Raisbeck Aviation High School

Highline School District | Tukwila, WA

2015 James D. MacConnell Award Submission

Introduction

Raisbeck Aviation High School (RAHS) is one of the premier STEM schools in the nation. The aviation-themed school is part of Highline Public Schools and located on the Museum of Flight campus adjacent to the King County International Airport (Boeing Field) in Tukwila, Washington. RAHS is a school of choice serving 400 students in grades 9-12. The journey from the initial vision for RAHS in 2000, to the opening of the new school in 2013, began with an extraordinary public/private partnership program that has helped the aviation- and aerospace-focused school prepare students for a future rich with opportunities. From its inception, RAHS has welcomed students from nearby counties (19 school districts) with innovative recruitment strategies to ensure that the student body reflects the broad diversity of the communities served.

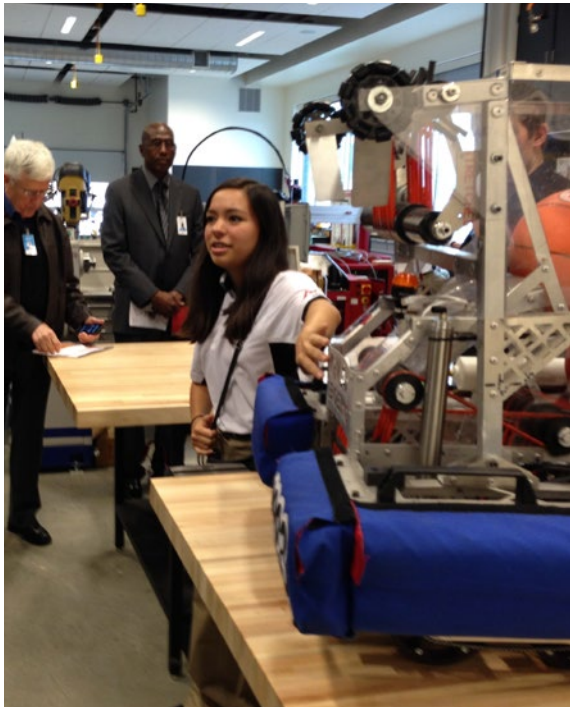
RAHS was the first small learning community developed and implemented within Highline Public Schools as part of a reform effort to connect student interests and motivation with engaging educational programs that are personalized, rigorous, and relevant. The goal was to keep students in school and prepare them for college, career, and citizenship. The theme for RAHS grew out of the District's proximity to a growing aviation industry that was experiencing a shortage of technical workers and career specialists in the profession.

An innovative planning process began in 2000 and led to operating the school out of three temporary sites from 2004-2011, while the program grew from 100 to 400 students. These early transitional years allowed the school to 'field test' their themed and integrated curricular approach, as well as the physical settings that supported the educational path. Lessons learned in these formative years were critical components in shaping the program for the new school. These lessons, along with consultations with industry and foundation partnerships (the Boeing Company, Museum of Flight and Gates Foundation), have resulted in a program where science and humanities are taught collaboratively with highly qualified industry professionals, all with the shared goal of merging a high caliber career and technical program with academic excellence.

Learning at RAHS is inquiry-based with an emphasis on students presenting and defending their work in front of industry experts. By sophomore year, each student is paired with a mentor from one of the school's professional partners who work with them until graduation. The mentor advises the students on coursework and career paths and assists with the selection of internships with local companies. Mentors and industry partners also advise RAHS faculty on the appropriateness of projects and their application in real-world settings.

The new school embodies the culmination of the program's evolution - from the curriculum to the site design. Its location on the Museum of Flight campus provides the opportunity for RAHS and the Museum to share educational programming and volunteer opportunities. The nearly 200 industry partners in the vicinity provide a steady stream of mentors. The iconic design feature of the three-story, 72,000 square foot building is its form - a curved cross-section inspired by the leading edge of a wing. Spaces within the building support teamwork, project-based learning, student presentations, and a highly personalized journey of discovery.

The process of programming and design involved extensive research, community engagement, and concept testing to balance the lofty aspirations of engaged, student-focused learning with the complex demands of budget and schedule on a contaminated brownfield site. The outcome is a vital school environment that supports exploratory learning; celebrates the students, staff, and volunteers who engage in the journey; and inspires everyone who walks through the doors.



Process

"Metropolitan Seattle is the birthplace of modern aviation and the regional economy is strongly shaped by the aviation and aerospace industries. What if we developed a public high school of choice for students in the region who wish to pursue their passion for aviation and aerospace in a learning environment that prepares them for higher education, citizenship, and work?" Reba Gilman

The innovative planning process for RAHS began as a vision in 2000, and the visionary was Reba Gilman, the founder of the school. Ms. Gilman proceeded on the first leg of an eleven-year journey of research and team building resulting in a vital, thematic learning environment.

The concept development for the aviation- themed school involved representatives from aviation, government, and K-12 and higher education communities. Site visits and reviews of over 60 existing aviation high schools helped shape an idea focused on high standards and expectations for student achievement. The team that Ms. Gilman developed began as a few early supporters and eventually avalanched into wide-ranging public/private partnerships sharing ideas, providing internships, funding programs, and financing buildings. The initial planning resulted in a research-based concept founded on: **vision, need, alignment with attributes of high achievement schools, leadership, and partnerships.**

RAHS Former Principal and CEO Reba Gilman and students

Vision

The vision imagined a small learning community serving 400 students in grades 9-12. To be recognized as a school of choice, performance targets to measure success included:

+ 100% of students will successfully complete a personalized learning pathway preparing them for a professional or technical aviation career.
+ 100% of students will matriculate to post-secondary education.
+ 90% of the graduates will earn post-secondary degrees.
+ Annual student retention will be at least 95%.
+ 100% of parents or guardians will be actively involved in their student's learning.
+ By 2008, business, industry, and private foundation support will provide 50% of the revenue to support the school and student scholarships.

Need

The need for an aviation-themed learning community emerged from two significant industry projections:

+ Long-term growth in all aviation sectors.
+ An impending local and national shortage of younger, highly trained, and qualified employees.

School labs are equipped to explore real world engineering problems

Attributes

Early consultations with educational visionaries, Gates Foundation coaches, and project-based learning experts shaped a programmatic alignment with attributes of high achievement schools. Foundational beliefs shaping the curricula included:

+ Developing a passion for aviation through personal vision and mission, aligned with core values.
+ Investigating and utilizing relevant information through inquiry-based learning.
+ Demonstrating systemic problem-solving skills.
+ Developing self-confidence, openness, and focus.
+ Fostering effective habits of mind courage to risk possibilities and entrepreneurial spirit.
+ Practicing responsible citizenship.

Leadership and Partnerships

Steadfast leadership throughout the early journey has been a major contributor to the school's success. Ongoing leadership of the new school rests with the Founding Board operating under the administrative supervision of Highline School District. The innovative Board, comprised of representatives from industry, higher education, and government provides support to maintain the vision and mission of the school. Finally, from its inception the success of the new thematic learning community has been dependent upon extraordinary numbers and types of mutually beneficial partnerships.

Perhaps the most unique aspect of the planning process for RAHS has been **time.** Following the initial vision in 2000, the school welcomed its first class of 103 ninth graders in September of 2004. Full capacity of 400 was reached in 2008. The school has occupied three temporary campuses in its nascent journey culminating in the opening of the new building in 2013.

This slow journey allowed for testing of curricular ideas, experimenting with effective learning environments, and assessing student success (and challenges) in a continuous feedback loop that honed and clarified the programmatic requirements to an unprecedented degree.

Innovation within the planning process emerged simultaneously from research-based, best practices and real world application.

Early homes of Aviation High School

Engagement

Community engagement in the planning process of RAHS has been unprecedented. Broad input helped shape the initial vision, program, and design through regular meetings and presentations. One of the innovative approaches shaping RAHS has been an ongoing loop of **research, assessment,** and **evaluation.** The school has implemented a continuous improvement process focused on learning significant lessons in how to effectively engage the broader community to facilitate highly effective contextual learning for all students. Input from a wide range of constituents has shaped, and continues to shape, the physical and educational program. This ensures that community engagement, started during the initial visioning process, continues to enrich every aspect of the school.

Mutually beneficial partnerships include aviation and aerospace companies and organizations, regional and state governmental adjacencies, local and state colleges and universities, regional middle and high schools, regional school districts and, of course, the families of students with a passion for aviation.

A brief list of the diverse partners bringing exceptional knowledge and skill include:

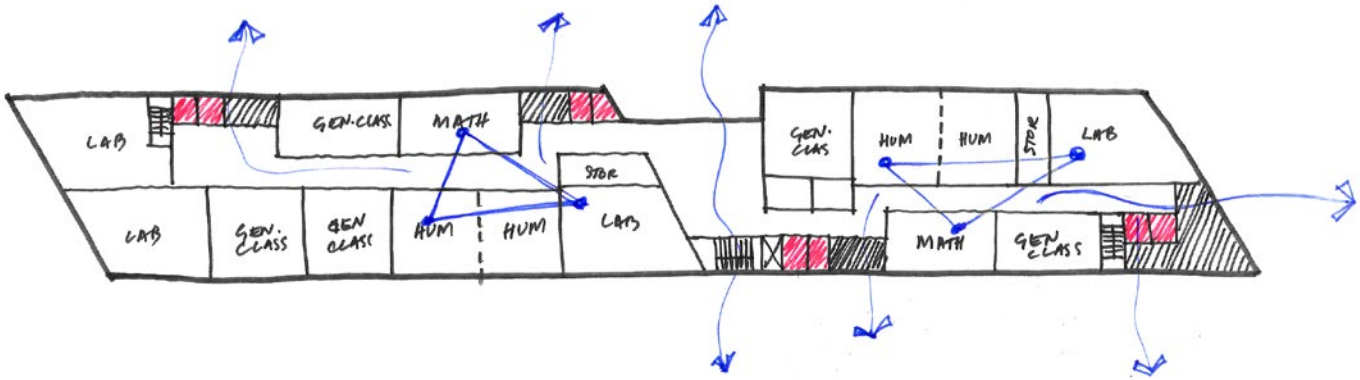
Alaska Airlines | Alton Training | Boeing Company | Experimental Aircraft Association Galvin Flying Services | Green River Community College | International Association of Machinists - Local 751 | King County International Airport (Boeing Field) | Museum of Flight The Ninety Nines (International Organization of Women Pilots) | SeaTac International Airport (Port of Seattle) | Society of Professional Engineers in Aerospace | South Seattle Community College | UPS | Washington Pilots Association Washington Department of Transportation / Aviation Division | Wings Aloft | Women in Aviation / International

Corridors are lined with inspirational story boards of industry partners

Programming

The educational specifications, developed in 2008/2009, describe goals and objectives, program activities, spatial requirements and relationships, environmental considerations, and finishes and specialties. The information was based on conversations with students, teachers, and staff combined with District standards. The program documents describe an ideal framework where the model educational curriculum may be practiced.

By the time the educational specifications for the new building were ready to commence, the initial vision and aspirations had been tested through application at temporary sites for over four years. Fortunately, the architectural design team had been working with the school through its early growth at various temporary sites. This knowledge, coupled with the seasoned experiences of staff members on the programming committee, ensured that the collective lessons (both curricular and spatial) of the transitional sites helped guide the educational specifications. Out of the initial observations and goal setting, a series of program themes emerged to guide the thinking about learning activities that would shape spatial and environmental requirements. The **themes** of the educational specifications included:



Common Focus

+ The curriculum will expose students to a spectrum of aviation-themed projects, mentorships, and internships.

+ Rigorous and relevant coursework will occur through a highly integrated, project-based teaching and learning model.

+ The building will be expressive of the Common Focus inside and out.

Each classroom node is identified by super graphics depicting images related to robotics, aviation and space exploration

High Expectations

+ Students will demonstrate competencies in math, science, and technology using knowledge of literature and history in problem solving. In-depth learning will be demonstrated through performances, projects, and products. Multiple learning pathways, extended time, and added support will be available to meet high standards.

"It really made me want to give back because of all of the time the mentors give us and the opportunities we get – it's really humbling." Skye Mceowen, Student

Personalized Learning

+ RAHS will be an intentionally small, personalized learning environment with 100 students per class and a student/teacher ratio of 20:1.

+ Every student will participate in a daily advisory program with a designated staff member, each of whom will work with 15-20 students over a four-year period as their advocate and guide.

+ Each student will be matched with an industry mentor assisting students in completing projects, assessing demonstrations and securing internships.

+ Personalization will be further enhanced by Individual Learning Plans and Portfolios.

+ Active engagement of parents and guardians will involve families in orientation activities, student demonstrations, school-wide celebrations, and career fairs.

Physics laboratory with garage doors connecting to outdoor open testing area

Respect and Responsibility

+ A respectful school culture will be supported by core values and norms crafted by students, staff, parents, and industry mentors. Seminars and cultural events celebrating differences and similarities will reflect a cultural competence within the school.

+ Students will engage in community service activities throughout their four years at the school.

Performance Based Assessment

+ Performance-based assessment data will be used to guide learning. Students, along with their parents, will learn to be keen evaluators of their own work. Exemplars will be used to teach about what is expected. Assessments will require students to demonstrate their learning through products and performances evaluated by teachers, industry professionals and the community.

+ The school will measure, report, and be accountable to the performance-based metrics.

Collaboration

+ Significant time will be built into the schedule of RAHS to ensure necessary collaboration among students, staff, industry professionals and post-secondary programs. Teams of teachers partnered with committed volunteers from the aviation industry will model the collaborative skills necessary for success in the demanding field of aviation.

+ Teams of students will regularly work together on projects and presentations. Students, teachers, and industry professionals will collaborate in a variety of formal and informal, curricular and extracurricular engagements.

Stewardship

+ The learning community will strive to be good stewards of the natural environment by promoting sustainable practices.

+ The facility will be durable and easily maintained.

Flexibility

+ Changing needs will be anticipated in order to allow the facility to adapt to a school-wide process, focused on continuous improvement.

Technology

+ Technology will be seen as a vital tool for communication, enhanced teaching and learning, and managing data.

+ Student portfolios, coursework, and tutorials will be online.

+ Laboratories will incorporate sophisticated graphic and manufacturing technologies for project production.

+ Mobile computing will enhance on- and off-site learning.

Top: Water bottle filling stations are distributed throughout the school; Below: The computer lab runs complex software such as CAD-based programs to support robotics and STEM learning

Safety and Health

+ User health and safety will be protected and encouraged.

Growing out of programming discussions, District requirements, and input from industry partners a number of unique parameters came to light. Spatial requirements were established using 160 square feet per student as a planning guide, in order to maintain parity with other District high schools. Given the small student population and the interest in accommodating numerous and large project work spaces, innovative strategies emerged in the creation of multi-use presentation, dining, socializing, and physical education space.

Personalization and collaboration goals resulted in significant spatial allocation for individual-, small-, and medium-sized groups to gather for team projects, mentoring, staff planning and training, spontaneous brainstorming, and problem solving.

The desire for indoor/outdoor connections (particularly to take advantage of the immediate adjacency to the Museum of Flight Airpark), required labs and shops to be grouped for teaching and/or project production on the ground floor.

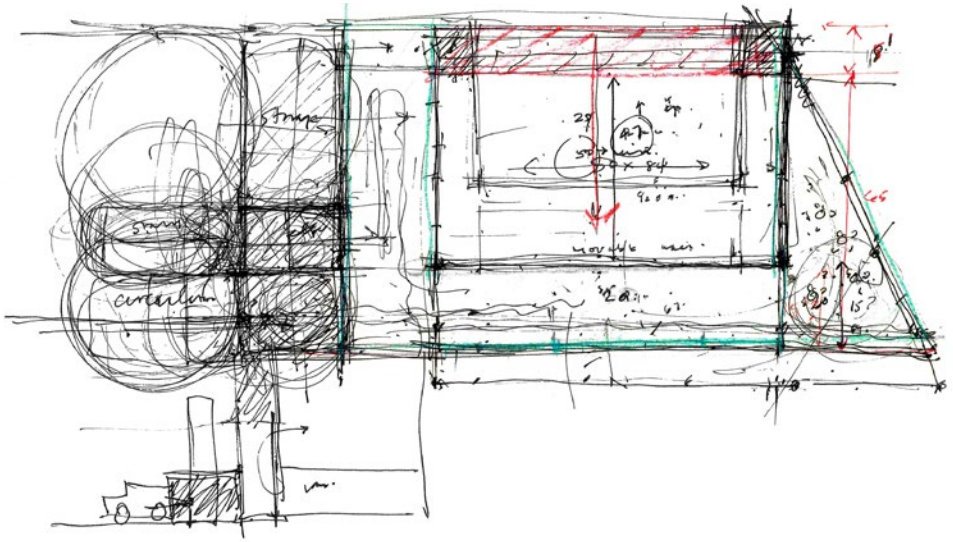
In addition to building-related criteria, a number of site related program requirements were influenced by: adjacency to the Museum of Flight Airpark, traffic flow, safety and security, and identity.

Protected from the street, the courtyard is a comfortable place for gathering, testing and presenting

Innovative Planning

To implement the foundational vision along with critical 'lessons learned' outlined in the educational specifications, a School Design Team (SDT) was brought together to provide ongoing input into the planning and design process. Meetings occurred every three weeks over a ten month period. The SDT was composed of students, teachers, mentors, parents, industry and government partners, administrators, and District facility managers working with the architectural planning and design team.

The planning process began with a discovery period in which programmatic themes were translated into architecturally-focused Guiding Principles and a series of design options were generated to explore outcomes grounded in the program. By using the Guiding Principles as a lens through which the emerging design was critiqued, the SDT was able to ensure that the aspirations and needs outlined in the educational specifications were manifested in the design.



Top: Early planning sketch exploring of commons / multi-purpose room options; Below: Meetings with the SDT shaped foundational guiding principles

Floor Plans

LEGEND

- Administration / Staff Planning
- Multi-Purpose Commons
- General Learning Space
- Science Lab / Project Lab
- Service / Utility
- Circulation
- Flex Area
- Mentoring / Conference

The following overview identifies the **Guiding Principles** and specific design attributes that address them:

Signature

+ The iconic streamlined building form embodies the aviation theme by reflecting the leading edge of a wing.
+ The linear massing creates a simple, elegant volume along the street and terminates the adjacent Museum Airpark.
+ North and south daylight is brought into learning spaces throughout the school.
+ Open balconies and floor to ceiling glazing along the east façade enhance views of the airport runway - reinforcing the embedded avionic learning theme.

"The design of the school invites partnerships…We get calls all of the time from people who work in the area and want to come by and visit. They don't necessarily know about Raisbeck Aviation High School, they just look at the building and want to see it." Reba Gilman

Greeting

+ The main entry opens to a reception desk, gracious lobby, and open stairway vertically and visually connecting the three-story school.

+ Administrative services, adjacent to the reception desk, provide adult supervision and welcome visitors.

+ Staff planning areas are grouped around the central stairwell to encourage teacher/student interactions and provide dispersed passive supervision.

+ The grand central stair acts as the "hub of connectivity" – showcasing student projects and awards.

+ The dynamic central stair also sets the tone of aviation by housing a student built 'red plane' and full-scale prototype of a spiroid winglet - auguring innovative career opportunities.

+ The central stair looks out to the historic planes of the Museum Airpark while promoting informal places to 'see and be seen'.

+ Simple massing, site circulation, and the articulated entry make wayfinding recognizable, safe, and straightforward.

+ A sheltered entry offers transparent protection for rainy Pacific Northwest winter arrival and departure activities.

The welcoming lobby and reception space is filled with natural light

The second and third floors are open to the lobby below, connecting people and spaces alike

Visible Learning

+ Student work is displayed throughout the school - in the grand stair and lining corridors - display surfaces promote learning, after-school clubs, events and inspirational messages from industry leaders.

"Students put up posters, conversations happen there. If I want to get a sense of what people are up to, that's where I go."
Mary Wombold, Teacher

+ Within labs, floor patterns of molecules, electronic circuitry and DNA formation remind students of their scientific engineering pursuits.

+ The open, two-story multi-use Commons provides a state-of-the-art presentation space that showcases student demonstrations for all to see.

+ Large-scale graphics depicting aircraft, outer space, computer technology, and the history of scientific invention enliven the corridors and provide unique identities to the classroom wings.

+ Ground floor labs promote the educational partnership with the Museum of Flight by visually and physically opening directly to the Airpark, an outdoor aircraft gallery where prestigious planes are exhibited such as the world's first 747, the Concorde, and Air Force One.

+ Breakout learning spaces (flex areas) invite informal learning opportunities; full height writable wall surfaces and flexible furniture enhances learning opportunities.

+ The staff development center serves to help teachers improve their professional skills. Located on the third floor just west of the central stair and staff planning office, the center embodies the continuous improvement process envisioned in the early planning stages. The staff development center is designed to support teacher training at RAHS and throughout the District. The center also supports the collaboration between the school and industry partners in enhancing curriculum relevance. The flexible space is outfitted with movable furniture to provide direct instruction or small group activities. It is also wired for cameras and speakers to support distance learning.

The flex areas are distributed at each classroom wing to support individual learning styles

Community Gathering

+ The multi-purpose Commons – an innovative design response to square footage limitations – transforms into a lecture hall with upholstered pull-out theater seating, motorized roller shades to control daylight, and a sophisticated audio-visual system.

+ The adaptable Commons accommodates a variety of uses: informal presentations to classmates, whole-school meetings, robotic demonstrations for visiting middle schools, professional critiques of student projects by industry professionals, and family events.

+ The building is zonable to open select spaces for after hours or community use. The Commons is used regularly by the Museum for evening presentations and demonstrations.

Health and Fitness

+ Learning spaces throughout the school are daylit through various strategies including tall windows, clerestories, and skylights. Glare is controlled by users with vertical and horizontal roller shades.

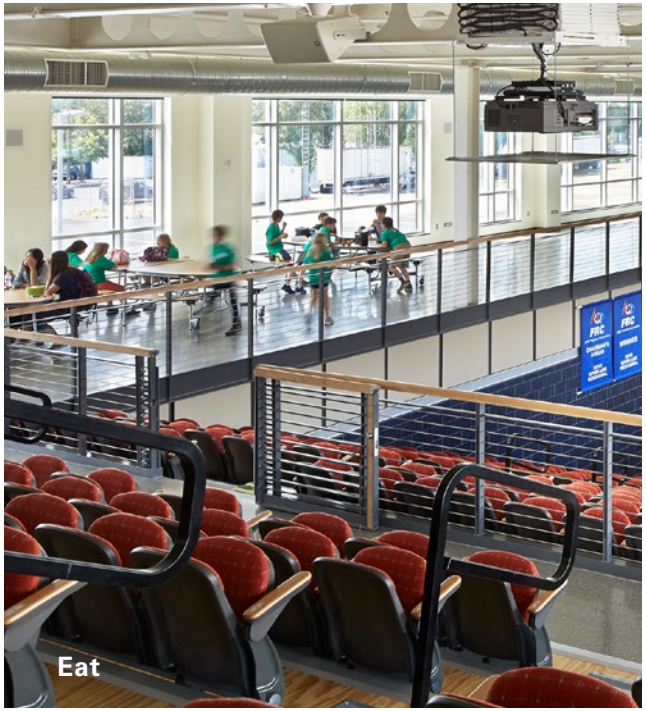
+ Building siting shields learning spaces from noise created by air traffic occurring throughout the day at 90 second intervals.

+ The glazing combines highly efficient noise reduction with solar reflectance to optimize acoustic, light, and energy performance.

+ The lower level of the multi-purpose Commons converts to a half-court basketball venue allowing students to burn off energy in midday games.

+ Bike parking areas promote non-motorized commuting for students and faculty.


Present


Eat


Play

Stewardship and Durability

+ RAHS conforms to the Washington Sustainable Schools Protocol (WSSP) reflecting LEED Silver equivalence.

+ Interiors incorporate low or no-VOC finishes throughout.

+ The stacked building results in a minimal footprint while maximizing an energy efficient shell. The curved airfoil volume allows for larger second- and third-floor plates, thereby meeting program needs while simultaneously reducing lot coverage and evoking the school's overachieving theme.

+ The polluted brownfield site was cleaned up following EPA guidelines and revitalized for its current use.

+ RAHS is a steel frame building constructed on a structural slab resting on concrete piers embedded in poor soils subject to liquefaction. The durable systems were chosen for longevity, adaptability and first cost.

+ Metal cladding was selected for durability, low maintenance, high recycle content, and its contextual reference to the nearby Museum of Flight.

Personalization and Collaboration

+ Conference rooms, flex areas, and informal study areas are scattered throughout the three floors to provide variable spaces to support differentiated learning styles.
+ The central stair serves to enhance the goal of knowing each student well.
+ Numerous mentoring and small group teaming spaces are located on the Ground Floor to make collaboration visible and provide passive supervision.
+ The balcony of the multi-level Commons is designed to support small- to medium-sized academic or social groups as well as enhance large group presentations.

Enhanced Tools for Teaching and Learning

+ Classroom teaching walls present an array of high- and low-tech options for learning and instruction. The sliding surfaces provide three whiteboards, an LED screen and Smart Projector, tack strips for pinups, and a surprising amount of storage.
+ Labs support rigorous programs such as the award winning robotics team, Skunk Works.
+ Cutting edge technologies (CNC laser and water jet cutters) along with precision metal and woodworking equipment enable students to construct projects, robots, or full-sized wings and airplanes.
+ A wind tunnel provides actual testing of experimental prototypes.
+ A CAD lab complements the machine shop with 3D modeling software, plotters, and 3D printers to enhance exploration.
+ Wireless connections throughout the school support a laptop environment for students and teachers.

Karl Nielsen, a RAHS sophomore, explained the way these rooms work together to assist his class in the creation of air foils.

"We're printing out CAD models of specific air foils on our 3D printer, and then we're going to our brand new wind tunnel to test them at various speeds and angles of attack and measure the lift and drag. Then we compile all of the information into a giant air foil library database that the whole class collects together."

As juniors, Karl and his classmates will select their best air foil and use the lift to drag data to design a wing beam in CAD. After stress testing, the students will then present the wing in "The Pit" to a group of engineers from Boeing; pitching a sale to them by explaining why theirs is better than all of the others in the class. The cycle of collaboration and mentoring then completes itself to begin again in a different form.

Top: The CNC cutter is used for production of precision engineered components; Below: The wind tunnel allows for testing of various designs

Support of Learning

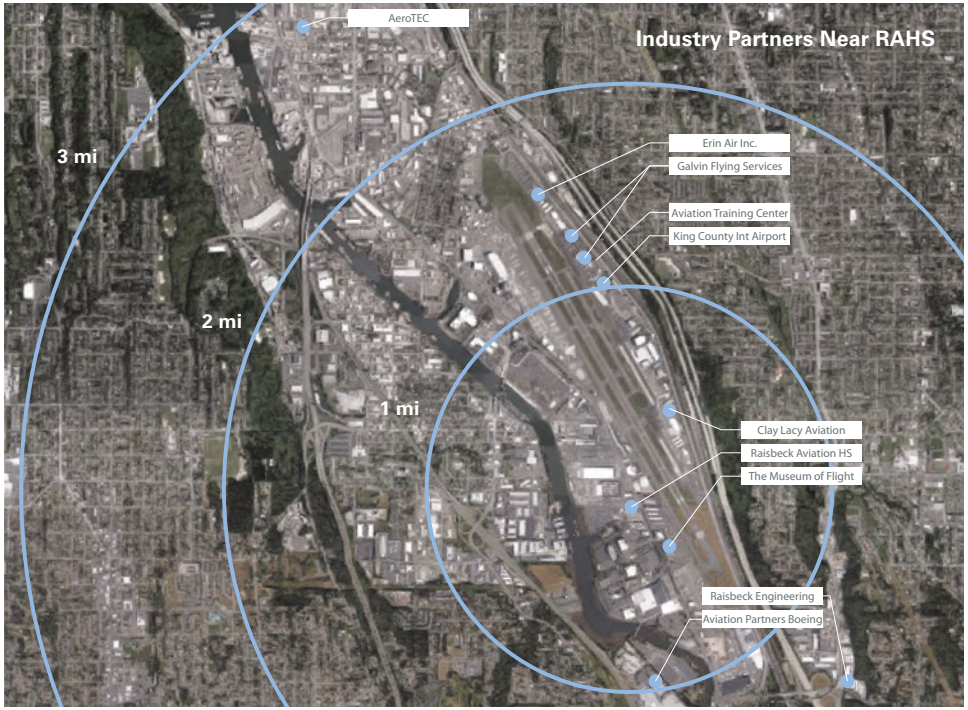
Because the planning and design process was directly shaped by Guiding Principles that grew out of themes defining the educational vision, the design response inherently fulfills the curricular needs. Key aspects of the design response serving these needs include:

+ The siting and co-location with the Museum of Flight embed the school into a neighborhood filled with aviation-focused businesses and institutions.

+ The building form embodies an aviation-oriented image, thereby responding to thematic goals of the curriculum and serving as an expressive signature statement to the surrounding community.

+ The structure houses the entire small learning community allowing each student to be known well by caring adults and fellow students, thereby addressing the desire for personalization.

+ General classrooms are laid out to enhance a wide range of curricular strategies. Some classrooms are grouped with science labs (stacked vertically in the east wing) allowing programmatic integration of various disciplines with the sciences. Another group of classrooms, located at the west wing of the third floor, was planned to support a broad range of spatial organizations – ranging from traditional 25-30 student rooms (as desired when the school opened); to a combination of small, medium, and large spaces supporting more differentiated learning needs; to an open plan designed to provide individual workstations for a highly individualized educational pathway. Due to the clear-span structure over the Commons and the absence of bearing walls and specialized labs, the adaptable space can be reconfigured in a variety of ways to support the evolving needs of teaching and learning.



Left: Visual connections to the Museum of Flight occur at classrooms, labs, and public spaces; Right: A number of adjacent industry partners support learning at RAHS by providing mentorship, internships, and shared amenities

+ The primary circulation route, the central stairway, encourages an awareness of the whole school and increases a sense of connection among the school community.

+ Staff offices and planning areas are located on three floors adjacent to the central stair, thereby supporting collaborative connections with students, as well as passive supervision to support a safe and secure school for all.

+ Highly specialized labs and shops are located on the ground floor to support: the project-based curriculum, partnerships with the adjacent Museum of Flight and other industry professionals, indoor/outdoor project development, ease of access for materials and large projects, adjacency to product testing spaces, and to highlight the exceptional student work for visitors.

+ Breakout learning spaces – both formal and informal - are scattered throughout the school signaling that learning happens everywhere.

+ Learning spaces are configured in various sizes to support individual, small group, and large group teaching and learning methods.

+ The multi-use Commons supports a broad array of learning, socializing, and physical activities recognizing the importance of supporting the needs of the 'whole child'.

+ Community partnerships and mentoring are enhanced by the location of conference rooms, production labs, and the Commons on the ground floor.

Small conference rooms are used by mentors / mentees and small teams for project-based learning and presentations to industry professionals

Balance of Needs

RAHS has become an effective school on many levels through clear goal-setting, steadfast leadership, extraordinary partnerships, innovative programming, and responsive planning and design. Throughout the journey, critical choices have balanced competing interests in order to achieve project success. The criteria for success, stemming from District-wide goals and project goals include:

Institutional Vitality

+ The Washington State Legislature has recognized RAHS as an Innovation School, a Washington Achiever School and a Lighthouse Model for STEM excellence.

+ US News and World Reports bestowed 'Gold' status for outstanding performance in preparing students for college; naming RAHS as the 6th top performing school in Washington State and 252nd out of more than 22,000 high schools in the country that were surveyed.

Student Achievement

Consistent with the initial concept for the school, student achievement has been paramount:

+ 98% of students graduated in 2014
+ 99% of students matriculated to post-secondary education
+ 100% of students have earned post-secondary degrees
+ The annual student retention rate is 95%.
+ 100% of parents/guardians have been actively involved with their student's learning.
+ Academically, students consistently perform in the top 2- 5% of state assessments.
+ RAHS first robotics team won the inaugural Washington/Oregon District Championship and placed 24th out of 3000 high school teams from 16 countries.
+ Extra-curricular activities include: Science Olympiad, Speech and Debate Club, Ultimate Frisbee, Environmental Challenge, Washington Aerospace Schools Program, Culture Club, Airline Career Experience (ACE), American Institute of Aeronautics and Astronautics (AIAA) and Film Club.
+ Over 170 students spent last summer interning at various aerospace companies.

Equality, Diversity and Graduation

Ethnic background

Black	4.5%
Asian/American	18.3%
American Indian	0.7%
Hispanic	10.1%
Multi-Racial	8.0%
White	58.5%

Free And Reduced Lunch 20.0%

Graduation Rate

96% of 100 students graduated in 2014, 94% of whom met college readiness standards and were accepted into college.

Budget and Schedule Adherence

RAHS was completed on time and on budget. Financial support from RAHS partners has been, and continues to be, robust.

Project Cost	$43.5 million
Project Schedule	
Design	14 months
Construction	23 months
Funding Partners	
State	9.0%
Port of Seattle	23.0%
Highline Public Schools	32.0%
Federal	1.0%
Private (Individuals, Companies, Foundations)	35.0%

Functional Adaptability

The approach to flexibility and adaptability looked at three distinct aspects of design: large, whole-building systems; the potential to reconfigure spaces; and the furniture, fixtures, and equipment that support learning. The structural, mechanical, and electrical systems selected for the building provide inherent adaptability. The steel structural frame alleviates bearing walls thereby maximizing flexibility in re-arranging the interior. The decentralized mechanical system can accommodate rezoning or the addition of duct coils to address changing needs. Accessible routing and distributed power drops mitigate changing electrical demands. Non-bearing interior walls throughout the facility support rearrangement. Strategies for adaptability within the project labs include vertical stacking to mitigate utility impacts and perimeter storage to maximize floor space flexibility. Lightweight, movable furniture and equipment encourage rearrangement to enhance a wide range of learning activities. Further specific areas of adaptability and flexibility include:

+ **Retractable overhead cord reels** maximize power flexibility in lab spaces. Between overhead power and recessed devices in the perimeter wall, there is the capability of providing power to any location within the lab.

+ Each student at RAHS is issued a laptop. A large **charging station** is centrally located and flex areas provide easy access to power and data throughout the facility.

+ The professional learning space (part of the continuous improvement program for staff) can **accommodate distance learning**, production lighting and camera locations within the studio environment.

+ Classrooms were outfitted with data devices located for **future camera installations** to promote distance learning.

+ The multi-use Commons epitomizes spatial flexibility.

+ Pull-out seating can transform the space into a formal presentation space quickly and seamlessly.

+ Motorized roller shades adjust daylight to appropriate levels.

+ Surface treatments combine hard surfaces for dining and physical play with soft surfaces for acoustic attenuation.

+ Crenellated beams above the Commons provide ample penetrations to accommodate flexible wiring relocation to enhance a variety of performance types.

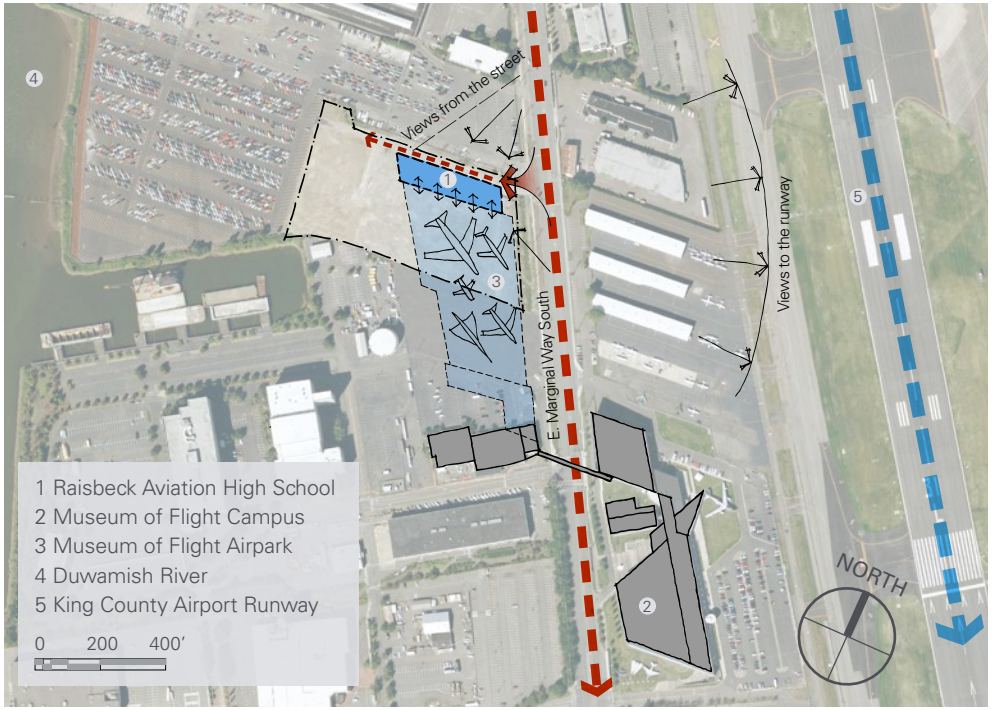
+ Relocatable performance lighting and dropdown cord reels on motorized battens provide flexibility in enhancing performances.

Site Development

Creative site development was a significant challenge at RAHS due to major constraints stemming from the property history and shared use with the Museum of Flight. The school is located on 1.4 acres of land owned by the Museum of Flight, adjacent to the Duwamish River. This, an EPA Superfund cleanup site, had a long history of manufacturing along the river's shore. Poor, contaminated soils beneath the school required removal of approximately two feet of polluted topsoil and a driven pile foundation to minimize disturbance of deeper soil contamination and address liquefaction concerns. Given the expensive excavation options, the footprint of the new building was designed for minimal lot coverage and maximum efficiency. The Museum of Flight required the remainder of the site to be used for overflow parking and relocation of the planes on display within the Airpark. Moving the airplanes demanded huge turning radii and no vertical obstructions. Therefore, no trees were allowed and light poles were required to be removable. Even the slight row of street trees was chosen to minimize obstruction of the Airpark from the street.

Given the site challenge of minimal landscape and maximum hard surface, providing a place of learning that was inviting to the community took on an even greater importance. The building's dynamic form serves as a beacon within the neighborhood that reinforces the aviation theme and invites engagement. The immediate adjacency of the Museum Airpark brings the history of commercial aviation, literally, next door. Diverse indoor/outdoor connections occur at each face of the building. The south façade connects through large roll-up doors, generous glazing, and a balcony to the Airpark. Shared projects between the museum and school can take place on the plaza linked to the Airpark. Because the museum anticipates enclosing the Airpark, the design of the east side of the building needed to accommodate a future roof addition over the plaza. To the east, a protected student courtyard nestles behind an earth berm to provide an outdoor learning or socializing environment protected from traffic noise. Above, the elegant east façade embraces a balcony and floor-to-ceiling glazing, connecting students to the busy proceedings of the airport. The north elevation provides a safe and protected main entry and drop-off zone. Above, the rolled roof geometry is punctured by generous fenestration providing even north light to learning spaces. Finally, the west façade accommodates service access and equipment at the ground level and a large window connects a flex area with views of the Duwamish River.

Original RAHS site as viewed from E. Marginal Way S.



Overall Impression

Following a courageous flight, replete with challenges such as temporary sites, massive public/private fundraising obstacles, and contaminated soils…Raisbeck Aviation High School has landed. The radiant new home is the result of inspired vision, comprehensive planning, committed partnerships, responsive design, and dogged perseverance. The iconic building welcomes dreamers and doers of all ages to engage their passion for aviation.

Projects and presentations culminate deep exploration. Inquiry-based discovery keeps the lights on nights and weekends. Learning and social milieus have intertwined. Adults collaborate with kids; informal cross-grade mentoring seamlessly coexists with friendships and after school activities. The seminal idea of a small community of learners focused on the primal dream of flight has taken root.