Abstract

We have found that decimeter-level accuracy in X, Y, and Z can be achieved, and generated DEMs and orthophotos align well with NYS or-collect coordinates with a Trimble Geo7X receiver with H-Star and correct through Trimble Pathfinder Office software, which queries/receives DMCs and orthoimagery. This accuracy must be repeatable over multiple student projects and multiple flights occurring across hours to years. We have learned an Unmanned Aerial Systems (UAS) Permission Form must be filed with Campus Safety prior to operating a UAS on Hamilton College Airman Certificate and the FAA’s certificate of registration of the UAS. - Before flying on College Property, the UAS operator must notify Hamilton’s Campus Safety and provide a copy of the Remote Pilot Airman Certificate and the FAA’s certificate of registration of the UAS. - UAS operators must comply with all federal, state and local rules concerning operation of UAS. - A GCP can be something that is easily recognized in the imagery, a painted mark, or a commercially available aerial target.

How Global Navigation Satellite System (GNSS) works

How Global Navigation Satellite System (GNSS) works

Global Navigation Satellite System (GNSS) is a system of satellites orbiting the Earth that transmit signals allowing a receiver to calculate its position on or near the Earth's surface. The GNSS used in this case is the United States GPS constellation or both the United States GPS and the Glonass constellation.

How Global Navigation Satellite System (GNSS) works

How Global Navigation Satellite System (GNSS) works

Global Navigation Satellite System (GNSS) is a system of satellites orbiting the Earth that transmit signals allowing a receiver to calculate its position on or near the Earth's surface. The GNSS used in this case is the United States GPS constellation or both the United States GPS and the Glonass constellation.

Some Part 107 operational rules

Some Part 107 operational rules

- Minimum Distance to Airports: The minimum distance from airports depends on airport airspace classification, a bit of flight distance from airports depends on airport airspace classification, a bit of flight distance from airports depends on airport airspace classification, a bit of flight distance from airports depends on airport airspace classification, a bit of flight distance from airports depends on airport airspace classification.

- Maximum Altitude: 400 feet above ground level (AGL)

- Maximum Flight Duration: 10 minutes after sunset (local time) allowed with anti-collision lights and 30 minutes after sunrise (local time) allowed with anti-collision lights. No flight must be conducted during a thunderstorm.

- Minimum Weather Conditions: A Visual Observer is required for Part 107 pilots when flying in less than VFR conditions, for all other pilots a Visual Observer is required for all flights.

- Varying Takeoff Elevations are the Issue

Varying Takeoff Elevations are the Issue

Although accurate of the surveyed area, true verticals methods can result in not too much distortion in the resulting image. Using tie-points and camera positions, the camera positions are "fine tuned" and a dense cloud consists of map area. Purple dot indicates object point. DJI is writing two altitude values to the image EXIF and TargetLink collects both the takeoff elevation and the barometric pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

Visual change detection does not necessarily need GCP data

Visual change detection does not necessarily need GCP data

The measured barometric pressure is associated with an elevation of zero at takeoff and changes in barometric pressure are used to calculate the takeoff elevation. Although more accurate, and consistent over the short flying time of a given UAS mission, there is a repeatability problem with this system. Pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

What does CFR Part 107 entail?

What does CFR Part 107 entail?

- CGP: A Ground Control Point or something that is easily recognized in the imagery, a painted mark, or something that is easily recognized in the imagery.

- Maximum Flight Duration: 10 minutes after sunset (local time) allowed with anti-collision lights and 30 minutes after sunrise (local time) allowed with anti-collision lights. No flight must be conducted during a thunderstorm.

- Minimum Weather Conditions: A Visual Observer is required for Part 107 pilots when flying in less than VFR conditions, for all other pilots a Visual Observer is required for all flights.

- Varying Takeoff Elevations are the Issue

Varying Takeoff Elevations are the Issue

Although accurate of the surveyed area, true verticals methods can result in not too much distortion in the resulting image. Using tie-points and camera positions, the camera positions are "fine tuned" and a dense cloud consists of map area. Purple dot indicates object point. DJI is writing two altitude values to the image EXIF and TargetLink collects both the takeoff elevation and the barometric pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

Visual change detection does not necessarily need GCP data

Visual change detection does not necessarily need GCP data

The measured barometric pressure is associated with an elevation of zero at takeoff and changes in barometric pressure are used to calculate the takeoff elevation. Although more accurate, and consistent over the short flying time of a given UAS mission, there is a repeatability problem with this system. Pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

What does CFR Part 107 entail?

What does CFR Part 107 entail?

- CGP: A Ground Control Point or something that is easily recognized in the imagery, a painted mark, or something that is easily recognized in the imagery.

- Maximum Flight Duration: 10 minutes after sunset (local time) allowed with anti-collision lights and 30 minutes after sunrise (local time) allowed with anti-collision lights. No flight must be conducted during a thunderstorm.

- Minimum Weather Conditions: A Visual Observer is required for Part 107 pilots when flying in less than VFR conditions, for all other pilots a Visual Observer is required for all flights.

- Varying Takeoff Elevations are the Issue

Varying Takeoff Elevations are the Issue

Although accurate of the surveyed area, true verticals methods can result in not too much distortion in the resulting image. Using tie-points and camera positions, the camera positions are "fine tuned" and a dense cloud consists of map area. Purple dot indicates object point. DJI is writing two altitude values to the image EXIF and TargetLink collects both the takeoff elevation and the barometric pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

Visual change detection does not necessarily need GCP data

Visual change detection does not necessarily need GCP data

The measured barometric pressure is associated with an elevation of zero at takeoff and changes in barometric pressure are used to calculate the takeoff elevation. Although more accurate, and consistent over the short flying time of a given UAS mission, there is a repeatability problem with this system. Pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

What does CFR Part 107 entail?

What does CFR Part 107 entail?

- CGP: A Ground Control Point or something that is easily recognized in the imagery, a painted mark, or something that is easily recognized in the imagery.

- Maximum Flight Duration: 10 minutes after sunset (local time) allowed with anti-collision lights and 30 minutes after sunrise (local time) allowed with anti-collision lights. No flight must be conducted during a thunderstorm.

- Minimum Weather Conditions: A Visual Observer is required for Part 107 pilots when flying in less than VFR conditions, for all other pilots a Visual Observer is required for all flights.

- Varying Takeoff Elevations are the Issue

Varying Takeoff Elevations are the Issue

Although accurate of the surveyed area, true verticals methods can result in not too much distortion in the resulting image. Using tie-points and camera positions, the camera positions are "fine tuned" and a dense cloud consists of map area. Purple dot indicates object point. DJI is writing two altitude values to the image EXIF and TargetLink collects both the takeoff elevation and the barometric pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.

Visual change detection does not necessarily need GCP data

Visual change detection does not necessarily need GCP data

The measured barometric pressure is associated with an elevation of zero at takeoff and changes in barometric pressure are used to calculate the takeoff elevation. Although more accurate, and consistent over the short flying time of a given UAS mission, there is a repeatability problem with this system. Pressure at the takeoff location and using standard sea level pressure (29.92 inHg) calculates the altitude of the takeoff point. This value is displayed on the map window as HAE.