

OP-ED: AMAZON PRIME AIR – ATTACK OF THE DRONES?

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This is an Amazon Prime Air delivery vehicle, it has a range of fifteen miles: (Photo Credits: Amazon)

But, because it has Jeremy Clarkson as its spokesman, I don't care.

I use Amazon all the time. After all, I lead an esoteric life of hermitage, I hate brick and mortar stores, I order incredibly hard-to-find books on Russian aviation and local traffic terrifies me. Enter Amazon Prime Air. It's like Prime Now, except without the sketchy delivery driver and tipping. In other words, if you need something fast, it will get there.

But just how will this work?

Well, that's the thing. Amazon has developed a "family" of drones that will carry parcels at least fifteen miles away from fulfillment centers.

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These drones will be taking off from an Amazon warehouse near you and flying at just below pattern height for any small aircraft! (Photo Credits: Amazon)

This one is pretty cool: it can take off and land vertically and then traverse at great speed as if a normal aircraft. It carries its parcels in an internal cargo bay and lands at spots where the smiling 'a' has been placed by a happy recipient.

Naturally, the autonomous aircraft has software to ascertain whether or not the landing zone selected is appropriate for the aircraft and there will clearly be some way to ask them to select an alternate should their first choice fail.

On the surface, this is great. I would kill for them to expand it to things like take away delivery for restaurants around the greater King County area.

Except what altitude do these bad boys fly at? 400 feet! Is this 400 feet above ground level or 400 feet above sea level? This matters for reasons beyond my pedantry—I fly choppers.

I do most of my flying to and from Boeing field, which coordinates extensive traffic from Boeing test flights and deliveries, UPS and other cargo aircraft (including ones to fulfill Amazon orders), private aircraft, fixed wing flight schools and helicopter flight schools. There are three VFR arrival and departure methods to and from Boeing field, only one of which is of any use for training—Rainier.

What does this have to do with Amazon? Well, the Rainier departure/arrival to Boeing field takes us over Longacres and Kent.

Where is Amazon's largest fulfillment center in King County? Kent!

Where do I suspect drones will be coming out to deliver packages to most of the greater Seattle Metroplex? You guessed it, Kent!

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I recognize that fifteen miles will not get them to Edmunds, but it will get them to all of Seattle, Redmond, Kirkland, and even a good deal of Bothell. So, from their end, using Kent as a launching point for their drones makes sense.

In a way, Kent is not the worst place for droning. There is no way the FAA will ever let drones fly into the extremely fortified class B airspace of Seattle-Tacoma International Airport. However, that does mean a lot of drones will likely be skirting its borders and flying under its shelf...which is exactly what we non-instrument pilots routinely do.

Even better, once we are out of Boeing Field's class D airspace that extends from 2500ft to the surface, we're in class G airspace— which extends from 700ft to the surface. Longacres is the corridor that all three Seattle helicopter companies use every day for heading towards areas that are safe for us to train in.

Why can't we go elsewhere? Well, most of the procedures for where we can train, practice, and fly were hammered out in meetings between the helicopter flight schools long ago as safety precautions. A lot of the Seattle area airspace near Boeing Field is taken up by fixed wing practice areas which have their own frequencies and are also quite crowded.

Helicopters and fixed wing aircraft sharing airspace is inherently risky. Some of our maneuvers take us up to fixed wing height. We share the same traffic patterns for towerless airports nearby Boeing Field. Helicopters are also quite hard to see—we usually look a bit like a spot on the windscreen from a distance.

Currently, we're already scared to death of people playing with quadrocopters and the lot of personal HUMAN-CONTROLLED drone aircraft. Drone pilots may have no idea what they are doing but they can usually see their tiny little spy machines taking photos of the cute neighbor doing yard work— which means that they tend to fly a lot lower. If, when Amazon says their drones fly at 400 feet, they mean above ground level—that's a bit of a problem. There are some spaces around the greater King County area where the prescribed altitude for helicopters would only give us 81 foot clearance of these tiny creatures assuming our altimeters are calibrated perfectly (and are not a million years old and riddled with error).

After all, we fly at an altitude safe enough to perform an emergency landing should we lose power. We also fly low enough to not get hit by fixed-wing traffic that has limited visibility below them. It's a dance. Perish the thought we're ever flying under the clouds to avoid accidental instrument flight.

I don't want these things being my undoing. Can you imagine what that kind of beastly death machine would do if it hit the tail rotor? Bad news!

Allow me to diverge for a moment to put our scheduled transport pilot friends at ease. Amazon Prime Air is less likely to be a threat to scheduled air travel, at least within the Seattle Area or the other 36 metroplex in the U.S. that have the highest, surface, airspace classification afforded to them. My suspicion is backed up because to enter this Class B airspace – one must not only be in possession of expensive equipment beyond a two-way radio and a regular mode C transponder. That is to say, they need a 4096- encoding altimeter- they must also be cleared to enter such airspace. Not simply establish communication, clearance must be issued. By its very nature, an autonomous vehicle cannot communicate in real time with approach, departure, or tower controllers. So, do not expect your scheduled service to get brutally interrupted by someone's sneakers. The same, I suspect will hold true for all airports that fall within the purview

of any sort of communication with air traffic control to enter. Now yes, there are some airports within the United States that have scheduled passenger services and no control tower. There could be an issue there, however- by the time Prime Air reaches these more rural points in America- I suspect these issues will be resolved.

Back to how these drones are terrifying for us chopper pilots.

So, how has Amazon decided to mitigate this risk? Well, other than an ambiguous statement about policy, the drones are going to be fitted with a system that allows them to, in the words of the immortal Clarkson “see and avoid”. They haven’t told us anything about how that works.

The policy angle is problematic at best. All policy directed at making aircraft safer from drones has meant pushing slower helicopters up into fixed wing airspace where they won’t see us and all of us involved die. Maybe they didn’t kill us due to lack of visibility alone– remember that outside of controlled airspace your list of required minimum equipment does not include a functional two-way radio. This means that—even if a pilot is doing all the calls right, all the see and avoid they possibly can—they’re still at risk of getting crashed into while the nice safe low air is restricted in the name of Autonomous drones.

The policy angle could work if it was to legislate stricter rules for drones. Delivery drones should have to fly specific routes, but be granted the freedom to fly lower. They are not loud. No one is really going to be a twenty first century bush ranger and start knocking the drones off if they fly a precious few tens of feet lower.

Even better—if these drones are capable of seeing and avoiding, that must mean that they will have the functional ability to avoid permanent obstacles such as buildings and towers as well as temporary ones such as cranes and circus tents. Having said that, crossing out swathes of land on the chart as drone routes also does not seem conducive to aviating. The best way is to have them treated as legitimate VFR aircraft and subject to the same see and avoid rules.

We’ll see.

As I said above, Clarkson said they are awesome and this man is not wrong. Having said that—I am also suspicious. So...

Amazon: I am the first aviation/tech reporter to write on this topic that would be in danger from your amazing innovation. Show me you’re not going to kill me. I want to be able to show the rest of my community of chopper nerds and hard core helicopter I live in King County and I have access to helicopters. Let me fly around with your drone and see if it avoids me first or if I am continually spooked by its presence. I would also like to be able to see as much of the drone’s perspective as possible to make sure that it’s not placebo effect and I am actually maneuvering to avoid the delivery vehicle.

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