

A Comparison between New and Established Collegiate Aviation Programs: Challenges, Lessons Learned, and Prospects

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Introduction & Background

With the rapid technological advancement and critical workforce transformation, the national workforce shortage for pilots and aviation management personnels are increasing. Boeing [1] estimates that there will be a long-term demand of 660,000 new pilots globally from 2025 - 2044. The Aviation Accreditation Board International (ABBI) serves as a third-party accreditation organization for aviation programs globally [2]. The accreditation evaluation considers quality of instruction, career placement opportunities, comprehensive continuous improvement, and recognition and credibility [2]. According to the Federal Aviation Administration (FAA) [3], there are 700 Part-141 certified flight schools in the U.S. Among those flight schools, only 37 universities are ABBI accredited [4]. Collegiate aviation programs in the U.S. play a pivotal role in providing holistic education and flight and management professionals to the industry.

This research paper aims to compare a newly established collegiate aviation program with a well-established aviation program, both of which are located within minority-serving institutions (MSIs). San Jose State University has a successfully established aviation program that gains steady enrollments and flight training. Texas A&M University - Victoria has a newly founded aviation program that anticipates starting flight training operations with the first cohort of students in August 2026. The study focuses on key areas, including program enrollment, curriculum development, faculty recruitment, future development, program assessment, and the current and future challenges faced by each program. A mixed-methods approach that incorporates both quantitative enrollment data, faculty recruitment, and qualitative interviews with faculty and students, and the program assessment plan. This research aims to evaluate how these programs address the unique needs of minority and first-generation students and align their skills with the demands of the aviation industry. Preliminary findings suggest notable disparities in enrollment figures, with the new program showing significant growth potential but facing initial hurdles in student and faculty recruitment, curriculum development, faculty, and resource allocation. On the other hand, while the established program boasts robust and consistent student enrollment growth, it shows the challenges of a lack of resources and faculty to sustain the increasing number of student enrollments. This study also compares and discusses the challenges and lessons learned regarding student recruitment and retention, as well as the experiences of first-generation college students and the third-party accreditation of these institutions. The findings of this study may be useful to collegiate aviation programs in constituting an effective program assessment strategy or address potential challenges in MSIs.

Institutional Context

San Jose State University's Aviation Program represents a well-established collegiate aviation program with a long history of development and industry alignment. Housed within the College of Engineering, the program has evolved over several decades to meet the changing needs of the aviation industry, emphasizing both technical competence and management proficiency. Enrollment trends indicate consistent participation across its aviation specializations, supported

by the university's reputation, the geographic demand to major aviation and aerospace hubs, and strong alumni and industry connections. Structurally, the program offers an integrated approach to aviation education, combining flight training pathways through external Part 141 flight training partners with a comprehensive aviation management and operations curriculum. Historically, the program was named Aeronautics until 1990, when it was formally renamed the Aviation Program, reflecting the expansion of its academic scope and industry focus.

The Bachelor of Science in Aviation Program at Texas A&M University - Victoria was approved and funded by the state government to fill the gap of absence of nearby flight schools. The program is integrated in the College of Natural and Applied Sciences, and the university has reached a partnership with the local regional airport to conduct flight training operations. The program is designed to take advantage of the regional interest, available facilities, generally favorable weather conditions, and job market.

University Demographics

Table 1 shows the number of undergraduate enrollments of the two universities.

TABLE 1 Number of Undergraduate Enrollments of the Two Universities [5,6].					
San Jose State University	Academic Year (AY) 20-21	AY 21-22	AY 22-23	AY 23-24	AY 24-25
Enrollment Headcount	3376	4295	4085	4552	4654
Texas A&M University - Victoria	Fall 2020	Fall 2021	Fall 2022	Fall 2023	Fall 2024
Number of Enrollment	3482	3038	2858	2707	2627

Due to data availability, this paper only presents the number of undergraduate enrollments at Texas A&M University - Victoria in the Fall semesters, whereas the enrollment at San Jose State University is only available by academic year. The enrollment data for the two universities shows diverging trends within MSIs. San Jose State University experiences significant growth from AY 20-21 to AY 24-25, increasing from 3376 to 4654 in new undergraduate enrollment, with a 38% increase. On the other hand, Texas A&M University - Victoria had a steady decline from 3482 to 2627 in new student enrollment in the Fall semester. Both universities serve a high percentage of first-generation students and minority students.

While both universities are considered as a minority served institutions, the student demographic for San Jose State University can be shown in Figure 1

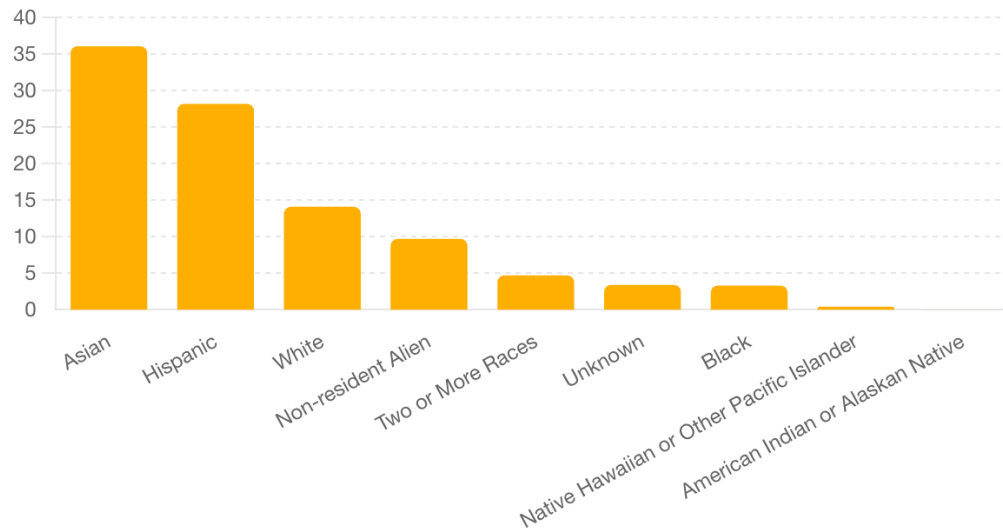


Fig. 1. Student Demographics at San Jose State University. [7]

Curriculum Development

At San Jose State University, the aviation program offers four academic pathways, including Professional Flight, Aviation Management, and Aviation Operations and Maintenance Management. Students in all four pathways earn a bachelor's degree. The Maintenance Management specialization, however, follows a 2+2 program designed for students who have already completed their Airframe and Powerplant (A&P) licenses. These students complete just two years of upper-division coursework to earn a bachelor's degree. While the curriculum catalog has been developed and applied for years, San Jose State University have been consistently trying to develop new courses to fit the needs of the current and future aviation industry growth such as Unmanned Aerial Systems and Sustainability in Aviation. A significant challenge in curriculum development aligns with one of the major challenges San Jose State University is facing: the lack of full-time faculty with expertise in course and curriculum development.

The Bachelor of Science in Aviation program at Texas A&M University - Victoria offers two academic pathways, with a Professional Flight track, and an Aviation Management track. By participating in the Professional Flight track, students can ultimately obtain Certified Flight Instructor (CFI) by the time of graduation with certain flight hours. Management track students will gain in-depth knowledge of the aviation industry needed to fill various ground-based roles in the field. The curriculum development in the new program focuses on the fundamental skills and knowledge the students need to obtain flight certification or to understand the industry. The structure of the curriculum includes general courses required to obtain Bachelor of Science degree in fields such as math, physics, etc. The program also provides aviation courses including both ground school instruction and flight training to students in the Professional Flight track; and provides in-depth courses such as Airline Management and Airport Planning Management to students in the Aviation Management track. However, the program has not designed any courses related to the emerging technologies in the aviation industry such as UAS or Artificial Intelligence. It is expected that the program will hire additional faculty with related backgrounds for curriculum development when the first cohort of students reach upper division. A partnership

has been reached between the university and the local regional airport to use the airport as the major facility for flight training.

Program Growth Trend

Table 2 shows the number of enrollments at the aviation program in San Jose State University by academic years.

TABLE 2					
Number of Enrollment at the Aviation Program in San Jose State University by AY [5].					
	AY 20-21	AY 21-22	AY 22-23	AY 23-24	AY 24-25
Enrollment Headcount	43	51	66	97	119

The aviation program at San Jose State University demonstrates the rapid growth characteristic of a newly established program responding to industry demand. Between the 2020-2021 and 2024-2025 academic years, enrollment surged from 43 to 119 students, representing an overall increase of approximately 177%. The most significant year-over-year jump occurred in AY 23-24, where headcount rose by nearly 47%. This upward trajectory underscores the program's success in student recruitment and its vital role in expanding the pilot pipeline. However, such accelerated growth may cause the need for proportional resource allocation, particularly in faculty hiring and flight training infrastructure, to maintain education quality and flight training safety standards.

Due to the fact that Texas A&M University - Victoria is in the process of starting its aviation program and anticipates the first cohort of students in 2026, the enrollment data of the aviation program is not available when this research is conducted. Table 3 shows the anticipated enrollment of students at the Texas A&M University - Victoria aviation program. The university anticipates approximately 5 students enrolling in the first year, with steady growth over the years. To adapt to the growth, the university plans to hire a program coordinator and a faculty to ensure the teaching quality and student experiences when the first cohort of students reach upper division. The second faculty is also expected to contribute to the development of new courses related to emerging technologies for the program.

TABLE 3					
Anticipated Number of Enrollment at the Aviation Program in Texas A&M University – Victoria [6]					
	Year 1	Year 2	Year 3	Year 4	Year 5
Enrollment Headcount	5	8	12	20	30

Third-party Accreditation

As a globally recognized accreditation entity, ABBI serves as the major accreditation organization of aviation for colleges and universities. To obtain the ABBI accreditation in a

Baccalaureate degree program, ABBI requires a site visit to the university, and a self-study report from the university that contains comprehensive assessment of the following subjects [8]:

1. Student and Student Support Services
2. Program Mission and Education Goals
3. Student Learning Outcomes
4. Curriculum
5. Faculty and Staff
6. Facility and Equipment
7. Institutional Structure and Support
8. Aviation Safety Culture and Program
9. Relations with Industry
10. Diversity, Equity, and Inclusion
11. Continuous Assessment and Improvement
12. Complementary Degree Programs
13. Credit for Non-Collegiate Achievement

San Jose State University is not currently accredited by AABI. However, with new full-time faculty joining the department in Fall 2024, achieving AABI accreditation has become a primary focus. Faculty members have received release time to work on the accreditation process and are attending in-person conferences and online webinars. After establishing a foundational process, the faculty leading the effort have begun developing assessment plans and identifying the main obstacles to obtaining accreditation.

As the aviation program at Texas A&M University - Victoria currently does not have any enrolled students yet, the program has not started the initial application of ABBI accreditation. However, the university intends to actively seek accreditation when the program grows. Currently, the program may anticipate challenges in the accreditation process in aspects such as faculty and staff, relations with industry, continuous assessment and improvement, and credit for non-collegiate achievement.

Major Challenges

This section discusses some of the major challenges that were encountered in both programs.

Faculty recruitment and retention.

Although it has a strong and steady growth in program enrollment, San Jose State University Aviation Program faces several challenges that affect ongoing program development and sustainability. One of the primary challenges is faculty recruitment and retention. Currently, the program has only three full-time faculty members along with eight part-time lecturers. Before AY 2024, the program has not had full-time faculty member for over three years. The program was sustained mainly relying on part time lectures. The aviation industry places a strong emphasis on professional experience and industry-specific certifications and ratings. While these qualifications are highly valued in practice-based programs, many highly qualified aviation

professionals do not hold terminal degrees that align with the university's faculty hiring requirements.

For San Jose State University in particular, one significant challenge affecting faculty retention is the high cost of living in the region where the university is located. The region where San Jose State University is located is known for its rising costs of housing, transportation, and living expenses which place substantial financial pressure on faculty members, especially those in early or mid-career stages. When combined with comparatively lower academic salary structures relative to the aviation industry, this economic reality makes it difficult for the program to retain qualified faculty over the long term. Over the past five years, the Aviation Program at San Jose State University has experienced notable challenges in retaining tenure-track faculty. During this period, two tenure-track faculty members left the program with one transitioning to a higher-paying position in the aviation industry and the other accepting an academic appointment in a different state with a significantly lower cost of living.

The impact of shortage on full-time faculty disrupts instructional continuity and advising capacity but also places additional strain on remaining faculty members and slows progress in curriculum development, research productivity, and long-term program planning. Collectively, these factors highlight the need for strategic retention efforts to ensure program stability and sustained growth and even accreditation process.

Limited resource capacity

Another major challenge is the limited resources including both physical instructional spaces, student activity areas and financial resources and funding to support the large number of enrollments. As student enrollment continues to grow, the demand for laboratory space, simulation equipment, and administrative support also increases. These resource limitations can impact the program's ability to scale effectively, update instructional technologies, and maintain optimal student-to-faculty ratios. Reliance on external Part 141 flight training partners further requires careful coordination to ensure sufficient aircraft availability and training capacity to meet student needs.

San Jose State University relies heavily on hangar facilities at the local county airport to support laboratory instruction and the flight schools around the county airport to conduct flight training. These off-campus hanger facilities are important and essential, as the main campus lacks the physical space required to accommodate large-scale, hands-on aircraft maintenance lab work and flight operations. However, the ongoing urban development planning has prompted multiple discussions regarding the potential closure of the county airport for residential disruption and real-estate development. Although no final decision has been made, this uncertainty presents a significant risk to the continuity and growth of the aviation program. Overreliance on a single external facility not only disrupts students' access to flight training and laboratory experiences but also raises serious concerns for long-term program development and sustainability.

At the time of writing, Texas A&M University – Victoria expects a total of 8 incoming students in Fall 2026, with 2 of them enrolling in the program with certain flight ratings. The university, airport, and flight school are undergoing discussions on methods to facilitate limited resources

such as hanger space, training aircraft, and instructors to ensure all students receive flight training at different levels as needed. In the long-term projection, the program may face similar problems as San Jose State University, where ground and flight training instructions are only conducted at the local regional airport.

Issues with Under-Prepared, Minority, or First Gen Students

One of the major challenges the faculty faces during student recruitment is issues with under-prepared, minority, or first-generation college students. Recruiting and retaining such students may encounter potential issues of financial, cultural, and informational barriers. The cost of the flight training cost is often the financial hurdle that many first-gen and minority students from low-socioeconomic backgrounds faces to become pilots. Such gatekeeping effect is most significant at Texas A&M University - Victoria where students are comprised of significant percentage of first generation and minority students.

In addition, the faculty also identified information gaps of students without family history in aviation or higher education. These students tend to struggle with the complex FAA certification regulations and collegiate enrollment process, which eventually resulted in dropping out of the program. Cultural isolation and lack of representation in the cockpit may present an inaccessible sensation to these students. Addressing these issues requires holistic support from the systems, such as summer bridge programs, asset-based mentoring, and intentional community outreach that reframes aviation as a viable and supported career path for all.

Discussions and Lessons Learned

At San Jose State University, effective curriculum development and applicants require sustained involvement from full-time faculty with both academic background and curriculum design expertise. Reliance on part-time or industry-only instructors, while valuable for applied learning, limits long-term curriculum coherence, assessment, and continuous improvement as in most part time lectures have another full-time job that is their priority.

In addition, the disconnect between industry expectations and university faculty requirements underscores the need for more flexible and innovative hiring and credentialing strategies. While the aviation industry prioritizes professional experience and certifications, academic institutions must find ways to recognize these qualifications without compromising accreditation standards, ensuring that students benefit from both scholarly rigor and real-world expertise. To address this challenge and to improve the recruitment of qualified instructors, San Jose State University has agreed to revise its terminal degree requirements by allowing candidates with a Master of Science (M.S.) degree and demonstrated research experience, rather than requiring a Ph.D. exclusively.

Finally, heavy dependence on a single external facility for flight and laboratory instruction exposes the program to operational and developmental risks beyond the university's control. Infrastructure uncertainty, such as the potential closure of the county airport, lease agreement, increase in rent, can significantly disrupt instructional delivery, student progression, and program

growth. This reinforces the importance of proactive risk management, diversified facilities, and strategic partnerships.

The development of the aviation program at Texas A&M University-Victoria provides a roadmap for regional HSIs aiming to enter a STEM related sector. The program serves a critical role in the pilot pipeline for first-generation and minority students, who comprise a significant portion of the university student population.

However, recruiting and retaining these students involves navigating substantial financial, cultural, and informational barriers. High flight training costs often act as gatekeeping hurdle for students from low-socioeconomic backgrounds. Additionally, students without a family history in aviation frequently struggle with complex FAA regulations and the collegiate enrollment process. To mitigate these issues, the university has identified the need for holistic support, such as intentional community outreach, asset-based mentoring, and bridge programs.

Operationally, the program relies on strategic partnerships with the local regional airport to facilitate flight training and address limited resources, such as hangar space and aircraft availability. The long-term sustainability of the program depends on the successful recruitment of specialized faculty and the pursuit of third-party accreditation (ABBI) though the program anticipates challenges in faculty staffing, industry relations, and continuous assessment.

References

- [1] Boeing. "Pilot and Technician outlook." <https://www.boeing.com/commercial/market/pilot-technician-outlook>
- [2] AABInternational. "Home - AABInternational," Aug. 12, 2025. <https://www.aabi.aero/>
- [3] Federal Aviation Administration. "AVInfo Find a facility dashboard," <https://www.faa.gov/av-info/facility-dashboard>
- [4] AABInternational. "Member Directory." <https://aabi-dir.weaveaccreditation.com/>
- [5] San Jose State University. "Student Enrollment Dashboards," [Online]. Available: https://prd-analytics.sjsu.edu/t/IRPublic/views/Student_Enrollment_Dashboard/StudentEnrollment?%3Aorigin=card_share_link&%3Aembed=y
- [6] Texas A&M University – Victoria. "Institutional Data and Accountability Measures," [Online]. Available: <https://www.tamuv.edu/institutional-research-effectiveness/institutional-research/>
- [7] San Jose State University. "By the Numbers | Facts and Accomplishments," [Online]. Available: <https://www.sjsu.edu/facts-and-accomplishments/facts.php>
- [8] AABInternational, "ACCREDITATION CRITERIA MANUAL," Jul. 2025. [Online]. Available: <https://growthzonecmsprodeastus.azureedge.net/sites/2232/2025/07/AABI-Form-201-Criteria-Manual-Rev.-7-17-25.pdf>