

National Transportation Safety Board

Office of UAS

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HWY23MH015

Unmanned Aircraft System Aerial Imagery

Group Chair's Factual Report

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crash scene³. Figure 1 shows the crash scene location outlined with a blue circle and KALN airport outlined with a red circle to the west.

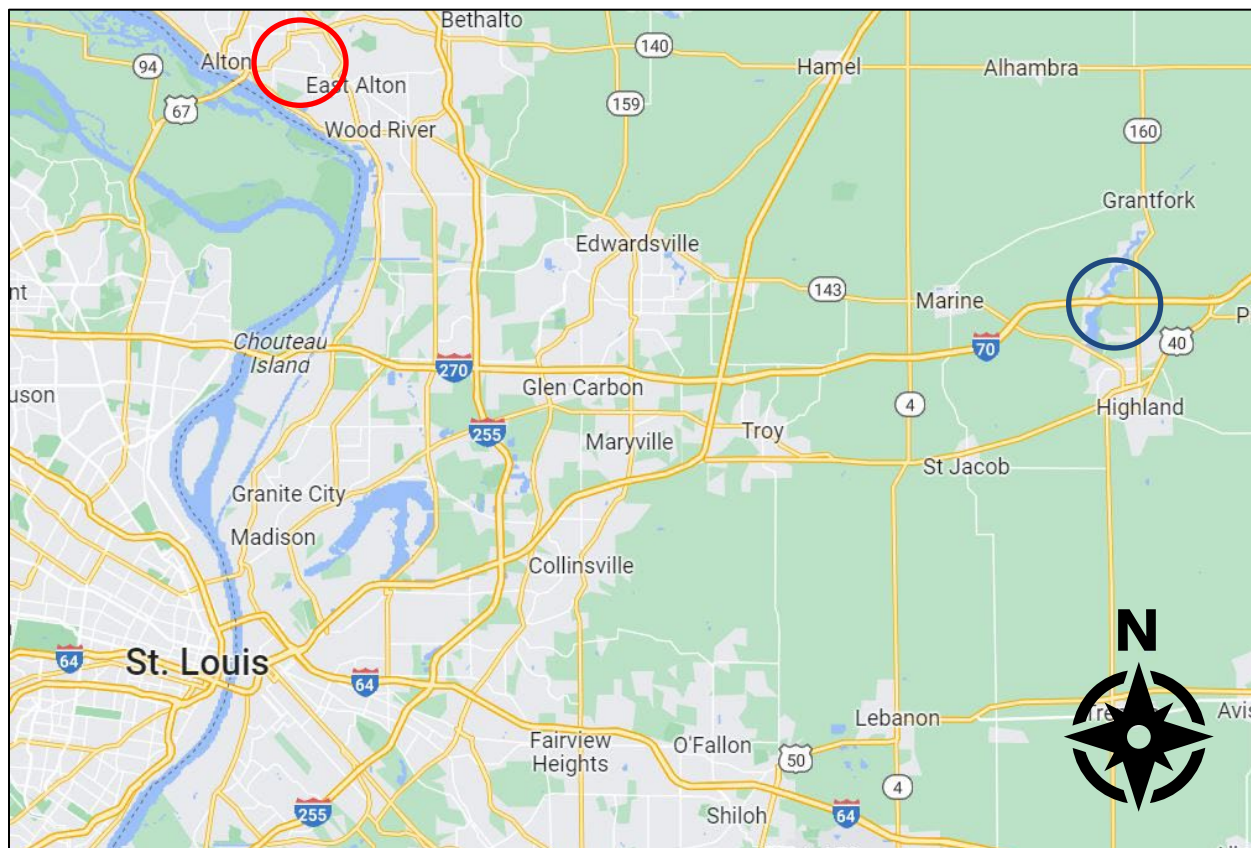


Figure 1. Nearest public airport to the collision scene.

There were trees and light poles located in the vicinity of the crash scene, but no significant terrain, environmental, or significant obstruction hazards. The flight was conducted under 14 CFR 107.

To obtain aerial imagery for the use of creating an orthomosaic image of the crash scene and surrounding roadway, the sUAS was flown over the collision site while traffic control was provided by the Illinois Department of Transportation or while no moving vehicular traffic was present underneath of the sUAS. A flight was conducted along Interstate 70 including the entrance ramp to the rest area. The flight pattern conducted was a manual flight at various heights below 400 feet above ground level (AGL). A total of 354 aerial images and 1 scene video were captured of the collision site. During all flights, a visual observer (VO) was utilized and the sUAS was not flown directly over moving vehicles.

³ <https://airnav.com>

During the second mission, 167 aerial images were taken of the Greyhound motorcoach involved in the collision using the sUAS in an orbital flight path. The Greyhound bus was located at a tow and maintenance facility, 3801 N. 89th St., Caseyville, Illinois. At this location there were buildings located in the vicinity of the bus, but no significant terrain, environmental, or significant obstruction hazards. A visual observer was utilized for the entire flight. **Figure 2** is an aerial image of the westbound Interstate 70 rest area looking east towards the area of the collision is circled in yellow. **Figure 3** is an aerial image of the of the involved bus.



Figure 2. Aerial image of the westbound Interstate 70 rest area looking eastbound.



Figure 3. Aerial image of the involved Greyhound bus.

3.0 Processing

The sUAS was used to capture 327 high resolution, georeferenced photographs of the crash scene suitable for processing in the Pix4D photogrammetry software⁴. An additional 27 perspective photographs were taken of an overview of the crash location and were not included in the photogrammetry processing.

⁴ Pix4DMapper is a photogrammetry software package designed to use overlapping photographic images to generate 3D point clouds. Additional outputs can be generated through additional processing, including 3D models and an 2D orthomosaic image.



Figure 4. Generated point cloud of the crash location.

The photographs taken using the sUAS were processed using Pix4D to create a point cloud of the crash scene location. An oblique view of the 3D point cloud can be observed in **Figure 4**. From the point cloud, a high-resolution orthomosaic image was created of the crash location and can be observed in **Figure 5**.



Figure 5. Generated orthomosaic image of the crash location.

The sUAS was used to capture 167 high resolution, georeferenced photographs of involved Greyhound bus along with 111 photographs of an exemplar bus suitable for processing in the Pix4D photogrammetry software.⁵ The resulting point cloud of the involved Greyhound bus can be seen in **Figure 6**. **Figure 7** is the resulting point cloud of the exemplar bus.



Figure 6. Generated point cloud of the involved Greyhound bus.

⁵ Pix4DMapper is a photogrammetry software package designed to use overlapping photographic images to generate 3D point clouds. Additional outputs can be generated through additional processing, including 3D models and an 2D orthomosaic image.



Figure 7. Generated point cloud of exemplar bus.

Submitted by:

Eric Gregson
UAS Aerial Imagery Specialist/RPIC