ABOUT YOUR PROJECT

Please answer each of the following questions. If more space is needed, please attach extra pages. Please avoid using names of specific teachers and/or schools in your responses as all grants are blinded for review.

PROJECT TITLE: **High School Aviation Modernization Project**

PROJECT DESCRIPTION

1. Briefly describe the project, please include the project's goals and how they will be attained and measured.

High School Aviation Modernization Project

The High School Aviation Modernization Project seeks to update the high school technology education aviation unit, that is taught in the Introduction to STEM course, by replacing obsolete simulation technology with updated and advanced hardware and software. Currently, students operate on Microsoft Flight Simulator X (released in 2005) using standard "stick-based" HOTAS gaming controllers. While functional, this 20-year-old platform lacks physics, avionics, and environmental realism required to accurately teach modern aviation principles.

The proposed upgrade involves acquiring Microsoft Flight Simulator 2024 and the Logitech G PRO Flight Yoke System. This transition shifts the physical interface to a yoke-and-throttle quadrant system, which is the standard control method for the vast majority of civil and commercial aviation. By pairing state-of-the-art software with realistic control surfaces, we will provide a more realistic learning environment. This update allows our established "Pilot/Co-Pilot" student teams to experience authentic flight dynamics, real-time weather challenges, and accurate cockpit procedures, bridging the gap between gaming and genuine pre-professional training.

Project Goals

The primary objective of this initiative is to deepen student understanding of the aviation industry, physics, and the technological aspects of aviation through simulation.

- **Goal 1: Enhance Realism and Authenticity** by replacing abstract "gaming" inputs with realistic mechanical inputs. Students will transition from generic joystick manipulation to managing pitch and roll via a yoke, mirroring the muscle memory required in actual flight operations.
- **Goal 2: Increase Career Readiness** by exposing students to modern avionics and flight physics. Microsoft Flight Simulator 2024 utilizes real-world satellite data and aerodynamic modeling, providing students with a realistic view of how pilots navigate and manage aircraft systems safely in the modern airspace.
- **Goal 3: Increase Student Engagement** through the implementation of these changes to increase interest in STEM and aviation careers by providing a visually immersive and responsive experience. The advanced graphics and physics of the Microsoft Flight Simulator 2024 platform

will provide the "fun" factor necessary to maintain high engagement levels while delivering rigorous real-world experience.

INNOVATION AND ENHANCEMENT OF LEARNING

2. Explain what makes this project innovative. How will assist you in meeting the needs of our students? Please be specific and provide data to support the need if possible.

What makes this project innovative?

The core innovation of this project is the transition from abstract representation to advanced simulation. While the traditional high school paradigm of lecture and memorization remains a core part of the classroom. This project relies on technology to create a professional-grade training environment within a standard classroom. The ultimate goal of this project is to help students discover potential careers and industries that they could follow in the future.

- **Technological Innovation:** Unlike the Microsoft Flight Simulator X (2005) software which relies on generic, repeated graphical tiles, Microsoft Flight Simulator 2024 utilizes real satellite data and artificial intelligence to render a 1:1 digital replica of the entire planet. This allows students to practice navigation over their actual neighborhoods, creating an immediate, innovative bridge between the classroom and the real world.
- **Pedagogical Innovation (Crew Resource Management):** By upgrading to the Logitech G PRO Flight Yoke System, we can implement a true "Multi-Crew Cooperation" curriculum. Innovation lies in the shift from a single student playing a game to a two-person team managing a complex machine. The specialized hardware (separating the yoke from the throttle quadrant) forces the Pilot and Co-Pilot to coordinate physical actions—one flying, one managing power and systems—mimicking real-world Crew Resource Management (CRM).

How will this assist in meeting the needs of our students?

This project specifically addresses two critical student needs: Career Readiness in a High-Growth Sector and Engagement through Authentic Learning.

1. Future-Ready Career Pathways

Our students need exposure to careers with high growth and stability. The aviation industry is currently facing a historic labor shortage. According to the **Boeing Pilot and Technician Outlook 2025-2044**, the aviation industry will require **674,000 new pilots** over the next 20 years to meet demand. (https://www.boeing.com/commercial/market/pilot-technician-outlook)

2. Meeting the Need for Kinesthetic and Applied Learning

Many students struggle with abstract physics concepts (aerodynamics, forces of flight) when taught via textbook or whiteboard. It's well documented that students benefit from tangible, hands-on

applications to cement theoretical knowledge. Using physical controller hardware and advanced simulation software passive classroom learning transforms into active, kinesthetic skill acquisition.

3. Meeting the Need for Technological Fluency

Our students are "digital natives" who are accustomed to the use of technology in their personal lives. Educational tools that lag 20 years behind consumer technology (like our current 2005 software) damage credibility and lower engagement. Providing more current simulation demonstrates that the school invests in their future, significantly boosting student buy-in and intrinsic motivation to learn complex STEM concepts.

AUDIENCE & SUSTAINABILITY

3 (a). Describe the student population targeted by this project. Might this project be repeated with new students in future years? Explain.

The student population is mixed between 9^{th}-12^{th} grade students who are enrolled in the Introduction to STEM course. Introduction to STEM is one of three district approved technology electives. All students must complete one of the three for a graduation requirement. As for repeatability, due to the nature of the equipment being purchased and the content being covered, this project will be repeatable every section every year. The only issue is normal "wear and tear" on the controllers.

3 (b). How many students will be served?

Students who enroll in the Introduction to STEM course at PTHS will all experience the aviation set of assignments and projects. On average the course runs 3 sections per semester with an enrollment of 22-24 students in each section. So, the course serves 144 students a year on average with students working in 2 person teams.

PROJECT EVALUATION

4. How will you evaluate the success of this project? What data, criteria, assessments, surveys, statistics or other measures will you use to assess its impact?

Project Evaluation Strategy

The success of the High School Aviation Modernization Project will be evaluated using a mixed-methods approach, combining performance-based skills testing, academic assessments, and student feedback. We will measure impact across three primary domains: **Technical Proficiency, Academic Knowledge, and Career Interest.** Curricular tools and knowledge base will be taken from the Aircraft Owners and Pilots Association (AOPA) foundation's You Can Fly High School curriculum (https://youcanfly.aopa.org/high-school).

1. Performance-Based Assessments

The most direct measure of the project's success is the students' ability to perform complex flight maneuvers that were previously impossible with the old equipment. We will utilize a standard "Flight Check Rubric" to grade student teams.

- **The Practical Flight Exam:** Student teams will be evaluated on their ability to perform specific flight operations based on standard flight school training curriculum.
- **The VFR Navigation Challenge:** Using the **Microsoft Flight Simulator 2024** capability, students will be tasked with flying a Visual Flight Rules (VFR) route using *only* ground references (roads, rivers, water towers). Success rate of teams arriving at the correct destination airport without using GPS assistance would be an example of a measurable data point.

2. Academic Knowledge Growth (Pre- and Post-Unit Testing)

To assess cognitive growth regarding aviation theory, we will administer standardized assessments before and after the unit.

- **Pre-Test/Post-Test Knowledge Test:** Students will complete pre-and post-assessments covering aerodynamics, cockpit instrumentation, and aviation weather concepts that are based on standard flight school training curriculum.

3. Career Interest

To gauge long term impact of this project, career interest in the aviation industry and enrollment in the CCBC partnerships will be evaluated over the course of 5-10 years.

- **Career Interest Trends:** We will track the number of students who show interest aviation as a potential career path year-over-year through the Naviance platform.
- **Enrollment Trends:** We will track the number of students who enroll in the aviation courses available through the district's partnership with CCBC.

BUDGET

5. Please provide the following information for the items you intend to purchase for this project (please include shipping costs, if applicable). If some of the items you will use to carry out this project are being paid by using funds from sources other than the GEO Grant (i.e., the school district, other grants, etc.) please include these items but enter zero (0) for the amount. This will let the reviewers know that the project is completely sustainable even if the Foundation is not financing the entire budget. Attach additional pages if necessary. Briefly describe any items that may be unfamiliar to the application reviewers.

Please consider your "ideal" request and also what you would be willing to accept if funds are limited. (For example, if 20 items for your classroom is ideal, but you would accept 5 or 10 and have students work in groups please indicate that below.)

	ITEM	UNIT PRICE	TOTAL	TOTAL* (if you will accept less based on funds available)
1	Flight simulator 2024 (Steam Edition)	$69.99	12	$839.88*
2	Logitech G PRO Flight Yoke System, Professional Simulation Yoke and Throttle Quadrant (on Amazon)	$179.99	14	$2,519.86*
3				
4				
5				
6				
7				
8				
9				
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11				
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14				
15				
		BUDGET TOTAL:		$3,359.74

*If full funds are not available then either the software OR the hardware (controllers) would be the alternative.

IMPORTANT NOTE: In order to ensure that projects including technology are priced properly, employees requesting technology or technology related items must submit prices for review to Adam Swinchock, Director of Instructional Technology. **Technology proposals without his signature will not be considered by the committee.** Please also consider allowing for a 2-4% increase in pricing as pre-holiday prices typically increase in the new year when we are purchasing the items.

Required for proposals including technology items:

Signature: _____ Date: 12/22/25