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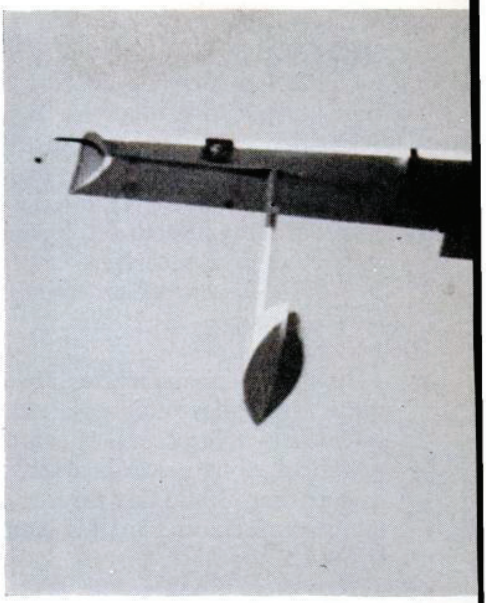
PILOT REPORT

LANE SIAI RIVIERA



Italian import holds two speed marks, has responsive in-flight handling and spirited water characteristics

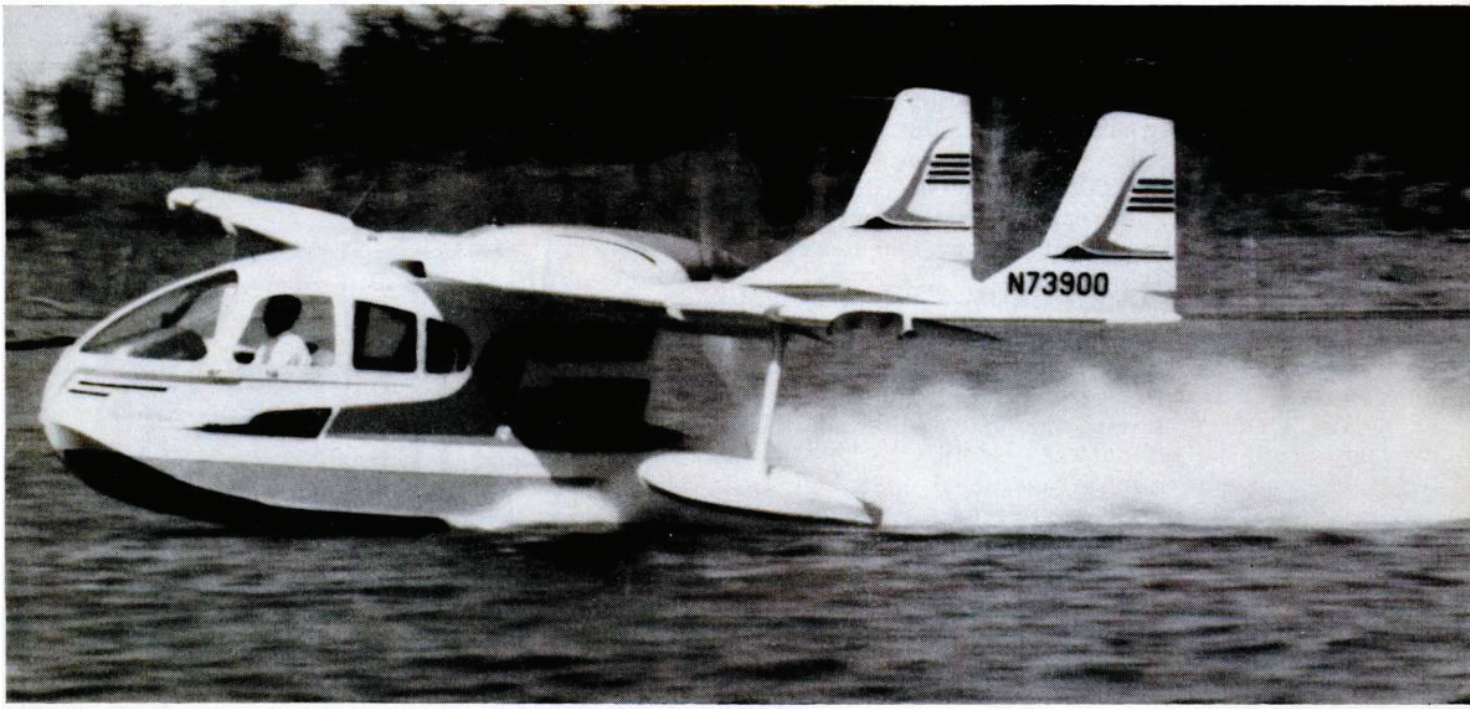
By GERALD J. SCHLAEGER

Landplane airspeed and takeoff performance are qualities rarely achieved by amphibious aircraft makers. The Riviera, a plush four-place, high-wing pusher amphibian manufactured by SIAI-Marchetti of Milan, Italy and distributed in the United States by Lane-SIAI of Dallas, comes very close. During over three hours of flight, this Flying pilot-editor cruised at 156 mph at both 5,000 and 10,000 feet, climbed at an initial rate of 1,200 fpm and made land and water takeoffs and landings under varied wind conditions.

The Riviera holds two speed records, which it set in 1960: Class C-2c seaplanes from 2,646 to 4,630 pounds for a 62-mile closed course at 168.9 mph; and a 310-mile closed course at 167 mph; an altitude record of 22,789 feet with a takeoff weight of 2,695 pounds.

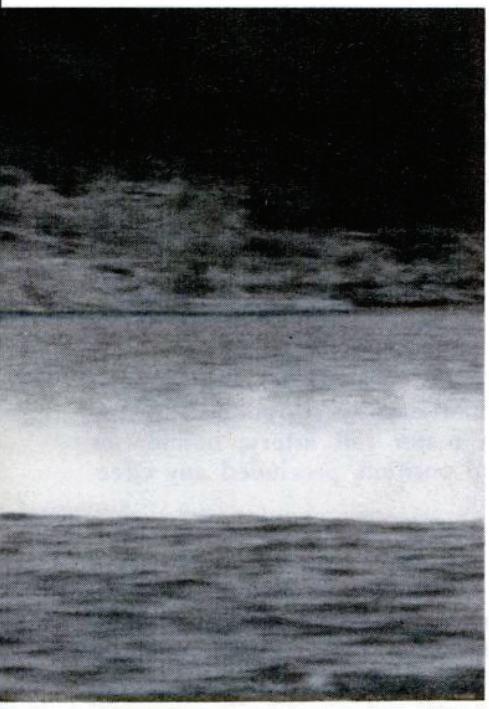
The Riviera is powered by an IO-470-P six-cylinder Continental fuel-injected engine rated at 250 hp at 2,600 rpm. It uses 91/96 octane fuel and drives either an 82-inch diameter two-bladed or a 78-inch diameter three-bladed Hartzell constant-speed controllable and fully reversible propeller. The three-bladed pro-

Water handling has been improved by an enlarged rudder modification. Maneuvering in and out of confined places is eased by full reversible propeller.



Aerodynamic fences two thirds of the wing length out from the center section enhance low airspeed characteristics. Maximum speed is set at 177 mph.

Forward-set cabin offers fine visibility.



peller is $450 additional and offers improved takeoff and climb performance as well as longer life where the aircraft is operated frequently from water. Basic price of the Riviera with the two-bladed propeller is $34,954.

A walk-around inspection revealed many fine points, for it is a well constructed airplane and workmanship is of the very highest quality. Perhaps it is the Italian craftsmanship, but the Riviera seemed to excell in this department: no dimpled skin, no scarred rivets, no drill marks.

The hull is constructed in nine watertight compartments, each with an inspection plate and drain plug. It is stressed for over eight-and-a-half Gs. This unusual strength is partially due to the Americanizing of the airframe. In changing from metric to decimal measurements, it is necessary to use the next heavier skin thickness and the next larger bolt or rivet, which results in a general beefing of the structure. It is a very sturdy airplane both on the water and in flight. Airborne, it will absorb 35 foot-per-second (fps) gusts at normal cruise and 45 fps gusts at 149 mph indicated air speed (IAS).

The bullet-shaped fuselage is attached neatly to the hull and is an example of excellent streamlining under difficult conditions, since the fuselage stops at the trailing edge of the wing while the hull continues aft to just under the leading edge of the horizontal stabilizer. Both hull and fuse- (Continued on page 72)

Riviera Amphibian

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lage of the amphibian taper to the rear.

The high wing is small; its 162 square feet of wing area and 3,270 pounds of allowable gross weight divide to a wing loading of just over 20 pounds per square foot. The wing tapers sharply between the fuselage and the booms and is an NACA 23019 airfoil in that section. Taper is outward and mild, actually more of a sweep than a taper. The airfoil is an NACA 23014 at the boom, tapering to an NACA 23012 at the tip. A high-speed wing, it is flush riveted over the forward 30 per cent to retain laminar flow back to where normal turbulence will occur. An aerodynamic fence two-thirds out on the wing retards the center section stall from progressing outward to the tip. Wing-tip floats provide plate action when retracted, and their effect of reducing wingtip vortices is equivalent to two additional feet of wingspan.

Flaps are trailing-edge split-type and are extremely well fitted. On our initial walkaround we wondered if the airplane had flaps since they were so well hidden. They are all metal, and full travel is 40 degrees. Fifteen degrees is used for takeoffs, 40 for airport landings. The company recommends no more than 30 degrees for water landings.

The engine is mounted high in the aft portion of the fuselage with the center of thrust just about on the wing chord line and level with the horizontal stabilizer. The result is outstanding elevator control, but reversed power reaction on pitch. In other words, added power pushes the nose down while reduced power causes it to rise.

This is typical of this type of engine installation and is further differentiated by the pusher configuration, which also reverses the torque action—you correct with *left* rudder in a climb. We found it a little disconcerting at first, but soon adapted and after awhile it became quite natural.

The engine is actually buried in the wing, and there are two cooling ducts running aft from the leading edge on each side of the fuselage to the engine. Coupled with a jet augmented exhaust system, this provides adequate cooling without resorting to an engine-driven fan.

The tail group is carried on twin booms, and large dual rudders provide adequate control. We made a crosswind landing with a 12-knot wind 90 degrees from the right and had more than ample control.

The nose gear retracts aft into the hull while the main gear rotates up and into the hull with the wheel well covers rising and lowering to permit passage of the wheels. The wheel well covers are closed when the gear is in the extended or retracted position. It is a foolproof system which has given no trouble and is fast in action.

The splash railing has a non-skid material on its upper surface and doubles as a step for either door, providing easy entrance to the cabin. The front seats fold forward for entrance to the rear.

A nice high cabin roof gives an abundance of head room, and leg room is generous in both seats. Front seat width

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is 42 inches, tapering to 38 inches in the rear. Fifteen cubic feet of baggage space is located beneath the rear seat, and there is additional storage room behind the rear seat.

The minute you are seated in any of the seats you immediately become aware of one thing: the visibility is superb. The large windows and forward located cabin provide unrestricted vision in all directions except directly aft. All four seats are very comfortable.

The instrument panel follows the conventional pattern with the flight group directly in front of the pilot, radios centered and engine instruments on the right. SIAI-Marchetti went to a lot of trouble to get the throttle, mixture and propeller controls on the instrument panel. Cable routing is forward, then up through the center windshield post and cabin ceiling to the engine.

Mixture and prop controls are vernier, but the throttle is push-pull and at times it binds slightly. We think it would have been simpler and just as effective to have mounted these controls in the ceiling as with most amphibians.

Hydraulic controls are centered below the instrument panel on a pedestal and include, left to right: landing gear, wing-tip floats and wing flaps. Water rudder extension is also hydraulic and is operated by a thumb button solenoid on the pilot's control wheel. It is springloaded to the up position.

Ground handling of the Riviera is greatly simplified by the fact that the airplane is nearly balanced on the main gear when empty, and one man can maneuver it in close quarters by pushing down on the heel of the hull and swinging the nose around. George Paquette, Detroit dealer for the Riviera developed a small hand hold which he inserts in the nose section and literally pulls the airplane all over the place.

The Continental started easily and idled contentedly but seemed a little busy. We were quite sure that it was the exhaust augmentor which caused the impression but it turned out to be the propeller instead. At nearly all rpm's the propeller noise is noticeable, but not objectionable.

The nose wheel is steerable through 40 degrees and with the reversible propeller, if you can't make it around a tight turn you can back up and try again.

Altimeter was 30.30, OAT was 22 degrees C on the surface and wind was 10 knots, 45 degrees off the nose. For our first takeoff, we weighed just over 2,900 pounds. Acceleration is rapid and we rotated at about 55 mph IAS. There is a tendency to overcontrol elevators. We were airborne at 75 mph IAS, 850 feet and 17 seconds down the runway. With full power climb the airplane settled at 1,200 fpm and with 2,400 rpm and 23 inches mp we had 85 mph and 500 fpm.

It is light and responsive on all three controls. Rolling from one bank to another you have no desire to use all the aileron for it would indeed be rapid. We had a little tendency to over-control the rudders but they soon fell into their proper place. It is a satisfying airplane to fly. It is solid and has no tendency to roll into or out of a turn once established.

Stalls are just a little quick. With 12 inches mp we pulled the nose up slowly and got little indication of the impending stall except the stall warning which sounded just about eight mph above the stall. The airplane would pitch forward with some intention of breaking to the left but this was easily controlled with rudder and aileron.

With cruising power and flaps down 40 degrees we were able to fly at 60 mph IAS with about 18 to 20 inches mp. Power off and clean, the break would occur at 75 mph. Aileron control was available throughout but was quite sluggish, as might be expected, in the stall.

We headed for Lake Dallas to get the airplane wet and see just what kind of water manners it had. The landing gear, wing-tip floats and wing flaps all may be operated at any airspeed below 125 mph IAS, so after checking the wind and dragging the lake we reduced our speed and got the tip floats down. Flap setting for landing was 30 degrees, and 90 mph turned out to be a good final approach airspeed.

The pattern is conventional with about 11 or 12 inches of power desirable. Round out and hold off just above the water and let it settle in a near-level attitude but at no more than a four-degree nose high condition. The Riviera does not like to be dived into the water for it will skip; nor does it like to be dropped in. It has to be flown, and properly, to get the best results. Once on the water it stays on the step nicely and falls off between 20 and 30 mph. Just adding power can keep it on the step at the pilot's wish and control is very good.

The first airplane we flew had a standard water rudder which was too small and gave poor response. Lane-SIAI is aware of this and has fabricated a modification adding two square feet to the area. The second plane we flew was so equipped and water handling was markedly improved. It still does not turn quite as sharply as a twin float seaplane but will certainly satisfy all practical situations. The reversible pitch propeller is very helpful for close-in maneuvering.

According to the factory, the Riviera is capable of operating in water with waves to three feet. We doubt that any pilot would subject this small amphibian to such waves, but 18-inch waves would certainly come within its capabilities.

Jerry Mackiewicz, Lane-SIAI demonstration pilot, made the first takeoff from water and we observed that his technique varied from the usual in that he held the control wheel well forward during the period prior to attaining step speed. It is usual for the pilot to hold the wheel well, if not full, back during this period and then let the nose down when step speed has been reached.

The Riviera did very nicely for him, so it was apparent that his technique was correct. And when it came our turn to make a takeoff, we did it the same way—we thought. When the nose came down to go on the step, it fell through, striking the water hard, and immediately went into what we have always called a "porpoise." It reared and plunged and evaded all our best efforts to stop it, so we pulled off the power and rode it down to a stop—there was a period of cogitation.

On our second attempt, Mackiewicz assisted us and the error immediately became apparent. The Riviera has a fairly flat bottom and, as speed is built up, the balance of the hull allows the nose to rise rather drastically. Unless it is held down with the forward elevator, a small wall of water builds up in front of the hull.

When it reaches sufficient speed to get over the wall of water, it is necessary, with rather accurate timing, to come back on the wheel and hold the correct attitude for the step. Failure to do so will allow the nose to fall through and set up a cycle of building walls of water and climbing over them—with each climb-out a little higher and a little less controlled.

Mackiewicz said it was properly called a "motorboat" and differs from a true porpoise in that the nose does not dive into the water, but rather the bottom of the hull slaps it. It appears to us that if allowed to continue, the motorboat would progress into a porpoise and eventually the plane would submerge.

The correct solution is, once the situation has gotten the least bit beyond the pilot's capability, to close the throttle and abandon the takeoff.

Once on the step the attitude can be easily controlled and proper attitude established by the feeling of acceleration. It

will break water at about 70 mph IAS and any attempt to pull it off will have the reverse effect, for the heel of the hull will dig in and prolong the run.

A practical method would be to retract the tip floats as soon as well established on the step and take advantage of the improved aerodynamic configuration. Should an aborted takeoff become necessary, the floats will extend rapidly, but even should the plane come to rest with them retracted, they will extend, lifting the wing from the water.

On one landing into relatively slick water, we inadvertently flew in and skipped off. Power was added and proper landing attitude re-established to put it back on the water. Attitude appears to be critical for both water landings and takeoffs. Lane-SIAI requires 50 water landings and takeoffs for checkout.

LANE-SIAI RIVIERA

Specifications:

Engine: Continental IO-470-P; 250 hp at 2,600 rpm.	
Propeller: Hartzell constant speed, reversible; 2- or 3-blade.	
Span	34.1 ft.
Length	24.3 ft.
Height	10.6 ft.
Wing area	162 sq. ft.
Passenger & crew capacity	4
Empty weight	2,270 lbs.
Useful load	1,000 lbs.
Gross weight	3,270 lbs.
Fuel capacity	63 gals.

Performance:

Maximum speed	177 mph
Cruising speed (70% power, 8,000 ft.)	164 mph
Cruising speed (60% power 8,000 ft.)	152 mph
Stall speed (clean)	72 mph
Stall speed (gear & flaps down)	68 mph
Service ceiling	18,500 ft.
Takeoff distance (ground)	980 ft.
Takeoff distance (water)	1,565 ft.
Landing distance (ground)	660 ft.
Landing distance (water)	625 ft.

During the airwork phase of the evaluation, the amphibian climbed at full throttle from 1,000 to 10,000 feet in 16 minutes for an average rate of over 560 fpm. A sampling of cruising speeds attained include an indicated 130 mph at 10,000 feet at 2,600 rpm and 19.5 inches mp for 70 per cent power at 12 degrees C OAT for a true of 156 mph.

Reducing to 2,450 rpm gave 63 per cent power and an indicated 128 for a true of 153 mph; 2,300 rpm was 58 per cent and indicated 123 for a true of 147 mph on a computed 10.5 gph fuel consumption.

At 5,000 feet, 2,450 rpm was 78 per cent power at 24 inches mp and indicated 142 mph for a true of 156 mph.

Overall performance of the Riviera closely approximates that of a similarly powered fixed-gear land plane with equal load carrying ability. Its inflight characteristics can best be described as responsive and pleasant—it is a pleasure to fly. Takeoffs and landings from runways are easily performed and there are no bad habits we could find. On water, it is like a spirited horse, requiring a firm and knowledgeable hand. It has the aspects of a thoroughbred, yet many of the attributes of a workhorse. ✚