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The Rationale for Embry-Riddle Aeronautical University's Ph.D. in Aviation: A Brief Explication

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FORUM**THE RATIONALE FOR EMBRY-RIDDLE AERONAUTICAL UNIVERSITY'S
Ph.D. IN AVIATION: A BRIEF EXPLICATION**

Alan J. Stolzer

The Doctorate

The earliest versions of a doctoral degree originated in Europe during the Middle Ages as a license for a *master* to impart wisdom to students at the universities of that time. The meaning of the doctorate and the requirements to obtain one have evolved over time and differ considerably in different parts of the world. Today there are many different types of doctoral degrees, including research doctorates, higher doctorates (found in some countries such as the U.K. and Ireland), professional doctorates (Medical Doctor, Juris Doctor, Doctor of Business Administration, Doctor of Education, Doctor of Public Administration, and many others), and honorary doctorates.

In most countries, including the U.S., the Doctor of Philosophy, or Ph.D., is generally the highest academic degree awarded in a field of study. The Ph.D. signifies that the student has not only mastered the body of knowledge in a particular field, but has also demonstrated the capacity to conduct original research and, in so doing, *contribute* to that body of knowledge. Though some other doctorates may have research components as part of the requirements, the Ph.D. is the doctorate regarded as a research degree.

The Maturation of a Discipline

As disciplines develop and mature, so do the academic programs that prepare educators and practitioners in those fields; the aviation discipline is no exception. Aviation has evolved and matured rapidly in the 20th century following the flight of the Wright brothers. The span of time from that first powered, controlled flight in 1903 to the landing of Apollo 11 on the moon was a mere 66 years. Aviation matured with high-altitude flight, flight solely by reference to instruments, the advent of the jet engine, construction of high-tech airports, and many other developments. Countless disciplines have informed and thus contributed to the aviation body of knowledge. This pattern of growth is not unlike that experienced in other applied science and technology areas, such as computer science, operations research, technology management, and engineering technology, to name a few.

The discipline of aviation is the body of knowledge and practices used by aviation professionals in their work. The profession contains various specialties such as aviation management, law, safety, economics, maintenance, piloting, electronics, ergonomics, physics, and others. Several factors

serve as evidence that the body of knowledge in the aviation field now justifies a Ph.D. program, including: 1.) the growth of aviation academic programs at both the undergraduate and graduate levels, 2.) the maturation of the aviation standards/criteria developed by the Aviation Accreditation Board International, 3.) the increase in the number of aviation publications and journals, and 4.) the nature and depth of research demanded in the field today. Each of these factors is discussed very briefly in the following paragraphs.

1.) Growth of Aviation Academic Programs

Undergraduate degrees in programs such as aeronautical science, aviation technology, aviation management, professional pilot, aviation maintenance, and aviation electronics, have been offered for more than fifty years. Currently, more than two hundred colleges and universities around the world offer such degrees producing more than 5,000 graduates annually. At the graduate degree level, universities have offered the Master's degree in programs such as Aeronautics, Aeronautical Science, Aviation Safety, Aviation Management, Aviation Administration, and Aviation Technology since the mid 1970s. Embry-Riddle

Embry-Riddle Aeronautical University's Ph.D. in Aviation

Aeronautical University (ERAU) was the first university to offer a master's degree in aviation, and has graduated more than 14,600 students from master's level degrees since 1978.

2.) Aviation Accreditation Board International Standards/Criteria

The Aviation Accreditation Board International (AABI), an outgrowth of the University Aviation Association, was created in 1988 as an independent organization to accredit non-engineering aviation programs at the undergraduate and graduate levels. AABI has developed criteria that serve as the basis to evaluate the quality of the educational program offered and to hold the program accountable to the educational community, the aviation profession, and the public. Criteria are specified in core topic areas, such as aviation safety and human factors, national and international aviation law and regulations, environmental issues, and others, and in specialty areas, such as professional pilot, aviation maintenance, aviation electronics, safety science, aviation studies, and aviation management. At a fundamental level, these criteria reflect the current body of knowledge for the aviation industry and represent the academic foundation for a Ph.D. in Aviation degree.

3.) Aviation Publications and Journals

The maturity of a discipline can also be measured by the production of scholarship in the field. The following are selected articles of evidence of the quantity and quality of that production.

Journals

Scholars in a field of study require an outlet for their work, and peer-reviewed academic journals are considered the primary venue for communicating that work. Years ago, there were very few academic journals; today, there are dozens of aviation-related publications to accommodate the tremendous increase in scholarship in the field. These include: Journal of Air Transportation, Collegiate Aviation Review, Journal of Air Transport Management, Journal of Air Traffic Control, International Journal of Aviation Management, Journal of Airport Management, Journal of Aviation/Aerospace Education & Research, International Journal of Aviation Psychology, International Journal of Applied Aviation Studies, and others.

Dissertations and Publications

A search on ProQuest (using the simple search term *aviation*) gives us an indication of the overall scholarly production in the field. It is noteworthy that the first aviation-related dissertation or thesis was published in the 1920s, the number of them has increased in every decade since, and we now have over 500 theses in this decade alone. Remarkably, the number of aviation-related

publications has more than doubled in each of the past five decades.

The Society of Automotive Engineers (SAE) database also provides striking evidence of the growth of scholarship in the aviation field. The dramatic increase of aviation and aerospace-related publications appears to be concurrent with the development of graduate degree programs in the field.

4.) Research Needs in the Aviation Field

Skilled researchers are needed in the field of aviation. Historically, these researchers have come from other disciplines, but there is a growing need for researchers who possess a broad understanding of the aviation system. For example, the Federal Aviation Administration plans to spend billions of dollars over the next several years on NextGen development and capital costs. Skilled aviation researchers are needed to support these research projects, and NextGen is but one illustration of a much broader landscape of research needs within the aviation industry today.

Demand

Recognizing this need, ERAU conducted a survey of its alumni in late 2007 to determine the demand for a Ph.D. in the aviation field. The survey was conducted online and on paper, and more than 2,300 responses were received (22% response rate). 83% of those responding indicated that they would be interested in enrolling in ERAU's Ph.D. program, and almost 70% indicated that they would prefer the degree to be offered online. In addition, various aviation companies that were contacted indicated enthusiastic support for the program.

The Program

ERAU program planners defined the skills and knowledge needed by our doctoral graduates. Once the purpose of the program was defined (i.e., *to produce scholars in the field of aviation*), the learning objectives were developed. The objectives are to:

- develop mastery of the central theories and concepts in the field of aviation, including foundations, safety management, economics, and regulatory procedures
- pose and solve theory-based and research-based problems designed to advance applications in the field of aviation
- extend the body of knowledge by conceiving, planning, producing, and communicating original research
- develop and demonstrate expertise in instructional processes
- demonstrate leadership, collaboration, and

communication necessary for scholarly work in aviation.

The learning objectives drove the development of the curriculum and coursework, the strong emphasis on research methodology and data analysis, selection of faculty, assessment program, and admissions criteria. Details about ERAU's Ph.D. in Aviation program can be found at <http://aviationphd.erau.edu>.

Conclusion

No longer a nascent discipline, aviation has matured through an accumulation of experience in the field and through decades' worth of contributions of academics in other disciplines. Its academic structure, similar to that of physician education, is composed of carefully defined skills education wedded to appropriate discipline theory, general education, and other subject matter borrowed from other disciplines and applied to aviation. These constituent areas

include aviation foundations, law, economics, and safety, and are found throughout the various professional and academic publications. It is this aviation educator, peer-defined body of knowledge that provides the foundation for ERAU's Ph.D. in Aviation and is captured in the program core, and it is the emphasis on the development of research skills that will ensure our graduates fulfill the mission of the program.

As evidenced by the growth of scholarship in the field, the significant need for applied research, and the number of (non-aviation) doctoral degree seekers writing dissertations in the aviation field, clearly aviation is a discipline whose *time has come* to move to the next level of academic growth. ERAU's Ph.D. program will ensure that the practice of aviation has its foundations in research as the body of knowledge continues to mature. →

Alan J. Stolzer holds a Ph.D. in Quality Systems from Indiana State University, an ATP, CFI, and an A&P from the FAA, and several other professional certifications from ASQ and PMI. Dr. Stolzer has more than 25 years of experience in academic administration positions, and is currently chair and professor in the Department of Doctoral Studies at Embry-Riddle Aeronautical University's Daytona Beach campus. Stolzer teaches Safety Management Systems in the program and facilitates the residency experiences for the doctoral students. He is an active researcher, and is currently the principal investigator on two federally-funded grants related to aviation safety. Stolzer is currently serving on the Board of Trustees of the Aviation Accreditation Board International and is chair of its accreditation committee.