“Please don’t describe us as a Tesla killer”—Ars talks to Lucid Motors

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- The Air looks superficially the same as when we saw it in 2017, but almost every body panel has changed.
- Lucid’s fleet of prototypes has been a little less busy than normal thanks to the pandemic.
- That’s a lot of beta prototypes!
- Peter Rawlinson was the chief engineer for the Tesla Model S before moving to Lucid in 2013 as CTO. He was named as CEO in 2019.
- This alpha prototype set a high speed of 235mph at the TRC test track in Ohio in 2017. Rawlinson thinks the production version should be capable of even greater performance thanks to a new 900V architecture, although customer cars will be limited by the speed rating of their tires.
- The Air has the external footprint of a Mercedes E-Class but the interior space of an S-Class, and these fancy reclining chairs will be an option.
- A contractor operates an excavator outside the Lucid Motors Inc. manufacturing facility while under construction in Casa Grande, Arizona, on Thursday, May 14, 2020. The 720,000 square foot factory should start

churning out production cars in early 2021.

With a brand-new, state-of-the-art factory nearing completion in the Southwest desert and an energy-dense battery pack using cylindrical cells, it’s all-too tempting to set up a rivalry between Lucid Motors and Tesla. Heck, it’s a trope that we’ve been guilty of using in the past. But it’s a bad take, according to Peter Rawlinson, Lucid’s CEO and CTO. “Please don’t describe us as a Tesla killer,” he told me. “The world’s big enough that we can both thrive and prosper alongside each other.”

It’s been a while since we checked in with Lucid Motors. In 2017, we got our first look at the Air, a stylish sedan that Rawlinson says is targeting the Mercedes S-Class, not the Model S. Later that year, one of the company’s alpha prototypes stunned us by achieving a remarkable 235mph (378km/h) in testing. But plans to enter production in 2019 were waylaid by a lack of funding.

“We saw our Series D funding take a little longer than anticipated. But it ended in an outstanding result with a public investment from Saudi Arabia that was over a billion dollars,” he told me, referring to the big (if controversial) investment from the Middle East. Rawlinson said the plan was always to go into production about two years after funding was secured, and were it not for the pandemic, that schedule would be on track.

“We started our factory construction at the very end of last year, and we’ve pretty much got the building complete—just about last week. If that’s not a record time, it’d be very close to it, and I believe it’s the very first purpose-built electric vehicle factory in North America,” he said, referring to the company’s plant in Casa Grande, Arizona.

With the building done, the next pieces are finalizing the car’s production and setting up a sales and marketing network.

“The secret is to get those to converge chronologically at the same time. So our philosophy is to have a state-of-the-art factory custom-built just in time so we don’t have capital hanging around,” he said. To that end, production prototypes of the Air should be ready by the end of 2020, with actual customer cars following at the beginning of 2021.

900V architecture

That search for funding might have delayed breaking ground on the factory until 2019, but design work on the Air continued uninterrupted in California. “In some ways, it’s changed very little, and in some ways, it’s transformed completely,” he told me.

“If you look at the stylistic intent and the design, the form, it’s matured like a fine wine,” he explained. “It’s still the same car that you remember—you’d have to put the two close together to spot the difference. We put a lot of care and attention into that original design, but it’s finessed, and I don’t think there’s a single surface that’s the same. But nevertheless, it is identifiably a Lucid Air.”

Some of those changes have been to increase the car’s aerodynamic efficiency—there’s a new front grille, and the active shutters have moved from a three-flap to a two-flap configuration, which should mean an unrestricted Air could go even faster than 235mph, presuming you had a high-speed bowl and some particularly good tires.

The changes to the car’s powertrain have been much greater. “There’s been an absolute transformation with technology in that period. The whole powertrain is effectively new,” he told me. For one thing, the Air will use a 900V electrical architecture, higher than even the Porsche Taycan. “That improves efficiency, because for giving power, with more than double the voltage it’s less than half the current. So it’s

greater than four times less I^2R losses," he said.

Rawlinson said that the Air has also moved to a new in-house silicon carbide inverter, as well as a switch from induction to permanent magnet motors front and rear. "They're our own design, which is very innovative—they've got very low cogging torque, so ultra-efficient. We've got our own epicyclic reduction transmission, our own differential, all which is super-innovative, state of the art. The rotor will spin to 20,000rpm, and each of those in standard form is rated at 600hp (447kW)," he said, adding that the combined motor, gearbox, differential, and inverter weighs in at just 160lbs (73kg).

"The key metric is volumetric power density, which is creeping up very close to 17kW per liter," Rawlinson told me. "And I think that's unprecedented—that's twice as good as any competitor out there that I'm aware of."

The Air's cylindrical lithium-ion cells will be made by LG Chem, but Lucid has designed and will build the packs itself. And Formula E has contributed to the management of the packs—Lucid supplies batteries to all the teams in that race series. The company's experience in Formula E has taught it a lot about predictive modeling of degradation.

"That's a cornerstone of what we've done with LG Chem now in our production supply agreement. We've worked with them to help develop the cell chemistry to a much higher standard, particularly making it degrade less as a consequence of repeated fast charging. That's important because the 900V architecture has been developed very much with our fast-charge network partner Electrify America in mind," he said.

Tesla isn't the enemy

Before joining Lucid in 2013, Rawlinson was previously employed by Tesla, where he was VP of vehicle engineering and

the chief engineer of the Model S. So it’s not surprising that he has plenty of praise for Tesla. Although his goal is to poach customers from the Mercedes S-Class, he acknowledged that comparisons with Tesla weren’t entirely off base.

“It’s a justifiable comparison in one respect, because I think that Tesla is undeniably the leader in electric powertrain technology today,” he told me. “It’s very interesting that when the Taycan’s rather disappointing range results came out, Tesla’s stock price soared. There were other factors, but I do think that that will have some bearing on the matter. The most important thing here is efficiency, and we’re chasing down four miles per kilowatt-hour for our car.”

Rawlinson thinks that a late-summer livestream reveal of the production Lucid Air is likely, with potential first drives happening before year’s end, pandemic willing. I hope he’s right.

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