rate is only average (though that may be perfect for flight training operations). Large side area might limit crosswind operations for less experienced pilots. No other negatives.

PERFORMANCE

PROS - For ultralight pilots, the Sky Arrow will seem a perfect combination of fast enough speed for regional cross-country flight, yet slow enough for local sightseeing flights (and you can see everything from the front seat). Glide measured by factory at 12:1. Engine well isolated from cabin; low noise and vibration experienced.

CONS - Pilots seeking aerial speedsters will probably keep on looking past the Sky Arrow; max speed is 110 knots (127 mph) and more typical flying speed will be 95 knots (109 mph), well under the speediest LSA. Ultralight pilots may not be inclined to fly this closed-cockpit airplane low over the terrain.

STABILITY

PROS - Excellent longitudinal stability. Very stable in slow flight (good for training applications). Adverse yaw was reasonably low, further proving good control qualities. Normal throttle response despite high relative thrust line (though full power initially lowers the nose).

CONS - The Sky Arrow fell rather quickly to the right wing on all stalls that I performed; easily recovered with strong rudder, but action required. No parachute installed (one is available). Greater nose-over tendency on high-power applications than most LSA (though within acceptable range).

OVERALL

PROS - The Sky Arrow is a good value in a robust, well-proven, fully certified LSA, especially at its modest price tag (about \$66,600, ready to fly). Company in business for many decades; broad aviation experience. Currently available (2006) in reasonable time compared for LSA industry.

CONS - Import has been slow in the past, which could delay delivery if sales increase. Italian brand adds effort when some repairs are needed. Dealerships, while serving each U.S. coast, are widely distributed (though the Sky Arrow attends many shows). Fairly small number flying in the USA (though sales reportedly growing). □