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THE JOURNAL

The *Journal of Air Transportation (JAT)* mission is to provide the global community immediate key resource information in all areas of air transportation. Our goal is to be recognized as the preeminent scholarly journal in the aeronautical aspects of transportation. As an international and interdisciplinary journal, the *JAT* provides a forum for peer-reviewed articles in all areas of aviation and space transportation research, policy, theory, case study, practice, and issues. While maintaining a broad scope, a key focal point of the journal is in the area of aviation administration and policy.



Development

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- Avionics, Computing, and Simulation
- Space Transportation Safety, Communication, and the Future
- Other areas of air and space transportation research, policy, theory, case study, practice, and issues

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ANALYSES AND COMPARISONS OF COGNITIVE LEARNING PREFERENCES AMONG AIRLINE PILOTS, CORPORATE PILOTS, AND AVIATION STUDENTS

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ABSTRACT

This paper presents analyses and comparisons of several research studies conducted with aviation students and career pilots in which their cognitive learning preferences (brain hemisphere bias) were assessed. Using a self-report cognitive learning style questionnaire, airline pilots, corporate pilots, and aviation students reported on their preferences when engaged in learning aviation material. This paper compares the results of each group's response with those of a control group. Results from previous studies on airline and corporate pilots indicate a cognitive preference for primarily sequential, logical instructional and learning methods, while those of beginning aviation students involve more relational, subjective methods. The comparisons in this study indicate significant differences exist between several of the population distributions. The importance of the findings is discussed as it relates to aviation instruction and training, in that aviation instructional bias may be an important factor in a student's success or failure. This paper further raises questions about the types of cognitive and behavioral outcomes expected in the aviation education and career field.

INTRODUCTION

Previous studies have been conducted that identify the cognitive (a.k.a., hemisphere) processing bias for sample populations of aviation students (Quilty, 1996), corporate pilots (Quilty, 1995), and airline pilots (Quilty, 1997) at different age, education, and experience levels. The purpose for conducting the studies was to generate baseline data for analyzing whether differences exist in the cognitive lateralization (ability to integrate information using both brain

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hemispheres together) between those who enter a university aviation program and those who have been successful in gaining employment in the industry.

The results from the previous studies indicate that: (1) students entering an aviation program had bias tendencies for more relational than sequential cognitive processing; (2) students in the upper grade levels, or who had recently graduated, had a bias for more sequential cognitive processing than first and second year students; and (3) airline and corporate pilots showed a greater tendency toward sequential and bilateral (sequential and relational) processing than the students. Data reflect that a significant number of corporate and airline pilots have the ability to use lateralization whereas aviation students represent a broader spectrum. It is postulated that differences in the distribution of the different pilot populations may be a result of how aviation instruction is taught.

This analysis reviews the cognitive hemispheric preferences of airline pilots, corporate pilots, and students in a four-year university aviation program. The results from those studies are compared to each other and to a general population control group. The investigation was undertaken primarily to see if support exists for a hypothesis of cognitive preferences in aviation students. This paper seeks to link cognitive and hemispheric processing theories with aviation specific groups for the purpose of investigating ways to improve those abilities where linkages exist. Cited in the previous studies as limitations were the lack of analyses as to whether each study group was different from a generalized population, or from each other. This paper provides for such analyses and helps lay the basis for future hypotheses and investigation into the cognitive capabilities of aviation students, and into learning and instructional styles that may affect their success or failure. Results from the analyses show significant differences do exist among several of the groups.

BACKGROUND

This author has sought to quantify observations made in an aviation program at a four-year university in the United States. It was observed that beginning first year and transfer students in an aviation flight program often had an artistic or musical background. It appeared that many of those same students tended to struggle academically in structured classroom courses, such as an aviation ground school, math, or physics course. Yet, they performed well in the hands-on experiential part of the curriculum, such as flying, maintenance, or a laboratory. Consequently, some students who did well in the ground schools, math, and physics courses, had difficulty in the experiential aspect of the curriculum.

As a result of the observations, questions were raised about students' cognitive preferences and whether the method of instruction may play a part in their success or failure. One explanation for the observations may lie in aviation students having different learning abilities and cognitive styles that are not suited to those of the instructor. However, identifying student learning styles or cognitive abilities are not necessarily pertinent unless they can be compared to the larger

population or to other specific aviation pilot populations. This required an understanding of learning and processing preferences of those who were successful in the field and those from a general population.

Instruments used to determine learning and cognitive style tend to be lengthy or difficult to administer. Also, learning style research has generally addressed the separate functioning nature of each hemisphere, or on four separate ways to learn information (Price, 1983) rather than on lateralization, or the ability to integrate the two hemispheres. Crane (1992) has studied the bilateral individual and how the two brain hemispheres work together. Crane's approach differs from learning style research in that he attempts to identify the degree to which the relational and sequential hemispheric cognitive functions integrate and process information.

The hemispheric bias theory is associated with how cognitive processing occurs in the brain, and how each hemisphere of the brain performs different cognitive activities. The left side primarily processes information using a logical sequence while the right side primarily uses relational patterns. Crane contends that the same information taken from the environment is processed differently in both hemispheres, with the majority of individuals responding to situations by integrating the hemisphere processes, depending upon the situation. This is in contrast to the conventional notion of information being processed in only one hemisphere.

McNeese and Katsuyama (1987) measured processing time in the brain hemispheres of pilots and suggested their results were due to higher level cognitive strategies involving different processing modes. Crane believes that for most tasks, the brain hemispheres work together to learn new information, rather than only one specific region being responsible for the learning. A continuum is used to represent the brain hemispheres and an individual's preference for learning (Figure 1).

Figure 1. Continuum of Cognitive Preference

<i>Sequencing Preference</i>		<i>Bilateral Preference</i>	<i>Relating Preference</i>	
1	2	3	4	5
Strong Sequencing (SS)	Moderate Sequencing (MS)	Specialized- Alternating- Combination- (SB-AB-CB)	Moderate Relating (MR)	Strong Relating (SR)

Source: Crane, 1992

The sequencing preference is associated with the left hemisphere of the brain and relates to those cognitive processes and organization of thought that have an external focus relative to the individual. Individuals favoring this cognitive bias often tend toward analytical and reasoning processes and use objective criteria.

They learn through a process of gaining knowledge, which leads to understanding, which in turn leads to action based on the knowledge and understanding. Functioning in the sequential mode results in abstract concepts being formed, but it requires very specific or objective detail as a basis for forming the concepts.

The relating preferences are associated with the right hemisphere of the brain where the cognitive focus and organization of thought tends to be more internal to the individual. Individuals favoring this cognitive bias tend to be intuitive, have greater emotional awareness, and respond to subjective feelings. They learn through a process of acting, which leads to understanding, which in turn leads to knowing. Functioning in the relating mode results in more generalized big picture concepts being formed. However, concrete thought or activity is required as the basis for developing and relating the concepts.

The bilateral cognitive process involves preferences that are: specialized (i.e., about half of the time information is organized, or a particular task is performed, in only one mode; while the other half of the time information is organized, or a particular task is performed, in the other mode); alternating (i.e., information is organized, or a particular task is performed, in either mode); or combination (i.e., both modes are used at the same time).

METHODOLOGY AND RESULTS

Respondents completed a 20-question instrument developed by Crane (1992). The instrument is designed to identify the cognitive hemispheric processing preference of respondents when engaged in learning activities. Validation and reliability of the instrument is addressed by Crane (1992) in his studies and include correlational studies to the electroencephalograph (EEG) measures of students. Further validation is being accomplished through correlational studies using the Myers-Briggs instrument for psychological types. This study provides a basis from which further reliability testing can be conducted.

Data from corporate pilots were obtained from corporate aircraft operators who were members of the National Business Aviation Association and who owned or operated two or more corporate aircraft. Data on the airline pilots were drawn from two U.S. certificated air carrier operators, one a national air carrier and the other a large regional carrier. Data for the aviation students were acquired from students enrolled in the aviation program at Bowling Green State University, Ohio, a four-year institution. Crane obtained data on the control group from students enrolled over several years in undergraduate and graduate communication courses at Western Michigan University, Michigan. This author analyzed the data.

Table 1 provides data on the frequency distribution of each group. Mean scores were compared using pair-wise t-tests. Variance was compared using pair-wise F-test. Bonferroni's multiple comparison method was performed to control experimental error at $\alpha = 0.05$ on both the t-tests and variance. Mean

scores and variances for each group are identified in Table 2. In both Table 1 and 2, mean score responses are rounded off to two decimal places, and percentages are rounded off to one decimal place. Statistical analysis of the responses was performed by the statistical processing center at Bowling Green State University.

Table 1
Frequency of Cognitive Preference Among Pilots and Aviation Students

<i>BIAS</i>	<i>Strong Sequencing</i>	<i>Moderate Sequencing</i>	<i>Specialized Bilateral Alternating Bilateral Combination Bilateral</i>	<i>Moderate Relating</i>	<i>Strong Relating</i>
Corporate Pilots N = 671	6 (0.8%)	139 (20.7%)	459 (68.4%)	59 (8.8%)	8 (1.2%)
Airline Pilots N=190	5 (2.6%)	31 (16.3%)	125 (65.8%)	26 (13.7%)	3 (1.6%)
1st/2nd Year Aviation Students N = 28	1 (3.6%)	4 (14.3%)	16 (57.1%)	6 (21.4%)	1 (3.6%)
3rd/4th Year Aviation Students N = 52	4 (7.7%)	10 (19.2%)	31 (59.6%)	7 (13.5%)	0 (0.0%)
Control Group N = 226	24 (10.6%)	28 (12.4%)	109 (48.2%)	28 (12.4%)	37 (16.4%)

Table 2
Summary of Statistical Analyses of Frequencies of Cognitive Preference Among Pilots and Aviation Students

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Variance</i>
Corporate Pilots	671	2.89	0.61	0.37
Airline Pilots	190	2.95	0.68	0.47
1st/2nd Year Aviation Students	28	3.07	0.81	0.66
3rd/4th Year Aviation Students	52	2.78	0.78	0.60
Control Group	226	3.12	1.15	1.32

The data indicate that there is a significant shift in the mean for corporate pilots when compared to the control group. The data also indicate that the variance of corporate pilots, airline pilots and third/fourth year aviation students is significantly more definable in their cognitive processing capabilities than the control group (Table 3). A comparison of standard deviations and variations shows a narrowing of the distributions from the control group to that of the corporate pilots. A means comparison shows a shift in the means from entry-level

aviation students to corporate pilots. The shift is in the direction of more bilateral and sequential cognitive processes. The shift in mean for corporate pilots is significant when compared to the control group mean (Table 4). The low number of responses for both the first/second year students and the third/fourth year students results in low statistical power when compared to the number of responses for the other groups. As a result, the shift in their means, especially that of third/fourth year aviation students, is not significant when compared to the control group. The low number of responses for first/second and third/fourth year students is a limitation of the study.

Table 3
Comparison of Means of Cognitive Preferences Among Pilots and Aviation Students

	<i>Corporate</i>	<i>Airline</i>	<i>1st/2nd Yr.</i>	<i>3rd/4th Yr.</i>
Control Group	0.0046*	0.0756	0.8457	0.0148
Corporate Pilots		0.1988	0.1197	0.2703
Airline Pilots			0.4041	0.1380
1st/2nd Year Aviation Students				0.1300

* $p < 0.005$ for individual tests.

$p < 0.05$ for overall comparison using Bonferroni multiple comparison method.

Table 4
Comparisons of Variances of Cognitive Preferences Among Pilots and Aviation Students

	<i>Corporate</i>	<i>Airline</i>	<i>1st/2nd Yr.</i>	<i>3rd/4th Yr.</i>
Control Group	0.0000*	0.0000*	0.0347	0.0012*
Corporate Pilots		0.0289	0.0156	0.0081
Airline Pilots			0.1922	0.2363
1st/2nd Year Aviation Students				0.7517

* $p < 0.005$ for individual tests.

$p < 0.05$ for overall test using Bonferroni multiple comparison method.

DISCUSSION

Cognitive bias is the preference for processing information using sequential versus relational patterns. It is theorized by this author that students desiring to be successful in an aviation program need to use cognitive hemisphere lateralization (i.e., integrate information from both hemispheres together) and incorporate several cognitive processing modes. A successful pilot is defined in this study as being a career pilot employed in either the corporate or air carrier ranks. This is because those individuals often have demonstrated through a competitive selection process those cognitive and behavioral characteristics that allow them to qualify and be retained in those positions.

The basic purpose of the analyses performed was to identify whether differences exist between the means and distribution of the different sample populations studied. The analyses show that corporate and airline pilots tend toward a

sequential and bilateral cognitive processing bias. This means they have an ability to learn from either a structured or unstructured environment. Though this characteristic is shared by many in the other groups, a comparison of the distribution of corporate and airline pilots to the others groups suggests that most strong sequencers and strong relaters, and many moderate relaters, will not make it to the ranks of an airline or corporate pilot position. This means that either the educational or pilot selection process is eliminating those whose cognitive organizing processes favor a strongly left or strongly right hemispheric bias. Chidester (1987) contends that training and selection processes should be combined to serve as complementary approaches to optimizing crew performance.

Supporting this contention is a study of air traffic controllers by Redding, Cannon, and Lierman (1991). They believe instruction should be reorganized and re-sequenced according to a mental model that serves as a broad cognitive organizer in support of task performance. Moore and Tefler (1993) have questioned whether or not different approaches to learning are more appropriate to pilots, given the nature of their education and training. However, the approaches they identified appear to be more based upon motivational factors than instructional techniques. Yet, learner motivation can be easily affected by instructional technique.

The question raised by the data and analyses in this paper is what happens to those who have cognitive preferences outside of those typically found in corporate and airline pilots? The means in the analysis indicate that first/second year aviation students tend to be more relational in their preferences while the second/third year students are sharply more sequential. Why the absence of an equitable number of relaters in the third and fourth year? Did the previous first/second year students become better at lateralization as they progress through the university? Or do relaters tend to drop out or move on to other pursuits, thereby resulting in the mean and variance becoming less in later years? Perhaps more importantly, is an individual who is primarily sequential or bilateral in their cognitive processes the best person for the cockpit?

The position advocated by this author is that instructional methodology and instructor pedagogical (or androgogical) skills are two factors that will affect the progress and selection of pilots, and their ability to integrate new information. Tefler and Moore (1995) have been arguing this point for several years. This author makes the assertion based upon the notion that if problem solving or task assignment is presented in only one mode of instruction, approximately half of the learners may have difficulty understanding the instruction or completing the task. If individuals have difficulty learning, then task performance will generally receive a negative evaluation from the instructor, which can affect selection or educational progress. Or, students become frustrated and leave the program.

Aviation classroom instruction tends to favor the sequential process, as exhibited by standardized FAA guidelines for flight and ground courses. Individuals favoring relational processing will have more difficulty in these circum-

stances than those favoring a sequential bias. For bilaterals, they are better able to adapt. Though, if specialized as a sequential processor when engaged in learning activities, an individual can still experience some of the frustrations of learning relational material or from a relational instructor.

As an illustration of the arguments and analyses presented in this paper, the availability of statistically significant information, similar to Tables 1 and 2, is best processed by an individual having a sequential or left hemispheric bias. An individual who has a relational or right hemispheric bias however, best processes a graphic representation of the data. Figures 2, 3, and 4 present the same information as provided in Tables 1 and 2. The ability to interpret and process the data in either presentational mode without preference is illustrative of alternating bilateral capabilities. Being able to interpret and process the data in either presentational mode, but having a greater preference and understanding of one mode over the other, is illustrative of specialized bilateral capabilities.

Figure 2. Comparison of standard of cognitive preferences among pilots and aviation students.

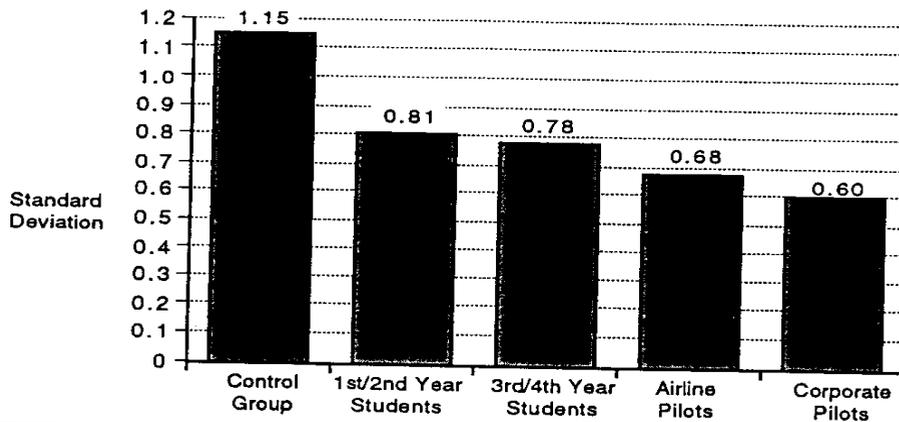
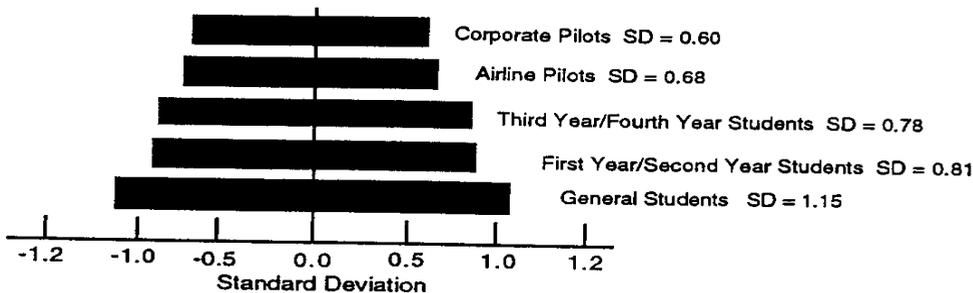
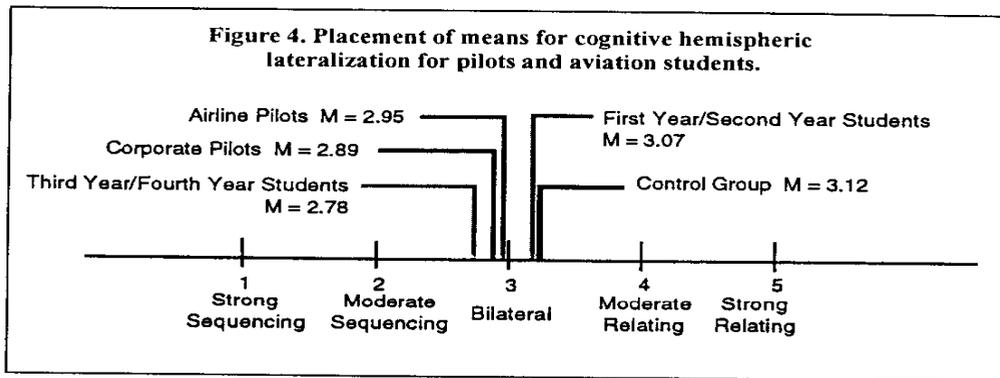


Figure 3. Multiple comparison of means and standard deviation (Bonferroni).





RESEARCH IMPLICATIONS

It is suggested that an instructor should have a variety of pedagogical skills and use various instructional methods that address the different cognitive biases and learning styles of the students. By incorporating different teaching and training methodologies and/or techniques that address the varied cognitive processing biases of pilots, more pilots will perform well. Implications from additional cognitive bias study may be most valuable in the area of crew resource management (CRM) and *ab initio* instructional methodology.

The ability to use different cognitive processing styles has implications on instructional techniques related to crew resource management (CRM) and *ab initio* training. One emphasis of CRM is understanding how different ways of communicating information are perceived, interpreted or processed by individuals, and how those different ways of communicating have a direct bearing on coordination and task completion. Therefore, it is suggested that communication, coordination and task completion can be optimized if cognitive preferences or biases are understood and appropriately considered in teaching CRM concepts.

Kaempf, Klinger, Wolf and Lofaro (1995) understood this principle by claiming that cognitive demands serve as the drivers of physical tasks. The underlying principles of this paper's analysis would suggest that communication, coordination and task completion in a cockpit environment are going to be influenced by the match up of cognitive processing styles among the flight crew. Freeman (1995) believes that integrating cognitive and team-working skills with traditional training offers promise in reducing the accident rate and improving training effectiveness and efficiency.

As it further relates to aviation, Schiewe (1995) contends that participants evaluate the different contents and methods of CRM training differently, and that different contents and methods vary in their efficiency depending upon the characteristics of specific participants and the characteristics of specific instruc-

tors. Schiewe interpreted his study results to suggest that airline pilots accepted case studies and job-related scenarios more readily than the lecture format. Other instructional methods were rated and evaluated quite differently by the participants. Schiewe found that a large number of participants (about 50 percent) ranked all instructional methods with high scores; 7 percent of the participants always assess methods relatively low; 17 percent preferred concrete information or tools on how to handle job specific situations; while 26 percent disliked the concrete and preferred the dynamics of relevant experiences. Those findings could be explained utilizing Crane's cognitive bias theory and the results from this author's research.

Cognitive bias theory could also help explain why, after a decade of crew resource management (CRM) instruction, some are beginning to question its effectiveness and results (Komich, 1997; Simmon, 1997; Sprogis, 1997). Simmon states, "In CRM training, 'WHAT TO TEACH' and more importantly 'HOW TO TEACH IT' so that flight crews are less likely to commit human error, are two questions which are yet to be adequately answered by the industry in spite of repeated pleas from many CRM program developers over the last decade" (p. 541). This author contends that much of today's CRM training attempts to teach concepts that are not natural from the learning and cognitive processing preferences of the subjects being taught. CRM deals with relational issues and favors the ability to use relational cognitive processes. Simmons (1997) further identifies a dichotomy that exists within current human factors training. He states that "most CRM training has been *interpersonal*, while most of the [flight crew] errors have been individual, *intrapersonal* cognitive errors" (p. 550). He goes on to emphasize, "Individual *intrapersonal* cognitive training is necessary to ensure that all crews master these skills **early in their careers**" (emphasis added) (p. 551). Intrapersonal cognition requires the ability to use lateralization.

Instructional techniques related to the concept of *ab initio* training center on the use of the relational mode of processing, where a student is immediately introduced to flying (action) with minimal ground based instruction. From that experiential flying, understanding and knowledge result. This is a departure from the standard sequential methodology of instruction. Tefler, Moore, and Scott (1993) studied airline pilots and discussed the need to examine the relationship between approaches to learning and performance in aviation. But as noted previously, relational processing individuals may struggle more in the aviation environment because the majority of instructional methods and techniques and aircraft task constructs favor a sequential processing individual.

Hunt (1995) has focused in on the problem when she suggests that the eclectic range of learning tasks in *ab initio* instruction should oblige teachers and instructors to equip their students with appropriate learning skills. Doing so would develop better awareness and use of hemisphere lateralization in the individual. It is surmised that *ab initio* trained pilots would perform better at CRM activities because both are cognitively relational based.

In a study exploring the relationship between pilots' individual differences in reasoning, perceptual, and verbal abilities with their actual performance, Boehm-Davis, Holt and Hansberger (1997) found it interesting that commercial pilots at a regional airline were superior to comparison groups of servicemen and college students on several measured abilities, including logical reasoning abilities, perceptual recognition, and verbal abilities. In measuring those factors, they suggested that a process of self-selection exists in becoming a pilot, or that daily exposure to perceptual tasks improves individual abilities.

Those abilities reflect different hemispheric processing capabilities. I would argue that it might not be so much a self-selection process as it is an instructional selection process used to prepare the pilots. It is self-selection in that aviation tends to attract students with a higher tendency for relational learning. However, classroom instruction and instructional methods favor sequential learning abilities in students, and that represents an instructional selection process. The selection process that results in success in the field favors individuals who can integrate the hemispheric process. Those who are not able to use lateralization have been de-selected through the long education and training process. Instructors can improve a student's integration processes by adopting a combination of sequential and relational educational techniques and presentation of information.

CONCLUSION

The results and discussion presented in this paper support the notion that the educational process serves as a screening process for aviation pilots because of the marked absence of strong sequencers and relaters in the ranks of corporate and airline pilots. It also points toward a primary method of teaching that is disadvantageous for relaters. This hypothesis is based on the theory that most aviation ground-based instruction is directed toward activities involving the left hemisphere of the brain, or sequential processing. Though flight-based instruction provides greater potential for processing relational patterns associated with the experience, sequential processing of information that was learned in the classroom is generally emphasized and reinforced (e.g., checklists, federal regulations, cockpit procedures, system operation, etc.). One could expect to see very few strong sequencers or strong relaters because for an individual with a strong bias, a deficiency exists for the opposite learning mode. This puts the strong learning biased individual at a disadvantage due to the difficulty in processing information other than toward their strong bias. The results from this study can be applied to educational and training processes and the instructional styles or techniques used.

Additional evidence to demonstrate that aviation educators may need to modify or improve their teaching skills and teaching effectiveness can be gathered by further study. Investigation into the cognitive capabilities of aviation students at other universities will add to the reliability of the data. Conducting a

study using more varied control groups will further substantiate the findings. A multi-year longitudinal study is recommended to help clarify and better assess the factors affecting the changes seen in the cognitive progression of aviation students. A longitudinal study would help to address the issue of whether students change or remain the same in their cognitive capabilities over the four years at a university, or identify whether a cognitive bias correlation exists between those who remain in the program and those who do not.

McCarthy (1987) developed a system incorporating hemispheric and learning style research to enhance teaching abilities. Research into actual delivery of different teaching and training methodologies, and/or techniques that address the varied cognitive processing biases of students, would be of further interest for many aviation educators. Correlation studies between successful *ab initio* trainees and cognitive processing bias would also be of value and interest to educators in the aviation field. Finally, though Crane's work has a solid basis in psychological research, his instruments are not widely known or utilized. Questions validity and reliability can be answered from more thorough correlational studies. Such studies are being undertaken.

REFERENCES

- Boehm-Davis, D.A., Holt, R. W., and Hansberger, J. T. (1997). Pilot abilities and performance. In R.S. Jensen (Ed.), *The Ninth International Symposium on Aviation Psychology*, 462-467. Columbus, Ohio: The Ohio State University.
- Crane, L. (1992). *The executive functions of the brain*, 3rd Ed. Needham Heights, MA: Ginn Press.
- Chidester, T.R., (1987). Selection for optimal crew performance: Relative impact of selection and training. In R.S. Jensen (Ed.), *The Fourth International Symposium on Aviation Psychology* (pp. 473-479). Columbus, Ohio: The Ohio State University.
- Freeman, C. (1995). The elite crew: a new look at crew resource management. In R.S. Jensen (Ed.), *The Eighth International Symposium on Aviation Psychology*, 2, (pp. 1221-1226). Columbus, Ohio: The Ohio State University.
- Hunt, L.M. (1995). Learning strategies: implications for ab initio pilot training. In R.S. Jensen (Ed.), *The Eighth International Symposium on Aviation Psychology*, 2, 1237-1242. Columbus, Ohio: The Ohio State University.
- Kaempf, G.L., Klinger, D.W., Wolf, S., and Lofaro, R.J. (1995). Using cognitive task analysis to support training development. In R.S. Jensen and L.A. Rakovan (Ed.), *Proceedings of the Eighth International Symposium on Aviation Psychology*, 2, 1172-1176.
- Komich, J.N. (1997). CRM training: Which crossroads now???? In R.S. Jensen (Ed.), *The Ninth International Symposium on Aviation Psychology*, 541-546. Columbus, Ohio: The Ohio State University.
- McCarthy, B. (1987). *The 4Mat system: Teaching to learning styles with right/left mode techniques* (rev. ed.). Barrington, IL: EXCEL, Inc.
- McNeese, M.D., and Katsuyama, R.M. (1987). Neuropsychology in the cockpit: An analysis of configurational processing, hemispheric asymmetry, and masking disturbance. In R.S. Jensen (Ed.),

The Fourth International Symposium on Aviation Psychology (pp. 202-208). Columbus, Ohio: The Ohio State University.

Moore, P.J. and Tefler, R. A. (1993). Pilot's approaches to learning. In R.A. Tefler (Ed.), *Aviation Instruction and Training*. Hants, England: Ashgate Publishing Limited. 121-129.

Price, Gary E. (1983). Diagnosing Learning Styles. In R.M Smith (Ed.), *Helping Adults Learn How to Learn. New Directions for Continuing Education, 19*, 49-55. San Francisco: Jossey-Bass.

Quilty, S.M. (1995). Cognitive learning preferences among corporate aviation pilots. In R.S. Jensen and L.A. Rakovan (Ed.), *Proceedings of the Eighth International Symposium on Aviation Psychology, 2*, 815-819.

Quilty, Stephen M. (1996). Cognitive learning bias of university students in an aviation program. *Journal of Air Transportation World Wide (On-line journal), 1*, <http://unomaha.edu/~himberg/aviation.html>.

Quilty, S.M. (1997). Cognitive learning preferences among airline pilots. In R.S. Jensen and L.A. Rakovan (Ed.), *Proceedings of the Ninth International Symposium on Aviation Psychology, 1*, 409-414.

Redding, R.E., Cannon, J.E., Lierman, B. (1991). Cognitive task analysis of air traffic control. In R.S. Jensen (Ed.), *The Sixth International Symposium on Aviation Psychology* (pp. 480-485). Columbus, Ohio: The Ohio State University.

Schiewe, A. (1995). On the acceptance of CRM-methods by pilots: Results of a cluster analysis. In R.S. Jensen and L.A. Rakovan (Ed.), *Proceedings of the Eighth International Symposium on Aviation Psychology, 1*, 540-545.

Simmon, D.A. (1997). How to fix CRM. In R.S. Jensen (Ed.), *The Ninth International Symposium on Aviation Psychology*, 550-553. Columbus, Ohio: The Ohio State University.

Sprogis, H. (1997). Is the aviation industry experiencing CRM failure? In R.S. Jensen (Ed.), *The Ninth International Symposium on Aviation Psychology*, 554-555. Columbus, Ohio: The Ohio State University.

Tefler, R. and Moore, P. (1995). Learning, instruction, and organisation in aviation. In R.S. Jensen (Ed.), *The Eighth International Symposium on Aviation Psychology, 2*, 1183-1184. Columbus, Ohio: The Ohio State University.

Tefler, R., Moore, P., and Scott, R. (1993). Some implications of pilot's approaches to learning. In R.S. Jensen (Ed.), *The Seventh International Symposium on Aviation Psychology* (pp. 726-731). Columbus, Ohio: The Ohio State University.

RECRUITING FROM WITHIN: ACTION-ORIENTED RESEARCH SOLUTIONS TO INTERNAL STUDENT RECRUITMENT IN COLLEGIATE AVIATION EDUCATION

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ABSTRACT

The authors present a case of good practice in student recruitment that can be applied for the overall benefit of collegiate aviation education. In this paper the authors explore an infrequently visited well of potential aviation student enrollments. They establish that student recruitment must be an active and ongoing commitment of each aviation academic unit. The single case scenario presented provides examples of internal student recruitment strategies that can be applied to any academic program. Related literature is examined and reported to theoretical and applied frameworks. A conceptual model of action research is developed and operationalized within the qualitative research paradigm. The supporting research tools of focus groups and Delphi are implemented in a triangulation discovery process which provides substantive results. The results convey a system that maximizes student recruitment and concludes with a plan that can be generalized to most collegiate aviation programs. In completing the action research circle, a call for a continuous improvement system for internal student recruitment is advocated to ensure a positive future for both collegiate aviation education and the whole of the aviation universe.

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INTRODUCTION

Everywhere in the aviation industry today, college faculty and administrators are being told that the need for pilots, managers and other aviation specialists is increasing. That need should be realized by increased enrollments on our aviation college campuses. Many believe that collegiate aviation education is now recovering from a declining enrollment trend. Forecasts by the Federal Aviation Administration (FAA) and industry document renewed growth and demand for aviation employment. (Federal Aviation Administration [FAA], 1997). However, long-standing practice suggests that marketing (in this case, student recruitment) should not only be practiced in the worst of times, but should be accelerated in the best of times. Consequently, rising forecasts of market potential cannot be rationalized into a sense of we are here and they will come. Therefore, aviation faculties must be pro-active and must maximize efforts to use all available tools to recruit aviation students.

Aviation professors must change their attitudes regarding recruitment or they may lose their jobs. Tenure does not help in this situation. Academic programs or departments can be eliminated, thus eliminating the tenured positions. Professors who have boasted: "Half of you will fail my course," have found themselves called upon to teach for mastery. Soon enough, many of them began to see the connection between student recruitment and retention, and their mortgage payments. (Mhalba, 1996).

Collegiate aviation education provides one of the most challenging, yet rewarding, career fields in academia. Unfortunately, it appears in many circumstances to have been kept a secret by the colleges and universities that offer such programs. Students on some college campuses are totally unaware that their college or university offers degrees in aviation. Often students (or worse yet, graduates) complain they had no idea that an aviation major was offered on their campus. The authors assert that it is time to cultivate those untapped resources on our own campuses to increase our aviation majors.

There is no question that the aviation industry is increasing in size (FAA, 1997) which, by itself, should increase the need for aviation majors. Combine that increase with the fact that many World War II, Korean War, and Vietnam trained military pilots and supporting staff personnel are now reaching retirement age, and it becomes obvious that the aviation industry desperately needs more aviation graduates. It is the task and the duty of the aviation colleges to satisfy that need given that the supply of pilots provided by the military is diminishing. Not only does the aviation industry need replacements, but it needs graduates who have been trained and educated to be leaders and managers, not simply workers and followers.

The next question should be: how do we attract that many students from our own campus. The authors would like to answer that question by explaining in a case study what has been done by one university which offers two undergraduate aviation majors.

New conventional wisdom has college training replacing the old minimum of a high school diploma for workers. (Grove, 1992). That certainly is true in aviation. Today, getting a job with one of the major airlines is virtually impossible for a pilot without a four-year college degree. In recent years, several reports have indicated that more than 96 percent of successful job applicants hired by major airlines have a college degree.

Framing the Case for Internal Recruitment in Collegiate Aviation Education. To anyone associated with recruitment of students on college and university campuses, it is obvious that there exists an entire group of students on campus who are either undecided or who are not satisfied with their current educational path. These students should all be exposed to the exciting world of aviation, and should be made aware of the potential career paths that exist for them if they adopt aviation as a career. The problem is how best to accomplish that goal within our own college campuses. The key, of course, is marketing. Unfortunately, "Marketing the services of colleges and universities is a discipline still in its infancy.... As in any organization that embraces the marketing concept, marketing research has become increasingly important to colleges and universities (Hayes, 1996, p.10)."

There exists a wealth of literature regarding how to externally recruit new students to an educational institution. Unfortunately, virtually no literature exists on how to successfully recruit students for any specific program or major from within the campus. Obviously, the success rate for such recruitment efforts can be much higher and will certainly result in less expense than with off campus recruitment efforts. That is why it is asserted that efforts expended by aviation faculty to recruit new aviation majors from within their own college campuses will produce the most productive and cost-effective results. It will also help the aviation community to experience a significant increase in qualified college aviation graduates.

As with any realistic and achievable goal, a plan must be developed (Lay, Endo, 1987). The plan must be realistic and must be designed for use by the one who will actually implement it. Nothing is more useless than a very attractive, nicely prepared plan that is never used. That is why the authors of this paper have chosen the action research method for their suggested solution to aviation student recruitment. Next, the programs must be prioritized, and the budget and financial commitments made in the order of importance, remembering to include a certain degree of flexibility to anticipate unforeseen future changes. Lastly, the plan must receive widespread institutional support involving key administrators, faculty and student leaders, admission officers, alumni, and academic units. The plan proposed in this paper will: (a) develop goals and objectives, (b) design marketing strategies and programs, and (c) have a budget that allocates financial resources to various marketing programs.

Why STUDY Student Recruitment? The purpose of this paper is to identify the need for additional aviation students; to decide that on each of our campuses there exist many undecided or undeclared students who are searching for the exact career field for them; and to offer suggestions on how to attract that undecided student to become an aviation major. It is also the purpose of this paper to convince aviation educators that marketing is not an onerous and unworthy idea; marketing techniques need to be used to attract new aviation majors. Aviation faculties need to be persuaded that potential aviation students are potential clients, or customers. The reticence with which aviation academics have previously embraced the marketing of new students needs to be eliminated. Academics now even camouflage the concept of marketing by calling it by another name. "Academia has quietly rejected the use of words like marketing and consumer and disguised them in other words like institutional research, enrollment management or issues management. Who could argue with anything as innocuous sounding as 'issues management.'" (Grove, 1992, p. 19). According to Grove, this attitude exists because college faculties tend to associate marketing strategies with flashy ads for fancy cars or slick brochures for expensive perfumes. It is the purpose of this paper to dispel some of these archaic notions and to convince college aviation faculties that marketing will work for them.

Operational Parameters and Environment. In the preparation of this article, the authors have limited the scope of the research and the single scenario case study to an examination of the procedure and the effects of an internally based recruitment effort only, eschewing any in-depth examination of the benefits and procedures involved in an external recruitment effort to part two of the series.

Also, the authors strongly believe that retention is essential to the continued vitality of any aviation program. This paper will be devoted to a discussion of how on-campus college students can be attracted to aviation. It is well known that the aviation career field is notorious for losing its majors. In fact, several aviation programs (including the university involved in the case study presented in this paper) have experienced an attrition rate often exceeding seventy-five percent. Four year aviation colleges expend significant effort to attract students to their programs, yet as many as seventy-five of every one hundred students leave the program and do not graduate with an aviation degree. The topic of retention will be provided in part three of this series.

Recruitment is defined as: "the active process an institution undertakes to favorably influence a prospective student's decision to attend the institution. The recruitment phase begins with identifying prospects, that is, those students who are eligible to attend and may have some affinity for the institution. Recruitment ends and retention begins once the student enrolls." (Dolence, 1993, p.15). This holds true as applied to the concept of internal student recruitment.

"In higher education, the product design involves curriculum and academic program development. When a product appeals to a well-defined yet not neces-

sarily small segment of the total prospect base, that segment is called a niche” (Dolence, 1993, p. 17). In our single scenario case example, our niche is based upon our specific program offerings.

Literature Framing the Case. There are many philosophies on how an academic department should approach the concepts of marketing. In general, they vary through the diversity of the department chairperson. Many departments still believe that it is unprofessional to go out and sell their academic program; this is quite an outdated idea. Also, many institutions of higher education feel an open admissions policy is a strong marketing tool for increasing enrollment. Those who hold this belief fail to see how marketing can be used to promote academic integrity through soliciting top students for their programs (Bassin, 1975).

For an academic department to successfully compete for resources today, it must keep its enrollments up by actively marketing its courses. The minimal marketing strategy used in the past, where departments designed programs and simply waited for students to appear, is no longer effective. If an academic program has sufficient demand without active marketing, it might choose to direct its efforts toward recruiting higher quality students and gaining a more prominent reputation. Departments should take a balanced approach to marketing. Marketing programs should strive to assure a quality product with reasonable promotion efforts to achieve high product adoption and high consumer satisfaction (Curtis, 1984).

Academic departments should consider adopting a three-step process to improve or initiate a recruitment strategy. First, a plan of action must be developed. It should include a timetable, establishment of goals, and target figures. A designated follow-up procedure is crucial to the plan of action. The monitoring of a plan is as vital to the plan’s success as the plan is itself. Guaranteeing the survival of a system requires a continuous process of both selection and checking to see if the selection is going to work. It is a counterbalancing action that checks to see if the plan is still valid (Schreyogg, 1987). Next, contact points with the students must be refined. Publications and other departmental literature must be current and informative. The distribution system for this material must be expedient and reliable. Contacts must be developed in feeder areas. Faculty involvement is a key factor. Finally, an assessment procedure must be implemented. (Goodell, Bowen, Holt 1991).

A literature review regarding aviation academic involvement in student recruitment, discovered a telephone survey of administrators representing the aviation educational programs of 20 colleges and universities. These schools, which are dispersed geographically throughout the United States, have enrollments of 2,000 to 30,000. With 81 degree programs and 7390 majors, the majors average 5 to 600 per degree program. Administrators being surveyed were asked, “What marketing techniques do you use in the recruitment of students for your degree program?” Table 1 summarizes those responses.

Table 1
Recruiting Techniques

<i>Responses</i>	<i>Frequency*</i>
Reputation of Educational Institution	12
Word of Mouth	9
No Current Marketing Program	6
Personal Promotional Lectures	3
Print/Electronic Media - Free PR	3
Print/Electronic Media - Paid	3
Location	2
Not Allowed to Advertise	2

* Note: Several respondents offered multiple responses.

It should be noted that several administrators stated they currently use no marketing techniques; however, they did rely on word of mouth and reputation. This indicates a lack of marketing understanding, as word of mouth and reputation are powerful marketing tools which can enhance, reduce or quite distinctly alter perceptions and opinions. It appears that educators themselves are not educated in the concept of marketing and fail to fully realize how marketing can benefit their institutions. It should be emphasized that marketing is not limited to paid advertisements. Marketing includes a variety of applications as highlighted in this paper. To correct the shortcomings of college administration, marketing principles must be learned and incorporated into an administration's way of thinking. Publication and integration of this knowledge should be ingrained into education just as it has been in industry. Cross-cultural communication should take place between business and education. Likewise, communication among academic functions must take place in order for institutions to maximize the benefits of an encompassing, comprehensive marketing program. (Goodell, Bowen, Holt, 1991).

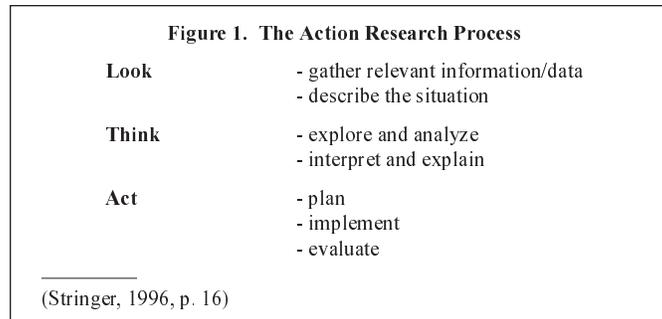
In a dissertation from Texas A&M University, an analysis of cohorts and generic groups in a university setting found that cohorts had better retention rates at the given university in the test. Further, it demonstrated through a faculty survey that faculty members are interested in understanding the culture of their students and their majors. Moreover, instructors indicated a high level of involvement in the interest and major-specific orientation classes they taught (Beran, 1996).

METHODOLOGY

Introduction of the Action Research Method

As social scientists, collegiate aviation educators should embrace scientific inquiry to resolve questions using applications of logical validity and empirical validation. This structured procedure is commonly defined as the research process. (Nachmias, 1996). Numerous tools have emerged that may be applied through accepted principles of scientific inquiry. Most readily acceptable have

been tools that provide quantitative data. However, qualitative research tools are rising to a new level of acceptance to address the complex issues facing us today. These complex, difficult issues lend example to the use of emerging alternative tools. An operational definition of action research could be defined as a research process which involves the researcher in the process of acquiring knowledge during an ongoing process in which he/she is involved. Action research emphasizes the solution of problems rather than the acquisition of scientific knowledge. There are no methodological differences between action research and other research methods. (Borg, 1963). The action research process is best summarized in Figure 1.



Action Research

Framing Action Research for Student Recruitment. The research method termed Action Research has been in active use for decades and emerged primarily grounded in the field of education. First criticized as not adhering to the rigid procedures of the scientific method (Borg, 1963), a review of research literature indicates that action research has now come to the forefront of acceptance. An explanation of this is most likely attributed to the widespread use of qualitative research paradigm tools to solve new, complex, and difficult to quantify problems. Quantitative research remains a very important research paradigm for hypothesis testing and explanatory knowledge but is limited in its ability to respond to the many rapidly changing variables in this study. Qualitative research however is more interpretive in nature but has limitations in the ability to measure specific relationships between variables. The ability of the action research model to provide an iterative process of action and feedback is well suited to the changes which occur in student recruitment. Action research is often utilized in applied research settings, and most often to explore an educational research issue. Often, administrators focus on problems or issues using research methods/tools in an action research framework. Action research is often carried out in a collaborative, or team setting, but is well suited for individual use, as in the teacher-researcher or administrator-researcher model. (McMillan, 1996).

“Action research is focused on immediate application, not on the development of theory or on general application. It has placed its emphasis on a problem here and now in a local setting. Its findings are to be evaluated in terms of local applicability, not universal validity.” (Best, 1993, p.24) This purpose can be applied to improving practice while combining research procedures, critical thinking, teamwork, and reason for study. (Best, 1993) Approaching the crucial issue of student recruitment through an action research model provides a synergistic structure to study, evaluate and initiate change to an ongoing complex problem.

Using action research as a conceptual model framework does not prohibit use of other research tools or procedures, such as triangulation to zero-in on the information needed. When actively engaged in an administrative process such as student recruitment, the evaluation of effectiveness of the process, return on budgetary investment, and maximization of human resource investment in the process are key points of ongoing action-oriented research. Perhaps these procedures are often considered a routine administrative task. Framing the process as an ongoing research endeavor will provide structure for continuous improvement. Although action research does not portend to have a generalization basis to other settings, it can provide an example of best practice which can be viewed as a case-like example.

Action Research Applied to Aviation Student Recruitment. The application of action research to the student recruitment process provides the methodological basis for approaching this vital and necessary endeavor. A 1993 report by Cornell University acknowledges that a “means to review on an ongoing basis the effectiveness of our recruitment efforts” is necessary. (Briggs et al., 1993, p. 18). The action research model is applied to the single case scenario of one aviation academic program that organized an ad hoc committee on student recruitment and retention (see Figure 3). This model was developed upon discovery of the crucial nature of the recruitment issue as identified through a focus group method. Focus groups are generally a small number of individuals brought together by a moderator as a discussion and resource group to focus on a limited topic. Focus groups can be used in qualitative studies to provide a rich source of cumulative and elaborative data in a flexible setting (Denzin & Lincoln, p. 365).

The group in this study concurred that immediate action was warranted. The focus group used the action research model to effectively implement, monitor, modify, and evaluate progress toward a goal of modest program growth. Following the model provided by Stringer in Figure 1, focus group members were assigned elements of the action research process for each stage of the student recruitment process. While working independently, team members effect assigned tasks. Through regular meetings, traditional and on-line, a consensus is generally obtained task by task toward the comprehensive outcome of maximizing effectiveness.

Action Research Model

Figure 2. Use of Stinger's Model for Recruitment		
	Stinger's Model	Recruitment Model
Look	- gather relevant information/data - describe the situation	Literature, campus/department resources Define goals for recruitment
Think	- explore and analyze - interpret and explain	Brainstorm student recruitment problem Convene committee as a focus group
Act	- plan - implement - evaluate	Use Delphi approach to formulate a plan Action oriented solutions Monitor outcomes, revise plan, track results

RESULTS**Research Tools Applied to the Action Research Model**

Results reported as information outcomes of the action research process were derived from the utilization of several research tools. These tools have been used to derive a triangulation-like approach to target the needed information outcome. Triangulation is used in qualitative research to determine if separate data sources and research tools lead to the same conclusions (Greenfield, 1996). Conceptually, this project can be viewed as a single case example, albeit not generalizable; however, it can provide an example of best practice that can be implemented by other programs. Survey research was used to gather data from prospects inquiring about the aviation program. Expert opinion and observational research tools were used to make key decision based on a five-year involvement in the process. A focus group and unstructured Delphi approach were utilized to formulate a consensus on which elements of the program are most effective to target until further evidence emerges to mandate program change. The Delphi technique is an iterative process of obtaining expert convergent opinions through the use of successive questionnaires and feedback. The experts do not meet face-to-face **THUS** allowing each person to objectively defend their own positions. Each iteration seeks a refinement of the group opinions until a general consensus is reached. The Delphi technique "is a rapid and efficient way to gain objective information from a group of experts (Babbie, p. 364)."

Outcomes of Student Recruitment Evaluation Tools

To develop a plan for internal student recruitment, a wealth of information exists in the literature regarding student recruitment. Less prevalent, are suggestions for internal student recruitment. Extracting that which is available, and using a Delphi approach, the recruitment focus group derived a plan to enhance on-campus student recruitment. Table 2 outlines these results providing strategies selected for implementation and a perceived scale of effectiveness as derived from the focus group's Delphi process.

Tracking sources of inquiry is fundamental to maximizing effectiveness. Each inquiry about the program is surveyed on key questions in order to categorize and follow-up. One key question asks for the marketing source of each inquiry. The results of these replies are outlined in Table 3. It should be noted that the effectiveness of on-campus recruitment may be direct enrollment in introductory courses. Thus, an official inquiry may not be logged.

Without exception, focus on the recruitment of students cannot be effected at the expense of services to current students. In our single case scenario, the process of retaining current students will most likely result in enhanced recruitment. This assertion is documented by the fact that personal referral is the most often cited inquiry result. Further exploration in retention is planned for another article in a series.

The authors have proposed a plan involving (a) the development of goals, (b) the design of marketing strategies, (c) the creation of a budget, (d) evaluation, and (e) feedback to repeat the process. The multi-step process of developing the plan of action, making contact with the students, and assessing the results of the process must be implemented for an effective continuous quality improvement system to result.

Table 2
Case Example's Internal Recruitment Plan

<i>Strategies Utilized</i>	<i>Scale of Effectiveness (5 being highest)</i>
Flyers on Campus	5
Word of Mouth	5
Campus Newspaper	4
Aviation Booths at Key Events	4
Sponsored Events	
Golf Tournament	4
Aviation Student Appreciation Day	4
Aviation Guest Speakers Promoted at the University	3
Letters to Advisors Asking to Promote Aviation Electives	3
Campus Radio/Electronic Billboards	3
Letter to All Undeclared Major Students	3
Letter to All ROTC Students Every Semester	3
Participation in New Student Orientation	2
Information Kiosks Located at Strategic Locations	1

Table 3
Sources of Internal Inquiries

<i>Strategies Used for Internal Marketing</i>	<i>Number of Inquiries 96-97</i>	<i>Percentage of Inquiries 96-97</i>
Personal Referrals/Word of Mouth	51	30.6%
Career Fairs	41	24.3%
Web Sites	23	13.5%
College Course Catalog	22	13.1%
Campus Newspapers	21	12.5%
ROTC	8	4.8%
Walk-Ins	2	1.2%
Total	168	100.0

DISCUSSION

There is no doubt that a significant need exists for more students in our aviation colleges and universities. The aviation industry needs these aviation graduates and is now looking, more than ever before, to the aviation educational institutions of this country to satisfy that need. The authors of this paper have propounded that internal recruitment is a fertile area from which to attract new aviation students to the aviation colleges and universities. The authors have pointed out that virtually no literature exists on how to successfully recruit students for any specific program or major from within the campus population.

The authors have also demonstrated that internal recruitment will produce the most productive and most cost effective results in aviation student recruitment. The authors have explored the various methods available to colleges offering aviation majors or degrees for the internal recruitment of these additional students and they have determined which methods should work best for the small, medium and large aviation programs in United States educational institutions. Finally, the authors have shown that a problem exists with retaining all of those aviation students which the colleges and universities have worked so hard to initially recruit.

The authors have pointed out that on all college campuses there exist many undecided students who would welcome information about the exciting career field of aviation, and that using the concept of marketing to attract those students is not the onerous and unworthy concept as initially perceived by most post-secondary educators. The flashy ad or slick brochure approach commonly associated with commercial marketing is not the only way to snare that new aviation student. It is entirely professional and, in this modern academic world, necessary to the future of our aviation programs that colleges and universities go out and sell their aviation programs. The astute college administrator will realize that the minimal marketing strategy used in the past, where aviation programs merely designed their curriculum and waited for students to magically appear, is no longer effective.

It is now up to the faculty and administration of the aviation colleges to become educated in the concepts of marketing for student recruitment discussed in this paper; to utilize action research (which appears to be the most proper method to operationalize this key educational research issue); to select which methods work best for them in their individual situations; and to implement those methods to attract and retain aviation students for now and in the future. The collegiate aviation department or program must acquire a student recruitment marketing orientation if it is going to excel within the institution or its discipline. The department chair or program director holds the key role. The chair will have to create the marketing initiative of the department in the same manner other departmental initiatives are established. The chair must also realize that traditional methods may centralize the marketing efforts of an institution away from the department. It, therefore, becomes obvious that any successful aca-

demographic department in general, and an aviation department in particular, must attempt to participate in the marketing efforts of the entire institution.

REFERENCES

- Babbie, E., (1998). *The Practice of Social Research* (8th ed.). Belmont, CA: Wadsworth Publishing Company.
- Bassin, W. M. (1975). A Marketing Technique for Student Recruiting. *Research in Higher Education*, 3 (January), 51-56.
- Beran, P. B. (1996). A comparison of the effects of major and interest specific orientation courses versus generic orientation courses. (Doctoral Dissertation, Texas A&M University, 1996). *Dissertation Abstracts International*, 57-12A, 5029.
- Best, J.W. & Kahn, J.V. (1993). *Research In Education*. Boston: Allyn and Bacon.
- Borg, W.R., (1963). *Educational Research: An Introduction*. New York: David McKay Company, Inc.
- Briggs, V., Cayo, F., Church, R., Cox, G., Dalton, R., Emmons, D., Ford, J., Kelley, M., Murphy, S., Penalver, E., Sidle, C., Smith, R., White, R. & Wulf, S. (1993). *Student Recruitment and Retention*. Cornell, NY: Cornell University, Strategic Planning Advisory Board.
- Curtis, D. B. (1984). *Marketing the Training Course on-and off-Campus*. Paper presented at the Annual Meeting of the Speech Communication Association. (November).
- Denzin, N. & Lincoln, Y. (1994). *Handbook of Qualitative Research*. Thousand Oaks, CA: SAGE Publications.
- Dolence, M.G. (1993). Strategic enrollment management: A primer for campus administrators. *Annapolis Junction, MD: AACRAO Distribution Center* 29.
- Federal Aviation Administration (1977). *FAA Aviation Forecasts: Fiscal Years 1997-2008*. Washington, DC: Office of Aviation Policy and Plans Statistics and Forecast Branch.
- Frankfort-Nachmias, C. & Nachmias, D. (1996). *Research Methods in the Social Sciences*. New York: St. Martin's Press.
- Goodell, P.W., Bowen, B.D. & Holt, M.J. (1991). *Marketing for Collegiate Aviation Education*. Wichita, Kansas: The Wichita State University, National Institute for Aviation Research.
- Greenfield, T. (Ed.). (1996). *Research Methods: Guidance for Postgraduates*. New York: John Wiley & Sons Inc.
- Hayes, T. (1996, January 29). Higher education marketing symposium wins top grades. *Marketing News*, 30, 10.
- Lay, R.S. & Endo, J.J. (1987). *Designing and Using Market Research*. San Francisco: Jossey-Bass Inc., Publishers.
- McMillan, J.H. (1996). *Educational Research: Fundamentals for the Consumer*. New York: Harper Collins College Publishers.
- Mhalba, S.L. (1996, July 30). Inside advice; Getting along once you get into college. *The Patriot Ledger* 08.
- Schreyogg, G. & Steinmann, H. (1987). Strategic Control: A New Perspective. *Academy of Management Review*, 12, 91-103.
- Stringer, E.T., (1996). *Action Research: A Handbook for Practitioners*. Thousand Oaks: Sage Publications.

AUSTRALIAN SPACE SOCIETIES: THEIR ROLE IN SPACE EDUCATION

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ABSTRACT

The paper provides an overview of space awareness societies in Australia and presents a possible explanation for the absence of an effective national space awareness society. Using commercial marketing techniques, the author defines and analyses the market place for space awareness and education followed by a range of suggestions for space education products that could be released in that market. This will be followed by a critical evaluation of the role Australian space societies currently play in space education, as well as what restrictions and limitations they face. In conclusion the presentation will explore what can be done to improve the level of space awareness and education in Australia, including a review of the experiences in other countries.

INTRODUCTION

Like so many facets of Australian society, the presence and activities of space awareness societies in Australia is heavily influenced by the geographical and demographic conditions of the country. Although comprising six federated states and two territories, the country is a loose conglomeration of very parochial and territorial pockets of habitation with 62.78 percent of the 17.9 million population living in the eight capital cities (ABS, 1997). This distribution of the population results not only in little coherence, but also a strong rivalry between the states and territories.

It is this lack of coherence that has prevented the establishment of an effective single space awareness society, such as, for instance, the British Interplanetary Society in the United Kingdom. Over time attempts have been made to establish such a national society, as well as federations of local space societies, informal forums, pressure groups and the like. All of these failed either on inception or shortly afterwards. In a similar way, attempts to establish a national and commercial space journal have failed.

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THE SPACE SOCIETIES

As far as the author can determine, Australia is currently served by seven space societies. However, the possibility that other such societies operate unnoticed at a local level, cannot be discounted. In Western Australia, the Astronautical Society of Western Australia (ASWA) is now in its twenty-fifth year of providing a service to Western Australian based enthusiasts. It is the longest running space society in this country. In Victoria, the Space Association of Australia (SAA), in spite of its name, principally serves Melbourne. In Sydney, the Sydney Space Association (SSA) operates effectively through its association with the Powerhouse Museum, whilst there is also the Sydney Space Frontier Society (SSF).

The Australian Space Education Association (ASEA) has its home in Queensland. Its principal mission is the publication of a regular newsletter entitled *Alsep Compac*. The Australian Space Research Institute (ASRI) in Adelaide, formerly known as Australian Space Engineering Research Association (ASERA), is a very specialised group operating at a professional level to develop an amateur satellite designated as VKSat. This group is also involved in the development of a very light launch vehicle under the designation Ausroc as well as some educational activities which will be referred to below.

The National Space Society of Australia (NSS) was established in 1989. It is affiliated with the U.S.-based National Space Society. Public domain information states that the NSS is a national organisation with chapters in Sydney, Adelaide, Canberra, Melbourne, Newcastle, Perth, Queensland and Western Sydney. In reality, it seems that this is an overstatement: other published information has indicated that the chapters in Adelaide, Melbourne and Queensland are struggling whilst Canberra, Perth and Western Sydney are dormant (SFN, 1997). This, effectively, leaves only Sydney and Newcastle as active and puts some doubt on the national claim. Finally, reference must be made to the CSIRO Office of Space Science and Applications (COSSA) and the Cooperative Research Centre for Satellite Systems (CRCSS), which, in the absence of a national space agency, play a limited role in space awareness.

Like all organisations, these societies have missions or objectives. Usually these say something like 'stimulating a national space programme' and 'increasing awareness'. The involvement of the space societies in space awareness and education stems not only from an emotional perspective, that would like to see every Australian have a deep interest in space, but is also a matter of survival. Any society needs new members as old ones continue to drop off. The only way to gain new members is through active promotion.

Based on personal experience, the membership of these societies is principally comprised of enthusiasts with the occasional presence of members who have a professional status. The obvious exception is, of course, ASRI. Also from personal experience, it is evident that all these societies rely extremely heavily on the resources of one or more dedicated members. These individuals are the

keys to the survival of these societies and once they leave, the society concerned may very well cease to exist unless another dedicated person picks up the lead.

THE MARKET

In analysing the role of these local space societies in the space awareness effort we can make use of the same marketing techniques that expose consumers to many new products. A first step in marketing is to identify, or segment, the market and determine the specific characteristics of each market segment. The market segments are shown in Figure 1. Of course there is an overlap among these market segments.

Figure 1
Market Segments for Space Awareness and Education

- **Students**
 - » primary school students
 - » secondary school students
 - » tertiary students in disciplines unrelated to space
 - » tertiary students in space related disciplines
 - **Adults**
 - » adults who are affiliated with a space society
 - » adults who are affiliated with 'fringe' space societies (such as an astronomical society)
 - » adults who are sufficiently interested to become affiliated with a space organisation but have not yet become aware that such a society exists in their community
 - » the general public
 - **Specialists**
 - » teachers
 - » politicians
 - » the media
 - » industrialists
 - » space scientists and engineers
-

THE PRODUCTS

The products that can be released on these potential market segments can be classified as in Figure 2. In practice, several of these products will be used in combination to get the most effective product mix optimised for a specific market segment. Some of these products or product mixes are further described below, as well as the extent they are used in the Australian context.

Figure 2
Classification of Space Awareness Products

- **Written communications**
 - » newsletters and journals
 - » project materials for students
 - » incidental articles in journals
 - » information materials for specialists
 - **Verbal communications**
 - » lectures to a selected audience
 - » lectures to the general public
 - **Visual**
 - » photos and diagrams
 - » movies and videos
 - » static displays
 - » hands-on displays
 - » an astronaut
-

Lectures, Congresses, etc.

An effective lecture requires a combination of a suitable venue (such as a lecture theatre) and a sufficiently promotable speaker. The effectiveness of lectures can be augmented by means of visuals such as movies and static displays.

Large-scale meetings, such as congresses, have a limited capacity as a space awareness product. They are usually directed to a very selected public (specialists) and, because of the high costs involved in running such an event, are often priced at such a level that the non-specialists will not be attracted.

Until the mid-eighties, the Astronautical Society of Western Australia successfully conducted monthly meetings. The loss of a suitable venue through increased security arrangements, as well as difficulty attracting speakers, saw a demise in these meetings. The Sydney Space Association, through its affiliation with the Powerhouse Museum, holds regular meetings but, in spite of an excellent venue, that Society seems to struggle with attracting quality speakers.

The National Space Society of Australia continues to organise the Australian Space Development Conference (the fifth was held in July 1998). In spite of the high effectiveness of this conference in the specialist's market segment, the high registration fee reduced much of its effectiveness as a general space awareness product. The same applies to the 49th International Astronautical Congress held in Melbourne in September 1998.

Newsletters

Newsletters provide a very effective means of communication. Ideally they should contain a mixture of current information and historical information and

should attempt to provide such information on a global basis, rather than concentrate on, for instance, Australian space activities only.

In Australia the Astronautical Society of Western Australia has issued 25 years of its News Bulletin and succeeded to build this up as a well-respected communications medium. The use of simple reproduction techniques has ensured that the production costs—and hence the membership or subscription fee—has remained at a level acceptable to space enthusiasts.

The Brisbane based Australian Space Education Association issues its regular *Alsep Compac* whilst the Sydney Space Association publishes a very irregular newsletter. In addition, the Cooperative Research Centre for Satellite Systems (CRCSS) published a high quality newsletter which is, however, largely restricted to news relating to the CRCSS.

School project material

Provided that the demand is there through the educational programme, school project materials can be a combination of written word and still pictures. Currently the demand is very ad hoc but can be satisfied through existing resources.

Displays

Displays in generally accessible areas are an excellent means of reaching the general public. Space awareness societies are usually limited to small and temporary displays in banks or shopping centres. Large temporary exhibitions, such as the one planned for the International Astronautical Congress in Melbourne, are extremely effective for space awareness purposes, provided that they are accessible to the general public. In Australia, permanent space displays are in the Powerhouse Museum in Sydney and at the Tidbindilla Tracking station in Canberra.

Space Camps

The United States has several space camps which cater to students and adults, whilst in Europe there is a space camp site in Redu in Belgium. Australia does not have a space camp.

Astronaut

The best way to promote space awareness is by having an astronaut make guest appearances. Australia does not have an astronaut. Recently the media portrayed Andrew Thomas as an Australian astronaut; in fact, he is a U.S. astronaut who just happened to have been born in Australia. His availability to Australia will always be courtesy of NASA. Having a real Australian astronaut, sponsored by the Australian government, with an Australian flag on the sleeve, will have a significant impact on space awareness in Australia. And whilst it is not cheap to train an astronaut, it would be money well invested.

THE SELLING EFFORT

It must be noted that, like many products thrust upon the consumer, the total market is not crying out for space awareness products. Thus, only a small sector of the total market has an identified need for the products. The larger part has no need for these products and the bulk of the space awareness effort is a matter of convincing the consumer that the space effort is really the best thing that could ever happen.

Primary school students

This is a difficult market segment as the students at this level are often not advanced enough in the basic scientific and engineering concepts to understand the technical aspects involved in the space business. As such, the effort should concentrate on saturating their minds with visual images which are latently stored in the brain and can be retrieved some years later when they are secondary students. Pretty pictures, both still and moving, should provide the fertile soil which can germinate the seed. Of course a display, especially a hands-on display, will make a more intense impact.

Secondary school students

The secondary school student market segment is one of the easiest to satisfy. At that age students have not only the desire to find out about new things, but they have also a sufficient knowledge of science and engineering concepts to understand the technology of space exploration and exploitation.

Some of the products for this market segment are written information on space, in the form of articles in newspapers and pamphlets. Included in this written word should also be material that will assist students in their school projects. Where at all possible, these products must be enhanced by pictures and diagrams. Of course, moving pictures are even better: nothing is more impressive, and effective, as seeing an IMAX movie on space. Finally displays are an effective means to reach this market segment, especially hands-on displays.

In this market segment it is, however, essential to generate the demand. Teachers must be induced to make space a topic of the educational programme!

Adults Who Are Affiliated With a Space Society or Fringe Space Societies

Most of the products that are suitable for the secondary school students, are also very effective to satisfy the needs of the affiliated adult market segment and the fringe affiliated adult market segment. To this should be added specialised newsletters.

General Public

The general public comprises the largest and potentially least interested, market segment. This is the market segment that happily accepts the non-stick

frying pan, the satellite weather pictures and the direct television broadcasts of the Olympic Games, without realising that all those things would not have been possible if it had not been for the space effort.

Nevertheless, one should never forget that this is the ultimate lobby group - sufficient understanding in this market segment will drive politicians to approve a space programme, will motivate industrialists to set up space industries to market space related products, and will allow scientists to continue to undertake space research.

The principal means of passing the message on are public displays, either at large specialised exhibitions, such as an annual hobby or science fair, or through displays at banks, shopping centres and the like.

Where accessible, serious consideration ought to be given to public radio and television in the form of regular programmes, as well as incidental articles in journals and local papers. Especially television must be considered as the ultimate medium.

Finally, public lectures, preferably by an astronaut, will attract interest.

Adults Who Are Sufficiently Interested to Become Affiliated

Products used to make the general public aware of the space effort, will allow participants of this particular market segment to become aware that a space society exists in their community. Hopefully they will be induced to graduate towards space society membership.

Tertiary Students in Disciplines Unrelated to Space

The same products that can be used in the general public market segment, will attract tertiary students in disciplines unrelated to space.

Teachers

Teachers require versions of the products which optimise their needs. They are constantly looking for new topics to present to their students. The effort in this market sector must concentrate on seeding their minds. The various ways to do this include articles in teacher's journals as well as talking to teachers.

Other Specialists

Like teachers, the other specialists require optimised versions of the products which satisfy their particular objectives. The industrialist wants a higher profit. The politician will accept anything as long as it translates ultimately into more votes. The media must be fed appropriate press releases whenever something exciting happens in space.

Space Practitioners

Two market segments can be ignored by space awareness societies. One group includes tertiary students who have already chosen a space-related disci-

pline (hopefully as a result of the space awareness products that they were exposed to as secondary students). The second group includes space scientists and engineers who are already involved in space related activities on a professional basis. These people are more interested in scientific and engineering information, and professional study grants. Such requirements should be met through professional institutions and libraries of tertiary institutions and not by the awareness products offered by space societies. Of course there is nothing to stop these people from being a member of a space society and their participation would be appreciated.

SOME SPECIFIC SPACE AWARENESS PROJECTS

It is useful to look at some specific space awareness projects that are being undertaken not just in Australia but also elsewhere in the world.

In Australia, the Royal Australian Air Force donated 800 obsolete rockets to the Australian Space Research Institute (ASRI) in 1997. The rockets are of the Sighter and the Zuni type and were destined for the 20 Royal Australian Navy's A-4 Skyhawk strike aircraft that were withdrawn from service in the 1980s.

The ASRI now intends to request Australian schools to design payloads that can be launched with the rockets. The plan is to conduct approximately 20 launches per year, using facilities at Woomera. Information kits will be distributed to schools in due course. The launches will be conducted by qualified ASRI personnel who will also assess the suitability of the payloads. The Sighters have a length of 140 cm and have a diameter of 8 cm, whilst the Zunis are 195 cm long and have a diameter of 18 cm. Both rockets can reach an altitude of 10 km. The first launch took place on 5 October 1997.

To augment NASA's excellent educational efforts, the U.S. space industry is actively working on space awareness. TRW's effort places an emphasis on education from kindergarten through eighth grade and involves TRW employees working with, for instance, day-care providers in shaping a suitable programme. The Lockheed Missile and Space Company recently paid for fifty U.S. teachers to attend a space camp in Huntsville, Alabama. In addition they sponsor students for the space camp. McDonnell-Douglas engineers work with high school students to control, via virtual reality and telepresence technology, a planetary rover that is being tested whilst Aerojet provides students with the opportunity to operate a mock mission control centre.

In France the space agency CNES has adopted a philosophy that attempts to bridge the gap between school education and the high sphere of space science. This programme actively sponsors amateur rocket development. It also provides SPOT images for processing in classrooms as well as flying balloons with experiments developed at schools.

The Rocky Mountains Chapter of the American Astronautical Society has given grants to schools in Colorado to foster an interest in space. It is sponsored by the large space industries in Colorado as well as some local small businesses.

For instance, one primary school concentrated on the Mars Pathfinder mission. The students built models, held art and writing competitions, and even simulated the landing on Mars by dropping one of the models using balloons as air-bags. Many more examples are available, but the above serve to demonstrate the possibilities.

Lessons can also be learned from other industries. In Western Australia, the Petroleum Club undertakes an effective awareness programme. The programme is funded by the petroleum industry in this state and it employs a part time teacher who has developed an educational package that includes representatives of the industry talking to students in a show-and-tell situation. The package also provides teachers with ideas for projects.

Of course the petroleum industry in this state is somewhat more developed than the space industry but there are sufficient space operators in this state to fund a similar scheme and promote their little niche of the space industry to the schools. Such a promotion must be considered a long-term investment in goodwill. All that is needed is a dedicated educator (perhaps a retired teacher?) and a willing space industry.

AUSTRALIAN SCORE CARD

Whilst there is little doubt that the Australian space societies have a high level of enthusiasm and dedication in the space awareness effort, they are not in a position to effectively execute the role they have.

Most of the societies rely extremely heavily on the resources of one or more dedicated people. These people are the key to the survival of these societies and, once they leave, the society concerned may very well cease to exist unless some other dedicated person takes on the lead.

In addition, the societies lack:

- Human resources—simply people who are prepared to undertake the tasks that need to be done, such as attending a display;
- Materials—for example, recently the Astronautical Society of Western Australia wanted to organise a small travelling display but had to abandon the idea because it was impossible to obtain display materials;
- Financial resources—for example, with reference to the travelling display referred to above, there were no funds to buy display boards;
- Exposure and networks—this shortcoming was clearly demonstrated when recently Alexi Leonov, the supreme Russian cosmonaut, was in Perth and the Astronautical Society did not know about it;
- Presence of a national space awareness programme— whilst the Cooperative Research Centre for Satellite Systems (CRCSS) undertakes effective programmes for the very specialised market, it does not provide general space awareness facilities;

- Existence of a national space agency—Australia does not have a national space agency; and
- Effective liaison with educational institutions.

CONCLUSION

It has been suggested that, if Australia, as a nation, is to look towards a future in space, a high degree of public awareness of the benefits that can be derived from space is essential. It is also evident that such an awareness is not there.

Space societies can provide a major contribution towards increasing space awareness. However, they cannot do this alone and in isolation. They must be allowed to operate within a framework that also involves industry and the government.

The means to achieve this would be by establishing a permanent space awareness forum that is composed of representatives of the national space agency, educators, industry and the space awareness societies. This forum, which should be funded by the national space agency, with assistance from the industry, should, on an on-going basis, aim towards increasing the level of space awareness in Australia.

REFERENCES

- Australian Bureau of Statistics (ABS), 1996 Census of Population and Housing, Canberra, 1997
- Proceedings of NSS Directors Meeting of 15 February 1997, Space Frontier News (SFN), Vol. 4, No. 2, p.1 (1997)

GENERAL AVIATION: A STEPPING STONE TO A WORLD CAREER IN AVIATION

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ABSTRACT

The future of the world's air transportation system is based on the available work force to safely operate this complex mode of transportation. Most airline pilots started their aviation careers in a general aviation aircraft. General aviation includes all aviation except military and commercial aviation and has the most pilots and aircraft. Not all people are suited to be airline pilots. Those who do not pilot commercial aircraft can still find related employment in the aviation industry. We need to expose our youth to our industry in order to guarantee the availability of an aviation work force of the future. What better way than to offer them the chance to enter an aviation career through a well planned aviation/aerospace, activity related youth program. The purpose of this paper is to suggest and identify resources of cooperation that can motivate young people to enter future aviation careers through general aviation and organized aviation

INTRODUCTION

The future of the world's air transportation system is based on the available work force to safely operate this complex mode of transportation.

Most airline pilots get their start in a general aviation aircraft. They then begin building the flight time and experience necessary for employment in the commercial airline industry.

General aviation includes all aviation except military and commercial aviation. By possessing the greatest number of pilots and aircraft, general aviation is the largest segment of the aviation industry.

Not all persons are suited to be airline pilots. Those who do not pilot commercial aircraft can still find related employment in the aviation industry. This includes almost every occupation that can be identified. For example, one important occupation in the aviation industry is the aircraft mechanic. The job

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knowledge required to perform inspections and repairs on aircraft is gained through on-the-job training, formal schooling, and work experience.

The replacement work force of the aviation industry will come from the world's youth. We need to expose youth to our industry. What better way than to offer youth the chance to enter an aviation career than through a well planned aviation/aerospace youth program. Some people have organized such programs but the numbers are small.

PURPOSE

The purpose of this paper is to suggest and identify resources of cooperation through general aviation and organized aviation youth activities that can motivate youth into pursuing future aviation careers.

DEVELOPMENT

A questionnaire was developed containing the following four questions. The purpose was to identify resources that are available in the world's general aviation community.

1. What are the total flight hour requirements for a private pilot in your country?
2. What is the average cost for private pilot training in your currency?
3. Does your country have a youth aviation program similar to the United State's Civil Air Patrol Cadet Program or the Aviation Explorer Scouts? If so, please provide name(s) and contact information.
4. Has your country published career information on aviation occupations? If so, please provide names(s) and contact information.

The questionnaire was sent to 34 countries using the information supplied by the International Aircraft Owners and Pilots Association (IAOPA). FAX, electronic mail, and postal mailing were used with responses returned the same ways.

The delegate list of the International Air Cadet Exchange Association (IACE) was obtained from the Headquarters of Civil Air Patrol, Maxwell Air Force Base, Alabama. This aviation youth exchange program allows outstanding youth from various organizations (military and non-military) from around the world to visit each other's countries and participate in aviation related activities.

The above information was combined with other data, including notes from visits outside the United States related to aviation starting in 1958. The areas of the world visited include North and South America, Africa, Europe and Russia (including Siberia and Far Eastern Russia).

The United States Federal Aviation Administration, Aviation Career Information publications were also used as a resource.

Mr. Philip Woodruff, FAA Headquarters, Washington D.C., and Dr. Mervin Strickler, retired FAA Director Aviation Education served as additional resources.

The 1993 publication of the United States Federal Aviation Administration "Aviation Careers—Your Career in Aviation: The Sky's The Limit" was used in the preparation of this article.

Starting October 24, 1997 the IAOPA of 35 countries were asked to respond to the four questions listed previously. As of January 4, 1998, members in 27 countries had responded. A summary is shown in Table 1.

The results of the IAOPA countries responding to the questionnaire provided the information needed to identify the flight hours and cost of obtaining the PPL. The monetary figures have not been converted.

The term Private Pilot License (PPL) was used rather than private Pilot Certificate. Some countries, like the United States, do not issue pilot licenses but rather issue pilot certificates.

The reported flight time required to obtain a PPL are the minimum flight hours and can only be met when the flight student is in full time training. Those who can fly only one or two hours per week find themselves spending an additional twenty or more hours of flight time to gain the required flight proficiency.

Another factor related to the flight time for a PPL is the actual time spent at the airport. For example, if the student pilot is flying 10 hours per week, the total actual clock time at the airport will be in excess of 25 hours. Pre-flight briefings, aircraft servicing, pre-flight inspection, walking to/from the aircraft, post-flight briefing, and evaluation of the student performance will take additional time.

Some of the IAOPA countries responding to the questionnaire also commented on ground or academic related training required in order to pass a written test for the PPL certification. Some countries have mandatory approved subjects in which specified classroom hours must be attended. Other countries allow self directed study and others require supervised study of specific aviation subjects.

Some countries in the IAOPA questionnaire reported that ground or academic training related to the PPL written examination is provided in their youth organizations. Others reported that a number of flight training scholarships are provided to their youth ranging from solo flight to the PPL.

The cost of flying varies from country to country. The variables of the high cost include, but are not limited to, the aircraft used. The operational cost and the economy of the country are major factors in the expense of flying.

Starting in July of 1999, the PPL of the 27 JAA member states in Europe will be standardized to a possible minimum of 45 flight hours. This will have a major effect, along with other changes, on the cost of the PPL and other pilot certificates/licenses in the European Community and JAA countries.

This data is being provided so that those pilots within the various countries are reminded of the large cost to start flying. Introductory flights or passenger

Table 1
Availability of Youth Organizations and Career Information, IOPA Members, 1998

<i>Country</i>	<i>Response Yes/No</i>	<i>PPL Hours</i>	<i>Career PPL Cost Yes/No</i>	<i>Youth ORG. Yes/No</i>	<i>Information</i>
Australia	y	40	A\$8000	y	y
Austria	n				
Belgium	y	50	200,000BFR	y	y
Brazil	n				
Canada	y	45	C\$5000	y	y
Columbia	n				
Cyprus	y	43	US\$3000	y	y
Denmark	y	45	50.000DKR	n	n
Finland	n				
France	y	50	25,000FF	y	y
Germany	y	40	13,000DM	y	y
Greece	y	40	US\$5500	n	n
Hungary	y	30	750HUF	n	n
Iceland	y	60	IKR 500,000	n	n
India	y	45	RS2000,000	n	n
Ireland	y	45	3150Punt	y	n
Israel	y	40	14,000NIS	y	n
Italy	y	45	20,000L	n	n
Jamaica	y	40	J\$150,000	y	n
Japan	n				
Liberia	n				
Luxembourg	y	40	250,000FLUX	n	n
Malaysia	y	43	20,000RM	y	n
Malta	n				
Monaco	y	40	FFR50,000	n	n
Netherlands	y	50	Dfl17000	y	n
New Zealand	y	50	NZ\$7,500	y	n
Norway	y	40	40,000Nkr	y	n
Pakistan	n				
Philippines	n				
Poland	n				
Portugal	y	40	1,000,000ESC	n	n
Russia	n				
Singapore	n				
Slovenia	n				
South Africa	y	40	R15000	n	n
Spain	y	40	8,000,000Ptas	n	n
Sweden	y	40	50,000SEK	y	n
Switzerland	y	30	20,000SFR	y	y
Turkey	n				
United Kingdom	n				
United States	y	40	US\$2600	y	y
Venezuela	n				

rides do cost money. The financial return for general aviation can be seen in ten to fifteen years, when the pilot-to-be has gained successful employment and has the surplus income to afford personal flying.

Some youth will take the direct path and become involved in aviation as soon as they possibly can. Those who find the financial resources to gain pilot licenses will usually need related employment and usually find it in the aviation industry.

Other youth will take the route of taking any aviation job for which they can qualify. Baggage handling, aircraft cleaning, and aircraft mechanic are occupations in which you will find aspiring airline pilots.

One pilot I know left the U.S. Air Force as an electronic technician and went into public education where he found that after several years, he could not afford the reduction in income associated with becoming a flight officer.

In Table 2, information from the 1996 statistical report of the IAOPA shows the number of pilots and general aviation aircraft in several countries. The numbers of commercial airline or military aircraft are not provided.

Not included in these numbers is the uncertificated ultra light or micro light flight vehicle. The cost of operation of these flight vehicles, is a fraction of that for a standard airplane. Some countries have certificated these flight vehicles as airplanes. while other countries will only certify flight vehicles when certain conditions exist. Some of these conditions are for example, is the horsepower of the power plant, the number of seats, and the maximum take off weight.

These flight vehicles have proven to be safe if operated under controlled and monitored conditions. While a poor safety record has existed in past years, organizations of pilots and manufactures of flight vehicles, have established safety standards that have even, in some countries, have become regulatory.

The information on the number of aircraft and other flight vehicles is being provided to show the potential each country has to offer their youth flying opportunities.

Table 3 identifies the various aviation youth organizations as reported in the responses to IAOPA questionnaire and by the International Air Cadet Exchange Association. It is interesting that in some cases, the organizations in certain countries are not aware of each other.

Table 2
IAOPA STATISTICAL REPORT
September 1996

<i>Country</i>	<i>Licensed Civil Pilots</i>	<i>Active G.A. Aircraft</i>
Australia	38,857	8,745
Austria	5,200	750
Belgium	N/A	919
Brazil	71,603	8,518
Canada	56,526	27,948
Colombia	5,000	1,200
Cyprus	450	40
Denmark	4,000	714
Finland	4,389	467
France	44,000	7,500
Germany	114,719	20,543
Greece	4,315	214
Hungary	1,962	517
Iceland	1,275	181
Ireland	2,100	313
Israel	2,400	190
Italy	14,300	1,400
Jamaica	N/A	N/A
Japan	33,343	707
Liberia	N/A	N/A
Luxembourg	N/A	N/A
Malaysia	2,159	99
Malta	52	14
Netherlands	8,751	886
New Zealand	9,175	1,584
Norway	3,702	357
Pakistan	1,478	90
Philippines	14,624	883
Singapore	1,276	30
South Africa	9,909	6,321
Spain	9,988	1,301
Sweden	12,402	1,786
Switzerland	11,048	2,405
Turkey	3,904	580
United Kingdom	51,755	9,500
United States	639,184	170,600
Venezuela	N/A	N/A

1. Licensed civilian pilots include some pilots who only pilot commercial aircraft.
2. The number of commercial aircraft for each country is far less than the G.A. (General Aviation) aircraft.

Table 3
Reported Youth Organizations

<i>Country</i>	<i>Reported In IAOPA Questionnaire</i>	<i>International Air Cadet Exchange Association</i>
Australia	Air Training Corps Air Scouts	Group Captain Hugh Bartholomeusz, RAAFSR Air Training Corps P.O. Box 841, Ipswich, Queensland, Australia
Austria	N/A	Mr. Alfred Schmitzberger IACE Project Officer Tauxgasse 17, A 5020 Salzburg, Austria
Belgium	Belgium Air Cadets Raketstraat 70 B 1180 Brussels Belgium	Commander Eddy Daniels IACE Project Officer Belgian Air Cadets Kwartier Koning Albert 1 Raketstraat 70, B-1130 Brussels, Belgium
Canada	Air Cadet League of Canada	Mr. Richard Logan Executive Director, Air Cadet League of Canada 313 Rideau Street, Ottawa Ontario K1N 5Y4, Canada
Cyprus	Air Scouts	
Denmark	none	
Finland	N/A	Mr. Matti Kausto Secretary General The Finnish Aeronautical Association, Helsinki - Malmin Lentoasema, 00700 Helsinki, Finland
France	N/A	Mr. Francois Lagarde IACE Project Officer 41 Allee des Bleuets 33610 Canejan, France
Germany	Club der Luftfahrt Generalmajor a.D. Detlef Wibel Godesberger Allee 70, 53175 Bonn, Germany	Mr. Frank Lange IACE, Euro-Agentur Waldstrasse 16a 34277 Fuldabrueck, Germany
Hong Kong	N/A	Wing Commander Len Leung Commanding Officer, Flat 3A, 8 Caldecott Road, Piper's Hill Kowloon, Hong Kong
Hungary	none	

Table 3 – continued
Reported Youth Organizations

<i>Country</i>	<i>Reported In IAOPA Questionnaire</i>	<i>International Air Cadet Exchange Association</i>
Iceland	none	
India	none	
Ireland	Air Scouts Air Activity Department, C.B.S.I 19 Herbert Place Dublin 2, Ireland	
Israel	IACE Aero Club of Israel	Lt. Colonel Simcha Aharoni Isreal Air Force Public Relations and Foreign Affairs, Doar, Tzevai 03717 Isreal
Italy	none	
Jamaica	Major F. Carl Barnett Jamaica Combined Cadet Force Air Section Up Park Camp Kingstton 5 Jamaica WI	
Japan	N/A	Mr. Hisayoshi Terai Chairman of the Board of Directors Japan Civil Aviation Promotion Foundation, 15-12, 1-Chome, Toranomom, Minatoku, Tokyo, Japan
Luxembourg	none	
Malaysia	EAA Malaysia	
Monaco	none	
Netherlands	IACE	Mr. M.M.W. Kasteleum IACE Project Officer Royal Netherlands Aeronautical Association Jozef Israelsplein 8 2596 AS THE HAGUE The Netherlands
New Zealand	Young Eagles Program of the Royal New Zealand Aero Club	
Norway	IACE	Mr. Arne Mathisen IACE, Project Officer Norsk Aero Club P.O. Box 383 Sentrum, N-0102, Oslo, Norway

*Table 3 – continued
Reported Youth Organizations*

<i>Country</i>	<i>Reported In IAOPA Questionnaire</i>	<i>International Air Cadet Exchange Association</i>
Phippines	N/A	Colonel Denis G. Narvios Secretary AAP Air Force Reserve Command Villamor Air Base, Pasay City Metro Manilla - 1301 The Phillipines
Portugal	none	
Romania		Adriana Dumitru Secretary General Ministry of Youth and Sports Romanian Aeronautical Federation 16 Vasile Conta Street Sector 1, Bucharest, Romania
South Africa	none	
Spain		none
Sweden	IACE	Lt. Lars Obom Flygvapnets Uttagnins Centrum (IACE), S10785 Stockholm, Sweden
Switzerland	Swiss Aero Club	Dr. Peter Reiner-Werner IACE Commission Galgenbuckstr. 16 CH-8212 Neuhausen am Rheinfall, Switzerland
Turkey	N/A	Mr. Mehmet Tiritoglu Secretary General Ataturk Bulvari 33, 0610 Opera Ankara, Turkey
United Kingdom na	Wing Commander	Richard B. Crowder, RAFRO Hq Air Cadets, TG Branch RAF Cranwell, Sleaford Lincolnshire NG 34 8HB, UK
United States	IACE	Aviation Exploring Division Boy Scouts of America National Office 1325 Walnut Hill Lane Irving, Texas 75038-3096, USA Civil Air Patrol Cadet Program Office 105 South Hansell Street Maxwell Air Force Base Alabama 36112-6332, USA Experimental Air Craft Association, P.O. 3086 Oshkosh, WI 54903-4800, USA

In question 4 of the IAOPA questionnaire, it was asked if aviation career information was available in their country. In Table 4, eight countries indicated they did. This number is possibly larger because this information is usually found only in the educational community or the employment/job information departments of the various countries.

Table 4
Aviation Career Information

<i>Country</i>	<i>Source Of Information</i>
Australia	Women Pilots' Association of Australia
Belgium	Youth and Aviation Antweap Airport, Box 16 B2100, Devrme, Belgium
Canada	Mr. Fred Joneo, ATAC 255 Albert Street, Room #1100 Ottawa, Ontario, Canada, K1P 6A9
Cyprus	Cyprus Aero Club
France	Federation Nationale Aeronautique (FNA) 155 Avenue de Wagram, 75017, Paris, France
Germany	Vermittlungsstelle fur Luftuerkehrsberufe Her Lenk Fischerfeldstr 8-12, 60311 Frankfurt/M, Germany
Switzerland	various flying schools in Switzerland
United States	Aviation Exploring Division - Boy Scouts of America, National Office 1325 Walnut Hill Lane, Irving, Texas 75038-3096 Civil Air Patrol, Cadet Programs 105 South Hansell Street, Maxwell Air Force Base, Alabama 36112-6332, USA Mr. Phillip S. Woodruff, Division Manager, AHT-100 Aviation Education Division Federal Aviation Administration 800 Independence Avenue, S.W., Washington, D.C., 20591, USA NASA - Johnson Space Center Teacher Resource Center Mail Code AP5 2101 NASA Road 1 Houston, Texas 77058-3696 USA Several trade unions and manufactures can provide information on specific occupations. Private vendors provide print, and electronic data for PC computers via, computer diskette and CDROM.

Figure 1 is a sample list of civilian occupations available in the United States from the Federal Aviation Administration. The publication is "Aviation Careers—Your Career in Aviation." The information was published in 1993.

Figure 2 is a sample form that can be used to gather data for an aviation career information system. With the availability of computers, the information can be stored for easy retrieval. In several countries, this information is available both in print and electronic media.

Figure 1
Civilian Aviation Occupations

Airline Captain
 Airline First Officer
 Flight Engineer or Second Officer
 Flight Instructor
 Corporate Pilot
 Air Taxi or Charter Pilot
 Commercial Airplane or Helicopter Pilot
 Patrol Pilot
 Ferry Pilot
 Agricultural Pilot (Aerial Applicator)
 Test Pilot
 Flight Attendants
 Flight Dispatcher
 Meteorologist
 Aviation Mechanic (Airframe and Power Plant Mechanic)
 Avionics Mechanic (Aircraft Electronics Mechanic)
 Schedule Coordinator
 Station Manager of Agent
 Reservations Sales Agent
 Ticket Agent
 Ground Attendant
 Skycap
 Air Freight or Cargo Agent
 Passenger Service Agent
 Sales Representative or Account Executive
 District Sales Manager
 Ramp Service Person
 Cabin Maintenance Mechanic
 Food Service Person
 Ramp Planner
 Auto Mechanic (Ground Support Equipment Mechanic)
 Engineer (several types)
 Specialized Instructor
 Computer Programmer
 Computer Maintenance Mechanic
 Various Aviation Management Positions
 Various Aviation Middle Management Positions
 Various Aviation support positions

Note: This should be considered only a partial list of aviation occupations.

Figure 2
Suggested Aviation Occupations
Information Gathering Data Form

JOB TITLE:

NATURE OF THE JOB:

REQUIREMENTS FOR THE JOB:

WORKING CONDITIONS:

WAGES:

OPPORTUNITIES FOR ADVANCEMENT:

COMMENTS AND SUGGESTIONS FROM THOSE WORKING IN THIS OCCUPATION:

NOTE: The data should be updated at least every two years.

SUMMARY

In this article, the identification of the available resources from the IAOPA and IACE were provided. The available resources to introduce youth to the Aviation Industry in several countries around

The military of several countries do offer or support a youth, aerospace education program and in most cases get the support of the civil aviation community. In other countries, programs not connected with the military operate through junior/senior high schools or private organizations with or without the cooperation of the aviation community.

Some paid professionals can be found operating and supervising these aviation youth programs, but in most cases you will find volunteers donating their time.

Further gathering and sharing of information will help each country to achieve a future work force for the aviation industry. With every part of the world connected to e-mail and the Internet, rapid electronic communications now allows one to one communications on the topics found in this article.

The youth of the world is the future of the aviation industry. It is the hope that with the contact information provided in this article, that educators, general aviation leaders and others interested, will provide the required support to motivate youth to enter a career in the aviation industry.

UTILIZATION OF PRESENTATION SOFTWARE FOR INFORMATION DISSEMINATION

Dutchie Riggsby
Columbus State University, Columbus, Georgia

ABSTRACT

The abundance of information that needs to be disseminated to students about events in space exploration and the theories and technology utilized may be overwhelming to the beginning teacher or lecturer. The utilization of a presentation package with computer and projection system can make it easier and more organized even for the novice. A presentation package, though there are many to consider, all have basic features of interest. The fact that they are organized to be nothing more than electronic slide shows make them attractive by providing a comfort zone to start with based on a familiar use. From the basic design to present text and or visual information there exists an expanded series of features that provide special effects. These effects can range from the manner in which the frame changes to the events that occur as the electronic slide is presented.

This article provides an overview of the various major packages used in our classrooms and the features that are available. The relative price, ease of use, and formats are also explored. Finally, the next generation capability is discussed.

INTRODUCTION

Educators are constantly faced with the problem of the most effective and efficient methods for disseminating information to their students. In trying to adhere to the curriculum guidelines and provide innovative approaches, one area to investigate is presentation software. With the simplest of presentation software one can present colorful slides that provide the information or data in a captivating way. As the level of complexity increases, the effects that may be added are escalated from sound bits to full motion to many other special effects. Just as transparencies evolved from basic words on a screen to those with color and polarized motion, the special effects of presentation software enhance the delivery.

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No matter the age of the learner, one must consider the exposure individuals have had to television, motion pictures, and virtual reality. The need to compete with these stimulating approaches appear to dictate the consideration of use of more sophisticated approaches to the disbursement of information than that provided by the traditional uses of lecture and reading assignments. Larry Keeley (1997) points out that we are experiencing a shift from learning as work to learning as entertainment. The use of multimedia presentations should help with the evolution to package intense experiences with the correct or best balance of technology and pedagogy. The appeal to learners of all ages to select their own best learning style can capitalize on the natural collaborative system necessary to construct a network of presentations.

Software may be found that enables the user to produce a finished presentation with just a few clicks of the buttons to select the style and then typing in the text. The other extreme would require that you write the protocols that develops an original and individually designed presentation. Generally, the first is usually referred to as presentation software while the later is termed authoring software. There are packages that fall in between and permit you options to create sophisticated presentations with relative ease. One popular, easy to use package is PowerPoint®. A program for authoring is called ToolBook®, and one in between is HyperStudio®.

According to Hanke, The static slide show is the most common approach and involves optimizing slide-shows built with PowerPoint®, Freelance Graphics®, or other presentation-graphics programs for Web delivery. Keep in mind that builds, sound effects, and other multimedia slide show components won't translate directly to the Web. If you want to deliver slides with motion, you will need to enlist the help of your service bureau. (1998, p. 50)

“Once portfolio-based teaching and learning becomes the norm, evidence of cumulative learning will be more reliable,” says Bazillion and Braun (1998). Presentation software which permits the importing of visuals and sound, has special effects, and allows for creative development of the finished product has been adopted as the tools to use for constructing portfolios. These high level electronic resumes provide a means of tracking the accomplishments of a student and displaying in a compact form an overview of the totality of experiences which occurred during the learning process. Video clips can show interactions in student teaching, still pictures can illustrate the text, interactive design can increase interest, and color and sound can deepen the impact. The same presentation packages which permit the versatility necessary for portfolios are those used for instructional purposes.

From a click and go approach which capitalizes on templates, to selection of blank slides which call for maximum input, the creator may complete a presentation that incorporates multimedia with appeal. If you are using part of an office suite, you may link to other parts and create more impact with such additions as 3-D graphics for tables and data display, insert customized artwork and link to Internet sites. Potentials and pitfalls are discussed in *The Easiest Way to Present*

on the Web. Depending on the amount you wish to invest, you may move from a basic presentation on the Web which requires the viewer to manually advance to the next screen to one that incorporates an on-line presentation with several clients or locations and that coordinates the exact pace of the visuals. In moving from a basic investment of a couple of thousand dollars to one of \$50,000 or more, you get a more controlled presentation. The more expensive package may also mean you will need the services of a professional company to help achieve the desired effect. The justification of this type expenditure is viable when you consider the total cost for travel, lodging, and other expenses required to bring a variety of participants together from different locations. The total costs involved in an on-site conference may well amount to more than the cost of the Web conference. When you consider that the presentation package investment may preclude multiple onsite meetings, it becomes even more economically desirable. (Hanke, 1998)

Noting the expense of presenting on-line helps explain why educators rely on less elaborate means and tend to do face-to-face presentations. Though it is desirable to know about this approach and be advised of the availability, the practicality of its use is in question at the moment. As with distance learning, until there is corporate cooperation there will be little done in this venue without a positive commitment from school administration and adequate budgets for both training and equipment.

ELECTRONIC PORTFOLIOS

One of the driving forces that demands presentation software be used is the development of electronic portfolios. In essence, these devices can be either versions of a cumulative evaluation tool which permits students the opportunity to input information in the form of a presentation to reflect the individual's achievements and thus provide materials for study to determine progress, improvement in skills, and increase in acquired knowledge or it may be an elaborate resume, easily presented for viewing by a prospective employer.

Once portfolio-based teaching and learning becomes the norm, evidence of cumulative learning will be more reliable. It appears that learning results from effective presentations are based upon the level of each of the following: active learning, individualization, cooperative learning, critical thinking, contextual learning, and learning to learn. (Bazillion and Braun, 1998)

Presentation software which permits the importing of visuals and sound, as well as, special effects, and allows for creative development of the finished product has been adopted as the tools for constructing portfolios. These high level electronic resumes provide a means of tracking the accomplishments of a student and displaying in a compact form an overview of the totality of experiences which occurred during the learning process. Video clips can show interactions in student teaching, still pictures can illustrate the text, interactive design can increase interest, and color and sound can deepen the impact. The same pres-

entation packages which permit the versatility necessary for portfolios are those used for instructional purposes.

PRESENTATION SOFTWARE AND HARDWARE

The top grade was given to Microsoft PowerPoint 97® for both presentation mode and the Web. It uses a click and go approach which capitalizes on templates. Another option permits the selection of blank slides to allow for maximum input from the creator including a presentation that may incorporate multimedia. PowerPoint® also links smoothly to other applications in the Microsoft Office Suite®. On the budget end is SPC ActivePresenter® which is reported to be fast and simple to use. In any case, presentation software can be used to do most of the work for you. (A-List: Software. 1998)

Macromedia Authorware4® is advertised as having Quickstart® templates and reusable course structures (learning engines) that make it easier to create interactive courses that promote high levels of understanding and retention. This, paired with Shockwave® prepares your multimedia presentation for use on the Web. (Keely, 1997)

One of the more reasonably priced programs, HyperStudio®, was developed by a science teacher, Roger Wagner. The program allows for those elements, sound and sight, which are so necessary for student involvement in the multimedia experience. You can access laser disks, include QuickTime® movie clips, import sounds, and in general be as creative as your storage space allows. Although this package is not the only one of its kind, it appears to be one that is most often selected, most likely as a result of considerations of budget and the available upgrades. The immediate upgrades are available free of charge and there is a home use option for school that is very reasonable. You also have several options for the purchase for classroom, by size of bundle and how you equip your classroom with CD support, instruction manual, etc.

A report on the use of HyperStudio 7 points out the process used to have students research, design and produce a multimedia presentation which was transferred to video tape for showing.

This project did more than just help students learn how technology can help them in academic and daily life. It helped them learn to work together and showed them that every class member has something valuable to contribute. (Silvas and Hall, 1997)

To compliment the visuals you have created, you may wish to import music or sound effects. By calling 1-888-449-2970, or accessing <http://www.commdataservices.com>, you can contact a company that will provide a CD of presentation music. It has over 100 tracks with multiple styles in 5 - 60 second segments. This will provide a diversity of music to add audio interest to your presentations. The CD is both MAC and PC compatible. (*Presentation*, 1998)

According to McMakin (1998), parallel-port encoders are the easiest way to put video into presentations. The cost range is about \$400 which, for this type of input is considered reasonable. In McMakin's article, several devices are

reviewed which provide motion clips in MPEG format. Most Pentium® based computers are configured to encode MPEG files without additional hardware which makes these clips easy to import.

CONCLUSION

As the use of multimedia software for the development of instructional materials increases, we must be vigilant of the legal ramifications of the use of resources in the process.

Ethical standards apply to computer-related behavior as well as to all other aspects of human interaction and communication. Ethical questions related to multimedia development concern two basic aspects of the activity; the behavior of the developer and the production, and the contents of the production. (Tannenbaum, 1998)

In the United States, access to public domain materials from the National Aeronautics and Space Administration makes it possible for teachers to have high quality illustrations without a problem of legal complications from copyright violation. It is always wise to use original illustrations if the product is considered for publication or production.

The easy approach to the use of presentation software is to use a storyboard for planning. This can be as simple as jotting each frame idea on a 3" x 5" card. After the storyboard is developed, transfer the frame content to the created frames on the electronic storyboard. Next, go in and add your visuals and/or sound effects. Other effects, such as builds and transitions can be included before you declare the work completed. Most effects may be changed as your content is updated or audience response indicates the need for a change. Should you create effects than cannot be changed, try inserting a complimentary frame with the desired information and then delete the one that needed an update. Being creative in your problem-solving will make any software work better for you. Of course, as with all technology, do not begin to think that nothing can go wrong, or it will! Technology is the master and we utilize its protective features to help us achieve our goals. Experiment with the various software offerings, find the one you respond to best, and use it wisely. Happy creating!

REFERENCES

- "A-List: Software" *PC Computing*. June 1998, Vol. 11, No. 6, p. 162.
- Bazillion, Richard J. and Connie Braun. "Teaching on the Web and in the Studio Classroom." *Syllabus* April 1998, Vol 11, No. 8, pp 37-39.
- Hanke, Jon. "The Easiest Way to Present on the Web." *Presentations* March 1998, Vol. 12, No. 3, pp. 43-51.
- Keeley, Larry, "Designing for an Educational Revolution." *Educom Review*. November/December 1997, Vol. 32, No. 6, pp. 12-14.
- McMakin, Matt. "Capture Digital Video with a Magic Little Box." *Presentations*, March 1998, Vol. 12, No. 3, pp. 53-58.

"Presentation Music Made Easy" (AD). *Presentations*, March 1998, Vol. 12, No. 3, pp. 84.

Silvas, Linda and Linda Hall. "In the Trenches." *Learning & Leading with Technology*. November 1997, Vol. 25, No. 3, pp. 58-61.

Tannenbaum, Robert S. "Legal and Societal Issues Related to Multimedia." *Educom Review*, July/August 1998, Vol. 33, No. 4, pp. 48-55.

MORE INFORMATION

AudioNet Inc
2914 Taylor St
Dallas, TX 75226
2114-748-6660
www.audionet.com

Contigo Software LLC
8334 Clairemont Mesa Blvd
San Diego, CA 92111
619-278-5900
www.contigo.com

E-Conference Inc.
885 Arapahoe Ave
Boulder CO 80302
303-786-8789
www.e-conference.com

Envoy Global Inc,
Suite 600
919 SW Taylor
Portland, OR 97205
800-695-7900
www.egivcc.com

TalkPoint Communication Inc
Suite N209
430 10th St. NW
Atlanta, GA 30316
800-336-5191
www.talkpoint.com

Macromedia Authorware 4
800-288-9576
www.macromedia.com/software/authorware

Fred D'Ignazio
Multi-media Classrooms, Inc.
1773 Walnut Heights Drive
East Lansing, MI 48823-2495
dignazio@msen.com

International Society for Technology in Education
480 Charnelton St.
Eugene, OR 97401-2626
541-302-3777

Education News & Entertainment Network (E.N.E.N.)
5961 Keary Villa Road
San Diego, CA 92123
619-503-5525
www.ene.com

Special Commentary

THE ENVIRONMENTAL IMPACT OF TOURISM AND AIR TRANSPORT ON THE SUSTAINABLE DEVELOPMENT OF SMALL ISLAND DEVELOPING STATES

Ruwantissa I. R. Abeyratne
Montreal, Canada

ABSTRACT

The United Nations General Assembly recognized that many small island developing countries were confronted with compelling factors such as their smallness in size, susceptibility and vulnerability to natural disasters, remoteness of access and geographical dispersion. All of these factors worked to their detriment. The fragility of their ecosystems and constraints on transportation and communications created almost insurmountable distances between market centers and a highly limited internal market for these developing countries. This paper will discuss these problems and the impact of United Nations initiatives.

INTRODUCTION

In February 1993, the United Nations General Assembly initiated specific measures in favor of island developing countries by adopting Resolution 47/186 (A/RES/47/186, 25 February 1993). This resolution marked the genesis of official action taken by the international community towards furthering the objectives of the United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, 3-14 June 1992), which addressed, inter alia, the question of small island developing States (SIDS) and their sustainable development.

The General Assembly recognized that, in addition to the general difficulties which developing countries faced, many small island developing countries were also confronted with such compelling factors as their smallness in size, suscepti-

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bility and vulnerability to natural disasters, remoteness of access and geographical dispersion—all of which worked to their detriment. The fragility of their ecosystems and constraints on transport and communications, which created, *inter alia*, almost insurmountable distances between market centers and a highly limited internal market, were further contributions towards the hindrance of development within these countries. It was noted by the Assembly that many of the above factors occurred concurrently in island developing countries, resulting in a negative growth in economic and social development and the necessary corollary of dependence, particularly in geographically dispersed island developing States.

Therefore, the General Assembly, in Resolution 47/186, came to the conclusion that many island developing countries are least developed countries and that the international economic environment that these countries faced in the 1990s would strongly affect their ability towards achieving sustainable development. In this context the Assembly took note of Agenda 21 of UNCED, particularly Chapter 17, Section G which relates to the sustainable development of small island developing States and reaffirmed earlier United Nations' action in resolution 45/202 of 21 December 1990 and other relevant resolutions of the General Assembly and of the United Nations Conference on Trade and Development (UNCTAD), all of which respond to the special needs of island developing States.

Finally, the Resolution appealed to the international community to maintain and, if possible, increase the level of concessional financial and technical assistance provided to island developing countries; to provide support to island developing countries over a mutually agreed and longer time frame to enable them to achieve economic growth and development; and to consider improving trade and/or other existing arrangements for assisting island developing countries in redressing negative effects caused to their export earnings.

The General Assembly also appealed to the international community to ensure that a concerted effort is made to assist island developing countries, at their request, in improving their institutional and administrative capacities and in satisfying their overall needs with regard to the development of their human resources.

In December 1993, the General Assembly adopted Resolution 48/193 (A/RES/47/193, 21 December 1993) on convening a global conference on the sustainable development of Small Island Developing States. This resolution recognized the fact that SIDS were faced with special challenges with regard to implementing sustainable development owing to their limited developmental options and that the assistance of the international community was necessary for these countries to effectively meet such challenges. The Assembly therefore decided to convene the first Global Conference on the Sustainable Development of Small Island Developing States in Barbados in April/May 1994.

The Programme of Action for the Sustainable Development of Small Island Developing States adopted at the Barbados Conference (A/50/422/Add.1 20

September 1995) in its Part VIII — on tourism resources — recommends various studies to examine indicators of sustainability with regard to tourism and suggests the development of proposals for environmental codes of conduct for the tourism sector (which is already being carried out by the Caribbean Tourism Association). The Programme also suggests the desirability of holding workshops on integrated tourism planning in selected regions and supporting tourism planning and management in SIDS.

It is also worthy of note that the Programme, in its Part XII, provides for the implementation of action on developing transport and communications in SIDS. The Programme calls for: continued efforts to strengthen transport services and facilities at both national and local level, with emphasis laid on environmental protection, with a view to introducing safe, energy efficient and low cost transport systems; regional co-operation by such measures as consolidation of national airline services; establishing effective links with regional organizations, particularly in improving provision of financial and technical resources; encouraging and promoting research and development in the field of transportation; and facilitation of tourism related travel formalities, such as quarantine requirements.

This article will examine the various issues involved in the attempts made so far by the international community at achieving sustainable development of small island developing states and assess the role played by tourism and air transport in this regard.

SUSTAINABLE DEVELOPMENT

Essentially, the term “sustainable development” in the context of environmental protection means “development which the environment can sustain without being polluted.” The term has its genesis in the UNCED Conference which had the following priorities incorporated in its Report, in Agenda 21:

- (a) achieving sustainable growth, as through integrating environment and development in decision-making;
- (b) fostering an equitable world, as by combating poverty and protecting human health;
- (c) making the world habitable by addressing issues of urban water supply, solid waste management, and urban pollution;
- (d) encouraging efficient resource use, a category which includes management of energy resources, care and use of fresh water, forest development, management of fragile eco systems, conservation of biological diversity, and management of land resources;
- (e) protecting global and regional resources, including the atmosphere, oceans and seas, and living marine resources; and
- (f) managing chemicals and hazardous and nuclear wastes.

For the above purposes, member States of the United Nations agreed at the Conference to establish a new Commission for Sustainable Development which was mandated to monitor and review the implementation of Agenda 21. The UNCED initiative re-established the notion that environment is an inextricable and integral part of sustainable development and that environmental issues were not *sui generis* or stand-alone issues but were incontrovertibly linked to their economic, political and social contexts. The general thrust of the UNCED conclusions was that environmental issues were the necessary corollaries to social processes and should be addressed on the basis of equity, care for nature and natural resources and development of society.

Environmental management is therefore the key to effective sustainable development. The flavor of the UNCED process introduced a hitherto unknown element in environmental protection—a diversion from the mere cleaning up or repairing damage to being a sustained social activity which brings to bear the need to force development to keep pace with the environmental equilibrium and stability of the world.

Another integral part of sustainable development is economics. Economics not only plays a key role in societal decision-making, but it also integrates environmental issues with distribution, ownership and control, identifying economic development and social issues as major elements in the management of a society. Another aspect of the role of economics in sustainable development is reflected in the very nature of sustainable development itself, in that it requires a delicate balance between the needs of the present generation and the long-term environmental well being of a society. If, for instance, the alienation of environmental assets which enrich the present generation, but would adversely affect future generations, the management of this dichotomy could be addressed by considering primarily, the economic implications of unsustainable development.

Another factor which influences sustainable development is globalization, which calls for intervention at international level to ensure that development could be sustained environmentally. In this context, in addition to the implementation of international environmental agreements, it becomes necessary to critically analyze the impact of the global economy and the liberalization of trade on environmental issues.

The UNCED process epitomizes the premise that any bifurcation of environment and sustainable development is arbitrary and cosmetic. With this in view, sustainable development is now internationally managed by the primary United Nations regulatory body on the environment—the United Nations Environmental Programme (UNEP)—which addresses the subject of sustainable development in three component elements:

1. environmental assessment: through the evaluation and review, research and monitoring and the exchange of views on the environment;

2. environmental management: through comprehensive planning that takes into account the effects of the acts of humans on the environment; and
3. supporting measures: through education, training and public information and also through financial assistance and organizational arrangements.

The above tools are used by UNEP in carrying out the task assigned to it by Agenda 21 of UNCED, which, in its Chapter 38, paragraph 22 set out the following priority areas on which UNEP should concentrate:

1. Strengthening its catalytic role in stimulating and promoting environmental activities and considerations throughout the United Nations system;
 - a. Promoting international co-operation in the field of environment and recommending, as appropriate, policies to this end;
 - b. Developing and promoting the use of techniques such as natural resource accounting and environmental economics;
 - c. Environmental monitoring and assessment, both through improved participation by the United Nations system agencies in the Earth-watch programme and expanded relations with private scientific and non-governmental research institutes; strengthening and making operational its early-warning function;
 - d. Co-ordination and promotion of relevant scientific research with a view to providing a consolidated basis for decision-making;
 - e. Dissemination of environmental information and data to Governments and to organs, programmes and organizations of the United Nations system;
 - f. Raising general awareness and action in the area of environmental protection through collaboration with the general public, non-governmental entities and intergovernmental institutions;
 - g. Further development of international environmental law, in particular conventions and guidelines, promotion of its implementation, and co-ordinating functions arising from an increasing number of international legal agreements, inter alia, the functioning of the secretariats of the Conventions, taking into account the need for the most efficient use of resources, including possible co-location of secretariats established in the future;
 - h. Further development and promotion of the widest possible use of environmental impact assessments, including activities carried out under the auspices of specialized agencies of the United Nations system, and in connection with every significant economic development project or activity.

- i. Facilitation of information exchange on environmentally sound technologies, including legal aspects, and provision of training;
- j. Promotion of subregional and regional co-operation and support to relevant initiatives and programmes for environmental protection, including playing a major contributing and co-ordinating role in the regional mechanisms in the field of environment identified for the follow-up to the Conference;
- k. Provision of technical, legal and institutional advice to Governments, upon request, in establishing and enhancing their national legal and institutional frameworks, in particular, in co-operation with UNDP capacity-building efforts;
- l. Support to Governments, upon request, and development agencies and organs in the integration of environmental aspects into their developmental policies and programmes, in particular through provision of environmental, technical and policy advice during programme formulation and implementation;
- m. Further developing assessment and assistance in cases of environmental emergencies.

In addition to chapter 38, directives are specifically given to UNEP or to UNEP in collaboration with others, in sixteen chapters of Agenda 21. Agenda 21 was endorsed by United Nations General Assembly resolution 47/19 of 22 December 1992.

The expectations placed upon and the tasks assigned to UNEP by the international community thus confirm UNEP's approach of positioning the environment in the broader context of sustainable development. UNEP's mandate is consistent with the conclusion that the environment cannot be viewed in isolation and needs to be managed within the integrated context of sustainable development. This approach was confirmed by the global community at UNCED.

Mention must be made of the perceived overlap between the UNEP and another United Nations body—the Commission on Sustainable Development (CSD) both of which are involved—within the parameters of Agenda 21 of UNCED—in issues addressing environment and development. The CSD is ineluctably involved in Agenda 21, of which the main thrust is sustainable development. Sustainable development in turn is linked to environmental and developmental issues, which is identified with the scope of work which UNEP is involved in. However, this seemingly obvious duplication is not an absolute one since UNEP's main interest lies in the environment, whereas the CSD focuses primarily on sustainable development. However, the scope and functions of the CSD, as reflected in Agenda 21, although bordering largely on monitoring and review, also involves for the CSD a largely interactive role with organizational and governmental entities which are involved with the implementation of

Agenda 21. This function irrevocably overlaps with that of the UNEP and may therefore be considered by the world at large as a perceived duplication. Another area of potential overlap between the two bodies lies in the existence of the Department for Policy Co-ordination on Sustainable Development (DPCSD) which provides support for the CSD and therefore is involved in the same work as UNEP. The UNEP and CSD dichotomy is also seen in their roles in monitoring progress made by the international Community under international conventions. Be that as it may, both bodies have so far performed their functions without tangible duplication, while contributing to Agenda 21 positively (UNEP/ GC.18/27, 21 March 1995).

The United Nations Inter-Agency Committee on Sustainable Development (IACSD) is yet another body which addresses the subject of sustainable development within the United Nations umbrella. The IACSD was established by the Administrative Committee on Co-ordination (ACC) which was set up under Agenda 21. The ACC, which was charged with ensuring the smooth and effective implementation of Agenda 21, in turn established the IACSD which identifies major policy issues under UNCED and advises the ACC on ways and means of addressing them. In addition, the IACSD identifies overall policy issues for the ACC under its guidance and advises ACC of major lapses and constraints affecting the United Nations system in the UNCED follow up.

Small Island Developing States

The United Nations uses the basic criterion of the size of the economy of a country in defining a developing country. Under this broad heading, various sub criteria are used to define the size of an economy. The three most widely used are population, physical area and size of the economy. However, there is no generally acknowledged measure of “smallness” and the criteria used would entirely depend on the purpose for which such a definition is generally used (UN Doc A/49/424, General Assembly, 49th Session, 22 September 1994).

Since population levels determine many of the basic characteristics of a national economy, it would seem to be the most significant criterion in the consideration of the size of a particular country with its economic development. The size of the economy is considered directly proportionate to population level and per capita income.

In its fifth programming cycle (1992-1996) the United Nations applied priority economic treatment to “least developed countries” on the following methodology of distribution:

Countries with gross national product per capita of \$750 or less, to receive 87 per cent of indicative planning figure resources, keeping the weight coefficients for gross national product per capita and population in the fifth cycle unchanged from those used in the previous cycle (UN Doc A/49/424).

The United Nations governing Council also decided to award seven qualifier points to countries designated as least developed countries among developing

countries and one qualifier point each to land locked developing countries and developing countries which have accorded to independence since 1985 respectively.

Small Island developing States are not always similar, and may exhibit different resource requirements and belong to a diverse group of countries. There are, among SIDS, such high income countries as Aruba, the Bahamas, Bermuda, Cyprus and the United States Virgin Islands. There are also low income and least developed countries such as Cape Verde, the Comoros, Haiti, Kiribati, Maldives, Samoa, Sao Tomé and Príncipe, Solomon Islands, Tuvalu and Vanuatu. The latter category do not have any significant domestic sources of productive income but depend on sources of external income such as royalties from fishing rights, foreign aid and remittances.

Tourism is the most prominent service export specialization of many island developing States, particularly in the Caribbean region. For instance, the 1989 tourism earnings of 28 island States showed incomes exceeding 75 percent of their total export earnings (UN/A/CONF.167/PC/10, 23/3/93) in 5 countries and constituted over 3 percent of total export earnings in 15 countries. However, despite their heterogeneity, SIDS share common features and disadvantages such as having a small area or land; being constrained by the lack of adequate natural resources; having small economies which lack diversification; and being vulnerable to exogenous factors which pose a threat to their sustainable development such as cyclones. These countries also generally have vulnerable and fragile economies which are unable to sustain development due to their incapacity to adapt to changing costs and prices in international markets.

An inherent disadvantage in an undeveloped economy is its inability to afford its country the benefit of studies on the special environmental and developmental characteristics of small islands. They need to plan, prepare and executive medium and long turn plans on sustainable development and promote environmentally sound technology for sustainable development within SIDS. The economies of SIDS also need to be able to sustain the development of inter-island and regional co-operation and information exchange, particularly in areas such as tourism, of which advertising is a compelling promoter.

TOURISM AND AIR TRANSPORT IN SIDS

It is an inevitable fact that tourism is inextricably linked with air transport and the development of one affects the other. Particularly in the instance of SIDS, the development of tourism would be influenced by air transport conducted in their territories and both would, in turn, affect the sustainable development of SIDS since the number of tourists brought by air carriers could affect the tourism industry of these countries and the expansion of the tourism industry would, together with the movement of aircraft, have a significant impact on the development of SIDS.

The most salient fact in the context of air transport and tourism is that air transport has positively contributed to the opening of new tourism markets which are often not accessible either by road or sea. In 1990, air transport contributed US\$700 billion to the world economy and the industry was responsible for employing 21 million people around the world. The symbiosis of aviation and tourism has resulted in the world's largest industry with more than 3.5 trillion U.S. dollars of gross output and an employment rate of more than 130 million people (Sidhu: 23). The interdependence of these two industries and their emergence collectively as the travel and tourism industry is eminently visible in SIDS, where, according to the World Tourism Organization, tourism will not decrease in the 1990s owing to the recession but in fact will increase in the latter half of the decade and intra-regional tourism (such as tourism in Caribbean States by inhabitants of North and South America) will thrive (WTO News: 3).

In the face of this encouraging scenario, it is useful to analyze the effects of air transport on SIDS and tourism. With emergent trends reflecting multilateral liberalization in the air transport industry, it is becoming more market-driven, and therefore it would not be unrealistic to expect that air carriers of the future would operate air services to tourism-based countries on the dictates of unpredictable and rapidly changing market forces rather than on sustained public service considerations. Given the prospect of advancement of tourism in the late 90s, this trend portends for SIDS a situation whereby their governments would have to weigh the desirability of allowing unlimited access by foreign carriers against the need to protect their own national carriers. Inextricably linked to this consideration would be the need for SIDS to determine the economic benefits that they would derive by opening their airports to a liberalized air transport policy.

In any event, the promotion of tourism to SIDS through the enhancement of air transport would involve some investment, particularly in the introduction of new technological products such as ICAO satellite-based Communications, Navigation, Surveillance/Air Transport Management (CNS/ATM) systems and of new developments in aeronautical meteorology, including the World Area Forecast System (WAFS) satellite broadcasts.

One of the most compelling needs of Caribbean SIDS in order to develop their tourism through air transport is the need to streamline air services to the main tourist generating markets in North America. This could be done by enhancing non-stop air services between the two which should be necessarily supplemented by "island-hops" by commuter aircraft. Although several Caribbean SIDS have their own airlines (including Aruba, the Bahamas, Cuba, Dominican Republic, Haiti, Jamaica, Netherlands Antilles and Trinidad and Tobago) those who do not have their own carriers have not shown sufficient enthusiasm in attracting tourist traffic to their countries aggressively, through air transport agreements with other countries.

One of the most signal events in the Caribbean SIDS since the Barbados Conference was the Summit of Heads of States of the Association of Caribbean

States (ACS) of August 1995, where the delegates adopted a Declaration of Principles and Plan of Action on Tourism, Trade and Transportation. The thrust of the Declaration in the context of transportation lay in the principle that sustainable, efficient, profitable, readily differentiated and significantly higher quality service at reasonable rates was the goal in air and maritime transportation. Another milestone in the expected air transport regulatory policy frameworks of the Caribbean Community (CARICOM) which is calculated to provide for a more liberal and transparent exchange of commercial air traffic rights.

Insofar as the Pacific SIDS are concerned, many have their own airlines and operate air services to neighboring island countries, many of which are also SIDS. Many SIDS in the region have strategically linked their services to tourist destinations such as Australia, New Zealand, Hawaii, points in Asia and the West Coast of the United States. The incidence of domestic air services in the Pacific SIDS is at a reasonable level although it could be developed further, particularly if the upward trend in tourism which is reflected in the late 1990s towards the 21st century is to be fully benefitted from.

African SIDS, unlike their counterparts in the Caribbean and the Pacific, are geographically dispersed, and, as a consequence share little in common with each other. While all African SIDS' airlines operate air services to some of their neighboring countries, there is no cohesive inter-connection between the African SIDS such as in other regional SIDS.

There are, of course, more affluent SIDS such as Singapore—which has one of the busiest airports in the world and an airline which ordered aircraft worth billions of dollars in 1994 and 1995—and Bahrain, which has a shared national carrier—Gulf Air—which has an extensive international route network. Cyprus and Malta have airlines which operate air services to many Mediterranean countries frequently and to prolific tourist markets in Northern Europe.

CONCLUSIONS AND RECOMMENDATIONS

The colorful mosaic of SIDS (except in such instances as Singapore and Bahrain) are unlikely to be affected overtly by principal environmental problems affecting the world today, such as aircraft noise and the impact of aircraft engine emissions. The comparatively small traffic flow at their airports would not give rise to noise or engine emission levels of concern. However, SIDS have to contend with environmental problems that may be linked to the construction and expansion of airports and hotels, such as soil erosion and loss of land and the impact of such developments on fauna and flora and the biodiversity of the ecosystem. Water pollution and spoilage of drainage are also two significant areas which have to be well planned in such development schemes.

The pivotal consideration in sustainable development is that it has economic, social and environmental dimensions. Therefore, in considering the extent of control that needs to be exercised by SIDS in the areas of tourism and air trans-

port development in order that a balance be maintained between progress and sustainable development, all three factors have to be carefully addressed.

Tourism has been a major contributory factor in the development of SIDS and will continue to be important, particularly in stimulating growth in other areas of the economy. However, if tourism is not managed properly it could result in seriously degrading the environment on which it is dependent. The development of tourism in SIDS should therefore be cautiously planned, particularly in the area of land use and water management.

The first step towards sustainable development of tourism is to ensure that the development of tourism and environmental management are symbiotic and mutually supportive. SIDS should integrate their planning and policies with carefully thought out environmental impact statements and consistent monitoring of the environmental impact on tourism activities. Guidelines should be established on standards for design and construction of airports and hotels which focus on energy consumption, the disposal of wastes and the degradation of land. The involvement of the national population in the protection and management of national attractions such as parks and gardens would also be a critical factor in the management of tourism.

From a regional standpoint, SIDS should assess the possibilities of developing co-operation at regional level in integrating tourism and the environment as being mutually supportive. They should also establish regional mechanisms which could sustain a safe tourism sector with a sustainable distribution of the infrastructure.

Internationally, SIDS would be well advised to seek support in supplementing the already fragile resources on which tourism in SIDS is dependent, while promoting efforts at national and regional levels to assess the total impact of the social, economic and ecological facets of tourism.

The above measures should be blended harmoniously with the fundamental principle that air transport and communications which are facilitated by air transport are crucial to the linking of SIDS with the outside world and with each other. The environmental uses such as the enforcement of quarantine measures which are associated with air transport have to be addressed, while at the same time strengthening air transport services and facilities with particular attention to environmental protection and safety. The cost implication of such measures have to be carefully monitored so that the advantage of expedient carriage of tourists in SIDS would not be lost in a cost-inefficient air transport system.

SIDS should also foster co-operation, to the maximum extent possible, in civil aviation including possibilities for consolidation of national and regional airline services. Essential to this exercise would be the development both at national and regional level of effective quarantine services and sophisticated communication technologies which would link main cities with rural areas.

Since air transport and tourism have international connotations as well, SIDS should develop appropriate cost effective and energy efficient air transport solutions to more people and cargo to and from island ports without the need to

depend on a high cost infrastructure. They should also gain access to financial and technical resources which exist in international and regional organizations and promote research and development in air transport and telecommunication in order to lower the costs involved in these two areas.

Finally, SIDS should integrate the above measures with a conscious attempt at ensuring compliance with the international standards and recommended practices (SARPS) and other measures on flight safety and facilitation suggested by the International Civil Aviation Organization. They should also be aware of the impact of changes taking place in the economic regulation of air transport and explore the scope for more regional co-operation with regard to regulatory aspects of air transport such as entering into code sharing and pool agreements. As far as possible, there should be no conflicts within and between SIDS on air transport and tourism policies. Of course, the benefits of these measures would be rendered nugatory if SIDS do not address technological changes taking place in aviation, such as satellite communications systems based on the CNS/ATM concept.

REFERENCES

1. UNCED — Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992 (A/CONF.151/26).
2. Sidhu, S.S., *Aviation and Sustainable Tourism, Emerging Trends*, Har-Anand Publications: India, 1994.
3. WTO News, World Tourism Organization: Geneva, No. 10, Nov/Dec 1992.

BOOK REVIEW

Findlay, C., Sien, C.L., & Singh, K. (Eds.). (1997) *Asia Pacific Air Transport: Challenges and Policy Reforms*. Singapore: Institute of Southeast Asian Studies. Pp. xix + 208. ISBN 981-230-002-3. U.S.\$39.90, softcover.

Reviewed by Frederick Hansen, University of Nebraska at Omaha.

Asia Pacific Air Transport: Challenges and Policy Reforms is an edited book created from a collection of papers prepared for a meeting of the Pacific Economic Cooperation Council held in July 1995. This meeting was held to review challenges to regulatory reform in air transport in the Asia Pacific region. Although much has changed since the 1995 meeting was held, specifically in the area of the economic health of the Asian countries, this collection of papers is still relevant to the needs of the air transport industry.

The combination of new airport capacity, forecasts of above average aviation growth, and the overall privatization trend in air transport has created an environment in which the old structure of bilateral agreements can no longer meet the future air transport needs of the Pacific Asia countries. This book discusses forces that are in motion that will have an extremely profound impact on air transportation in the region. Forecasts still predict that the Asia Pacific region will experience the highest aviation growth rate in the early 21st century. The underlying question of this book then is what policy changes are necessary to allow the Asian countries and their air carriers to become significant players in the global transportation industry.

The term Asia Pacific is used in general terms, especially in economic discussions, to include East Asia, Australia, New Zealand, North America, and the Pacific coast of Latin America. ICAO defines Asia Pacific in a narrower sense that excludes North America and Latin America. In this book, the focus is predominately on the western side of the Pacific — the Pacific Asia region.

The book starts with an overview of the issues facing the Pacific Asia region. In part 2, individual authors examine policy issues concerning the capacity of the air transport infrastructure, privatization, options to reform the existing bilateral agreement system, and an introduction to multiple designation policies. Specific examples are presented dealing with multiple designation policies in Korea, Australia, and Japan. Part 3 presents other examples of regional developments in air transportation, notably the U.S.-Canada open skies agreement, the European Union experience in establishing a unified air transportation market, and the development of a single air market between Australia and New Zealand.

The Asia Pacific market has shown a growth pattern exceeding the North American market during the past two decades and is forecast to be the fastest growing air transportation market for another two decades. These forecasts are based on a continuing sound economy in the region. Unfortunately, most of the major Asian airlines have not been able to take full advantage of the opportunities for growth because of restrictive bilateral agreements. Asian carriers have generally benefited from lower labor costs compared to the North American and European competition but this advantage has been eroded due to a stronger economy. U.S. and European air carriers, however, will continue to maintain an advantage in this marketplace as long as the policy makers of the Asian countries restrict the aviation rights of their neighbors.

Tae Oum provides the opening chapter of this book with a discussion of the challenges and opportunities for the Asian air market. Asian carriers must overcome a number of impediments to liberalization. These impediments include aspects of self protectionism, weak consumer influence, variations between countries in their political systems and the military use of airports and air space, and the costs of operating airlines in different countries - Japan and China representing two extremes. Each of these impediments must be dealt with in order to establish an open sky environment that would optimize the air carrier operations within the region.

European and North American airlines have established significant continental markets through the use of hub and spoke networks. Although Asian countries recognize the importance of gateway hubs in the growth of long haul international air services, their existing bilateral aviation agreements restrict the ability of airports and airlines to develop significant hub operations. Unfortunately, most Asian air carriers are limited to a small network concentrated at a single hub in their home countries. Policymakers are torn between the potential benefits of an open sky policy benefiting their airports and the fear of too much competition for their flag carriers.

Oum suggests several short term and long term objectives for the liberalization of the Asia Pacific air market. Possible short term measures include open charter and freight markets between countries, relaxed code sharing rules, the liberalization of third and fourth freedom rights, relaxed rules on foreign ownership of airlines, and the expansion of bilateral and multilateral agreements among like minded countries. Potential long-term measures include intra-Asian open sky agreements, more liberalized bilateral agreements with countries outside the region, and the development of multilateral general trade agreements. These measures will become increasingly important as the Asian carriers lose their operating expense advantage from low wages.

Dempsey and O'Connor present a summary of capacity problems in the region and suggest three broad responses to these problems. One response is the replacement of inadequate airports with new facilities, e.g. Hong Kong's Chek Lap Kok airport. Another response is the construction of new facilities, e.g. Japan's Kansai airport at Osaka. The final response is the expansion of existing

facilities by adding additional runways and terminals to meet international demand. An important element of the construction efforts at many airport sites has been the effort to include high capacity, intermodal landside links. The authors argue that connections to other transportation modes will be essential in the development of future international airports in the region.

This expansion of ground facilities is the most expensive but perhaps the easiest capacity problem to solve. The other problems to be considered include airway/air traffic control, landing slots, and gate assignments. Airway congestion may also be directly linked to the recent expansion of airport facilities. Many of the Asia Pacific airports lie along the coastlines of Korea, Vietnam, eastern China and Kuala Lumpur creating a general North-South axis for air traffic. This corridor also competes with an East-West corridor of routes from North America, Europe, and the Middle East. The U.S./E.U. hub operations and long flight times associated with many of the East-West routes create an intense peak hour demand for landing slots and gates at Asia Pacific airfields. "In Tokyo, the size of the early afternoon peak passenger movement almost doubled between 1990 and 1994" (p. 31). Pricing systems may provide temporary relief for this congestion but other solutions will be required for the long term.

Forsyth tackles the privatization activities in the Pacific Asia region. Privatization predominately involves airlines in the region but issues of airport privatization are also discussed. This region is following the general world trend towards ever-increasing public ownership of air carriers. Of those airlines that have privatized over the last decade, the majority involved relatively large, economically successful companies. There is a strong correlation between per capita income and the private ownership of the airlines. Richer nations tend to have privatized airlines while the poorer nations tend to remain public.

Privatization of airlines also creates additional problems. The role of the flag carrier and national ownership cannot be completely removed from the political arena due to the close tie between the carrier and the public interest. The trend towards mega-carriers in the United States and Europe have already shown that governments are concerned about foreign ownership of their own airlines. Privatization also impacts regulatory policies and governmental attitudes towards liberalization. During the period leading up to a privatization and for a time thereafter, governments try to protect the airline to generate the largest sale price possible. Liberalization efforts during this period are unlikely, especially if the profitability of the airline might be jeopardized. Over time however, governments may tend to be more interested in liberalization in order to meet national economic policies.

With the exception of Australia, the nations of the Pacific Asia region have been less interested in the privatization of their airports. The high sales price associated with major airports is attractive to governments seeking injections of money into their coffers but it must be balanced against potential problems involving monopoly pricing, continued regulatory obligations, and externality problems such as noise. Somewhat lacking in this discussion was the impor-

tance of mutual support and cooperation between the air carriers and the airports necessary to establish significant hub status.

Tretheway examines in greater detail the impediments to liberalization in international aviation. Bilateral agreements in particular, he argues, are “expensive to administer, especially in high growth markets” (p. 66). A consequence of bilateralism is that gains from trade are only possible when each country believes it is gaining equally. This leads to inefficiency for both partners in the agreement and greatly increases the difficulty of either nation expanding beyond a single hub network concentrated at their gateway airport. This problem is further compounded by the fact that the Pacific Asia region does not have an equivalent trade agreement that includes air transport in the package of goods and services.

Tretheway offers four paths to free trade. First, include air services in trade in other goods and services. The Treaty of Rome established this link for the European Community and led to liberalization of air services. Second, an effort should be mounted to document consumer gains from open air transport markets, e.g. the tourism industry and high-tech industries. Third, start with areas where potential gains are large such as in air cargo. This would have a minimal effect on a flag carrier and could benefit other sectors of the economy also. Finally, develop sub-regional agreements of like-minded nations that believe they will enjoy economic gains from liberalization. These blocks would then have increased power to exert economic pressure on other nations to join.

Two chapters discuss different approaches to the introduction of a new air carrier on international routes (multiple designation). The rules for the allocation of capacity between carriers approximate a formula approach in Korea and an administrative approach in Australia. The formula approach in Korea ties the availability of routes and capacity of the new entrant carrier to those of the established carrier. “The more frequencies the incumbent exercises, the more frequencies are allocated to the newcomer” (p. 78). A unique problem facing Korean airlines however is the military control of ten of the fourteen airports available for civilian use. This control by the military prevents both airlines from optimizing their fleet utilization.

The Australian administrative model in contrast, allocates capacity under two separate sets of regulations — one for start up and another for follow on conditions. The emphasis during the start-up phase is to introduce competition by granting enough capacity to a new entrant to ensure commercially sustainable operations. The key criteria are summarized as “an allocation should be consistent with the development of commercially sustainable operations, by both the Australian entrant and incumbent, which will enhance competition on the route without decreasing inbound tourism, consumer benefits or trade” (p.86). The greater the allocation during the start up phase, the less the new entrant will receive during the second phase.

The last section of this book reports on regional developments that form case studies of the process of liberalization. Although these specific papers do not

directly relate to the liberalization of Asian countries, they are included as case studies in how the process has worked elsewhere. These lessons do have implications for the future liberalization and deregulation of the Pacific Asia market, especially in the application of pressure by alliances on others outside the club. These alliances of like-minded countries may offer the best hope for the Pacific Asia air industry to join the international marketplace as significant partners.

The current economic crisis in Asia has changed the impact of this book. How deep and long lasting this economic downturn will impact the aviation industry of the region is yet to be known. It has already had a significant impact on many airlines in the Pacific Asia region. Several regional airlines have already failed and others may follow before the crisis ends. It has also had a ripple effect on the rest of the international aviation market as aircraft orders and airline yields have responded to the decrease in the Pacific air market. The purpose of this book remains valid however as do most of the policy recommendations. The economic crisis may actually accelerate some policy changes while other changes may drag on longer than expected. Regardless of the short term impact on Pacific Asia countries, this book provides a valuable guide to changes that must eventually occur if Asia wishes to reap the benefits of the growth in air transportation during the 21st century.



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Omaha, NE 68182-0508 U.S.A.

E-mail other correspondence concerning reviews to
journal@unomaha.edu



Review Procedures

Book reviews should present both a summary and critical evaluation of significant investigations and provide suggestions for further inquiry. A good review will include both a subjective and an objective account of the work. Provide proof to substantiate your position.

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Criteria

In reviewing the book, include a combination of the following elements:

- personal impression
- analysis of objective
- presentation interpretative capability
- a generalization of main statements
- subject orientation
- overall valuation

Articles accepted for publication will not undergo the standard JAT blind review process, but will be reviewed by the editorial staff for relevance and compliance with the following criteria:

- Does the book present a topic of interest to readers of JAT?
- Does the review portray a clear idea of the contents of the book?
- Does the review depict a fair and accurate presentation of the book?
- Does the review maintain a balance between content and critique?
- Does the submission fit within the specified format and length requirement?

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Format

All review articles must be submitted in electronic format on an IBM formatted 3.5 diskette and must be in a standard word-processing format such as WordPerfect or Microsoft Word.

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Author Description

Reviews should include a brief description of the author's institutional affiliation, highest degree earned, and areas of research/teaching interest.

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Bibliographic Citation

Every review article should begin by citing the book(s) to be reviewed with full bibliographic information including author(s), copyright date, full title, place of publication, publisher, number of pages, ISBN number, and price if available in U.S. dollars.

The following are examples of bibliographic citation:

Kern, T. (1997). Redefining airmanship. New York: Mc-Graw-Hill. Pp. xi + 463. ISBN 0- 07-034284-9. U.S. \$29.95 hard cover.

Findlay, C., Sien, C.L., & Singh, K (Eds.). (1997). Asia Pacific air transport: Challenges and policy reforms. Singapore: Institute of Southeast Asian Studies. Pp. xix + 208. ISBN 981-230-002-3. U.S. \$39.90 soft cover.

Horonjeff, R., & McKelvey, F.X. (1994). Planning and design of airports (4th Ed.). New York: McGraw-Hill. Pp. x + 829. ISBN 0-07-045345-4. U.S. \$54.95 hard cover.

Length

Review articles should be between 750-1500 words. Reviews outside these limits may be considered at the Editor's discretion. Comparative reviews of two books may be somewhat longer, but should not exceed 3000 words. Comparative reviews of more than two books are discouraged.

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Editorial Policy

Reviews appearing in the JAT represent the opinions of the reviewer and are not necessarily those of the editorial staff. Reviewers should have some authority or experience in the subject area. Reviews may contain positive or negative evaluations of the book. Negative remarks should be objective, precise, and expressed in a constructive, respectful manner. Vague or unsubstantiated criticism may be offensive to an author and generally fails to persuade a reader. Inflammatory remarks will not be accepted.

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Solicited Reviews

The maximum time allowed for completing a solicited review will be four weeks. If a reviewer is unable to meet this deadline, please inform the editor of a new date for completion or return the book so another reviewer can be contacted. For reviewers living outside the U.S.A., reviews may be returned via e-mail.

Conflict of Interest

Reviews written by the book's author(s), publisher, distributor, or by colleagues at the same institution or organization will not be considered. Also, duplicate reviews (previously published) will not be accepted. All authors of book reviews are required to include with their submission the following statement signed and dated. I, author's name, do not have any commercial interest in the main topic of the book under review, nor am I associated with a company or other organization with commercial interest in the main topic of the book.

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Sample Book Review

[Sample Book Review](#)



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Manuscripts and Call for Papers

JAT GUIDELINES FOR MANUSCRIPT SUBMISSION INSTRUCTIONS TO AUTHORS

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Authors wishing to submit original manuscripts for consideration should send two double-space paper copies and one electronic copy either via email at journal@unomaha.edu or on an IBM compatible three and one-half inch diskette to the following address:

Aviation Institute/JAT
University of Nebraska at Omaha
Allwine Hall 422
6001 Dodge Street
Omaha, NE 68182-0508
U.S.A.

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Format

All papers must be written in the English language. Use a 12 point font and allow for a 1" margin on all sides. Double-space all material including quotations, the abstract, notes, and references. All figures and tables should be on a separate page at the end of the text. Include the figure name and filename on the bottom of the page. Please proofread all article submissions for punctuation, spelling, and format errors.

The cover page should include the title of the manuscript, the author's name(s), shipping and email addresses, telephone number, and a short biographical statement summarizing the author's education and current affiliation. Please note the primary contact person. The second page should contain an abstract of the manuscript. The abstract should include a concise description of the contents of the paper, the research method used, and the results. Abstracts should generally be kept to about 100 words.

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Figures and Tables

Figures and tables should appear at the end of the paper with each item on a separate page. Indicate in the text the approximate location where each figure and table should be placed. Figures, tables, and the text should each be saved as separate files. Do not embed tables and figures in the text files. Include the appropriate file name at the bottom of the page for each figure and table. Figures and tables must be camera-ready, printed in black ink only and must fit within a 4 inch by 7 inch area.

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Reference Style

Due to the international participation, rigid referencing style criteria are not mandated. Acceptable reference styles of the author's country will apply. For the U.S.A., the most recent edition of the American Psychological Association (APA) Manual of Style is preferred. Ensure all references are cited and all citations are referenced.

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Review Process

A rigorous double-blind review will be conducted by the *JAT* Panel of Reviewers. Additionally, a member of the Editorial board will conduct a third review. If revisions are necessary, the editor will determine when a revised manuscript is in compliance with reviewer recommendations. Authors must make revisions to original documents and resubmit them to *JAT* on disk in Word or Word Perfect format. All revisions must be completed within two weeks after return to the author. Manuscripts must be original, not previously published, nor under consideration for another journal while undergoing review by the *JAT*.

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