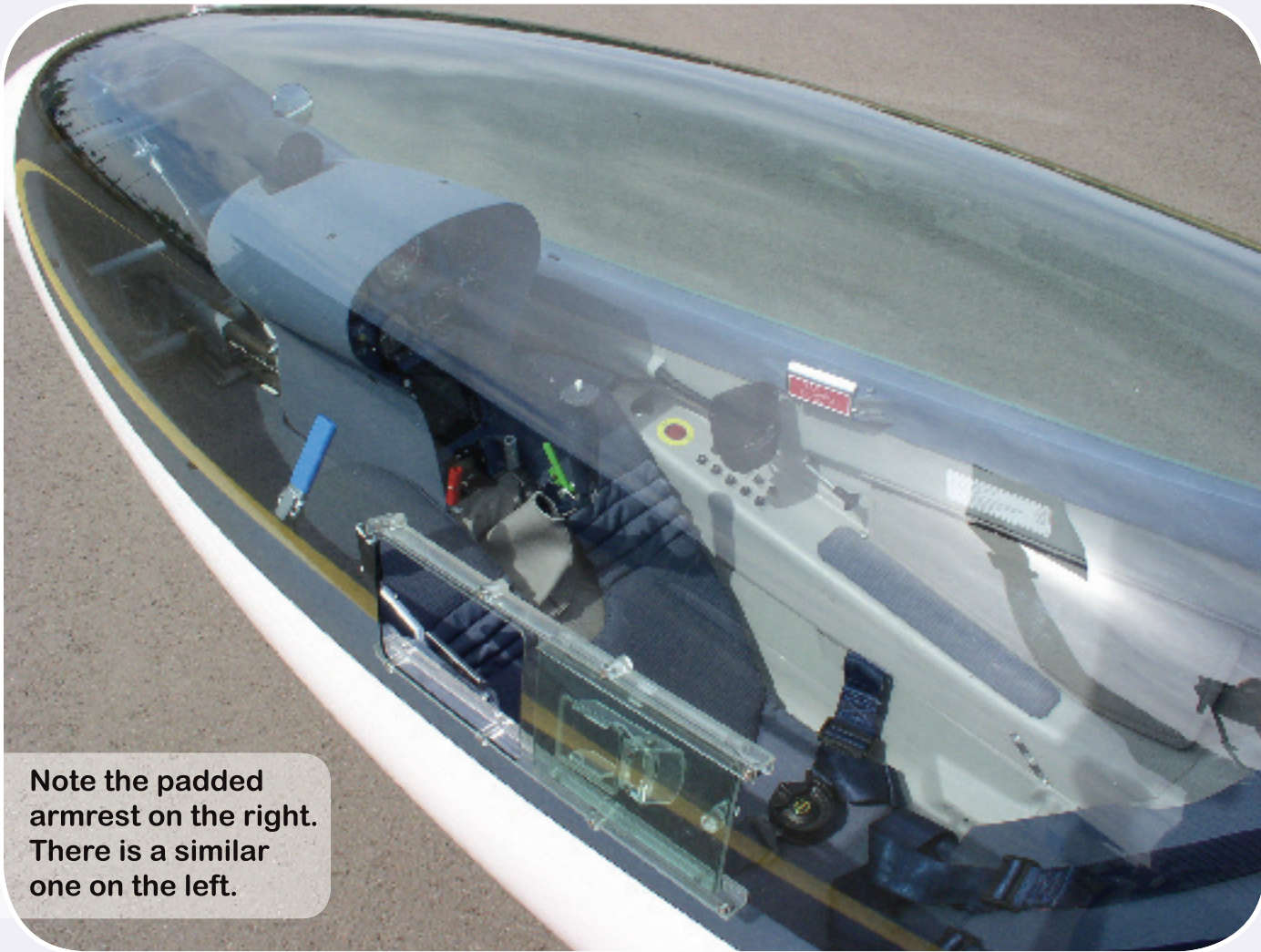


The low sides of the cockpit give the author a good view of a good view.

# Flying the Electric Antares by Roger Buchanan

The Antares accelerates, levitates, and climbs out – nothing unusual here. But what is unusual as I take off from Zweibrücken, the home of Lange Flugzeugbau, is that I have not reached the red alert level, my normal state for a self-launch. Without engine noise and vibration to scare me, I have reached level yellow at most. Yet it is not as quiet as I imagined when I first read about the Antares two years ago. Even at 1500 rpm, the propeller makes some noise.

What drew me to the Antares initially was the prospect of a competitive, self-launching sailplane with minimal maintenance, rock-solid reliability, and advances in cockpit safety and comfort. We will see in a couple of years whether it fulfilled its promise, but right now the cockpit is as comfortable as my armchair at home, and I am climbing at 800 feet per minute, under power, in relative quiet.



Note the padded armrest on the right. There is a similar one on the left.

### First Impressions

I am at the Lange Factory today to test fly the Antares and to determine if I will convert my option on an Antares into a deposit. My guide and tutor for the day is Ola Roer Thorsen, a factory engineer who has contributed to the Antares project in many areas, including the control

system and test flights. After Ola gives me a tutorial on the propulsion system and other unusual features, he and I enter the hangar to see the real Antares. If the propeller were retracted I would undoubtedly notice the beautiful wings with their elliptically curved leading edges, or the large, uncluttered cockpit. But as I walk in the hangar the propeller is out and I register surprise, like the time I saw a glider launched by a pterodactyl. Okay, it was the Flintstones, but you get the idea.

The propeller has a two meter span with the bottom of the arc about 6 inches above the fuselage, making it look even larger. In spite of the propeller's size, the propulsion system is clean and simple. The blades attach directly to the brushless electric motor, a cylinder about eight inches long and eight inches in diameter. All of this stows neatly, and with this distraction out of the way I can focus on the cockpit.

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## Pre-Flight Familiarization

The only lever in the cockpit not found in a pure sailplane is the Multi-Function Lever (MFL) between the flap and spoiler handles. The MFL slides forward to extend the propulsion system and increase power, and backward to reduce power and stow. MFL, flap, spoiler and trim handles are all within easy reach of the left hand with the forearm on the armrest. With the right hand on the stick, the right armrest is in just the right spot for the elbow. This is definitely more comfortable than yesterday's flight to Frankfurt. Since a manual lever could interfere with the armchair-like comfort, the landing gear is hydraulically operated by a switch on the panel. A panel switch also operates electric dump valves on the four ballast tanks. One click down dumps the outer tanks. One more click down dumps the inner tanks as well.

In addition to usual sailplane instrumentation, the panel contains a Multi-Function Display (MFD). In the air, it displays only propulsion system vital signs and the

**The MFD is above the radio in the lower panel, the gear extension/retraction switch is on the left, and the ballast dump switch is on the right. The red button, just ahead of the fuses on the right, disconnects the battery packs in an emergency.**

extended/retracted status of propeller and landing gear. On the ground, it presents a preflight checklist with normal sailplane items as well as propulsion battery parameters. The propulsion battery consists of 72 lithium ion cells, each 4 volts and 37 amp hours. There is a pack of 36 in each wing. The cells are in a series so the two packs provide 288 volts and 10,656 watt hours of energy. Under full power the motor draws about 160 amps. 120 amps produce the maximum altitude gain, so this is the recommended setting after reaching a safe altitude, say 500 ft. With a current of 120 amps the voltage on each cell drops to about 3.6, and then drops very slowly until near complete discharge at 2.7

volts. The preflight checklist confirms that the propulsion system is in working order and that enough juice is available for the intended mission.

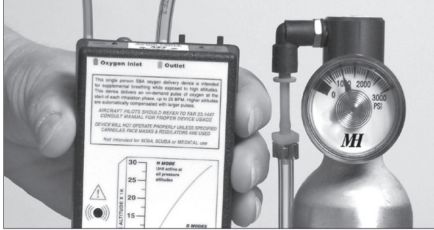
## The Flight

There is no idle setting with this motor. When no power is needed, such as when taxiing down hill or waiting for takeoff, one pulls the MFL back to the end of the power slot, thereby reducing current to zero and stopping the prop.

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The author shows great concentration as he goes through the electronic checklist on the MFD before taxiing out.

The Antares has a lot of power (57hp) so it is important to keep the stick back against the stop and add power gingerly to keep the tail on the ground (and the nose off the ground). It stays straight on the paved runway and the wing comes up quickly – no wing runner required. The wings are heavy with the big battery packs, but I do not notice it here.

At 1000 ft, I move the undercarriage switch up. The MFD shows the undercarriage in motion and then shows its status as retracted. At 3500 ft I pull the MFL all the way back. The prop stops, steps around until it is vertical, retracts, and the doors close. I watch this in the mirror for



entertainment only. There is no way for me to participate. The MFD now shows the propulsion system as retracted.

Circling in zero sink is the best I can do today, but I get a sense of how it will feel in thermals. For a 20 meter glider, it feels nimble, and the controls are unusually smooth and light, due perhaps to the steel control rods supported by linear ball bearings.

At 1500 feet I do an in-air restart. To extend the propeller and develop full power, push the MFD forward, period. I

think I can even do this while planning an off-field landing. While such planning is crucial while attempting a restart, the restart should have a high probability of success. Like a good cordless drill, if the battery has some juice, you will get power.

As I enter the pattern, I push the undercarriage switch down, monitor progress on the MFD and see its status change to "extended." Once firmly on the ground, it is practical to push the MFL forward for extension and taxi power, if this is needed to clear the runway.

## Assembly/Disassembly

Apart from the weight of the wings and the large electrical connector between each wing and the fuselage, assembly and disassembly are normal. For assembly, a dolly, similar to a one-man rigging dolly, is placed by the fuselage and receives the wing at its center of gravity. The wing is then wheeled around, rotated, inserted in the fuselage and supported by a regular wing stand. The dolly has a gas spring, engineered to balance the weight of the wing, so turning the wing from vertical to horizontal and vice versa requires little effort. Also, when the wing root is in the fuselage, a lock on the dolly axle may be disengaged so the wing may be moved a small distance fore and aft for precise alignment.

In the Cobra trailer, the wing is supported by a dolly at the root, followed by a 10 foot long support contoured to the shape of the wing, and by a conventional padded support nearer the tip.

The horizontal stabilizer snaps into place without any tools. A tool is screwed into the top and pulled upwards to unlock it for removal.

## Specifications

The standard configuration is 20-meters, but the wing breaks just short of 18-meter to allow the optional 18-meter tips. In fact, except for instrumentation, this is about the only option. The special mid-wing dolly, tail dolly, upper and lower surface gap seals are standard.

The empty weight of the prototype in the 20-meter configuration is 920 lbs giving a wing loading range of 7.8 to 9.7 lbs/sq. ft for the 20-meter ship and 8.2 to 10.2 for the 18-meter one. Other specifications are available on the web site [www.lange-flugzeugbau.com](http://www.lange-flugzeugbau.com).



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## Contest Considerations

The 20-meter configuration, for which the Antares has been optimized, qualifies only for Sports and Open Class contests. Its theoretical polar is impressive at high speeds and it may surprise the larger gliders on strong days. In the 18-meter configuration the Antares can compete against gliders of the same size. Its performance is still unknown but in the areas of comfort, handling, and ease of operation, it will be hard to beat.

A major consideration at contests is how to charge the batteries. At some contest sites there may be tie-down spots within reach of an extension cord. If this is not the case, the only other option that I see is to use a portable generator. Honda and Yamaha each make very quiet generators of appropriate output. Fully charged batteries are good for a climb of 10,000 ft, after which it takes 9 hours to fully recharge them. So, after a typical climb of 2500 ft, it would take 2 hours 15 minutes to top them off. This does not seem too onerous. After the recent blackout in the northeast, I was thinking of getting one of these generators anyhow.

## Delivery

I have serial number 30 with a projected delivery of December 2004. The factory reports it has orders for 60. So it will not be long before these self launchers are seen (but not heard) at contests.



*About the author:* Roger Buchanan, a retired software engineer, has 1800 glider hours, has owned four pure sailplanes and four self-launchers, and is looking to return to contest flying after a long hiatus. He flies out of Winter Haven, Florida.