

Drones in School After Action Report

Twin Buttes/White Shield

Staff:

Thomasine Heitkamp: Project Coordinator/Presenter/Set-up & Tear-Down

Amanda Brandt: Program Manager/Pilot/Presenter/Set-up & Tear-Down

Zach Reeder: Pilot/Presenter/Set-up & Tear-Down

Prairie Rose: Presenter/Set-up & Tear-Down

Additional Note: At White Shield School Kerry Hartman arrived and presented to 3 sessions about the opportunities to attend NHS College

Itinerary:

- March 31st: Travel Day
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- April 2nd: White Shield Middle School/High School
- April 3rd: Travel Day (Due to inclement weather, additional time to travel home)

Attendance:

Twin Buttes: Completed 3 Sessions; 21 Students

White Shield: Completed 4 Sessions; 71 Students

Objective:

The objective was to offer a hands-on educational STEM experience to Middle School and High School students at Twin Buttes and White Shield using Drones. The MHA Project staff, with the Research Institute of Autonomous Systems at the University of North Dakota and Nueta Hidatsa Sahnish College, will provide students with an opportunity to apply real-world search mitigation applications using drone technology to simulate early detection of wildfires. By identifying wildfires using Forward Motion Video goggles from drones and taking those GIS coordinates, students can plot where those wildfires are and report them before they become large to local authorities, thus gaining experience with critical tools used in the field, enhancing their understanding of the vital role of Autonomous Systems and STEM. This exciting exercise provides multiple opportunities for practical drone flying, fostering teamwork and technical skills in a dynamic, educational environment.

Outcome:

Over two days, UND and MHA staff put a drone in the hands of more than 90 students, of whom 86 had never previously discussed or operated a drone prior. It was a truly unique opportunity to witness what happens when the power of opportunity meets the spark of providing education and enthusiasm for eager minds. There is no doubt that seeds were planted in those schools that will bear fruit in some young women and men who may have never considered a career in aviation or robotics. Every student was afforded the opportunity to fly a drone, and where there once existed intimidation and hesitation, there is now an attitude of confidence and curiosity. Many students asked about the drones they were flying. “How can I buy one of these? What else can they do? What other types are out there for someone like me to fly?” These were among many of the questions fielded by our staff while students were enjoying their turn at the controls. Not only was the main objective listed achieved above, but the students also had the added benefit of collaborating with other students at different grade levels and showing support and teamwork among individuals they most likely would not normally associate with on a daily basis. Overall, it was a very successful trip.

Lessons Learned:

- The new drones used were ideal for Drones in School.
- There were not enough staff per student, nor drone per student’s ratio to support the group size at White Shield to give the most optimal experience, which would be defined as:
 - 4-5 minutes learning to fly using the obstacle course
 - 5 minutes using the FMV to gain an appreciation of UAS technology in a real-world application, such as fire-fighting
- RESOURCES NEEDED FOR 20 STUDENTS FOR A 1-HOUR SESSION:

In one hour, while providing staff introductions and educational presentation for 20-minutes, followed by a 30-minute flight activity (even though it is an hour time slot, it takes time to get the students to get to the gym or location, and then you have to allow time to explain things between activities), the following is the required resources to best set up for success:

 - 5 staff members per 20 students, with 10 flight operational drones
 - 5 drones for the obstacle course/with 5 obstacle course lines set up

- 5 drones for the FMV paired up/with 5 wildfire pictures and cones set-up
- Suggest 2 spare aircraft/one for each activity (obstacle course and wildfire)
- Set of 40 batteries total (1 battery per 2 students per hands-on activity). This would allow ½ the batteries to recharge during the next one-hour session and be ready to go for the following session, ensuring enough batteries no matter how many sessions throughout the day.
- If the schedule allows, having a 10-minute break between sessions and the ability to have a lunch break if there are going to be more than 3 sessions would help the staff stay energized and engaged. Having more than 3 back-to-back sessions with no breaks for food/water/bathrooms was challenging.
- For the FMV session, those aged 16 and above had more success operating the drones once they were successful with the obstacle course. Those in middle school took a bit longer to learn how to use the controllers, and unfortunately in larger groups, we did not have enough time to help them get them all to where they could do basic flight skills. If the student was not able to successfully operate the drone in the obstacle course, they are not going to be able to operate the drone with FMV goggles on. They are just going to crash the drone over and over again since they now can't even see the controllers. It is important to make sure the student can operate the up/down/forward/back/left/ right controls (basic flight skills) before putting the FMV goggles on. Suggest we have a simple dot sticker we put on their hand, so the next instructor knows they are good to use the FMV in the next stage. If they don't have the sticker, then the student can still put on the FMV goggles, but the instructor will fly the aircraft and let the student experience the goggles and direct the instructor where to fly the drone to find the fires. This will avoid a lot of the punishment the drones took (and where we lost and damaged some of the drones over the camp).