

Grok Companion Drone: Staged Build

A small camera drone that goes where the robot can't, with Max talking to Grok through his own Raspberry Pi 4 and 10-inch touchscreen. Stage 1 about \$155, Stage 2 about \$450 more (running total about \$605), Stage 3 about \$300 more (running total about \$905).



COPPER GATOR AERO

Grok Companion Drone

Max talks to Grok. The drone goes and looks. It starts small and grows one step at a time.

Concept render

What it is

The companion drone is part of Max's swarm idea. It is Max's eyes and voice where the robot can't go: up on the roof, over the trailer, out past the fence line. Max asks Grok a

question out loud, the drone flies there, and Grok tells him what it sees.

Uses what he owns

His Raspberry Pi 4 and 10-inch touchscreen become the ground station. That is where Grok listens, talks and shows the video.

Small first

Stage 1 is a 36 g ready-to-fly kit. It is light, gentle, and safe around the house.

Grows with him

Each stage keeps the last one's parts. Nothing gets thrown away.

The three stages

STAGE 1: FLY AND TALK

~\$155

Tiny camera drone. Video goes to the Pi 4. Max and Grok talk at the ground station.

STAGE 2: VOICE AND GPS

+~\$450

Mic and speaker on the drone. GPS and return-to-home. Running total about \$605.

STAGE 3: THINKS FOR ITSELF

+~\$300

Onboard computer and autonomy, the Grok Scout. Running total about \$905.

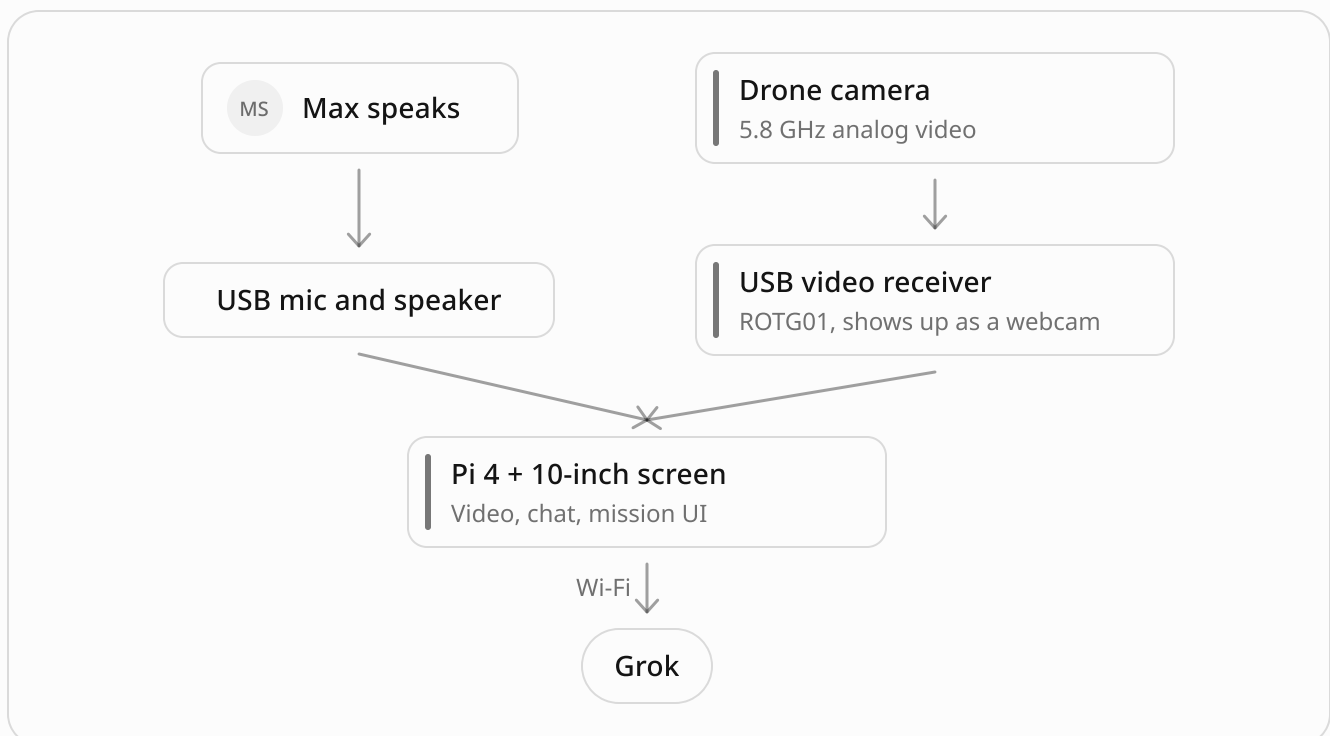
Prices marked ~ are approximate. Verified prices are listed in Under the Hood.

The ground station: his Pi 4 and 10-inch screen



Concept render: Pi 4, 10-inch touchscreen, USB speakerphone and 5.8 GHz video receiver

The Pi 4 stays on the ground. It weighs about 46 g bare and draws 3 to 6 watts, so a drone big enough to carry it plus its own battery would be well over 250 g, louder and more costly. On the ground, it has wall power, the big screen, and a good mic and speaker. The drone only needs to carry a camera.



Stage 1: the smallest thing that flies and talks

Recommended: the BetaFPV Cetus Lite FPV Kit (\$109.99 at BetaFPV) plus an Eachine ROTG01 USB receiver (\$23.99) plugged into the Pi 4. The kit includes the 36 g drone, a radio, goggles, two batteries and a charger. Its altitude hold makes it easy to fly. The receiver shows up on the Pi 4 like a webcam, so Grok can look at the frames and describe them.



Concept render: a Stage 1 tiny whoop

- Max says "What's on the roof?" into the speakerphone. He flies the drone up with the radio. Grok watches the feed and answers out loud.
- It is honest about its limits. Flights last about 4 to 5 minutes, it doesn't like wind, and the range is short. It is best around the house and yard.
- Second choice: a used DJI Tello (\$80 to \$190 on eBay). The Pi can fly it from Python and get 720p video over Wi-Fi. It is out of production in the US, so the condition of used units varies.

Stage 2: a voice on the drone, GPS and coming home



Concept render: Stage 2 with a GPS mast, camera mic and a small speaker

- It moves up to a 3.5-inch ArduPilot quad with GPS and return-to-home. If the link drops, it comes back on its own.
- Mic: the analog video transmitter carries sound from a tiny mic. The ROTG01 Pro receiver (\$28.99) passes that audio to the Pi.
- Speaker: a small ESP32 board with a 2 W speaker plays Grok's or Max's voice from the Pi over Wi-Fi. Prop noise is loud, so this works best for short messages while hovering.
- It weighs over 250 g, so it needs Remote ID (a broadcast module of about \$35 if the flight controller doesn't have one).

Stage 3: thinks for itself

This stage becomes the Grok Scout. A small onboard computer flies plain-English missions and comes home without Max needing to hold a radio. The radio, GPS, charger and Remote ID from Stage 2 carry over. Later options are the cellular alerts add-on (about \$50) and the hot-swap brain battery (about \$45).



Later: the trailer and truck ground station

His second 10-inch display can be mounted in the truck or on the new 16-ft utility trailer, with a Pi running from 12 V through a step-down converter. That makes a mobile base: drive to a job site, launch, and talk to Grok from the cab.

✓ Under the Hood: parts, costs and rules

Stage 1 parts

Part	Price	Notes
BetaFPV Cetus Lite FPV Kit (drone, radio, goggles, 2 batteries, charger)	\$109.99	Verified at BetaFPV. Legacy model, so buy soon
Eachine ROTG01 UVC 5.8 GHz USB receiver	\$23.99	Verified at Banggood. 640x480, about 100 ms latency
SunFounder USB mini mic	\$8.59	Verified at SunFounder
Small USB-powered speaker	~\$12	Approximate
Stage 1 total	~\$155	Uses his Pi 4 and screen
Optional upgrade: EMEET M0 Plus speakerphone (in place of the mic and speaker)	\$49.98	Verified on Amazon. Echo cancelling, so it's better for conversation
If needed: official Pi 4 USB-C power supply	~\$8	Approximate. 5.1 V 3 A

Stage 2 parts

Part	Price	Notes
3.5-inch frame, props	~\$33	Approximate
ArduPilot F405 mini flight stack	~\$60	Approximate
Four motors	~\$50	Approximate

Two 4S 850 mAh batteries and a charger	~\$75	Approximate
Matek M10Q GPS	\$42.99	Verified
EWRF TS5823 VTX + 1000TVL camera, with mic	\$31.31	Verified
ROTG01 Pro receiver with audio	\$28.99	Verified at Banggood. Replaces the Stage 1 receiver
ELRS radio and receiver	~\$80	Approximate. Also used in Stage 3
Remote ID broadcast module	~\$35	Approximate
ESP32 board, amp and 2 W speaker	~\$15	Approximate
Stage 2 total	~\$450	Running total about \$605

Stage 3 and running totals

Stage	Adds	Running total
Stage 1	~\$155	~\$155
Stage 2	~\$450	~\$605
Stage 3 (Scout minimal, reusing about \$200 of Stage 2 parts)	~\$300	~\$905
Optional: cellular alerts	~\$50	~\$955
Optional: hot-swap brain battery	~\$45	~\$1,000

Onboard vs ground compute

Option	Weight and power	Verdict
Pi 4 on the drone	~46 g bare plus a battery, 3 to 6 W	No. It forces a drone over 250 g
Pi 4 on the ground	Wall or 12 V power, big	Yes, for Stages 1 and 2

	screen	
Pi Zero 2 W or similar on the drone	~11 g, about 1 to 2 W	Stage 3 autonomy

FAA rules in plain words

- Every recreational flyer needs the free TRUST certificate, even for a drone under 250 g like the Cetus Lite.
- Under 250 g flown for fun: no registration and no Remote ID needed.
- Over 250 g (Stage 2 and up): register the drone (\$5) and broadcast Remote ID.
- Keep it in sight, stay under 400 ft, and avoid people and controlled airspace.

Setup steps for Stage 1

1 Plug in

Connect the ROTG01, the mic and the speaker to the Pi 4's USB ports.

2 Check the video

Match the receiver's channel to the drone. The feed appears as `/dev/video0`.

3 Run the Grok app

Grok voice runs through the mic and speaker. Every few seconds a frame goes to Grok vision, and Grok describes what it sees.

4 Fly near home

Do short hops with the kit radio. Altitude hold keeps it steady.