



Architectural rendering of renovated exterior of Akerman Hangar

AEM Update



Department of Aerospace Engineering and Mechanics

Winter 2010

Building for the Future Akerman Hall Hangar Renovation Project Begins

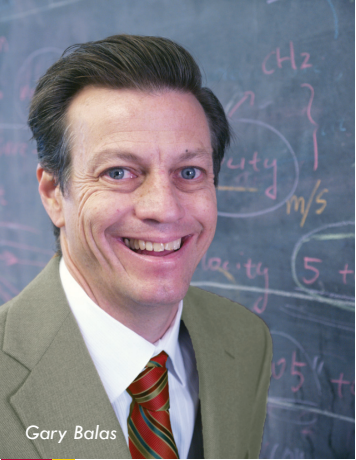
A \$2.5 M renovation of the Akerman Hall Hangar is planned as part of a \$5.3 M project to upgrade the fire/life/safety systems in Akerman Hall and the old Mechanical Engineering buildings. The project is scheduled to begin Spring 2010 and will be completed in September 2010. A tall dramatic entry vestibule and new pedestrian plaza will create a grand east entrance to Akerman Hall off of Scholars Walk. The original 16-foot steel hangar doors will be replaced with a striking, glazed curtain wall entry.

Renovation of the hangar area has been the top departmental priority for the past three years. The renovation will return the hangar to its original layout by removing the temporary laboratories, added in 1985, and hallway from the driveway to Akerman Hall. The first and mezzanine (second) floors for the hangar will

be completely replanned and repurposed to provide flexible light industrial research labs, office and collaborative space for undergraduate, graduate and post-doctoral students.

Higher Education Asset Preservation and Replacement (HEAPR) funds will pay for the addition of fire protection to the Akerman Hall and Mechanical Engineering buildings, accessible toilet rooms on the first floor Akerman Hall, enclosure of the stairways, and a new platform lift to provide access for disabled individuals from the 3rd floor corridor to the 3rd level of the hangar.

Renovation of the Hangar and the fire/life/safety upgrades for Akerman Hall and Mechanical Engineering is the result of partnership between the Office of the



Gary Balas

Chairman's Corner

Friends and Colleagues,

The end of the Fall semester is upon us and the department is looking forward to 2010. As you will see, the focus of this Update is the

Akerman Hall Renovation project. We are excited about the project, which is set to begin March 2010. Renovation of the Akerman hangar area and a new plaza on the east side of the hangar will provide a grand entrance to Akerman Hall and the East Bank of the University of Minnesota, as well as improved graduate and undergraduate laboratories and research office space. The project will also address building life and safety issues throughout Akerman Hall.

Renovation of the Akerman Hall hangar has been our top departmental priority for the past 3 years and it is gratifying to see it come to fruition. We have been successful in gaining support for the \$2.52M project from the Office of Vice President for Research, Facili-

ties Management, Institute of Technology, and, most importantly, departmental faculty, students, alumni, friends and local industry. An area in the renovated hangar is designated to recognize the generous supporters of our program and renovation project.

We are thrilled to announce that ATK Advanced Weapons Division has provided a \$75,000 foundation gift to the Akerman Hall Hangar renovation. ATK has been a long time supporter of our program and we greatly appreciate their support. The department is providing \$300,000 in matching funds for the renovation and we are committed to raising \$650,000 for the project through external support from industry, alumni, faculty and students. We have had many positive conversations with our industrial partners about the renovation. Alumni visitors have also expressed their enthusiasm for the renovation. I look forward to working with all of you to raise the funds to support the most significant improvements to Akerman Hall since the addition of the 3rd floor of the hangar in 1954. The Akerman

Hall Hangar renovation will improve the experience and opportunities for our students, faculty, staff and alumni.

I'd like to highlight two of the recent awards and recognition our faculty have received. Professor Graham Candler has been selected as a McKnight Presidential Professor. There are currently only 11 faculty with this recognition at the University. Professor Tom Schwartzentruber was selected by the Air Force to receive the 2010 Young Investigators Research Program.

In closing, I would like to take the opportunity to thank all of you who generously donated your time and money to support the AEM department. Your contributions have helped us provide an outstanding education for our students and we very much appreciate it.

Gary Balas, Head

Around the Department

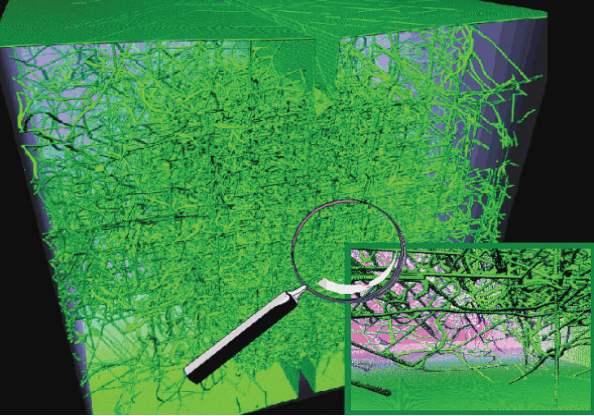
Faculty news and department happenings

AEM alumnus Lt. Col Duane Digger Carey visited the department during Homecoming week. While on campus Carey met with students and also presented a public lecture with the Institute of Technology. | Prof. Gary Balas cochaired the International Workshop of the Future of Controls held in Berchtesgaden, Germany in October 2009. | Prof. Tom Schwartzentruber was selected by the Air Force to receive the 2010 Young Investigators Research Program. | Prof. Graham Candler has received the honor of McKnight Presidential Professor from the Board of Regents. | In November the 62nd Annual Meeting of the American Physical Society's Division of Fluid Dynamics was held in Minneapolis. AEM Prof. Krishnan Mahesh was the chair of the local planning committee. This meeting brought over 1900 people from all over the globe to campus and downtown Minneapolis. | AEM



View of Akerman Hall Hangar from Scholars Walk

Post-doc Dr. Yaniv Ganor was selected to receive the Barazani Foundation Prize for outstanding PhD research from his alma mater, Technion Israel Institute of Technology. | Prof. Richard James gave the Pacific Institute for the Mathematical Sciences Distinguished Lecture in Vancouver. | Prof. Roger Fosdick gave an invited lecture series in August of 2009 at the University of Sao Paulo, School of Engineering at Sao Carlos, Brazil.



Abraham F F, Walkup R, Gao H J, Duchaineau M, De la Rubia T D, Seager M "Simulating materials failure by using up to one billion atoms and the world's fastest computer: Brittle fracture"

Knowledge-base of Interatomic Models

Tools for the researchers of tomorrow

AEM faculty Prof. Ellad Tadmor and Ryan Elliott received a \$2.0 million grant from NSF to build a data-

base that will revolutionize how researchers think about and perform atomistic materials simulations.

Atomistic simulations in materials science and nanotechnology play a key role in many scientific and industrial applications. However, the predictive capability of these approaches hinges on the accuracy of the mathematical models used to describe atomic interactions.

The group, which also includes Prof. James Sethna from Cornell University, will build an interactive self-extending database that will allow users to rapidly compare model predictions with reference data to generate new predictions. The database will be known as the Knowledge-base of Interatomic

Models (KIM).

Tadmor comments, "In almost any discipline of science and engineering, the availability of robust reliable interatomic potentials would revolutionize the way atomistic simulations can be used as part of the research and development process."

Currently, no standard approach exists for quantifying the range of applicability or estimating the accuracy of model predictions. The field of atomistic modeling struggles with the unknown capacity to predict phenomena outside the fitting database.

Elliott says, "We have assembled a great team of leading researchers and students in the field of atomistic simulation and, with the new NSF CDI funding, we now have a great opportunity to create a tool that will help catalyze future scientific developments and technological breakthroughs."

The creation of the KIM system will provide unprecedented standardized access to the state-of-the-art atomistic models and simulations and will bring about a paradigm shift in how models are developed, selected, and used.

The End of an Era

Joseph retires after forty-six years

After forty-six years, Professor Daniel D. Joseph retired from AEM this fall. He was the only faculty member at the University of Minnesota to have been elected to all three of the most prestigious national academies; the National Academy of Science, the National Academy of Engineering, and the American Academy of Arts and Sciences. Joseph leaves a legacy of ground breaking theoretical, experimental and computational research in fluid mechanics.

Joseph's former students and colleagues assembled to celebrate his 80th birthday at a Symposium for Fluid Mechanics, held on campus in August of 2009.

Joseph has authored seven books, edited five books and authored over 375 articles.

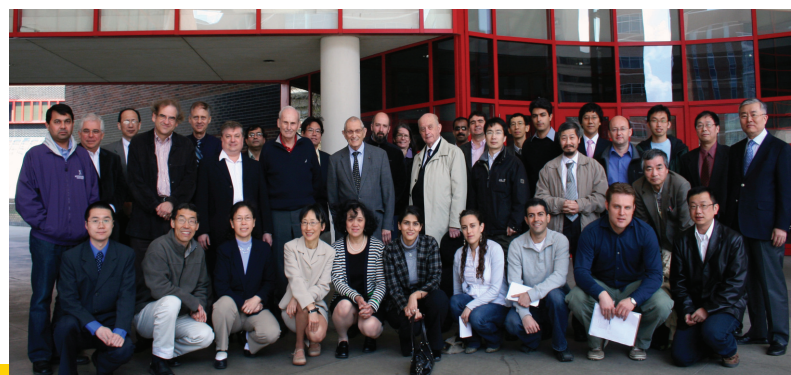
He is a named inventor of 10 patents, has consulted for over a dozen firms, and has served as an Associate Editor for 10 journals. He was recognized among the highest cited researchers in academia.

Professor Joseph and his research group engaged in research on viscoelastic fluids, multiphase flows, fluidized beds, two-fluid dynamics, and drag reduction. He led projects concerned with the motion of solid particles and drops and bubbles in Newtonian and viscoelastic fluids. The work carried out in Joseph's lab was done with the aid of experiments, theory and high performance

computing.

During his career Joseph was selected as a Russel J. Penrose Professor and Regent's Professor. Regents Professor is the highest recognition for faculty by the University of Minnesota.

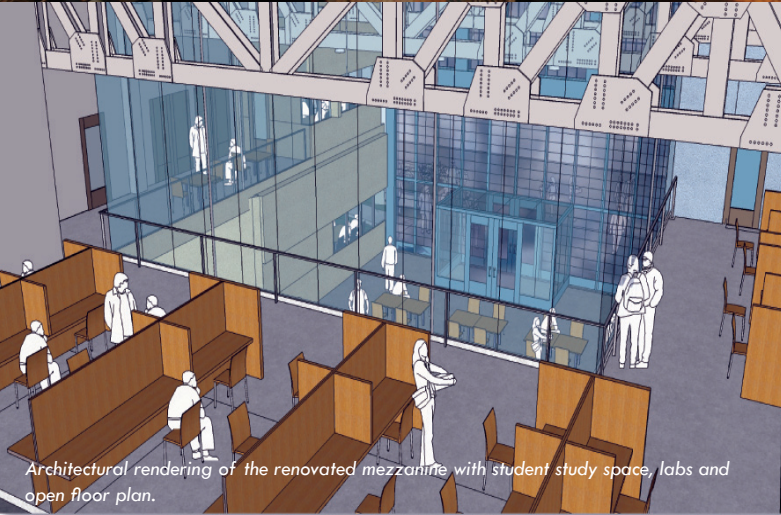
Joseph remains dedicated to his work and plans to actively continue his research.



Joseph (center) with the attendees of the Symposium of Fluid Mechanics held on campus, August of 2009.



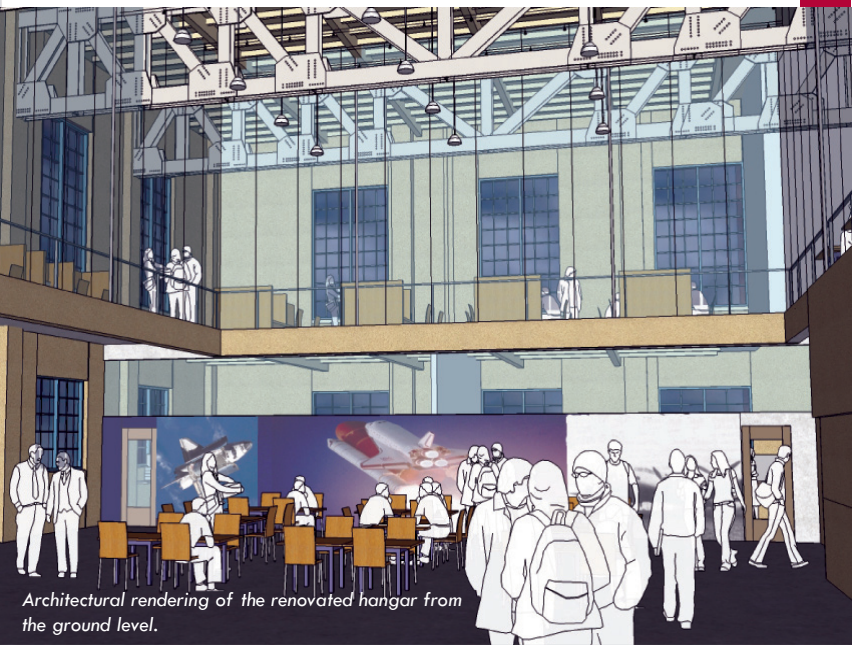
Present view of the second floor of Akerman Hall hangar.



Architectural rendering of the renovated mezzanine with student study space, labs and open floor plan.



Present view of the first floor showing the temporary lab spaces constructed in 1985.



Architectural rendering of the renovated hangar from the ground level.

Continued from page 1

Vice President of Research (OVPR), Facilities Management, the Institute of Technology and the Department of Aerospace Engineering and Mechanics (AEM).

The Hangar project was initially awarded \$475,000, which was subsequently increased to \$570,000, from the State of Minnesota Laboratory Renovation fund by the OVPR for laboratory renovation. AEM is providing \$300,000 in matching funds, the Institute of Technology is contributing \$500,000 and Facilities Management is providing \$500,000 to address fire/life/safety in the hangar area.

AEM is committed to raising the additional \$650,000 for the hangar renovation through external support from industry, alumni, faculty and students.

The Akerman Hall Hangar was constructed in 1948. At the time, it was used for actual aircraft testing and retains much of the original construction and infrastructure. The original two-story space was intended to accommodate an airplane with the large, 16-foot high steel doors that open to Union Street. The comprehensive remodeling of the hangar will correct many building code violations, provide a more efficient use of space and create an attractive, engaging and collaborative learning environment better than any space currently in the department. The project will also provide greater energy efficiency by replacing all the single-pane windows with historically accurate, high efficiency windows and a new heating, ventilation and air conditioning system.

The project is being led by BWBR Architects of St. Paul, M.A. Mortenson is the general contractor and Sebesta Blomberg & Associates are the mechanical design contractors. Progress on the Akerman Hall hangar renovation project can be found at www.aem.umn.edu/hangar. Future editions of AEM Update will provide progress information on the project.

ATK donates \$75,000 to Hangar

ATK Advanced Weapons has generously donated \$75,000 to the renovation of the Akerman Hall Hangar. ATK is based in Plymouth, Mn, and is an aerospace and defense applications organization that hires many AEM and UMN graduates.

John Weyrauch, Vice President of Engineering at ATK and member of the AEM Professional Advisory Board, sees funding the new facility as one of the important ways his organization supports the department and the students who someday may be a part of their organization.

Nearly half of ATK's 600 local employees are directly employed as engineers and many others with engineering backgrounds work in functions such as program management, business development, production, operations and safety. ATK has more than 18,000 employees internationally.

Weyrauch states, "We feel strongly about continuing to build a relationship with the University. We have sponsored a number of interns throughout the year, and have found that their contributions to the organization have always been

nothing short of excellent. This is a way for us as an organization to give back to the University and help provide state of the art capabilities and facilities for the students who are the future of our profession."



Architectural rendering of the renovated hangar from exterior.

Giving to AEM

A note from the Development Office

Thanks to the many alumni and friends who gave so generously to the Department of Aerospace Engineering and Mechanics in fiscal year 2008-09. These annual gifts are instrumental in supporting our students, faculty and the academic program. They allowed us to attract and admit the most talented freshman class to-date in the Institute of Technology this fall.

With state support of the University decreasing rapidly, tuition rising significantly, and a challenging economy,

the need for private support for the college and the department has never been greater.

All gifts, of whatever amount, are making a difference in the lives of our students. The continued support of our alumni, faculty, staff and friends will ensure that our students will have the chance to shape the future of our world thanks to the education they receive in our department and the Institute of Technology.

Join us in training the next generation of scientists and engineers by supporting the department and the college.

You can make gift online through this link <http://it.umn.edu/alumni/giving/index.html> or contact Kathy Peters-Martell, External Relations Officer for the Department of Aerospace at 612-626-8282 if you need assistance in making your gift.

Congratulations Scholarship Recipients

Top undergraduates recognized for academic accomplishments

2009 - 2010 AEM Scholarship Recipients

Greg Hoepfner, Chester Gaskell Aeronautical Engineering Scholarship
Karime Alame, Chester Gaskell Aeronautical Engineering Scholarship
Max Schadegg, Chester Gaskell Aeronautical Engineering Scholarship
Graydon Finn, Rose Minkin Scholarship
Matthew Hardel, Rose Minkin Scholarship
Jonathon Olson, John and Robert McCollum Memorial Scholarship
Samuel Hess, Richard & Shirley DeLeo Scholarship
Cole Kazemba, Richard & Shirley DeLeo Scholarship
Stephen Haviland, Robert H. & Marjorie F. Jewett Scholarship
Letian Chen, Boeing Scholarship
Brenton Hartung, Boeing Scholarship
David Blette, Boeing Scholarship
Erik Eid, Boeing Scholarship
Joseph Tuttle, Boeing Scholarship
Steven Prinsen, Boeing Scholarship

We are pleased to announce the award of fifteen undergraduate scholarships for the academic year of 2009-2010. Top students are selected each year and recognized with a monetary gift.

The department congratulates all scholarship winners and commends them on their exemplary academic performance and achievements.

Funding for these scholarships is provided through special programs such as the Rose Minkin Scholarships, Chester Gaskell Aeronautical Engineering Scholarship, AEM Program Support, DeLeo Scholarships, and Jewett Scholarships.

From the Students

2009-2010 Scholarship recipients express gratitude to donors



"I am extremely grateful to have been awarded the Chester Gaskell Aeronautical Engineering Scholarship. I grew up with a father who had a fascination for planes and in turn inspired me

to follow his footsteps."
- Karim Alame



"Receiving the Boeing Scholarship award shows me that hard work and dedication is rewarded in the end. I take much pride in my studies, and I appreciate being recognized for doing so. I'd like to

thank the Boeing Company for providing me with this scholarship."
- Brenton Hartung



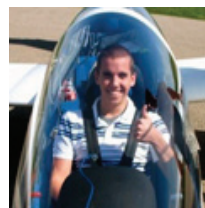
"I am greatly honored to be presented with the 2009-2010 Boeing Scholarship. As I advance into the next semester and throughout my college career, I will continue my

best efforts as I have done before."
- Joe Tuttle



"I am deeply grateful and honored to be the recipient of the Rose Minkin scholarship award for this year. I am very interested in low Reynolds Number flight and the impact aerospace engineering can have on our world."

- Graydon Finn



"I am very honored to receive the Chester Gaskell Aeronautical Engineering Scholarship. This award provided me with valuable financial assistance and the encouragement

to continue giving my best effort in such a challenging field."
- Maximilian Schadegg



"It is a great honor to receive a Boeing Scholarship this year. I am from a very small town in Wisconsin and I never once dreamed of being recognized by such a

renowned aerospace corporation..."
- Erik Eid

Thank You

The department of Aerospace Engineering and Mechanics thanks the alumni, friends and businesses that donate their financial support, time, and talents to furthering our mission. This supports the opportunities and growth of students in our graduate and undergraduate programs.

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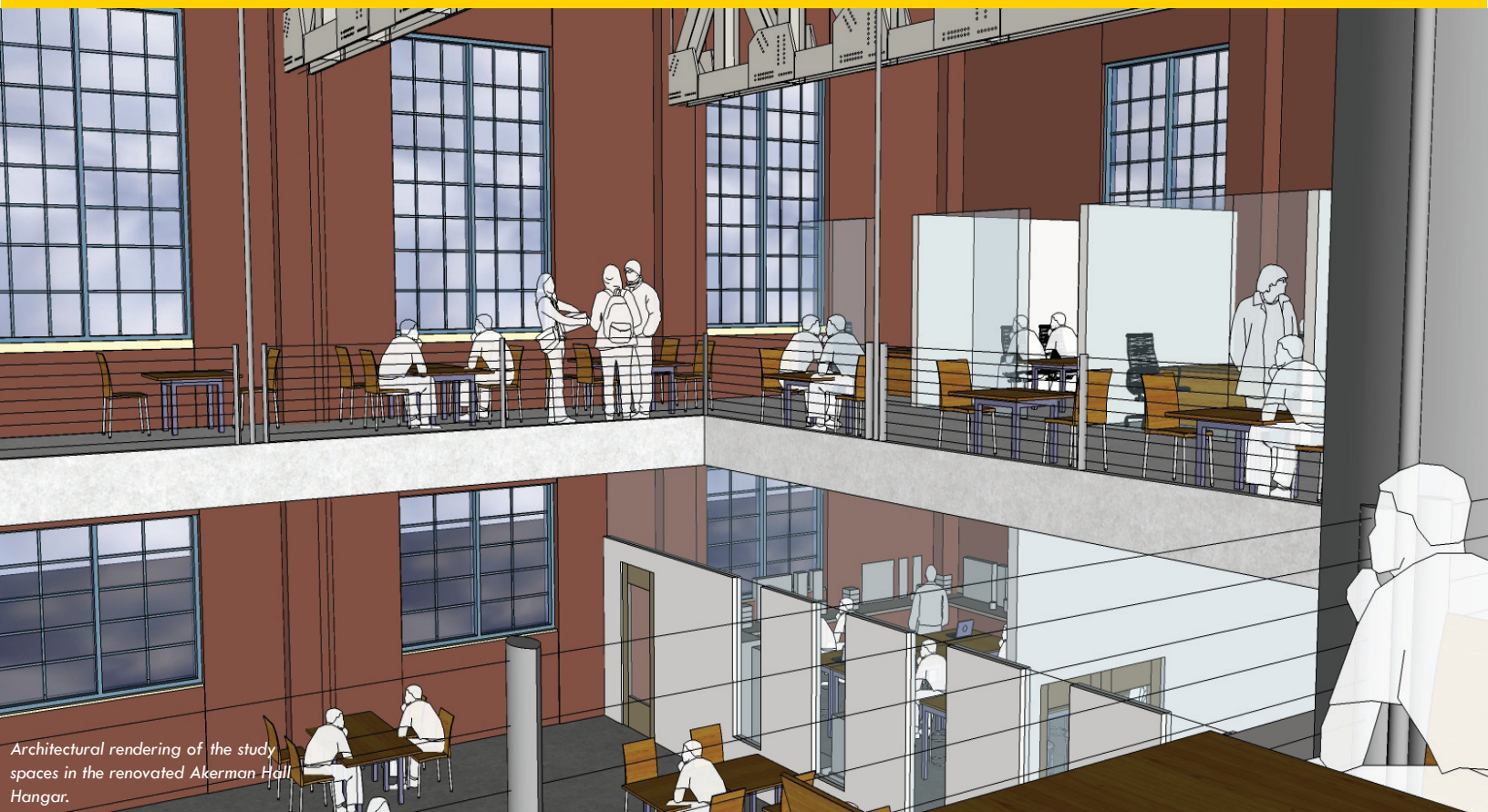
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Aerospace Engineering and Mechanics
University of Minnesota
107 Akerman Hall 110 Union St S
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Tel: 612-625-8000
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Architectural rendering of the study spaces in the renovated Akerman Hall Hangar.