📌 UAV Mission Tasks Based on MiniSpec Skills & Categories

Now that we have a **fully structured MiniSpec skill set**, let's define **realistic UAV tasks** that use these skills effectively.

Each **mission task** will:
✅ **Map to specific MiniSpec skills**
✅ **Use vision-based and GPS-based skills**
✅ **Cover real-world UAV operations**

🛠️1️⃣Pre-Flight & System Check Tasks

These tasks ensure the **drone is flight-ready** by checking sensors, GPS, and motor status.

Task Name	MiniSpec Skills Used	Description
Check all sensors before flight	`sensor_check();`	Validate UAV's GPS, barometer, and battery status.
Arm motors for takeoff	`motors_arm();`	Enable UAV motors before takeoff.
Read GPS position	`gps_read();`	Get the UAV's current GPS location.
Ensure altitude sensor is working	`baro_read();`	Read barometric altitude before launch.
Send telemetry to ground station	`st();`	Stream real-time UAV data.

🛩️2️⃣Basic Flight Tasks

These tasks handle **takeoff, landing, and hovering**.

Task Name	MiniSpec Skills Used	Description
Take off to 5 meters	`tk();`	Drone takes off and stabilizes at 5m.

Hover for 10 seconds	`hv(); d(10000);`	Hold position mid-air.
Land at the home position	`rh(); ld();`	Land at the starting position.

📍 ③ Navigation & Waypoint Missions

These tasks guide the **drone to waypoints** and execute navigation maneuvers.

Task Name	MiniSpec Skills Used	Description
Fly to a specific GPS location	`wp(x,y,z);`	Navigate to (x,y,z).
Follow a set of waypoints	`wr(route);`	Execute a pre-planned path.
Return home after mission	`rh();`	Fly back to the launch point.

🛑 ④ Obstacle Avoidance & Path Planning

These tasks ensure safe navigation by **avoiding obstacles**.

Task Name	MiniSpec Skills Used	Description
Detect obstacles ahead	`od();`	Check for obstacles in front.
Replan route if blocked	`pr();`	Adjust flight path if needed.
Avoid an obstacle and continue	`oa();`	Move around an obstruction.

🎯 ⑤ Perception & Object Interaction

These tasks use **vision-based perception** for **AI-assisted UAV operations**.

Task Name	MiniSpec Skills Used	Description

Find an object	`s('object');`	Search for an object in view.
Check if an object is visible	`iv('object');`	Verify if the object exists in the scene.
Get object's position	`ox('object');` `oy('object');`	Identify where an object is located.
Measure the object's size	`ow('object');` `oh('object');`	Detect object dimensions.
Get distance to an object	`od('object');`	Measure how far the object is.

📡 6 Communication & AI Tasks

These tasks involve **LLM-assisted reasoning**, telemetry logging, and safety monitoring.

Task Name	MiniSpec Skills Used	Description
Send telemetry to control center	`st();`	Broadcast UAV data.
Ask the AI what is in front	`p('What is in front?');`	AI-assisted scene analysis.
Capture and log image data	`tp();`	Take a picture and save it.

📷 7 AI & Camera Missions

These tasks use **object detection and AI-based decision-making**.

Task Name	MiniSpec Skills Used	Description
Take a picture of a target	`tp();`	Capture an image for analysis.
Find and go to a specific object	`s('bottle');` `g('bottle');`	Locate and approach a bottle.
Log object information	`p('What is this object?');`	Query AI for object classification.

⚙️8️⃣ Low-Level Motion Control Tasks

These tasks involve **precision movement for close-range navigation**.

Task Name	MiniSpec Skills Used	Description
Move forward 2 meters	`mf(200);`	Travel straight ahead.
Move left by 1 meter	`ml(100);`	Shift left laterally.
Rotate 90 degrees	`tc(90);`	Turn right in place.

🚀 Summary

✅ **Covers real-world UAV operations using MiniSpec**
✅ **Balanced between GPS-based & Vision-based drone tasks**
✅ **Prepares for AI-driven automation & dataset generation**

Would you like me to generate **automated dataset entries** from these tasks? 🚀📊