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## Facing Issues in Aerospace Education

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Jo Ann Eisenzimer

Aerospace is a keystone of our civilization which affects every part of our society. Aviation and space today touch all nations and all people of the world, but none so much as the people of the United States. We live at a time and in a nation where aerospace has become a vital part of our everyday lives.

How successful have we, as educators, been with infusing aviation and space into the school curriculum?

For over fifty years, concerned, futuristic educators, business leaders, and governmental influences have attempted to bring aviation/aerospace education into a permanent visible niche within our education system. One of the earliest efforts involving a formalized movement in aviation education dates back to 1940 when a group of authors and educators from throughout the United States completed an in-depth kindergarten through 9th grade curriculum using aviation as the foundation to meet objectives in all content areas. With a few modifications to update the airplane examples, this curriculum could still be used today as an excellent motivational tool to teach critical thinking skills as well as to satisfy content area objectives.

Since then, many special interest groups and separate curriculum projects in aerospace education have also been established by forward thinking educators and business leaders. These outstanding individuals recognized that aviation/aerospace must be a part of the education system if we are to prepare students for living and thriving in a technology-oriented society. We, as aviation/aerospace educators, have not been successful in maintaining the movement with the accelerated momentum necessary to keep pace with changing educational needs.

Aerospace education, within itself, has brought more technological change in our society than any other technology area. There is no scientific principle or procedure that cannot be illustrated in terms of its application to aviation or to a related field. Even though these advancing technologies from aviation and space science have greatly impacted the social, political, and

economic lives of our citizenry they, as new subject areas, have not yet found their way into the core of the school curriculum. In order to keep aviation/aerospace education in the limelight where it belongs, we need to verse ourselves in the emerging research of national curricula development and trends and focus our efforts accordingly:

(1) Time and budget restraints preclude teaching aviation/aerospace as an isolated topic. However, the wonderful, unique quality of aerospace education enables its integration into every traditional as well as innovative subject within the curriculum rather than approaching it as a separate subject area. With proper training, teachers can easily integrate aviation and aerospace into existing curricula.

(2) Each year many national and state aerospace education organizations conduct numerous successful teacher aerospace workshops. When these workshops are taught, greater emphasis needs to be placed on the requirements of individual state guidelines, if aviation/aerospace is to find a permanent footing in national curricula. For example, California and Texas, which lead the United States in national curricular trends, now have aerospace science built into their frameworks. Major publishers design programs to fulfill the requirements of these states in particular, since they represent a major proportion of textbook marketing. It would appear then, as aerospace educators, we must begin to work at the state level in helping to design programs which use aerospace education to meet curricular objectives in the content areas.

(3) While other states may not have specified curricular objectives related to aviation or aerospace science, many do have specific guidelines related to technology as a focus of instruction in all subject areas.

(4) Although it is important to integrate aviation/aerospace into all subject disciplines, another area in which we can capitalize on public interest to bring aviation/aerospace back full swing is science education. Aviation/aerospace is well positioned to be a pivotal point of instruction for the society/technology theme. Over 40,000 spin-off technologies have evolved from our space program--more than any other field.

The relationship between technology and society is of continuing public interest because technological change and its effects constantly confront and challenge our society. It is evident that a continuously evolving educational program is essential if man is to adapt to this change. What, then, is to be done to correct these problems?

Our goal must be to develop and maintain an educational program, materials, and methods geared to preparing children and adults to live productively in our social and technological world.

To accomplish this, our educational goals and programs must be alert to change. We must be flexible and knowledgeable enough to make the changes and capitalize on the impact these changes have on our society. This may mean using workshops and/or inservice to meet the needs of educators.

Numerous studies and resulting rhetoric have documented the deficiencies within our educational system in producing scientists and engineers. Two major National Science Foundation studies--Project Synthesis and Project 2061--specifically discuss space, aviation, and their related technologies as important elements within science education.

Project Synthesis discusses the importance of students understanding various accomplishments in space research and develops the background necessary to react to the problems and benefits to society that space programs might provide.

More recently, Project 2061 notes that space and aviation technologies demand considerable imagination. This forces students to search for advanced technologies in many fields and serves as a vehicle to consider social values as related to technology also.

These studies have been the catalyst for creating national changes in science education. Both Project Synthesis and Project 2061 specifically mention aerospace as an area demanding attention if we are to prepare our young people for fulfilling careers as scientists and engineers. Again, it is up to us as aviation/aerospace educators to become knowledgeable of the emerging research in national curriculum development and design recommendations of this research.

**Aviation/aerospace technologies represent unique opportunities for our students of today. Studies have shown that activities based on space and aviation technologies motivate students, regardless of age, gender, or ethnicity. The excitement these technologies generate and the curiosities they stimulate extend beyond the classroom.**

Thousands of people with different talents and interests have found rewarding careers in the aviation/aerospace fields. Many of them began these careers because of people who believe that the education of our youth in the wide spectrum of aerospace sciences will insure our nation's future scientists dedicated to preserving this country's superiority in aerospace technology.

General aviation is one of the fastest growing segments in our national air transportation system. There are over 220,000 general aviation airplanes now, and that number is expected to grow to over 300,000 in this decade. General aviation dominates flying by logging 84 percent of all hours flown by 96 percent of all civil airplanes.

There are about 1,350,000 people employed in aerospace industries in this country. There are probably that many more who are employed by government and education in the aerospace areas. These employees range from highly trained scientists and engineers to production workers. Several reports have predicted a shortage of three quarters of a million scientists and engineers by the year 2000 representing a crisis that warrants corrective and rebuilding actions by the entire education community. It has also been estimated that another three quarters of a million jobs will be created indirectly by aviation/aerospace in the areas needed to support the industry. With proper training and knowledge, our youth will be eligible for these job openings in the 1990s.

The products and benefits of aviation/aerospace and technology are not superficial; they are essential in our day-to-day lives. Americans, if they are to compete in the global marketplace, must meet these demands through scientific and technological literacy. Our country's future is very closely tied to aviation/aerospace technology, so it is extremely important that we have a good understanding of that technology to be successful in the frontiers of the future. It is our charge as aerospace educators to be knowledgeable of the changing

educational trends. We must provide a means of integrating aerospace education into state and local guidelines. Only then can we design curriculum and teacher training programs which will ensure that our young people will have the technologic skills necessary for living and thriving in a high tech society.