



Drone Exploring: Career Spotlights

Cartography — Post

Overview: This session takes a serious look at cartography and GIS mapping as a career, built increasingly on drone data: the roles involved (GIS technician, cartographer and photogrammetrist, drone mapping specialist), the certifications and software skills needed (FAA Part 107, ArcGIS and QGIS, photogrammetry tools), and realistic pay ranges. Explorers plan a mock orthomosaic mapping mission and build a simple map legend for a site plan.

OBJECTIVES

- Understand the roles and career pathways in drone-based cartography and GIS mapping.
- Learn the certifications (FAA Part 107) and software skills (GIS platforms, photogrammetry tools) used in this field.
- Identify realistic pay ranges across GIS technician, cartographer, and specialized mapping roles.
- Practice planning a mock orthomosaic mapping mission, including flight lines, overlap percentage, and ground control points.

SUPPLIES

- Laptop and projector to show sample orthomosaic maps or GIS software screenshots
- Printed handouts: Career Pathway — Drone Mapping or GIS Specialist and Mapping Mission Planning Worksheet
- Whiteboard or flip chart and markers
- Optional: printed or digital copy of FAA's free Part 107 study guide (faa.gov/uas)

ADVISOR NOTES

- This session is career-focused: Use real software names, real certification requirements, and real pay ranges rather than a hobbyist framing.
- Clarify the difference between a GIS technician (entry-level, often no formal certification required) and a cartographer or photogrammetrist (usually requires a degree or specialized credential).
- Encourage Explorers who are 16 or older and interested to look at the FAA Part 107 study guide as a concrete next step after this session.
- Consider inviting a guest speaker who works in GIS, cartography, or drone mapping to share their career path. See Optional Extensions.
- If no guest speaker is available, Advisors can run the entire session using this outline, the Career Pathway handout, and the resource links below.

SESSION OUTLINE

- **Welcome and Icebreaker** (10 min)
 - “What’s a map you rely on all the time, and what would happen if it were even slightly wrong?”
- **Regulatory and Technical Moment: Certification and Software** (10–15 min)
 - Review the FAA Part 107 Remote Pilot Certificate: minimum age 16, required knowledge test.
 - Introduce common GIS platforms (ArcGIS, QGIS) and photogrammetry tools (like Pix4D) used to turn drone imagery into maps.
 - Discuss why accuracy and ground control points matter for maps used in engineering, construction, or emergency planning.
- **Mini-Lesson: Careers in Cartography and GIS** (15–20 min)
 - Roles: GIS technician, cartographer and photogrammetrist, drone mapping specialist, remote sensing analyst.

- Typical pay: Surveying and Mapping Technicians have a median salary around \$54,250/year; Cartographers and Photogrammetrists earn a median around \$81,390/year; specialized mappers with LiDAR and remote sensing skills can reach \$100,000+.
- Discuss the field's growth outlook and the value of programming skills (Python or SQL) for spatial data work.
- **Activity: Plan an Orthomosaic Mapping Mission (20–25 min)**
 - Using the Mapping Mission Planning Worksheet, small groups plan a mock mapping flight: altitude, image overlap percentage, flight line spacing, and ground control point placement.
- **Activity: Build a Map Legend (10–15 min)**
 - Groups create a legend for a simple site plan (such as a park or campus), choosing clear symbols for at least 5 features.
- **Wrap-Up Discussion (10 min)**
 - Groups present their mapping mission plans and legends.
 - Discuss the concrete steps (certification, GIS coursework, software practice) needed to pursue this as a career.

REFLECTION SECTION

Advisor Note: Some sample questions are below. They are designed to help the participants apply what they have learned to their own interests. You are welcome to use these questions or develop your own.

Focusing Questions

- What surprised you about the technical planning behind a single mapping mission?
- Which role in this field (GIS technician, cartographer, mapping specialist) sounds most interesting to you?

Analysis Questions

- Why do ground control points matter for map accuracy?
- How does a clear legend affect how useful and trustworthy a map is?

Generalization Questions

- How is organizing information clearly on a map like organizing information in other kinds of work?
- What other careers rely on turning raw data into something people can easily understand, like mapping does?

Challenge: This week, research one GIS or cartography certificate program (community college, university, or online) and identify what skills it teaches.

OPTIONAL EXTENSIONS

Guest Speaker: Invite someone who works in GIS, cartography, or drone mapping to share their career path and take questions in person or by video call.

Advisor-Led Option: If no guest speaker is available, Advisors can run the full session using this outline, the Career Pathway handout, and the resource links below. No outside expert is required.

Resource Links: FAA Part 107 overview ([faa.gov/uas/commercial_operators](https://www.faa.gov/uas/commercial_operators)); free GIS software (QGIS) for practice; Esri's free introductory GIS learning resources.

Extension Project: Explorers who are 16 or older can begin studying for the actual Part 107 knowledge test using the FAA's free study guide.

Handout: Career Pathway — Drone Mapping and GIS Specialist

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A typical path into this field looks like this:

1. Interest and Hobby Flying

Learn basic drone operation and become comfortable with flight-planning apps.

2. FAA Part 107 Certification (Age 16+)

Pass the FAA knowledge test to legally fly for pay.

3. GIS Software Skills

Learn GIS platforms like ArcGIS or QGIS; entry-level GIS technician roles often don't require formal certification.

4. Degree or Specialized Credential

A degree or certification in GIS, surveying, or geomatics strengthens applications for cartographer or photogrammetrist roles.

5. Specialized Roles

Surveying and mapping technicians: median around \$54,250/year. Cartographers and photogrammetrists: median around \$81,390/year. LiDAR and remote sensing specialists: \$100,000+.

Handout: Mapping Mission Planning Worksheet

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Use this worksheet to plan your mock orthomosaic mapping mission.

Planning Item	Your Plan	Notes and Risks
Flight altitude		
Image overlap percentage		
Flight line spacing		
Ground control point locations		
Map output use (planning, construction, etc.)		