



#### User

Frederick Douglass Academy at Northern High School (FDA)

#### Partners

Esri, OHM Advisors, RomoGIS

#### Industries

Education, Drones

#### Challenge

FDA wanted give high schoolers the opportunity to pursue careers in geospatial technology.

#### Solution

Arrow Gold® GNSS Receiver,  
ArcGIS® Field Maps,  
ArcGIS Drone2Map,  
DJI Phantom 4 Drones

#### Results

Students learn to use GIS, GNSS, drones, and other technology. Most earn GIS college credits, and some earn internships and related opportunities.

## MAPPING DREAMS: DETROIT STUDENTS EMPOWER THEIR FUTURES WITH GNSS

In Detroit, Michigan, a transformative program is helping students map their futures. The GIS Pathways program at Frederick Douglass Academy at Northern High School (FDA) is a 9-12th grade program providing instruction in geographic information systems (GIS), global navigation satellite systems (GNSS), drones, and related skillsets. The program, which began in 2019, offers a unique blend of both technical and life skills.

### ABOUT FDA: THE GENESIS OF A GIS PROGRAM

FDA is the only all-male, tuition-free public academy in the state of Michigan. When Dr. Willie L. White II came on board as principal, he searched for ways to enhance students' future career prospects. Recognizing the diverse career paths offered by GIS, he collaborated with then-science teacher and current GIS Pathways Lead Instructor Chad Segrist to develop the GIS Pathways program.

"GIS provides students a pathway to a particular career immediately out of high school," White said. "You can use it in a number of different environments."

FDA assembled a board of industry experts to guide students across many professional applications of mapping. Board members help lead classes, facilitate connections with industry professionals, and provide valuable mentorship.

OHM Advisors has two employees on the board: Partner and GIS Practice Lead Michael Cousins instructs the students in GIS, and Senior Technical Lead Ray Lillibridge teaches drone piloting, data processing, and FAA Part 107 drone licensing exam preparation. Meanwhile, RomoGIS founder Frank Romo instructs the students in GIS and entrepreneurship.

"We try to have those all-encompassing support systems so that students can get mentorship," Romo said. "That's really, I think, what makes this program different."

“Having the Arrow Gold® has really allowed us to take this program to the next level and teach these students the full evolution of mapping with a drone. It allows our students to understand the full process from start to finish.”

Michael Cousins

Partner and GIS Practice Lead, OHM Advisors

## MASTERING MAPPING

All FDA freshmen learn the fundamentals of GIS as part of the GIS Pathways program. Afterward, students decide if they'd like to continue with the program. On average, the program maintains a 94% retention rate.

GIS Pathways students can earn up to three Eastern Michigan University (EMU) credits annually, reducing future university costs and providing valuable job skills. Sophomores focus on ArcGIS® Pro, data analysis, high-accuracy GNSS mapping, and drone flight training. Juniors deepen their skills in data analysis, map creation, GNSS data collection, and advanced drone piloting. In their final year, students prepare for the FAA Part 107 drone licensing test, work on individual GIS projects, and pursue internships.

## CAPTURING HIGH-ACCURACY DRONE IMAGERY WITH GNSS

To develop their skills, students engage in outdoor data collection labs. They use an Arrow Gold® GNSS receiver and ArcGIS Field Maps on iOS® and Android™ devices to map the locations of ground control points (GCPs) with centimeter-level accuracy. Later, these GCPs are used to georeference imagery captured during class. The students capture imagery of the school grounds with a DJI Phantom 4 Pro drone.

“They become excellent pilots, a couple of them even better than me,” Lillibridge said.

After collecting the GNSS data and drone imagery, the class uses ArcGIS Drone2Map to combine both elements into highly accurate 2D and 3D products. These include orthophotos, orthomosaics, digital terrain models, 3D point clouds, and 3D mesh models.

## MAPPING FUTURES: COMBINING TECHNICAL SKILLS WITH LIFE SKILLS

GIS Pathways encourages students to explore their options for careers, university programs, and more. Some students want to become doctors, engineers, web designers, restaurant owners, and even GIS professionals.

Since the program's inception, GIS Pathways Lead Chad Segrist has also seen firsthand how students have improved not only their technology skillsets, but also their soft skills.

“Their confidence grows,” Segrist said. “In not only their skill set and in what they can accomplish, but in the way they can work with others and talk with others.”

## FOSTERING SUCCESS AT FDA AND BEYOND

Since GIS Pathways' inception, FDA has transformed from an "F"-graded school to an "A"-graded school. Their post-secondary enrollment rate has risen by 30%.

“Our approach of utilizing GIS as a pathway has led to an increase in enrollment each and every year,” Segrist said. “Presently we have 84 students. That is an approximate 15% increase from the end of last year.”

Through the program, students have already logged impressive extracurricular achievements. Some have presented their work at conferences, while others have won trophies at drone competitions. The program has equipped all students with more knowledge, purpose, confidence, and camaraderie.

“The more you know, the stronger you can be,” FDA senior Keith Anthony Morales said. “I think knowledge is freedom. Knowledge is power.”