



# About the Journal of Air Transportation

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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

The *JAT* was conceptualized to fulfill an international void of scholarly publications in this area as identified by the primary organizers. It is envisioned that aviation leaders will utilize the *JAT* as a key decision-making tool. Scholarly rigor and standards will be uncompromised with regular evaluation by the Editorial Board and Panel of Reviewers.

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## Scope

The *JAT* will accept manuscripts on all topics that relate to air transportation, both technical and non-technical. The Panel of Reviewers represents the interdisciplinary nature of air transportation to ensure review by recognized experts. Broad categories of appropriate topics include, but are not limited to:

- Aviation Administration, Management, Economics, Education, Policy, Engineering, Technology, and Science
- Intermodal Transportation
- Aerospace Education and Flight
- Airports and Air Traffic Control
- Air Transportation Systems: Domestic, International, Comparative
- Aviation/Aerospace Psychology, Human Factors, Safety, and Human Resources
- 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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## Dissemination

The *JAT* is catalogued at key research libraries world wide, including the U.S. Library of Congress. It is also indexed in Aviation Tradescan, EBSCO On-line, the National Research Council TRIS Index, and ERIC Resources in Education. In addition, the *JAT* is available through interlibrary loan at the University of Nebraska at Omaha Library and the Transport and Telecommunications Institute in Latvia via accessing the global OCLC inter-library loan network. A permanent archive is maintained at the University of Nebraska at Omaha. Annual subscriptions are available for U.S. \$35 for individuals and U.S. \$68 for institutions. For subscriptions outside the U.S. add \$20. Payments may be made by check or purchase order payable to the UNO Aviation Institute.

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# Organizations

## **Host Organizations:**

University of Nebraska at Omaha (UNO) - Nancy Belck, Chancellor; Derek Hodgson, Vice-Chancellor for Academic Affairs.

## **Co-Sponsor Organizations:**

American Society for Public Administration - Transportation Section - Jeremy Plant, Chair, Transportation Section

Air Transport Research Society - Tae Oum, Chair

NASA Kansas Space Grant Consortium - David Downing, Director

NASA Nebraska Space Grant Consortium - Brent Bowen, Director

NASA Space Grant and Fellowship Program, Aerospace Working Group – Diane DeTroye, Interim Program Director

Transport and Telecommunications Institute, Latvia - Eugeny Kopitov, Rector

World Aerospace Education Organization - Kamal Naguib, Chairman

## **Supporting Organizations:**

Aviation Institute, UNO - Brent Bowen, Director

Center for Public Affairs Research, UNO - Jerome Deichert, Director

College of Public Affairs and Community Service, UNO - B.J. Reed, Dean

School of Public Administration, UNO - Russell Smith, Chair

University Library, UNO - Janice Boyer, Dean

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## Editors

### **Brent D. Bowen**

Dr. Brent Bowen is Director and Distinguished Professor, Aviation Institute, School of Public Administration, University of Nebraska at Omaha, and the University's Director of Aviation and Transportation Policy and Research. Bowen attained his doctorate in Higher Education and Aviation from Oklahoma State University and a Master of Business Administration degree from Oklahoma City University. His Federal Aviation Administration certifications include Airline Transport Pilot, Certified Flight Instructor (Gold Seal), Advanced Instrument Ground Instructor, Aviation Safety Counselor, and Aerospace Education Counselor. Dr. Bowen's research on the development of the national Airline Quality Rating is regularly featured in numerous national and international media, as well as refereed academic publications. Dr. Bowen has in excess of 250 publications, papers, and program appearances to his credit. His research interests focus on aviation applications of public productivity enhancement and marketing in the areas of service quality evaluation, forecasting, and student recruitment/retention in collegiate aviation programs. He is also well published in areas related to effective teaching and has pioneered new pedagogical techniques. Dr. Bowen has been recognized with awards of achievement and commendation from the American Marketing Association, American Institute of Aeronautics and Astronautics, Federal Aviation Administration, Embry-Riddle Aeronautical University, W. Frank Barton School of Business, Travel and Transportation Research Association, World Aerospace Education Association, and others.

### **Igor Kabashkin**

Dr. Igor Kabashkin is Vice Rector of the Transport and Telecommunications Institute, Latvia, and a Professor in the Aviation Maintenance Department and member of the Technical Committee on Transport of the European Commission for Cooperation in the Field of Scientific and Technical Research. Kabashkin received his Doctor Degree in Aviation from Moscow Civil Engineering Institute, a High Doctor Degree in Aviation from Moscow Aviation Institute, and a Doctor Habilitus Degree in Engineering from Riga Aviation University and Latvian Academy of Science. His research interests include analysis and modeling of complex technical systems, information technology applications, reliability of technical systems, radio and telecommunication systems, and information and quality control systems. Dr. Kabashkin has published over 274 scientific papers, 19 scientific and teaching books, and holds 67 patents and certificates of invention.

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## JAT Personnel

Editor: Brent Bowen, Aviation Institute, UNO

Co-Editor: Igor Kabashkin, Transport and Telecommunications Institute, Latvia

Former Managing Editor: Nanette Scarpellini-Metz, Aviation Institute, UNO

Managing Editor: Jocelyn Nickerson, Aviation Institute, UNO

Manager, Technology-Based Educational Systems: Scott Vlasek, Aviation Institute, UNO

Library Liaisons/Advisors: John Reidelbach, University Library, UNO

Publications Specialists: Joyce Carson, Layout; Melanie Kiper, Copy Editor, Center for Public Affairs Research, UNO; Michaela Schaaf, Stylistic Reviewer, NASA Nebraska Space Grant Consortium, UNO

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## Editorial Board

Membership on the *JAT* Editorial Board is by invitation and approval of the board. This appointment should be viewed as professional recognition of significant career achievement and high academic/industry distinction. Applicants will generally be senior faculty members (graduate faculty standing where applicable), or persons who have attained substantial industry or public service achievement in the case of practitioner members. Term of appointment is three years with opportunity to request renewal. For membership consideration, submit a curriculum vita or industry resume and statement of interest to: Dr. Brent Bowen, Executive Editor.

### Members:

R. I. R. Abeyratne -- ICAO Air Transport Bureau, Canada  
Ballard Barker -- Florida Institute of Technology  
Brent Bowen -- University of Nebraska at Omaha  
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Igor Kabashkin -- Transport and Telecommunications Institute, Latvia  
Gary Kiteley -- Council on Aviation Accreditation  
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Mike Lavelle -- The Boeing Company  
Henry Lehrer -- Rossford, Ohio  
Keith Mason -- Cranfield University, England  
Robert Matthews -- FAA, Washington, D.C.  
H. C. McClure -- Mac Air Consulting  
Graeme McDowal -- Air New Zealand, New Zealand  
Frank Mitchell -- University of Oklahoma  
Phillip Moore -- Hong Kong Institute of Technology, China  
Kamal Naguib -- World Aerospace Education Organization, Egypt  
Isaac Netey -- Kent State University  
David NewMyer -- Southern Illinois University  
Gary Northam -- Parks College of Engineering and Aviation; Saint Louis University  
Tae Oum -- University of British Columbia, Canada  
Korham Oyman -- Anadolu University, Turkey  
Kent Penney -- Nebraska Department of Aeronautics  
Aisling Reynolds-Feighan -- University College, Ireland  
William Shea -- SHEA Aviation Associates  
N. Thomas Stephens -- Florida Institute of Technology  
Scott Tarry -- University of Nebraska at Omaha  
Abdul Wahab Teffaha -- Arab Air Carriers Organization, Lebanon  
Alexander Wells -- Embry-Riddle Aeronautical University  
Kenneth Wiggins -- Oklahoma State University

## Panel of Reviewers

Reviewers are appointed by the Editor to represent all elements of aviation and space transportation scholarship and practice. An appointment to the Panel of Reviewers recognizes professional and academic achievement. Appointments are for a three-year term with the option of renewal. For membership consideration, submit a curriculum vita or industry resumé to Dr. Brent Bowen, Executive Editor.

### International Members

Ahmed Abdelghany -- *United Airlines*  
Densel Acheson -- *University of Nebraska at Omaha*  
Anthony Adamski -- *Eastern Michigan University*  
Julio Aguilar -- *Soluciones en Regulaciones y Mercados, Mexico*  
Fariba Alamdari -- *Cranfield University, England*  
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Kenneth Barnard -- *Kansas State University*  
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Gerald Chubb -- *The Ohio State University*  
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Gerald Cook -- *Spirit Airlines*  
Milford Coor -- *International Aviation Law Consultant*  
James Crehan -- *South Dakota State University*  
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Steve Erb -- *U.S. Department of Transportation*  
Jay Evans -- *National Business Aircraft Association*  
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Mavis Green -- *Embry-Riddle Aeronautical University*  
Allen Hamilton -- *Federal Express*  
Fred Hansen -- *Oklahoma State University*  
William Herrick -- *Middle Tennessee State University*  
Jos Heyman -- *Tiros Space Information, Australia*  
John Horine -- *Central Missouri State University*  
Matteo Ignaccolo -- *University of Catania, Italy*  
Sajjad Jasimuddin -- *King Abdulaziz University, Saudi Arabia*  
Randy Johnson -- *Embry-Riddle Aeronautical University*  
Alexander Kalmykov -- *The SABRE Group, Texas*  
Craig Kanske -- *Sky Views, Oklahoma*

John M. C. King -- Aviation & Tourism Management, Australia  
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Respicio A. Espírito Santos, Jr. -- Universidade Federal do Rio de Janeiro, Brazil  
Michael Schukert -- Palm Coast, FL  
Mary Sandy -- Old Dominion University—Virginia Space Grant  
Michaela Schaaf -- University of Nebraska at Omaha  
Kim Jeffrey Stevens -- Aeronautics Division of ADOT  
Vadim Stroitlev -- Air Navigation Service, Latvia  
Yoshinon Suzuki -- Iowa State University  
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Victor Ujimoto -- University of Guelph, Canada  
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Timothy Vowles Victoria -- University of Wellington, New Zealand  
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David Widauf -- Utah State University  
Marc Wilson -- AMES Consulting, Inc.  
Irina Yatskir -- Transport and Telecommunications Institute, Latvia  
Malcolm Yeo -- Edith Cowan University, Australia  
Jule Zumwalt -- World Aerospace Education Organization



# JOURNAL OF AIR TRANSPORTATION WORLD WIDE



## Volume 5 Number 1

Consequences of Slot Transactions on Airport Congestion and Environmental Protection

The "Rock": The Role of the Press in Bringing About Change in Aircraft Accident Policy

Service Quality in the U.S. Airline Industry: Variations in Performance Within Airlines and Between Airlines and Industry

An Examination of the U.S. Regional Airline Policies Regarding Child Restraint Systems

Flying Lessons: Learning from Ryanair's Cost Reduction Culture

Culture in the Cockpit - CRM in a Multicultural World

Book Review - Institutions in the Transport and Communications Industries

Book Review - Compendium of International Civil Aviation

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## SORENSEN BEST PAPER AWARD

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The Journal of Air Transportation World Wide is proud to announce the *Sorenson Best Paper Award*, named in honor of Dr. Frank E. Sorenson. This award gives recognition to the author(s) with the best literary and scholarly contributions to the field of air transportation. The Sorenson Award will be granted by the Editor on the basis of reviewer rankings during the review process. The manuscript with the highest overall score will be awarded the *Sorenson Best Paper Award*. This will be considered a high recognition in the aviation community.

Dr. Frank E. Sorenson was a pioneer in the field of aviation education since its early beginnings in the 1940s. A renowned educator and prolific writer, Sorenson contributed not only education texts to the field, but also served as a consultant and innovator throughout the expanding realm of aviation education and research.

Dr. Sorenson's aviation impact and potential were recognized early on by the National Aeronautics Association when he received the Frank G. Brewer Trophy in 1946 for "the most outstanding contribution to the development of youth in the field of education and training." In 1958, the University Aviation Association honored him with the William A. Wheatley Award in recognition of outstanding contributions to aviation education. These were the first of many awards and citations he would earn on a local and national level as he continued his active involvement in the field of aerospace education up until his death in 1977.

Through his involvement with the University of Nebraska-Lincoln Teachers College, Dr. Sorenson generated some of the earliest teaching materials for aviation education and textbooks for military aviators during World War II. Throughout the course of his career, he contributed over forty articles and publications related to the field of aviation education. His efforts guided the way for extensive aerospace research and scholarship from the grassroots to the global level through his participation in Civil Aeronautics Association, the World Congress on Air Age Education, and UNESCO.

He has served as chairman of the Air Force Association's Aerospace Council, the Aerospace Education Forum at the First World Congress of Flight, the U.S. Air Force's Air Training Command, the "Men in Space" book series, and NASA's Aerospace Education Advisory Committee. As a result of his visionary involvement and development of the Link Foundation, the

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organization has gone on to provide grants now totaling over a half million dollars a year to support and advance aerospace education and training in aeronautics.

Dr. Sorenson's continuous involvement in aviation education and research laid the groundwork for many of the advancements currently taking place in the industry. His continual research and educational outreach demonstrated how one person can make a difference not just today but well into the future.

Currently, several awards exist that are representative of his achievement in aerospace education and research exist. These include the Frank E. Sorenson Award for Excellence in Aviation Scholarship, representing the highest scholarly honor in aviation education, presented annually by the University Aviation Association; the Frank E. Sorenson Pioneers in Nebraska Aviation Education Award presented annually by the University of Nebraska at Omaha Aviation Institute, as well as a memorial lecture fund and scholarship fund.

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## A TRIBUTE TO DR. FRANK ENGLAND SORENSON\*

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Since the beginning, the field of aviation and Dr. Frank E. Sorenson have been interwoven. In the same year the Wright Brothers made their historic flight, Frank England Sorenson was born to an immigrant village storekeeper and his wife in rural Nebraska. The year was 1903. It would be some time before Sorenson would enter the fledgling field of aerospace studies and become a driving force that would continue for nearly 40 years until his death in 1977. The benefits of his involvement remain strong and vital today.

Sorenson began his career as a schoolteacher prior to attending the Teachers College in Lincoln. His love of teaching and helping others learn was central to his entire career. Sorenson once said, "My interest in developments in aerospace grew out of my two basic interests—teacher education and geographical instruction. From my point of view, these two fields must reflect the new discoveries in air and space" (Quoted in Nebraska's Air Age Pioneer, 1961). While attending the University of Nebraska-Lincoln, he earned a bachelor's degree in education in 1932 and a master's degree in 1935. He taught geography for one year at Ohio State University and returned to the University of Nebraska-Lincoln in 1936.

1940 was a pivotal year. Sorenson received his Ph.D., and the first of many requests for aviation education teaching materials as part of the UNL Teachers College. Using teacher workshops, Sorenson and his group developed a manual for the classroom that became so sought after on the state level that he sent copies to airlines and the Civil Aeronautics Commission. His proficiency proved crucial to the war effort of the 1940s. He shared co-responsibility for some of the earliest textbooks for military aviators. On the homefront, as the newly appointed Nebraska Air Age Education Division administrator, he set about creating curriculums that would "relate air age materials to such subjects as physics, mathematics and social studies" (Nebraska's Air Age Pioneer, 1961).

He was a frequent consultant to National Aeronautics Association (NAA) on aviation matters. In 1946 he received the Frank G. Brewer Trophy from the NAA for "the most outstanding contribution to the development of youth in the field of education and training" (Nebraska's Air Age Pioneer, 1961). Awarded annually since 1943, this recognition is regarded as the most prestig-

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\*Dr. Brent Bowen and Nanette Scarpellini, University of Nebraska at Omaha.

ious national award dedicated to aviation and space education. Sorenson's work was recognized for determining what knowledge teachers must have to effectively instruct the air-minded youth. Over the course of his career, he has contributed publications totaling well over the 44 listed below. He prepared such books as "Elements of Pre-Flight Aeronautics" and "Now We Fly." This was just the beginning of Sorenson's impact in the field of aerospace education and research as he continued to play an active role throughout his lifetime.

With the war over, the field of aviation and aerospace studies opened even wider. Sorenson conducted a special study in the late 1940s for the United Nations Educational Social and Cultural Organization (UNESCO). He went on to be a delegate to the third national conference of the U.S. Commission for UNESCO. On a more regional level, Sorenson championed and helped establish aerospace programs at other colleges and universities. During this time, he began his association with Edwin A. Link and the Link aviation training aids. Together they established the Link Foundation (December 10, 1953), which by 1959 provided grants of \$181,775 in support of 71 projects over a six-year period (Nebraska's Air Age Pioneer, 1961). In the beginning, Sorenson developed the original programs and charter. His involvement continued as he went on to lead all program developments as well as being the primary grant approver while serving as a Trustee and Director of Program Development. Currently the Link Foundation has a \$12 million principal with annual grants of over a half million dollars each year (M. Link, personal communication, September 22, 1999). Designed to advance education and training in aeronautics, the Link Foundation is still going strong.

As director of Summer Sessions at UNL from 1948-1968, Sorenson was the principal power behind Project TOGA (Teacher Orientation to General Aviation). This joint project between the Nebraska Department of Aerospace and the UNL Summer Sessions, conducted between 1962 and 1965, significantly influenced the future development of the Curriculum Guide for Aerospace Education. The guide was written in 1965 by a committee of aerospace teachers in Lincoln, Nebraska and made available nationally by the FAA (Lueninghoener, 1994). During this time period, Sorenson also served as president of the North Central Conference of Summer Schools and the Association of University Summer Sessions.

While remaining strong within the university community, Sorenson continued to serve at a national level. He was chairman of the Air Force Association's Aerospace Council (1957-1962) and the Aerospace Education Forum at the First World Congress of Flight (1959). He played a role on the advisory board of the U.S. Air Force's Air Training Command (1955-1961), the "Men in Space" book series, and Air Force Civil Air Patrol Education Committee with a rank of Colonel. In 1970, Sorenson received the Apollo Achievement

Award from NASA for his contribution to space education research. Five years later, he was awarded a place in the National Aerospace Education Association's Hall of Honor. The following year, the University of Illinois presented Dr. Sorenson with an Institute of Aviation Certificate of Achievement for his generous support of research programs, flight training and staff development. At the time of his death, Dr. Frank E. Sorenson had been awarded 24 aerospace education national awards and numerous citations.

Sorenson never abandoned his love of geography as he entered the world of aerospace education. Instead he made a connection between the two worlds that translated into a productive and fruitful career which benefitted the entire aerospace community. The programs he helped to establish set the groundwork for the thousands of pilots and aerospace specialists that have helped to make the United States the aerospace world power it is. In a time before personal computers, he saw the global community emerging and said, "...man's earth is shrinking today our world is a neighborhood of nations resulting from the fact that we can move through the air" (Nebraska's Air Age Pioneer, 1961).

Upon Dr. Sorenson's death in May 1977, several memorials to continue his work were created. These included programs at the Clare McPhee Elementary School Space Center which had been dedicated to him in 1968, the Dr. Frank E. Sorenson Memorial Scholarship Fund for Arnold Air Society or Angel Flight members, and the Dr. Frank England Sorenson Memorial Summer Lecture Series established at the University of Nebraska Lincoln. The lecture series featured such topics as "Humanization Beyond Earth: The New Age of Space Industrialization," "The Future of Education and Education in the Future," and "Life Sciences as an Adventure in Space."

To continue and expand this work, the University of Nebraska at Omaha Aviation Institute (UNOAI), in conjunction with the Sorenson family, has created three awards at the state, national, and worldwide level. In the state of Nebraska, UNOAI designed the **Dr. Frank E. Sorenson "Pioneers in Nebraska Aviation Education"** honor to be conferred each year. At the national level, the University Aviation Association (UAA) will bestow annually the **Dr. Frank E. Sorenson Award for Excellence in Aviation Scholarship** to represent the highest scholarly honor in aviation education. Additionally, the *Journal of Air Transportation World Wide* established a best paper designation in Dr. Sorenson's name to be recognized in each journal. This three-pronged award plan honors the many contributions Dr. Sorenson made to the sphere of aviation education in his influential career.

#### **Awards:**

Frank G. Brewer Trophy from National Aeronautics Association, 1946

- William A. Wheatley Award *In recognition of outstanding contributions to aviation education* from the University Aviation Association, 1958
- Flying Cornhusker Award *Dean of Nebraska Air Education* from the Nebraska Department of Aeronautics, 1958
- Hoyt S. Vandenberg Trophy *For outstanding contributions to public understanding of air power* from the Air Force Association, 1959
- Civil Air Patrol Recognition Award, 1961
- Clare McPhee Elementary School Space Center dedicated to Frank E. Sorenson, 1968
- Apollo Achievement Award by NASA, 1970
- University of Nebraska-Lincoln Community Development Award, 1975
- National Aerospace Education Association's Hall of Honor, 1976
- Frank England Sorenson Summer Lecture Series established at University of Nebraska Foundation by friends and colleagues through a fund, 1977
- Honorary National Angel, 1978 Arnold Air Society/Angel Flight Program at UN-L
- Nebraska Aviation Hall of Fame, 1994

**Citations:**

- Nebraska Wing of the Air Force Association, 1958
- U.S. Air Force Recruiting Services
- Air Reserves Forces
- Arnold Air Society *"The education fraternity of America is rapidly awakening to the importance of the aerospace age in the field of education. A pioneer in this process of awakening the interest of the educator is Dr. Frank England Sorenson."* 1960
- United States Air Force Scroll of Appreciation *"For rendering meritorious service to the United States Air Force from 1940-1961 as Professor of Education at the University of Nebraska and as Administrator of the Nebraska Air Age Education Division."* 1961
- Air Force Association Citation of Honor *"In recognition of his devotion to the principles of the Air Force Association, and particularly in tribute to his brilliant leadership as the first Chairman of the Aerospace Education Council."* 1964
- Arnold Air Society Certificate of Appreciation, 1975

Link Foundation Citation for Distinguished Professional Service as Trustee, 1975

Institute of Aviation Certificate of Appreciation "For generous support of research programs, flight training and staff development" from the University of Illinois, 1976

### Professional Recognition:

- 1940 Selected to serve as consultant to National Commission on Teacher Education Program conducted in South Carolina
  - 1941-1942 Selected by the Civil Aeronautics Administration to serve as consultant on Aviation Education
  - 1943 Selected by the Civil Aeronautics Administration to conduct a National Study of the Teaching of Pre-Flight Aeronautics in high schools.
  - 1945 Named consultant to the Air Age Education Departments of several major airlines
  - 1945 Assisted with the Denver Congress on Air Age Education
  - 1945 Administered the Iowa-Nebraska Audio-Visual and Air Age Education Institutes
  - 1946 Directed activities for the Social Studies Group in attendance at the World Congress on Air Age Education in New York
  - 1946 Named as member of the Executive Committee of the Institute of Air Age Activities, a national organization established to promote research in Air Age Education
  - 1946 Texas A. & M. Evaluation Study of Junior Aviation Project
  - 1947 Selected to assist with Lake Success Conference and Mountain-Plains Conference on UNESCO Education Project
  - 1948 Oklahoma A. & M. Conference on Air Age Education
- Listed in: *Who's Who in American Education*  
*Leaders in Education*  
*American Men of Science. III*

### Membership:

Aerospace Education Council of the Air Force Association  
 Aerospace Education Committee of the Civil Air Patrol  
 Deans and Directors of Summer Sessions  
 Institute of Air Age Activities, Executive Committee

Men of Space Advisory Committee  
 National Aerospace Education Association  
 National Association of School Administrators  
 National Council for Geographic Education  
 National Council for Social Studies  
 National Education Association  
 Phi Delta Kappa  
 Research and Service Committee of the North Central Association  
 Technical Assistance Board, The Link Foundation  
 University Aviation Association

**Professional Experience:**

- 1938-1971 Instructor, Assistant Professor, Associate Professor, Professor of Educational Administration & Secondary Education at the University of Nebraska
- 1940-1977 Consultant to selected school systems
- 1948-1968 Director of Summer Sessions and Chairman, Department of Educational Services at the United Nations
- 1943-1945 Director of Supervision and Curriculum Development, Nebraska Department of Public Instruction (LOA)
- 1949-1951 First United Nations Education Program in the world at UN-L
- 1949-1955 Civil Air Patrol Air Age Education Committee as Colonel, CAP-USAF
- 1950 U.S. named staff member, International Seminar on the Teaching of Geography, UNESCO, Montreal, Canada (summer) (LOA)
- 1951-1953 Director of Education and Technical Training, U.S. Technical Cooperation Administration (Point 4) U.S. government world-wide (LOA)
- 1955-1956 Air Training Command Advisor Board
- 1957-1962 Air Force Aerospace Education Council, chairman
- 1960-1965 Coronet Film Company series of geography visual materials for use in elementary schools educational collaborator
- 1963-1968 NASA Aerospace Education Committee
- 1963-1969 Consultant to Matson Navigation Company
- 1965-1975 Coordinator of on-board ship educational enrichment programs for Matson, Princess Cruises and Royal Viking Lines

- 1968-1969 Assistant to the Vice-Chancellor and Dean of Faculties
- 1969-1971 Professor of Educational Administration and Secondary Education, and Coordinator, Aerospace Education Division, UN Teachers College
- 1970-1971 Consultant to Princess Cruises
- 1970-1971 Special Assistant to UNL Academic Dean
- 1971-1977 Special Assistant to the Director, Mid-America Research Center, Inc.
- 1969-1971 Member of Board of Directors of Educators Security Insurance Company
- 1971-1973 Director of Educational Programs, Royal Viking Line

## **Publications:**

### **1. Theses**

M.A. — The Influence of Instruction on the Ability of Children to Interpret Maps. Lincoln: University of Nebraska.

Ph.D. — A Technique of Selecting, Organizing, and Evaluating Instructional Materials for a Course In Modern Problems. Lincoln: University of Nebraska.

### **2. Books**

#### **Co-author:**

University of Nebraska (Lincoln Campus). Teachers College. Aviation Education Research Group. (1942). *Elements of Pre-Flight Aeronautics*. New York, NY: The MacMillan Company.

(1943). *Friends Near and Far*. Chicago, IL: The Follett Publishing Company.

(1944). *Now We Fly*. Philadelphia, PA: The John C. Winston Company.

(1946). *Aviation Education, Plans and Materials*. Chicago, IL: The United States Junior Chamber of Commerce.

(1949). *Aviation Study Manual*. CAP, Vol. I. Book II. Washington, D.C.: United States Printing Office.

(1951). *Neighbors in Latin America*. (plus workbook, "Living with Neighbors in Latin America"). Philadelphia, PA: The John C. Winston Company.

(1952). *Neighbors Around the World*. (plus workbook, "Living with Neighbors Around the World"). Philadelphia, PA: The John C. Winston Company.

(1952). *Neighbors in the Americas*. (plus workbook, "Living with Neighbors in the Americas"). Philadelphia, PA: The John C. Winston Company.

(1952). *Our Neighbors at Home*. (plus workbook, "Living with Our Neighbors at Home"). Philadelphia, PA: The John C. Winston Company.

(1954). *Neighbors Across the Seas*. (plus workbook, "Living with Neighbors Across the Seas"). Philadelphia, PA: The John C. Winston Company.

(1954). *Neighbors in the United States and Canada*. (plus workbook, "Living with Neighbors in the United States and Canada"). Philadelphia, PA: The John C. Winston Company.

(1955). *Exploring Near and Far*. Chicago, IL: The Follett Publishing Company.

(1956). *Neighbors and Faith Across the Seas*. Philadelphia, PA: The John C. Winston Company.

(1956). *Neighbors in Canada and Latin America*. Philadelphia, PA: The John C. Winston Company.

(1957). *Neighbors and Faith in Latin America*. Philadelphia, PA: The John C. Winston Company.

(1958). *Our United States In a World of Neighbors*. Philadelphia, PA: The John C. Winston Company.

### **3. Magazine and Yearbook Articles**

Co-author. (1936, May). Equipment for Teaching Geography. *The School Executive*.

(1936, November). The Influence of Specific Instruction on Map Interpretation. *The Journal of Geography*.

(1939, December). Selecting Geography Equipment. *The Nebraska Educational Journal*.

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# CONSEQUENCES OF SLOT TRANSACTIONS ON AIRPORT CONGESTION AND ENVIRONMENTAL PROTECTION

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## ABSTRACT

Recent trends in the liberalization of market access by many commercial airlines have opened the skies to virtually unlimited flights between many countries. However, this liberalization is stultified by the lack of airport capacity to accommodate the many flights that are generated by demand for capacity. Accordingly, the allocation of slots for open skies airlines remain dependent on the expansion and effective management of airport capacity. This article examines the ramifications of slot allocation on traffic peaking at airports and environmental concerns, which may emerge with this activity.

## INTRODUCTION

Congestion of airports brings to bear the need to manage airport capacity more efficiently in order to meet the increasing demand for air transport. Whether this is achieved by increasing airport capacity or utilizing available capacity more efficiently, the inevitable increase in air traffic the world is facing will result in the need to manage effectively the allocation of slots at airports and the protection of the environment.

A recent ruling of a high court in the United Kingdom, to the effect that airlines could exchange slot times of arrival and departure at airports, even if such exchange involved a financial transaction. This ruling puts into perspective the growing issue as to whether slots are the property of airlines once they are awarded to them, or whether they are merely allocated rights and therefore are not real property rights which are susceptible to being alienated in a legal sense. The court in this instance said that British Airways, with 37 percent of 441,000 slots used at London Heathrow airports, legitimately

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exchanged slot times at Heathrow with KLM, the Dutch carrier, even if a payment was involved in the exchange transaction.<sup>1</sup>

Recent trends in the liberalization of market access by many commercial airlines have opened the skies to virtually unlimited flights between many countries. However, this liberalization is stultified by the lack of airport capacity to accommodate the many flights that are generated by demand for capacity. Accordingly, the allocation of slots for open skies airlines remain dependent on the expansion and effective management of airport capacity. This article examines the ramifications of slot allocation on traffic peaking at airports and environmental concerns, which may emerge with this activity.

The International Civil Aviation Organization (ICAO) has been addressing the issue of traffic peaks at international airports since 1973. In June 1975, the Secretary General of ICAO established a Study Group on Traffic Peaks at International Airports (TRAP Study Group), which held two sessions between October 1976 and August 1977. The group was charged with undertaking studies of the traffic peaking situations (current or recent) at a limited number of international airports, the aim being to establish the facts and experiences associated with those situations as fully as possible and thereby facilitate the formulations of guidance and other international action helpful in attacking such situations when they arise. The study group was also required to identify to the extent possible from the studies, as well as from other related experience and information available to the group, such elements as were sufficiently typical to enable it to formulate conclusions and guidance of general applicability, and to develop recommendations as to:

- a) specific guidance of general applicability that would be of assistance in combating peaking problems; and
- b) any other international action that the group believed ICAO might usefully consider taking in the matter.<sup>2</sup>

The airports selected for the study were Sydney, Copenhagen, Frankfurt, Cairo, Nairobi, New York/J.F. Kennedy, Toronto, Caracas/Maigueta, Bordeaux, Marseilles, London/Heathrow, Prestwick, Hong Kong, and Bombay. Based on results of the questionnaire sent by ICAO to the states concerned, the study group concluded that, at the time, the severity of passenger peaking (as measured by the average to peak hour ratios) was greatest at Bordeaux and Prestwick (with ratios below 5 percent) followed by Marseilles, Bombay, Sydney, London/Heathrow (long-haul—terminal 3) and Caracas/Maigueta (with ratios in the 10 to 18 percent range).<sup>3</sup> The group also found that, in light of the responses from states received, the utilization of passenger facilities was, in general, substantially below that achieved for aircraft movement facilities, when taking the ratios of average-hour to peak-hour traffic as broad

indicators of overall utilization at various airports.<sup>4</sup>

The factors significantly contributing to peaking were preference for travel at certain times of the day rather than certain times of the year and the influence of seasonal fares on the market, which, although creating peaks of their own, were considered beneficial on an overall perspective, in that they widened the spread of traffic throughout the year and thereby decelerated growth of the summer traffic peak.

The effect of wide-body aircraft, which were relatively new at that time, was a mixed-bag. While several airports considered that wide-body aircraft contributed significantly to peaking, it was evident that in spite of the spatial problem created by these aircraft in the apron and terminal areas, the aircraft delayed runway saturation. Thereby the usually more costly development work associated with runway expansion was deferred.

The problems brought about by attendant commercial arrangements such as interlining and transiting of passengers were of a somewhat different dimension, in that the demand for increased terminal capacity, gate-lounge space, increase of baggage capacity with regard to baggage handling, directly brought to bear several complex facilitation problems at airports at peak times. These same problems would emerge from such practices as optimization of aircraft utilization and carrier competition.

Curfews imposed on aircraft, calculated to obviate peaking problems, were found to be counterproductive in that they tended not only to result in a loss of revenue to activities and airports, but also to transfer aircraft to already busy airports aggravating the peak problems experienced therein, while creating peaking problems for not so busy airports at given times, which had to take in diverted aircraft from curfew affected airports.

Another factor that adversely affected airport congestion was found to be incompetent governmental controls at departure and arrival gates, which created facilitation problems at the terminals.

The group was of the view that there were two ways in which to ameliorate the peaking problem at airports:

- a) seek ways in which to accommodate the peaks, or
- b) handle the problem by efficient management of traffic flow.

The first measure was found to be proactive when considering the service rendered to a rapidly evolving and developing air transport industry and the complex needs of a wider traveling public. The inevitable recommendations from the study group related to the expansion of physical facilities at airports and aerodromes, more effective use of existing resources and more efficient application of handling procedures. Fundamental to accommodating peaking trends, however, was the need at every airport for a cost-benefit analysis

of peaking, wherein the costs increased additionally by accommodating peaks could be assessed against benefits brought about by the addition of capacity.

On the issue of management of traffic flows at airports, the group noted the usefulness of scheduling committees in the situation where amelioration of peaking needs to be sought through the management of traffic flow, and recommended that where such situations existed their establishment should be considered at least by the more important airports. The procedure seen as being most suitable would be for airport management to decide on the overall capacity to be allocated to commercial operators, and thereafter leave the scheduling committee to allocate that capacity, since being comprised of airlines concerned, it would be best informed as to their individual circumstances and requirements. The International Air Transport Association's (IATA) support for the recommendation was qualified to the extent that the establishment of a scheduling committee should normally only be necessary when the costs involved in expanding facilities were completely unacceptable, or for the period during which such expansion was proceeding.

The group noted that the airlines in particular, through IATA, had been active in the field of scheduling, but airports too were studying this subject in detail.

At many airports the national airline or, where there was more than one, the major national carrier acted as spokesman of the scheduling committee and also served as the channel through which the administration makes known the constraints applying to airport capacity. In this regard the group pointed out that it was important that all airlines, scheduled and non-scheduled alike, be given the same opportunity for making their requirements known, and be afforded the same treatment subject to the basic stipulation that they make their tentative schedules known well in advance. This last requirement had often proved difficult for charter airlines to meet and they were consequently often obliged to accept more inconvenient arrival and departure slots than the scheduled carriers.

It was also the group's observation that airport regulations and government regulations sometimes endeavoured to control peaking problems by ordering the transfer of certain categories of traffic (usually general aviation and charter flights) to other airports. The group understood that little existed in the form of legally enforceable regulations, and concluded that the main reason why such directives tended not be challenged was that it lay in the airlines own interest to see an orderly administration of traffic capacity even at the cost of penalties to certain categories of traffic. The group considered it important that in such circumstances all government regulations in this area should be equitable and fairly administered since they might otherwise have

the effect of inducing retaliatory action from other states which felt their airlines had been unfairly treated.

According to the study, surcharges on traffic movements during peak hours were only levied at two airports. The surcharges had only been in existence for a relatively short period and the group judged that there was no conclusive evidence as to whether or not they had proved effective in reducing peaks. It was recognized that small-aircraft movements might be most discouraged by such charges, but the group also saw the same effect being achieved through a pricing policy that set minimum charges at a high level.

For the peak surcharges to be effective, the group was of the view that surcharges would have to be incorporated into the fare structure in a manner whereby they could be passed on to the passengers using the airport at times when the surcharges applied, and even then a shift in travel away from peak hours could be expected only to the extent that demand was price-elastic. Incorporating surcharges in such a manner on a worldwide fare-construction basis would be difficult, but less so on a regional basis. Charter traffic on the other hand was recognized as a specific case where such charges could be directly passed on to the passenger. Turning to the broader aspects of the question of airport administrations employing their pricing policy to ameliorate pending problems, the group would emphasize that caution should be exercised in employing this tool, since airports more often than not are in a monopolistic position shielding them from the usual competitive forces that would enable the financial reasonableness and acceptability of changes in their pricing policy to be realistically assessed.

The effectiveness of airline pricing policy as a means of ameliorating peaking problems was something that the group found difficult to quantify in any precise terms. However, based on the experience with airline pricing to date, it was recognized that offering significant reductions from base fares during off-peak hours or periods had resulted in a spreading of traffic, and this in itself had caused peaking to be generally less severe than otherwise would have been the case. Since even new traffic resulting from normal growth was directed, in part, by such fares to off peak hours or periods. The group noted that such fares had principally affected the weekly peaking patterns, but there was also evidence of a change in the pattern within seasons.

The group also pointed to the feasibility of further educating the general public about airport-capacity shortages and the problems that arrive at peak-times of travel, with a view to achieving a better spread of demand over time. British Airports Authority was engaged in an advertising campaign to this effect that had already produced encouraging results. Also relevant in this context was the success achieved by the efforts made in the German Federal Republic to spread travel by staggering vacation periods and school holidays in different areas of the country. As originally conceived, this plan was seen

as a means to improve the utilization of highway system, but air transport also benefited from its application.

Apart from the several means of ameliorating peaking problems just discussed, the group also suggested that it could be useful for airports to review carefully the various factors contributing to peaking, those that may prompt ideas as to the kind of remedial action that may be most effective in the particular circumstances of any given airport.

Additionally, the group drew attention to the amelioration of peaking problems that may be secured through implementation of the Standards and Recommended Practices in Annex 9 – Facilitation to the Chicago Convention.

### **The ECAC Study**

In March 1993, the European Civil Aviation Conference (ECAC) considered a report pertaining to a study on Modulated Airport Charges Against Airport Congestion: An Economic Way of Regulation<sup>5</sup> that focused exclusively on modulated charges as a deterrent to traffic peaking at airports. It reviewed some economic principles which were relevant to the analysis as to whether, *inter alia*, airport congestion on the airside could be minimized by the imposition of air navigation services charges and taxes. The conclusion of the study was that modulation of airport charges (passenger charges, landing and take-off charges) could be an effective way of dealing with congestion-prone airport facilities. The report hastened to add that scheduling committees and other short-dated strategic regulatory systems were not to be impinged, but that a long-dated solution (the imposition of changes) was considered desirable.

### **Initiatives of ICAO**

The 27<sup>th</sup> Session of the ICAO Assembly in 1989 adopted Resolution A27-11 (Airport and Airspace Congestion) which directed the Council, when developing Standards and Recommended Practices for Air Navigation Services, to pay particular attention to their impact on airport and airspace capacity and to ensure effective coordination in order to avoid duplication of activities of other international organizations. At its 29<sup>th</sup> Session in 1994, the Assembly endorsed the Strategic Action Plan developed by ICAO that defined, *inter alia*, objectives<sup>6</sup> by ICAO concerning airport and airspace congestion and ways of achieving those objectives. ICAO objectives with respect to airside aspects of airport and airspace congestion can be defined as the following:

To develop measures for overcoming airport and airspace congestion on a global basis with the following objectives:

1. identify tasks within the competence of ICAO which can contribute significantly to easing airport and airspace congestion;
2. study possible solutions for alleviating congestion problems;
3. develop the overall ICAO action plan with objectives defined in the short-medium and long-term and assist states in its implementation; and
4. accelerate the development of systems and procedures for enhancing existing and airspace and promote the development of additional capacity

The Air Navigation Commission of ICAO, which undertook the task of formulating an action plan on airport and airspace congestion, examined factors such as the knock-on effect of airport curfews on scheduling international operations, particularly for long-haul flights; environmental restraints on airport arrival/departure flight paths; runway usage; airline hubbing; and recognition of new generation of quieter aircraft.<sup>7</sup> It was also concluded by the Commission that airport and airspace congestion was related to safety regulations and that, in the development of any technical or operational standards associated with enhancing capacity, due regard must be given to existing levels of safety. The Council of ICAO noted the report of the Air Navigation Commission and requested the Commission to keep the Council advised of further work conducted in the area of airport and airspace congestion.

There are compelling factors that any airport administration should take into account when planning for the injection of additional capacity. These are the responses of the international community in the form of Standards and Recommended Practices as promulgated by ICAO, in order that international civil aviation retains a certain consistence and uniformity in its global activity. For instance, ICAO has in use an Airport Planning Manual<sup>8</sup> in two parts, setting out in detail all aspects of airport planning. ICAO has in this document, developed a master planning process which involves plans, programmes and stringent policy that go to make airports adequate to meet the present and future air transportation needs of an area or state.<sup>9</sup> The manual starts from the fact that early aviation pioneers recognized the need for some public control of land in the vicinity of an airport<sup>10</sup> and bifurcates this need to reflect airport needs i.e. obstacle limitation areas and future airport development etc. and the need to ensure minimal interference with the environment and the public.<sup>11</sup> By this dual approach, ICAO has introduced a whole new area of thought into airport development. What was once a concern to merely

provide easy facilities for the fluid movement of air traffic has now become, in addition, an ecological concern. By this process, airport development now falls into three main areas:

- a) the development of airport capacity and facilities;
- b) the balancing of airport development with necessary security measures; and
- c) the balancing of airport development with ecology, i.e., city planning, noise pollution avoidance, etc.

The ICAO Airport Planning Manual ensures a balance between airport development and ecological considerations.

In its findings, ICAO lists studies of air quality at certain large airports and nearby areas reflecting the fact that automobiles, airport ground vehicles and other urban pollution sources account for most of the atmospheric pollution<sup>12</sup> and that airports may destroy the natural habitat and feeding grounds of wildlife and may eradicate or deplete certain flora important to the ecological balance of the area.<sup>13</sup> Another ICAO document<sup>14</sup> establishes that bird hazards may be avoided if, in the process of planning an airport, migratory bird habits and bird migration routes are considered. The Airport Planning Manual also considers the necessity to avoid contamination of rivers and streams by airport waste disposal and drainage systems,<sup>15</sup> the avoidance of noise caused by aircraft to human habitation,<sup>16</sup> and highway planning.<sup>17</sup> It even considers revenue generation where airport lands not used for air transportation purposes may be used for agricultural<sup>18</sup> and recreational purposes.<sup>19</sup> Finally, the document calls for a detailed study of the impact of airport development on the environment in the form of an environmental impact statement.<sup>20</sup>

Ecological considerations of airport planning are considered in detail by ICAO in Annex 16 to the Chicago Convention. Annex 16<sup>21</sup> deals extensively with aircraft noise pollution in Volume I and with aircraft engine emissions in Volume II.<sup>22</sup> In these documents ICAO sets standards for noise evaluation measures for subsonic aircraft,<sup>23</sup> airworthiness requirements (noise) for supersonic aircraft<sup>24</sup> and the overall monitoring of noise,<sup>25</sup> aircraft smoke emissions,<sup>26</sup> gaseous emissions<sup>27</sup> and measurement techniques thereof.<sup>28</sup> The role of ICAO in the area of securing a harmonious balance between the gigantic strides made by aviation technology and the preservation of the environment has been one of responsibility. It is no mean task to pair off such interests as the economic development of international civil aviation, standard setting for meeting of challenges of the new decade and the next century and the problems of pollution caused by aircraft. In fact ICAO's endeavours at developing civil aviation in these areas go as far back as 1970 where a Special Committee on Aircraft Noise was created. This Committee published a

report<sup>29</sup> with futuristic prognoses of noise reduction. Other landmarks in ICAO history reflecting positive action taken on aircraft noise pollution are the Resolution on Aircraft Noise in the Vicinity of Airports passed at the Sixteenth Session of the ICAO Assembly in September 1968<sup>30</sup> and the two ICAO Resolutions<sup>31</sup> passed consequent to the Stockholm Declaration on the Human Environment.<sup>32</sup>

From the preceding paragraphs, one could glean that while the airport congestion problem is grave and that statistics throughout the world show alarming trends, much has been done to alleviate the problem. Many nations have already commenced contrived planning and in some cases even the implementation of such plans to accommodate the exodus of air traffic of the next decade and the next century. ICAO in the regulatory field and IATA in the operational field have so far abundantly shown their concern and indeed taken concrete action to meet the future challenge. The question now is what more needs to be done in the future and how should problems be approached? This question will be addressed later in this article.

### **Airport Planning Laws**

On an examination of the foregoing discussion on airport congestion, no one could say that the problem has not been perceived so far, *a fortiori*. No one could even say that those responsible for the alleviation of the problem have not attempted to solve it. What now remains to be done is to examine the most proper manner in which to approach this problem in the coming decade and the next century. There is no doubt that the planners can take off from where we are at present. However, any future planning by individual states on the expansion of the airport programmes would have to be done with the primary consideration that, "Looking to the immediate future, air transport will require new forms of international co-operation in technical and economic areas."<sup>33</sup> The cooperation referred to in technical and economic areas would have to be further expanded to include security and ecological factors in the technical field and all economic research in city planning and infrastructure development in the economic field. These studies would have to be done in the form of committed and in-depth country studies by individual states taking into consideration futuristic studies of a country's outlook and the financial outlay that the country would be prepared to make for an airport expansion programme. The outcome of these studies could then form legislation for the planning of airports in a state. Such legislation would present, for the first time, a cohesive and enforceable set of laws in that state that would meet the airport congestion problem.

## Guidelines for Drafting Laws

Although the concept of airport planning laws can be summed up easily in one paragraph about, the three broad areas of ecology, security, and infrastructure planning, there is a need for a sustained approach of study before such are incorporated into laws. For a start, ICAO's *Airport Planning Manual* is geared to provide information and guidance to those responsible for airport planning,<sup>34</sup> where information on a comprehensive list of planning subjects such as sizes and types of projects,<sup>35</sup> task identification,<sup>36</sup> preparation of manpower and cost budgets,<sup>37</sup> selection of consultants<sup>38</sup> and standard contract provisions<sup>39</sup> are given. With these guidelines, each state can start its planning process.

The first step to the planning process, which would eventually lead to the drafting of legislation, is to predict demand for each area and facet of the airport passenger and cargo terminal. Four basic steps have been suggested for this process. These are: the analysis of handling passengers, baggage, goods and mail in the terminal; the identification of optimum capacity levels; the coordination of research in futuristic studies; and, the laying of emphasis on areas that need more research in airport planning.<sup>40</sup> It is submitted that the last step serves as an appropriate culminating point of fact-finding in airport planning. The appropriate end to the ultimate planning process would then be to identify actual demands in quantifiable terms in order that regulations and laws could be drafted to ensure adequate supply for the demands.

Once the economic studies are completed, the final outcome of the process, i.e., the drafting of the laws, could begin its phase. At its first phase, the legal draftsman would have a preconceived set of ecological and security standards to fit into the overall economic picture. To fit in ecological and security aspects to the overall economic plan that would make the final airport planning laws, certain factors would have to be made available to the legal draftsman.

First, the planner should outline some critical facts that would be incorporated in the planning law together with substantiating facts and figures. They are the location of the area for the airport and its relation to the city and essential facilities, the location of facilities for the proposed airport or extension (such as fuel tanks, handling and supply access), aeronautical requirements, maintenance facilities and areas, passenger access and cargo areas, designing requirements of terminal buildings and noise mufflers in crucial areas.<sup>41</sup> These considerations would have to be specified in detail in order that the law unequivocally sets out the standards upon which an airport building or extension programme may be undertaken. Further, the requirements should be carefully blended to accord with minimum cost levels and maximum aesthetic standards both of which require skilled economists, engineers and

architects. These elements should then be incorporated into an overall airport system plan allowing for international and domestic air transportation. Major issues that may be considered in the introduction of planning laws are such facts as:

- a) The relationship between airport and city. (Distance, access, communication links, etc.);
- b) all personnel involved with airport operations would presumably live in close proximity to the planned airport;
- c) all airport related industry and trading would be centered in the airport region;
- d) all infrastructure, such as road transportation, shopping, schools and recreational facilities, would have to be provided for or planned for in order that b) and c) above are properly supported;
- e) daily airport activities do not interfere with the existence of persons within the region of the airport.

In other words, ecological considerations should be considered closely with economic planning in order that environmental planning and facility planning be made interrelated.<sup>42</sup> At this stage, the draftsman of the planning law would have to be guided by environmental considerations that are specified by the planner. It is on this basis that the Swiss legislature has formally incorporated ICAO Annex 16 standards in their Ordinances<sup>43</sup> and the Singaporean Government has banned the issue of permits for schools, hospitals, and certain residential building in specified areas around the Changi Airport.<sup>44</sup>

Second, matters of aviation security concerning overall air transportation of a state as it affects the airport should be researched in detail. Although placed second in the planning process, this aspect of airport planning by no means is of less importance. Indeed, in the words of Dr. Assad Kotaite, President of the ICAO Council:

In the absence of any international enforcement machinery, it is only for the sovereign states to safeguard that security by strict adherence to the internationally agreed rules and international morality. The security of international civil aviation is not a local or regional problem. It is a global problem of worldwide dimension. Furthermore, the security of international aviation is indivisible on the global scale and any local or regional arrangements are only as strong as the weakest link in the entire international community on a worldwide basis.<sup>45</sup>

The airport planner should find an excellent guide in Annex 17 to the Chicago Convention that is geared to safeguard international civil aviation against acts of unlawful interference. Procedures on all aspects of aviation

security are incorporated into this Annex and the overall airport plan could do well to include the recommendations therein for the consideration of the legislator.

### **Allocation of Slots**

Slots are essentially times allocated to airlines to land and take off at international airports. Although airlines may claim that slots allocated to them over a sustained period of time are historic slots and thereby claim proprietary interest over those slots, airlines by no means own any slots in terms of being able to legally claim slots as a matter of course.

In September 1998, six unions representing 80,000 British airline workers vehemently objected to British Airways and American Airlines being paid for the 267 slots they were giving up at London Heathrow Airport as part of their transatlantic alliance. The six union aviation forum claimed that legally, since the slots are allocated, they couldn't be transacted for valuable consideration. Besides, the unions claimed, slot sales were bad for the air transport industry and may lead to the rise of airport charges and fees and decrease of choice for the consumer. George Ryde, Chairman of the Forum said: "It would lead to a Heathrow largely monopolized by the more profitable wide-bodied aircraft, primarily serving long distance destinations, squeezing out short distance and feeder airlines, some of which could collapse."<sup>46</sup> The sale of slots, although claimed by some as pro-competitive in that it would attract fierce competition for the slots offered for sale, is considered by many as unduly oligopolistic and favouring only a few powerful air carriers of the world.

The contrary view—to the claim that slots are allocated and therefore not owned—that slots are assets inasmuch as are airports or breweries, has been put forward by interested parties in the European Union, contrary to the European Commission's fair trading laws which prohibit the sale of slots in Europe.<sup>47</sup>

Another lobby against the policies concerning the allocation of slots has been directed from the charter carriers who recently hit out at London Gatwick airport for giving slot allocation on a preferential basis to scheduled carriers. The basis of the complaint is that Gatwick Airport is primarily charter carrier oriented and the allocation of slots to preferred scheduled airlines would wipe the unscheduled airline industry from the Gatwick area.<sup>48</sup>

The allocation of slots, if applied strategically, could be an effective marketing tool. An example of this approach could be seen in the allocation of slots at Narita Airport in Tokyo in mid 1968 when Japan's three big airlines received extra weekly landing slots at the airport in the ratio of Japan Airlines (28); All Nippon Airways (44); and Japan Air systems (14), thus giving Japanese airlines 44 percent of the total slots at Narita Airport. This measure,

taken after seven years of historical allocation of slots, incontrovertibly provokes intense competition among the three airlines of Japan.<sup>49</sup>

Speaking in terms of marketing strategy, a hub in Tokyo is what airlines dream of, and the award of slots to generate competition among similar carriers bodes well for the airport. Narita is further boosted in its strategic slot allocation by the fact that its second runway is to open in March 2001, adding up to 260 more take offs and landings per day. Of course, the inevitable turf war has already begun in Narita, where European carriers claim that they are being left out of the race for slots by the American carriers and Japanese carriers in Tokyo.<sup>50</sup> Conversely, Japanese carriers claim that Narita is already controlled by far too many foreign carriers.<sup>51</sup> One of the compromises suggested is the invocation of the "use it or lose it" rule, whereby an airline would automatically lose a slot that it does not use over an allocated period.

The problem of ever common delays over European skies owing to airspace congestion contributed to by ground congestion has been tackled by the use of sophisticated equipment, such as the new surface movement guidance control system (SMGCS) which uses object-oriented technology (OOT) that works on a software application from pre-assembled blocks known as objects, to speed aircraft movements on a tarmac and optimize the use of runways.<sup>52</sup>

With regard to airport management, the dichotomy emerges between the rights of airports to manage the capacity they create, and slot congestion and unsatisfactory demand for slots that a non-market based system created by airport autonomy may generate. Indeed, the answer may well rest with encouraging airport capacity growth, rather than manage existing limited capacity to fit its slot requirements. The latter may well stultify the growth of air transport. To this effect, the International Chamber of Commerce (ICC) most strongly urged governments through the ICC's Commission on Air Transport in 1992<sup>53</sup> to make adequate and timely investments in airports as part of the aviation infrastructure. The ICC observed in its statement that failure to invest would result in serious airport and airspace congestion that would in turn damage international trading.

In 1991, at the Third Meeting of the European Civil Aviation Conference (ECAC) Working Group on Intra-European Air Transport Policy (Paris, 14-16 May 1991), IATA addressed the issue of slot allocation in its working paper,<sup>54</sup> explaining that schedules were decided as slots allocated at Schedule Coordination Conferences, during which schedules are adjusted mainly through bilateral discussions between airlines and coordinators regarding alternative offered, or between airlines to exchange slots offered or accepted.

IATA gave, in this instance, a balanced view of the advantages and shortcomings of this system and introduced various solutions that had been considered by the aviation community to improve slot allocation in keeping with

demand. One solution IATA reported was to scrap the bilateral system that existed in favour of some kind of market mechanism. Another was to have government regulation of slot allocation. A third alternative was to maintain the present system but modify procedures and priorities by law.

At the same meeting, the ECAC Secretariat queried the existing practice, particularly the justification for giving preference to historical slots (grandfather rights) and 50 percent of the remainder of slots to new entrants, the passive governmental role played in slot allocation and the possibility of using a slot pricing mechanism (e.g. auctioning of slots between competing airlines).<sup>55</sup>

In May 1998, the Organization for Economic Cooperation and Development (OECD), in addressing the issue of competition policy and international airport services, observed that where there was a vertical relationship between an airport and an airline, and the airport was price regulated, the airline may have strong incentives to attempt to exclude other air carriers from access to the airport, which may need to be addressed through regulatory controls.<sup>56</sup> Be that as it may, regulatory concerns over slot allocation may also arise at a number of airports where there is no vertical relationship with airlines. A profit-maximizing airport has efficient incentives to allocate slots and expand capacity efficiently. In this case there would be no regulatory concern over the allocation of slots. In particular, regulatory intervention would make more transparent the number of available slots and the use of those slots, in order to make it more difficult for incumbent airlines to prevent access by new airlines (on the basis of lack of capacity) and encourage, through administrative means, an allocation of slots which might have arisen if airports have appropriate incentive to price-discriminate efficiently between flights.

OECD also felt that, where there was adequate inter-airport competition, regulatory controls on airports should be removed so that airports faced appropriate economic incentives. Where it was not possible to rely on inter-airport competition, vertical relationships between airports and airlines should be avoided. Also recommended by OECD was that regulation on airports should be improved so that airports faced efficient incentives in setting of charges and in rationing access to take off and landing rights.

One of the most significant recommendations of the OECD study was that where it was not possible to establish efficient incentives on airports, the slot allocation process should be regulated. In this context, it was suggested that slots should be allocated using market processes, in both the primary and secondary markets subject to established competition law.

## CONCLUSION

The issue of slot allocation and the need for more capacity to accommodate new slots for the increasing volumes of air traffic cannot be addressed in isolation. The issue, in its totality, has to mesh with the need to infuse more airport capacity according to opportunities of market access afforded to airlines and with minimum loss of environmental and ecological equilibrium. A suitable individual case study in this regard is the preparations undertaken by Kingsford Smith Airport in Sydney for traffic envisaged during the 2000 Olympic games.

With Sydney's election as the venue for the 2000 Summer Olympic Games, the environmental impact of airport capacity and activity offered by Sydney—an aviation issue that has evoked some debate in the past—becomes once again worthy of attention. Kingsford Smith Airport has been in use since 1919 and is not the subject of Australian government policy that calls for the development of a third runway and the offer of adequate capacity until the runway is built.

All global environmental indicators reflect that the balance of nature is profoundly disturbed by the industrial practices of developed nations. The concept of sustainable development has gained acceptability in recent years to obviate any concern that one might have of industry and other development eroding nature's balance. Sustainable development has been summed up by one commentator as development that requires land to be protected, the water recycled and the air kept clean so that future generations would inherit an environment that must not be worse than the environment of our own generation.<sup>57</sup>

The United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro from 3–14 June 1992 (more popularly called the Earth Summit) adopted the Rio Declaration on Environment and Development that broadly recognizes that the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.<sup>58</sup> The Declaration also provides that in order to attain sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.<sup>59</sup> States are called upon by the Declaration to cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, states are recognized as having common but differentiated responsibilities. The developed countries acknowledge in the Declaration, the responsibility that they bear in this international pursuit of sustainable development in view of the pressure their societies place on the global environment and of the technologies and financial resources they

command.<sup>60</sup> States are called upon to cooperate to promote a supportive and open economic system that would lead to economic growth and sustainable development in all countries in order that the problems of environmental degradation are better addressed. It is emphasized in the Declaration that trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. States are called upon to avoid unilateral actions that deal with environmental measures that address transboundary or global environment problems on an international consensus as far as possible.<sup>61</sup>

The Declaration recognizes that environmental issues are best handled with the participation of all concerned citizens at the relevant level. At the national level, each individual has the right to have appropriate access to information concerning the environment that is held by public authorities, including information concerning hazardous materials and activities in their communities, and the opportunity to participate in the decision-making process. Public awareness should be facilitated by states that are required to make information readily available to any citizen who requests such. States are also required to provide effective access to judicial and administrative proceedings, including redress and remedy, as relevant.<sup>62</sup>

There is also provision in the Declaration for states to enact effective environmental legislation. Environmental standards, management objectives and priorities are required to reflect the environmental and developmental context to which they apply. The Declaration envisages that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries—particularly to developing countries.<sup>63</sup> Finally, the significance of environmental impact assessment, as a national instrument, is recognized where the Declaration requires states to undertake assessment for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.<sup>64</sup>

Consequently, the Rio Conference adopted Agenda 21—a wide-ranging plan—that called for the establishment of the Commission on Sustainable Development to ensure effective follow-up to the Rio Conference; enhance international cooperation; and, rationalize inter-governmental decision-making for the integration of environment and development issues. In a public statement, United Nations Secretary General Dr. Boutros Boutros-Ghali said:

The challenge after Rio is to maintain the momentum of commitment to sustainable development, to transform it into policies and practice and to give it effective and coordinated support... The United Nations must put its development objectives on par with its political and security commitments.<sup>65</sup>

The fifty-three member Commission, which was established by United Nations General Assembly Resolution 47/191, began its work in May 1993. The Commission monitors *inter alia* programs towards the United Nations target of providing 0.7 percent of gross national product of industrialised countries for official development assistance and actively interacts with other United Nations inter-governmental bodies, regional commissions and development financial institutions, including the Global Environmental Facility—a fund established in 1990 by the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNEP) and the World Bank. The Commission was also mandated by the United Nations General Assembly Resolution 47/191 to promote the incorporation of the principles of the Rio Declaration in the implementation of Agenda Item 21.

The Non-Governmental Organizations (NGOs) that participated in the Rio Conference adopted the Earth Charter, which was a list of declarations and principles concerning environmental protection. The Earth Charter runs parallel to the Rio Declaration in so far as NGOs are concerned. One of the declarations of the Earth Charter is the alternative Treaty on Trade and Sustainable Development that declares that international trade should be part of sustainable development. The Treaty also requires that compensation, working conditions, land use and the exploitation of natural resources must be directed toward sustaining socially and ecologically balanced communities.<sup>66</sup>

The sustained interest in environmental protection shown by the world has made industries, including aviation, realize that they must take into account the adverse impact that their activities would have on the environment. Avi Gil makes a valid point when he observes that in the near future, industries and governments would be compelled to take environmental issues seriously or lose their competitive edge.<sup>67</sup> Gil attributes this need for caution to customers' increasing demands for cleaner products and services, and the willingness of financial institutions to support environmentally conscious industries above others who are not so environmentally conscious.<sup>68</sup> Sustainable growth in airport development is therefore a necessity for survival of airports. Airport managers have to be guided by the legislature and planners alike to ensure sustainable development in the implementation of airport projects.

Airport expansion is a natural corollary to increased demand for air transport, and therefore the issue of environmental protection must essentially be viewed against the increasing demand for airport space. While it is incontrovertible that airport construction and expansion may have inevitable beneficial effects on a local community or national economy, the attendant environmental problems that may arise from such projects could not be dismissed lightly. Prudent land use and waste disposal are important reasons for

caution in airport development. Airport developers often have to take into consideration the land use policies of other jurisdictions. The broad objective is to facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition by a sustainable and integrated management of land resources. In so doing, environmental, social and economic issues should be taken into consideration. Protected areas, private property rights and the rights of indigenous persons and their communities, among other considerations, also have to be taken into account.

In Europe, an Airbus Industrie study on politico-economic trends as they affect the airline industry predicted that current and future events would render twenty-four European Airports frequency limited and unable to take any more aircraft movements.<sup>69</sup> To counter this problem, Munich is building a new airport; Stanstead has been expanded as London's third major international airport; while Frankfurt, Manchester, Charles de Gaulle (Paris), Schiphol (Amsterdam) and Fiumicino (Rome) airports are all expanding rapidly. A study undertaken by Stanford Research Institute (SRI) reveals that air traffic in Europe alone is expected to increase by 100 percent to about 500 million passenger movements by the year 2020 and even triple to 740 million during the first decade of the next century.<sup>70</sup> The report claims that by the year 2020, half the airports in Europe will be straining for capacity even with potential expansions of airports.<sup>71</sup> Airport congestion is expected to stultify the growth of the tourism industry, the airline industry and the entire communication system in general.<sup>72</sup> In the airline industry alone in Europe, 390,000 people had found employment in 1989 while the entire airline, airport and other governmental enterprises in Europe employed 540,000 personnel in the same year.<sup>73</sup>

The SRI Report, claimed to be a conservative one,<sup>74</sup> has recommended eight measures for implementation by IATA, two of which are the development of an airport capacity monitoring programme and an airport support programme<sup>75</sup> in Europe. The report further states that the \$1.5 billion expended by the European Governments to upgrade airport facilities is inadequate to support even the existing infrastructure.<sup>76</sup> In response, IATA has set up an Infrastructure Action Group (IAG) to take anti-congestion action in Europe.<sup>77</sup> The main task of this group is to work closely with the already existing IATA Task Force on Airport Congestion, where the former would implement the findings and recommendations of the latter. The situation in Europe with regard to the increasing demand for airport capacity is thus identified as critical and is underscored by the fact that in Frankfurt Airport alone, the 1985 traffic forecast for the year 2002 of 27 million passengers had been reached in 1989—more than a decade early.

Airport congestion in Europe has grown so acute that, in 1990, the International Civil Airports Association (ICAA) called for all governments con-

cerned to legislate more financial freedom in order that more facilities in airports could be installed.<sup>78</sup> This concern runs parallel to the SRI Report's finding that severe capacity constraints over Europe has cost airlines such as Lufthansa as many as 5200 hours in holding pattern delays over Frankfurt, Munich and Dusseldorf in 1987.<sup>79</sup> This is approximately a 100 percent increase from the previous year. The most recent statistics available at the time of writing shows that the percentage of people traveling by air in Europe over the total population is increasing steadily by 15 percent and that the trend would continue, owing to the steady increase in business traffic.<sup>80</sup> One of the most significant responses given by the aviation community of Europe towards combating airport congestion in Europe was the Meeting of the Transport Ministers of the European Civil Aviation Conference (ECAC) in Paris in April 1990. The ministers at this meeting initiated a programme with a view to improving airport infrastructures.<sup>81</sup>

In the United States, the problem of airport capacity is as acute and the big hubs of Chicago, Atlanta, Denver and Dallas/Fort Worth are already experiencing significant delays in departures. A survey conducted in 1990 concluded that of the thirty airports in the U.S. that have developed as hubs, at least two-thirds suffer more than 20,000 delay hours annually.<sup>82</sup> One of the measures that has been taken to counter airport congestion brought about by the influx of traffic is the support by the administration, the Department of Transportation and the Federal Aviation Administration for the levy of a passenger facility charge (PFC) that is now being imposed.<sup>83</sup> This charge is imposed by airports in the United States who, after application to the Department of Transportation, obtain permission to charge a *head tax* from \$1 to \$3 for each departing passenger. Revenue from the proposed fee is expected to contribute \$623 million to the coffers of the Airport and Airways Trust Fund<sup>84</sup> and it is claimed that this money will be utilized to improve the nation's transportation system.<sup>85</sup>

At the 8<sup>th</sup> ICAO Air Navigation Conference in 1974, delegates adopted a recommendation,

That states not already doing so should, to the extent practicable, take action to develop programmes for compatible land use administration and planning around aerodromes, in order to avoid incompatible development in critical noise areas, both around new aerodromes and in respect of still undeveloped areas in the vicinity of existing aerodromes.<sup>86</sup>

The conference also noted that planning had been enforced in many states with encouraging results and recognized that the benefits that could be derived from proper land use planning could contribute materially to the solution of the problem of noise in the vicinity of aerodromes.

One expert view is that since each airport has its own social, economic and political situation as well as a unique history and physical geography, allow-

ance must be made for these factors, while special note must be taken of the future impact of noise caused by the proliferation of aircraft that will inevitably happen in the future. The ICAO Council's Committee on Aviation Environmental Protection (CAEP) also holds the strong view that while steps taken to replace noisy aircraft by quieter ones could cause the problem of aircraft noise at airports to decline in general terms in the next decade, the proliferation of air traffic in the future would eventually bring the problem back in its full force.<sup>87</sup>

It is also worthy of note that the 28th ICAO Assembly, which held its sessions in Montreal from 22 to 26 October 1990, adopted Resolution A 28-3 that urged the ICAO Council to promote and states to develop an integrated approach to the problem of aircraft noise, including land-use planning procedures around international airports so that any residential, industrial or other land-use that might be adversely affected by aircraft noise is minimal.<sup>88</sup>

The Australian response to the deliberations of the world community and expert opinion seems to have been to amend the Federal Airports Corporation and Civil Aviation Acts in January 1991 to extend the functions of the Federal Airports Corporation (FAC) and the Civil Aviation Authority (CAA) to include carrying their measures that stemmed from the recommendation of the House of Representatives Select Committee on Aircraft Noise, the Minister for Transport and Communications also issued formal directive under the Acts in August 1991 to allocate appropriate responsibilities to the FAC and CAA.<sup>89</sup>

When any major improvement or change occurs at an aerodrome or airport, such as the building of the third runway at Sydney's Kingsford Smith Airport, planning strategies for the entire complex structure of aviation would have to be revised. It is not only the effect on the people residing, working or schooling in the area that matters. There are also such factors as congestion caused in the terminal building through the injection of additional traffic, security implications and long term planning for adaptation to the changing commercial and social environment brought about by the additional construction at the aerodrome that have to be taken into consideration. A well-rounded revision of airport planning therefore becomes a necessity.

#### ENDNOTES

1. See British Court Clears Dealing in Slots, *The Air Letter*, Monday, 29 March 1999, No. 14, 209 at p.2.

2. *Secretariat Study Group on Traffic Peaks at International Airports, Report of the Two Sessions* (Montreal, 25-29 October 1976 and 22-26 August 1977), ICAO Montreal 1977 at p.1.

3. *Id.* at p. 9.

4. The average levels were 19 percent and 35 percent, for utilization of passenger facilities and aircraft movement facilities respectively. *Id.* p. 10.

5. *EURPOL-1/SG*, Information Paper No. 1, 6/3/93

6. ICAO has adopted eight Strategic Objectives (A-H), Objective E lists nine sub-objectives. One of these is to respond on a timely basis to major challenges to the safe and efficient development and operation of civil aviation on the subject of airport and airspace congestion.

7. *ANC Action Report* No. 282, 6 January 1993 at p.2

8. *Doc. 9184-AN/902*, Parts 1 and 2

9. *Id.* Part 1, 2.9.1(a).

10. *Airport Planning Manual*, *Doc. 9184-AN 902* Part 2, 1.3.1.

11. *Id.* 1.3.23.

12. *Id.* 2.1.3.

13. *Id.* 2.2.1.

14. *Airport Services Manual*, *Doc 9137*, Part 3.

15. *Airport Planning Manual*, Part 2, *op. cit.* 2.4.1.

16. *Id.* 2.5.2

17. *Id.* 4.3.1.

18. *Id.* 4.3.1.

19. *Id.* 4.4.1.

20. *Id.* 2.6.1.

21. Annex 16 to the Convention on International Civil Aviation, Environmental Protection, and Vol. I and II.

22. See also generally, Frank A Spencer, *Transport Jet Aircraft Noise Abatement in Foreign Countries: Growth, Structure and Impact, Final Report Vol I: Europe* July 1980, Chapter 4 at 26-41.

23. Annex 16, Vol I *op.cit.* 2.2.1 and Appendix 1, 3.2.1 and Appendix 2

24. *Id.* Chapter 4.

25. *Id.* Part III.

26. Annex 16, Vol. II *op.cit.* 2.2.

27. *Id.* Appendix 3.

28. *Id.* Appendix 5.

29. *Doc 8993*, Montreal 15-26 November 1971.

30. Resolution 16-3. See Annex 16, Vol. I 17/11/88, Forward, V.

31. Resolutions A 18-11 and A 18-12, Doc 8958, A 18-RES 18<sup>th</sup> Assembly Session, Vienna, 15 June-17 July 1971.
32. See generally, *Harvard International Law Journal* Vol. 14 No. 3 Summer 1973, at 423.
33. Eugene Sochor, *From the DC 3 to Hypersonic Flight: ICAO in a Changing Environment*, *op.cit.* 438.
34. *Airport Planning Manual*, DOC 9184-AN/902, Part 3.
35. *Id.* 1.3.1-1.3.5.
36. *Id.* Chapter 2.2.1.
37. *Id.* 2.4
38. *Id.* 3.1
39. *Id.* Appendix.
40. *Interavia Aerospace Review* 4/1990 305.
41. Alan H. Stratford, *Airports and the Environment* *op.cit.* 84.
42. *Airports and the Environment, Organization for Economic Co-operation and Development* (1975) at 53.
43. Frank A. Spencer, *Transport Jet Aircraft Noise Abatement in Foreign Countries*, *op.cit.* 93.
44. *Id.* Vol. II August 1980, at 161.
45. Assad Kotaite, ICAO Policy and Programmes in the Field of Aviation Security, *Annals of Air and Space Law*, McGill:Montreal Vol X 1985, 83 at 87.
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60. Rio Declaration, *op.cit.*, Principle 7.
61. Rio Declaration, *op.cit.*, Principle 12.
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72. *Id.* ES-7. See also *Interavia Aerospace Review* 4.1990, 301.
73. *Ibid.*
74. *Airline Executive International*, *op.cit.* 16.
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78. *Airport Support*, May 1990, 5. See also generally page 7 for an account of the London airports' congestion problem.
79. See *SRI Report op.cit.* n.7 at 1-1-1.

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81. See *IATA Press* 119 May 16-31 1990, at 3.
82. *Airline Executive International*, May 1990, 18.
83. *Ibid.*
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# THE “ROCK”: THE ROLE OF THE PRESS IN BRINGING ABOUT CHANGE IN AIRCRAFT ACCIDENT POLICY

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## ABSTRACT

From 1926 to 1938, the Aeronautics Branch, forerunner of the Federal Aviation Administration (FAA), had been charged with aircraft accident investigation. While the Branch had been investigating accidents since its inception, it had, early in its tenure, put into place a policy making its findings secret. Media and political pressure began to mount in late 1928 over its policy of non-disclosure and the debate brought pressure to bear on the young Aeronautics Branch to reverse its policy and make its findings public. The focusing event for the Branch's policy reversal was the death of Knute Rockne, the famous Notre Dame football coach, in a Transcontinental and Western Airways (TWA) airliner on March 31, 1931. This paper will examine the role of print media in bringing about a significant, and lasting, change in aircraft accident public-disclosure policy.

## INTRODUCTION

“Its motors still roaring, the Fokker disappeared behind a hill. There was a splintering thud and the motors ceased.”<sup>1</sup> His mother learned of her son's death from a radio news bulletin, as did one of his four sisters, Martha Stiles, as she listened to WGN in Chicago. Mrs. Stiles telephoned the radio station, where a staff member explained that while it was known that her brother, Knute Rockne, the legendary Notre Dame football coach, had booked passage on the Transcontinental and Western Airways (TWA) airliner, his body had not been identified. Confirmation came quickly, however, and his mother

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cabled Rockne's wife, Bonnie, who had been vacationing in Florida with their children.<sup>2</sup>

Rockne had left his family in Florida in order to attend the opening of spring training at Notre Dame and then visit his mother in Chicago before beginning a business trip to Los Angeles. He boarded the TWA Fokker Trimotor airliner in Kansas City with five other passengers on March 31, 1931. At 9:15 a.m., the Fokker departed Kansas City for a scheduled mail and passenger stop in Wichita. After approximately ninety minutes in the air, witnesses near Bazaar, Kansas heard the airplane's engines above the clouds. One of the observers, Mr. Blackburn, described to a coroner's jury what followed:<sup>3</sup>

I heard the plane flying above the clouds hanging low over the ground. The motor was sputtering. Suddenly the plane shot out from the clouds. It was tipping to one side and headed straight toward the earth. A moment later I saw a part of the wing floating down to the earth.

I heard a terrific crash and started for the scene. Every man was dead when I arrived. Four of them were in the crushed cabin. Four others had been thrown clear of the plane. They were scattered over an area of about 20 feet from the wreckage. Every body was mutilated and broken.<sup>4</sup>

The "Rock" had now gone the way of the Gipper, and a nation mourned. President Hoover cabled his condolences to Rockne's wife: "I know that every American grieves with you...his passing is a national loss." "We share with Notre Dame the inspiration of his gallantry, his vigor and his skill," wrote General Douglas MacArthur, "The army will cherish his memory." Charles Lindberg praised him for "his character and influence" that "were felt even by those far removed from his field." Sportswriters and coaches such as Bill Roper of Princeton, Ted Jones of Yale, Lou Little of Columbia and John Law, the captain of Rockne's 1929 football team, remembered the Rock during a special April 3 broadcast on WOR in Chicago.<sup>5</sup>

He was admired for his sportsmanship and contribution to collegiate football. "He was so considerate of everyone, so great a man, football will never know another like him"—John Meechan, President, American College Football Coaches Association. "I can't believe it"—Major Frank Cavanaugh, Fordham. "The most colorful figure of all football history has made his last touchdown"—Major Ralph I. Sasse, West Point. "Rockne was a master coach and a great leader"—Alonzo Stagg, University of Chicago. "He was held in great esteem by all our citizens for his manly character, his high sense of sportsmanship and his splendid influence on the youth of our country"—Joseph V. McKee, Acting Mayor, New York City.<sup>6</sup>

In an editorial, the *Chicago Daily Tribune* stated his death brought grief to tens of thousands, while both Notre Dame and Purdue universities flew their flags at half-staff. From Rockne's Norwegian homeland, King Haakon post-

humously knighted him. This consummate strategist, coach of the Four Horsemen, developer of the forward pass, possessor of a thirteen-season record that included 105 wins and only 12 losses for the Irish, was gone.<sup>7</sup>

### **An Issue of Policy**

What had caused the Fokker to crash? There were eyewitnesses, but few facts were known. Within the Department of Commerce, the Aeronautics Branch, forerunner of the Federal Aviation Administration (FAA), was charged with accident investigation under the Air Commerce Act of 1926.<sup>8</sup> Investigators soon arrived from Kansas City and Wichita. The Branch had been investigating accidents since its inception and, early in its tenure, had put into place a policy making its findings secret. Media pressure, however, was mounting, and the accident coverage and commentary brought pressure to bear on the young Aeronautics Branch to reverse its policy and make its findings public.<sup>9</sup> This paper will examine the role of the print media in bringing about a significant and lasting change in aircraft accident public disclosure policy.

### **Methodology**

Four newspapers, as well as periodicals from 1929 through the summer of 1931, were analyzed. This period was chosen because it encompassed the public disclosure debate leading up to the TWA crash that killed Knute Rockne and the subsequent public release of the causes of the accident.

Newspapers included *The New York Times*, recognized as the “newspaper of record” and the “foremost exponent of aviation advancement” according to Meyer Berger, in his book, *The Story of the New York Times 1851-1951*.<sup>10</sup> Two Washington, D.C. newspapers were also chosen. *The Washington Post* was chosen because, in the words of Chalmers Roberts, it “has paid more attention to government and those who compose it than to anything else”.<sup>11</sup> *The Washington News* was chosen because, in 1928, it had begun one of the first daily columns devoted to aviation. The column’s creator and author, Ernie Pyle, had developed an affinity for aviation and those who engaged in its practice. As Amelia Earhart said, “Not to know Ernie Pyle is to admit that you yourself are unknown in aviation.”<sup>12</sup> The *Chicago Daily Tribune* was also selected because it offered a unique perspective since Rockne had grown up in Chicago and his sisters and mother still lived there. Chicago also became the last stop for the train that bore his body to its resting place in South Bend, Indiana.<sup>13</sup>

Two methods were employed in determining which issues of the newspapers were to be examined. First, *The New York Times* index was used to locate subjects, events and persons directly involved in the political and public

debate. Second, dates surrounding congressional debates, documented in the *Congressional Record*, also determined the selection of newspaper issues.

Periodicals were also examined. These were chosen using the *Readers Guide to Periodical Literature*, *The United States Works Progress Administration Bibliography of Aeronautics* and the *National Advisory Committee for Aeronautics Bibliography*. The time period selected corresponds to that of the newspapers.

### Historical Perspective

When Congress created the Aeronautics Branch in 1926, charging it, in part, "To encourage and regulate the use of aircraft in commerce," Senator Hiram Bingham (R-Vermont.), an architect of the new law, argued its purpose was one of industry "promotion" not just regulation.<sup>14</sup> This placed the Aeronautics Branch in a delicate position. On one hand they were to encourage this fledgling industry, and on the other attempt to create a safe and economically healthy environment by regulating it. It was a complex task often requiring the Wisdom of Solomon to balance the seemingly contradictory roles. As FAA historian Nick Kommons noted:

In the years to come, it would be no easy task to keep the broad interests of the public and the parochial interests of the aviation industry in balance. The two interests, though not wholly incompatible, often clashed. In short, the framers of the Air Commerce Act, by entrusting to a single agency both promotional and regulatory powers, had created a potential and permanent source of conflict.<sup>15</sup>

It was in this context that newly appointed bureaucrats began their education in the ways of aviation regulation. They, the early industry stakeholders and the public, had much to learn.

The Air Commerce Act of 1929 left little doubt as to the Branch's responsibility in the reporting of aircraft accidents. Section 2 (e)<sup>16</sup> required the Department of Commerce "to investigate, record, and make public the causes of accidents in civil air navigation in the United States." William MacCracken,<sup>17</sup> the first Assistant Secretary for Aeronautics under the new law, at first released detailed accident reports. However, the aviation industry recoiled, and the Branch, faced with one of its first tests of promote versus regulate, decided aviation interests and the congressional mandate could both be served by publishing a compilation of accident statistics on a semi-annual basis.<sup>18</sup> In its June 30, 1928, report, the Director of Aeronautics, Col. Clarence Young<sup>19</sup> explained: "A careful analysis of accidents is made and a percentage valuation assigned to contributory causes. This method will provide statistics that will show the exact cause of accidents and point the way toward their elimination."<sup>20</sup>

## The Press

In September 1929, the Branch began facing mounting pressure from both the Senate and public debates in the press calling on it to make public detailed results of its investigations. The political agenda was set when Senator Bratton (D-New Mexico)<sup>21</sup> introduced Senate Resolution 119, which, in part, required the Department of Commerce to provide the Senate with details of all prior aircraft accidents involved in interstate commerce. Of special interest to Senator Bratton was the fatal crash of a Transcontinental Air Transport (TAT)<sup>22</sup> aircraft, the *City of San Francisco*, which had occurred on September 3 near Mt. Taylor in his home state.<sup>23</sup>

Two other provisions in his resolution proved to be controversial, obscuring the public disclosure debate. The first directed the Senate Committee on Interstate Commerce to investigate all previous fatal interstate air crashes, and the second authorized the committee to study the feasibility and draft legislation that would transfer oversight of commercial interstate aviation to the Interstate Commerce Commission (ICC). Senator Bratton argued that airlines were already engaged in interstate commerce, and, as there were some owned by railroads, their oversight should logically fall to the ICC. The ICC was already investigating and making public its findings of railroad accidents—should the airlines be treated differently? While this was true, there were important differences. The ICC was afforded protection from civil action under the law, and its reports could not be used as evidence in civil suits.<sup>24</sup>

The provisions requiring the Senate Committee on Interstate Commerce to become the conduit through which aircraft accident data flowed to the Senate and placing the ICC over commercial aviation was unacceptable to Senator Bingham. As a member of the Senate Committee, which exercised Senate oversight of the Aeronautics Branch, he resisted transferring any of its functions to the ICC.<sup>25</sup>

Defending the Department's policy, Senator Bingham argued that the present system of providing statistical accident data met the requirement of the Air Commerce Act. Furthermore, Congress had not provided the authority to subpoena witnesses and hold hearings for accident investigation. In this, the law was deficient, and he intended to correct it by introducing an amendment that would remedy the problem. Senate Resolution 119 was subsequently defeated.<sup>26</sup>

A dispute was brewing that quickly appeared in the press. On September 18, *The New York Times* reported the debate and then did so again the next day. Both articles reported the resolution (S. Res. 119), debate and the probability that it would not be taken up again until debate had concluded on the tariff bill that was then under consideration. *The Washington Post* joined in

the discussion on September 19. In an editorial, the *Post* reminded the Senate that the Department of Commerce should be protected from lawsuits that might arise from public disclosure of accident causes. This protection was afforded the ICC when railroad accident information was released, it advised, and as to Senator Bratton, it admonished him that instead of attempting to introduce a resolution, he should have considered legislation that would protect the Commerce Department in the same way. This, in the *Post's* view, was far better than allowing the ICC to supervise the aviation industry.<sup>27</sup>

The Interstate Commerce Commission is not prepared to take over all the functions involved in air transport regulation and if it were given jurisdiction over interstate air commerce there would still be a divided control in matters relating to design and construction of planes, lighting of airways, examination and licensing of pilots and mechanics, etc. These subjects fall properly under the jurisdiction of the Department of Commerce (Who Will Regulate, 1929)

*The Washington Daily News* editorialized that opposition to Bratton's resolution lay in the notion that "the railroads were allowed to operate for 70 years without regulation" and that the airlines should be "let alone awhile." This, in the *Post's* view, was "like putting off teaching a child good habits until he is a grown man."<sup>28</sup>

Senator Bratton's<sup>29</sup> resolution was again brought up for debate on September 30 as reported by *The New York Times* on October 1. The headline read "Blocks Air Crash Inquiry (1929)." In it he once more argued for ICC control of interstate aviation. He reasoned that the Department lacked the legal authority to compel witnesses in an accident investigation and lacked the necessary resources to employ additional accident investigators. Therefore, the ICC would better serve the process.<sup>30</sup>

An editorial appearing in *The Washington Daily News* the next day called for releasing accident reports. "Why this secrecy in an accident to a common carrier?" Aviation, it argued, would only prosper if the public were informed about accident status and subsequent regulatory action.<sup>31</sup>

Then on October 16, Senator Kenneth McKellar (D-Tennessee)<sup>32</sup> introduced S. Res. 135 calling for the Department to release information concerning an aircraft accident that had occurred in September in Memphis, Tennessee. Senator Bratton, adding an amendment requiring the release of information about *The City of San Francisco*, joined him in the fray. This time Senator Bratton steered clear of the ICC debate and stuck to the issue of public disclosure. The strategy yielded results, and there was progress. It was referred to the Senate Committee on Interstate Commerce and favorably reported out of committee on October 23. The Senate agreed to the resolution, and the Department was now forced to disclose the causes of the two accidents.<sup>33</sup>

On October 24, Senator Bingham kept his promise and introduced an amendment to the Air Commerce Act. His bill (S. Res. 1947) provided for the subpoenaing of witnesses, the administration of oaths, protection and access to evidence and public disclosure. A key aspect to the proposed legislation was outlined in Section 15 (c): "Neither the report upon the investigation nor any part thereof shall be admitted as evidence or used for any purpose in any suit or action for damages growing out of any matter mentioned in the report or investigation (Young, 1929)".

The stakes were getting higher, and during the congressional holiday break, Clarence Young, who had recently replaced MacCracken, as Assistant Secretary of Commerce for Aeronautics, requested, through the Department's Solicitor, a legal opinion on the matter. In early January 1930, the Solicitor forwarded Young's letter to the Attorney General for a ruling.<sup>34</sup>

In its December 7 issue, *Aviation* presented both sides of the debate and then recommended that the current non-disclosure policy be left in place. The magazine was concerned that decisions of disclosure should be left to the discretion of the Department of Commerce, and not based on senatorial whim.<sup>35</sup>

Then on January 4, 1930, the *Christian Science Monitor* printed an editorial entitled "Air Safety: What Are the Facts". It claimed the precious achievement of commercial aviation's safety record was placed in jeopardy by the mystery and uncertainty that are permitted to surround every aircraft accident of major importance. The writer pointed out that when facts surrounding accidents were not accessible by the public, the results were often unfounded fears and damaging publicity.

The hitch in the present arrangement is that their reports on specific accidents and specific causes are not made public. Every available source of information should be open to its examiners. They should undoubtedly be invested with authority to subpoena witnesses, and their findings should be made public as quickly as thorough investigation will permit (Air Safety, 1930).

The *Monitor* chronicled six recent fatal aircraft accidents and ended each with the question, "What are the facts?" The public, it said, demanded answers.<sup>36</sup>

Sometime between the congressional break and January 21, 1930, Senator Bingham appeared to undergo a political conversion. In a *The New York Times* article, "Pushes Air Inquiry Bill—Bingham Demands Publication of Findings on Accidents," the *Times* reported the crash of a Maddux airliner that killed sixteen people. Surprisingly, the Senator now believed that "Airplane crashes should be taken out of the realm of unexplained mysteries. There is a reason for every crash and public confidence can only be inspired by giving this reason and putting the blame where it should be."<sup>37</sup> *The Washington Daily News* printed two photographs of the crash (January 21 and 24)

and reported the company's investigation was to be conducted by its vice president—Colonel Charles Lindberg.<sup>38</sup>

A second accident soon followed. "Seven Persons Die in Plane Crash" read the January 28 edition of *The Washington Post*. The article described the fatal crash of a Travel Air flight near Fairfax Airport on the previous day. The Central Air Lines aircraft had crashed in a field near the airport and burned. As soon as the bodies could be moved, pilots and mechanics employed by the company destroyed and removed all evidence of the aircraft at the crash scene. Newspaper photographers were physically threatened when they tried to take pictures of the accident site. *The Washington Daily News* carried the same story with the headline "Death Plane Hastily Destroyed at Night."<sup>39</sup>

That same day the newly converted Senator Bingham strongly questioned the cause of delay in considering his bill. His urgency was brought about by the Maddux accident and Central Air Lines story appearing in the press that morning. He questioned if the delay might not be the work of the aviation industry.

Is it possible that some of the aviation companies are blocking the passage of this proposed legislation and do not want to have a full investigation of accidents and the results immediately made public, because they fear its effect on their business; but I believe that the general cause of aviation will not suffer if that is done, and, on the other hand, I believe that passenger air transportation is suffering due to the policy which is followed by some companies.<sup>40</sup>

In later debate, the point was made that the Department of Commerce did not want the results of its investigations used as evidence in lawsuits and therefore kept them confidential. Senator McKeller pointed out, though, that the Secretary of Commerce had testified before the Interstate Commerce Committee that reports had actually been given to some of the airplane companies.

"Did you not consult the airplane company?" he [Secretary Lamont] replied, "Yes; I did." "Did you not disclose to them the causes of the accident?" "Yes, sir; I did." "Well, if you disclosed it to the carrying company, why did you not disclose it to the families of those who were killed?"<sup>41</sup>

The Secretary had made a tactical error. It now became a much more difficult task to defend the Department's policies and actions when it was in fact releasing some of the reports to the industry and not to families of victims.

Both *The New York Times* and *The Washington Post* ran accounts of the Senate debate on the next day, January 29, along with Young's response while *The Washington Daily News* ran an editorial denouncing the destruction of the wreckage. It also printed a picture of the only remaining part of the aircraft—the engine.

"Air Crash 'Secrecy' Assailed In Senate—Bingham Charges Aviation Companies 'May Be Blocking' His Accident Investigation Bill," said *The*

*New York Times*. Assistant Secretary Young defended the Branch's policy in the article, explaining that the 1926 act "made no provision for formal hearings, but that with the machinery available his branch determined the facts from voluntary and visible sources and then made public the results as soon as practicable." He added, "The Department's investigations do not attempt to determine the legal responsibilities attaching to accidents."<sup>42</sup>

On page one, *The Washington Post* ran "Inquiry Is Ordered In Fatal Air Crash-Sweeping Investigation to Include Reason for Wreck Removal." The *Post* disclosed that permission to dismantle the crashed aircraft had come from a Department of Commerce aeronautical inspection supervisor, Richard H. Lees, Jr. He defended his actions, declaring, "We are trying to sell aviation to the public and the wreckage of a plane lying around for people to stare at has a bad effect." Universal Aviation Corporation's branch manager, while he admitted that he tried to discourage photographers, "denied responsibility for the actions of workers who cursed, threatened and hampered newspaper photographers." The report also included Senators Bratton's and McKellar's argument that the Department had failed in its clear mandate to make public its findings.<sup>43</sup>

Senator Bratton led the attack in the Senate on the Department's policy and position on January 29, dismissing Col. Young's rationale, as quoted in the *Post*. The argument that the Department lacked "authority and machinery" to make public its investigations was not acceptable. "Mr. President, it was asserted yesterday and I reassert it for emphasis today, that the law not only gives to the Department authority to make its findings public but makes it the duty of the Department to do so."<sup>44</sup> The Senator quoted from an October 9 article appearing in *The Washington Daily News*, "When the Bureau [Branch] started functioning in 1926 a few accidents were made public and caused such a storm of protest from pilots, manufactures, and operators that the practice was discontinued, officials said."<sup>45</sup>

His point was that the Department had originally understood that its mandate was to make public its accident reports, which it did. Only after industry protests did they resort to semi-annual statistical compilations. Senator McKellar questioned this, "In other words, the Department, when the owners of transportation companies protested, simply disregarded the law absolutely and undertook to repeal it; and, so far as their carrying out its provisions is concerned, did repeal it?" Senator Bratton replied, "Yes."<sup>46</sup> Referring to Young's arguments in the press, Senator Bratton called them "fallacious" and said that the Department indeed had authority to publicly release its findings.

Senator Bingham's bill along with the Department of Commerce's comments was read into the record. The comments, supplied by Young, reiterated the position that the branch, under the present statute, did not possess the authority to either call witnesses or take testimony. This was now done on an

informal basis, which he felt was adequate. He outlined the current accident investigation procedures and reported that the "information thus obtained, when properly compiled from a number of cases, tells a graphic story as to the causes of accidents." He defended the procedure and explained the statistical grouping of accident causes, which, he asserted, had worked well. Young expressed his opinion that the branch's purpose was not one of affixing legal responsibility; rather the purpose was one of "applying remedial measures in future operations."<sup>47</sup>

February saw more debate in both the Senate and the press. Senator Bingham reintroduced his bill (S. Res. 3399) on February 1, which empowered the Department of Commerce to subpoena witnesses, preserve evidence, publish reports and protect the Department from legal actions arising from those reports and the inadmissibility of reports in civil suits.<sup>48</sup> On February 4, Senator Bratton introduced Senate Resolution 206 requiring the Department to release to the Senate a report on each aircraft accident of which the Department has a record that had occurred since May 20, 1926. The resolution was favorably reported out of committee two days later.<sup>49</sup>

As to Young's arguments in opposition to the Bingham bill, *Aviation*, on February 8, and *The Commonwealth*, on February 12, explained the debate between the Department and Senate. *Aviation* recapped the positions advanced by Senators Bingham and Bratton and Assistant Secretary Young adding little comment.<sup>50</sup> However, *The Commonwealth* did have an opinion. It quoted Young as saying:

Injustices to individuals could easily result were the information, thus developed in individual cases, released for consideration in the light of legal technicalities, contributory negligence phases, and proximate and remote causes, rather than for the practical deductions of thoroughly experienced aviation personnel, for the purpose of applying remedial measures in future operations. (The Bingham Bill, 1930, p. 411)

*The Commonwealth* was not impressed: "It is not a particularly direct and satisfactory answer." It went on to argue that the principle articulated by the Department was in effect giving the airlines "immunity" not afforded other modes of transportation. The idea that airlines must somehow be "babied," it argued, would be to its detriment and would not elicit support for the industry. Commenting on the "poor policy" of intentional removal of crashed aircraft before inspectors could arrive *Commonweal* warned, "Accidents will not hurt the flying business, more than temporarily. Mystery will. Irresponsibility will."<sup>51</sup>

In a February 14 *The New York Times* article, "Defends Silence On Air Crash Data—Col. Young Says Publication of Federal Inquiry Records Would Aid Dishonest Lawyers," Young, speaking to the National Exchange Clubs in New York, answered the critics of the Department's policy. It was his

hope that Senate Resolution 206 would not pass. "Its passage," Young asserted, "would enable lawyers of the ambulance-chasing type to make use of the confidential records of the Department." He repeated the argument that the Department's goal was not to affix legal responsibility; rather its purpose was to use the reports to enhance accident prevention. "The purpose of the air commerce act," Young said, "was to foster aviation, and the sole purpose in investigating accidents is to determine the causes and promote aviation by what we learn."<sup>52</sup>

As examples of policy changes brought about by investigations, he used the two accidents that Senators Bratton and Bingham had brought up in the Senate. The TAT accident in New Mexico resulted in a course change and the Maddux accident in California produced a new requirement for pilots to "land whenever they were forced to fly passenger planes below 500 feet." Though he defended the Department's current policy, his review of the Bingham bill brought no criticism.<sup>53</sup>

Young's defense of the Department's policies in the press brought Senator Bratton to the Senate floor. He was especially unhappy with Young's comments concerning Senate Resolution 206.

Mr. President, two things stand out prominently in Mr. Young's address. One is that he believes that the Air Commerce Act of 1926 was designed to foster aviation. The other is that if the Department complies with the plain mandate of that act by making public its findings relating to accidents ambulance-chasing lawyers will be aided. In other words, the sympathy of the Bureau is with aviation, and they utterly disregard the public in connection with whole subject matter.<sup>54</sup>

On the next day, February 15, *The New York Times* reported the public diatribe between Young and Senator Bratton. In the article, "Assails Secrecy In Air Accidents—Bratton Tells the Senate That Aeronautics Branch Refused to Publish Crash Report," Senator Bratton said the Department's policy was "an insult to Congress because it was a plain violation of an act of Congress." *The Times* recognized the emotional capstone of Senator Bratton's Senate speech, ending its article with this quote:

Suppose the company was negligent. Suppose women were made widows and children orphans by this accident. The Department seals its findings and leaves the widows and orphans in each case to get along the best way they can. That runs afoul of our theory of government, and the sooner the Department of Commerce becomes aware that the public has some interest in this matter of commercial aviation the better off all of us will be.<sup>55</sup>

On the same day *The Washington Post* weighed in with its editorial, "Air Accident Publicity." The *Post* was more sympathetic to the Department's position, explaining that the Bingham bill would protect the government against claims made by those who were "injured by the findings." It defended the current Department of Commerce policy, claiming that a lack of legal pro-

tection forced the Department to release information in its current format. The ICC was afforded this protection and so should the Department of Commerce.<sup>56</sup>

The *Air Commerce Bulletin* of February 15, 1931, reiterated the Branch's position regarding its accident reporting procedure. However, in an apparent softening of its stance against public disclosure it said the following:

It is believed that if the authority now granted under the air commerce act for the investigation of aircraft accidents were augmented by a provision precluding the admission of official accident reports as evidence in civil suits and authorizing formal investigations of aircraft accidents if and when preliminary informal investigations of a given accident made such a hearing necessary or advisable, much of the alleged mystery as to why aircraft accidents occur would be removed.<sup>57</sup>

The Branch claimed that under current law this was not possible and, using "the next best method," continued to issue statistical data. This course of action, it said, allowed all those interested in the growth of aviation "to proceed along the course leading to unquestioned safety."<sup>58</sup>

Assistant Secretary Young's position was strengthened when, on February 19, he received an answer from Attorney General William Mitchell regarding the question he had posed in December. Had the Department fulfilled its congressional mandate by releasing statistical data? Mitchell answered with the following: "I am of the opinion that the course which you have followed, with respect both to the manner and time of publication, has been within the limits of your description under the statute and in substantial compliance with its requirements."<sup>59</sup> A report of the Attorney General's answer appeared in "High Points in the News" for *Aviation* readers on March 8.<sup>60</sup>

It may have been the Attorney General's opinion that the Department was measuring up to its mandate under the law, but many disagreed. The March 1 issue of *Literary Digest* asked: "Shall 'secrecy' be permitted to shroud the causes of our fatal airplane accidents?" In explaining the Department's position on the matter, the *Digest* quoted from *Liberty* magazine, which discussed the Department's views. The Department had listed three reasons for not disclosing its accident reports to the public.

First, many times exact causes are difficult to determine often because of witnesses. When there were witnesses, they frequently are unfamiliar with aviation. Since reports constructed from such witnesses, or lack of witnesses, might prove less than accurate; they might serve the safety effort but would not measure up to the standard for public disclosure.

Second, pilots and aviation employees are more likely to be more forthcoming and provide accurate information if they know that their testimony will not be used publicly in civil suits or legal proceedings.

Third, if the accident board knows its findings might be made public, it might tend to classify accidents as “unknown” or “doubtful” in order to give the pilot the benefit of the doubt.

But a majority of newspapers seem to disagree with this “policy of silence.” “Hushing up, for real or imagined causes, will not promote air safety,” says the Philadelphia *Evening Bulletin*, and the Chicago *Tribune* holds that “abetting concealment is a disservice on the part of the government” and “it is psychologically the wrong way to ‘self aviation to the people.’”<sup>61</sup>

The Dayton *Journal* presented an opposing view, believing that the advancement of aviation could best be served by allowing the Department to conduct its investigations silently and scientifically, not involving itself in legalities by becoming prosecutor or witness in accident cases.<sup>62</sup>

In the April 1930 issue of *Aero Digest* appeared an article by the former Assistant Secretary of Commerce for Aeronautics, William P. MacCracken, Jr., who was now in private practice. He had made the decision that began the controversy, and so it came as no surprise that he was now defending it in the press. He began his defense by explaining that initially it had been a “trial and error method” and that after having “experimented” the present non-disclosure policy worked the best. His reasoning supported that of the Department’s in that it was not the Department’s duty to “fix blame” but to advance the cause of aviation safety through the proper administration of regulations. His defense of the Commerce Department’s policy followed along the lines of the arguments that had previously appeared in *Liberty* and *Commonweal*.

Compelling testimony from a witness would not produce the needed “opinions” that the inspector required in order to reconstruct the incident, he argued. If the witness knew the testimony was to be made public, and the testimony was compelled, the best an inspector might hope for were facts. “On the other hand, if he knows they are going to be treated in confidence, . . . he is nearly always very willing to give his opinions.” He added that even with an amendment to the law compelling witnesses to testify, it would be difficult to obtain a “full, frank expression of opinion.”<sup>63</sup>

The six-member Crash Board’s opinions might not be “frank opinions” if they believed their remarks were to be made public. Why? Straightforward answers were more likely to come from the Board if “they do not have to stand up and defend their findings before a public with a very limited aeronautical experience.” A reluctance to defend its positions in public may cause it to attribute the causes to “unknown and undetermined.” Additionally, if the cause of the crash rested with the pilot, the Board might feel indisposed to place responsibility on someone who has died as a result of the crash because the public might criticize the Board for passing the buck to a dead man. By the same token, the Board might be called into question if it did not blame the

pilot. McCracken warned that critics might be inclined to say they are trying to protect the memory of somebody who had a clean record before by saying he is not responsible for this accident.<sup>64</sup>

MacCracken believed that witnesses, uneducated in aviation, and viewing the same accident, could easily create serious problems for the inspector and Department of Commerce.

Yet if those men were to come out and make some statement and if the inspector of the Department of Commerce were to submit a different report because he has some other evidence, once more the Department of Commerce man would be on the defensive against some fellow who, though he may be a totally disinterested witness, knows nothing about the technical side of flying.<sup>65</sup>

He added that if public hearings were held, and there was controversy about the facts, prolonged newspaper coverage would have a negative effect. "Of course, any controversy of that kind makes news, and instead of helping to get the matter out of the public mind, it would tend to emphasize it." MacCracken concluded the answer lay in the proper enforcement of adequate regulations, not public disclosure of aircraft accident reports.<sup>66</sup>

Senate Resolution 206, requiring the Department of Commerce to release all accident causes from May 20, 1926, onward, was debated on May 16. Senator Bingham vigorously opposed it since testimony concerning the accidents was obtained confidentially. He felt that to divulge this information would be a breach of confidence between the government and those who had provided statements in the past, and, if the Department was forced to publish this information, it would make the gathering of future testimony much more difficult. Faced with the prospect of a lawsuit, a potential witness might be hesitant to volunteer any information to the Department's investigator.

Senator McKeller interjected that information acquired during the New Mexico investigation had been handed over to the airline company. Senator Bingham responded with the following:

It has been the case occasionally that they have secured confidential information leading them to believe that an accident was caused in a certain way, and in the promotion of aeronautics they have given that information to the company concerned in order that there might not be a repetition of the accident...<sup>67</sup>

As an example of confidential testimony Senator Bingham noted the particulars of a fatal accident that initially could not be explained. The pilot was considered good, and the airplane had been properly maintained. The inspector could find no cause for the accident until, in confidence, a personal friend of the pilot confided that he and the dead pilot had been drunk and they were not quite sober when his friend took off. The pilot had remarked to his friend before the flight that he did not feel like flying. The Senator continued, "This information probably never would have been received by the Department if the close friend of the dead pilot knew his utterances would become public

property and probably would become involved in a subsequent action."<sup>68</sup>

After many such examples and debate, Senator Bingham failed to stop the resolution and it passed, 42 to 23. A letter was transmitted to the Department of Commerce requiring it to supply all aircraft accident causes between the dates of May 20, 1926, and May 16, 1930.<sup>69</sup>

The Senate received the Department's reply in February 1931. In the Letter of Transmittal to the Senate, Young, in presenting the requested information repeated many of the arguments he had officially made to the Senate and to the press. He reminded the Senate of the following:

No attempt is made to determine legal responsibility because it is not within the province of the Department to do so".... "No authority has been granted the Department to hold formal hearings, subpoena witnesses, require testimony under oath, preserve evidence or engage in other similar procedure [sic] in the matter of investigating accidents."<sup>70</sup>

Between May 1930 and March 1931, examination of the *Post*, *Times* and the *Washington Daily*, revealed no new articles about the public disclosure issue, nor did any appear in periodicals. Likewise the Senate did not take it up again, and, in fact, Senator Bingham's bill was passed over on June 2, 1930.<sup>71</sup>

There are two factors that account for the temporary sabbatical in the disclosure debate. The Senate adjourned on July 3, 1930, and, with the exception of the special Senate session called by President Hoover, it did not convene again until December 1, 1930. Another important element was the decrease in accidents. The year 1930 proved to be good for commercial aviation safety. Air transport operations had shown a significant decrease in accidents as compared to 1929, resulting in fewer accidents finding their way onto the pages of newspapers.<sup>72</sup>

Senator Bingham did, however, give a speech during the National Aeronautic Association convention in Chicago in August 1930. Both he and Young spoke during the convention. Addressing the convention, the Senator said:

The whole question of the best governmental policy to be followed in connection with accidents in civil aviation is one which has caused a good deal of discussion during the past twelve months, and I should be very glad to have an expression of opinion from the Convention as to the best course for the government to follow.<sup>73</sup>

Senator Bingham concluded his address to the convention and introduced Young. During his speech, Young defended the Department's policies and procedures for aircraft accident investigations and the subsequent release of statistical information. However, he had come to realize that the publicity the Department had received from the press had begun to take its toll. He said the following:

I still think that with the record established it is perhaps a most constructive way to obtain suitable information. However, I at the same time recognize that public psychology is a very important factor, if not a dominating factor, and that the position, which the Department has been obliged to maintain, is rapidly becoming untenable. It needs legislation.<sup>74</sup>

The TAT crash in New Mexico had precipitated the issue. It gained national recognition and took on more political visibility for policy makers, the Senate and, via the press, the public. Young's policy fortress, buttressed by the Attorney General's opinion, had become a sandcastle that was about to disintegrate under the weight of public opinion. The focusing event for policy change within the Department was the Rockne crash. The death of this well-known public figure on March 31, 1931, demanded answers. National attention was now focused on Young and the Aeronautics Branch. *The Washington Daily News*, *The Washington Post*, *The New York Times* and the *Chicago Daily Tribune* all devoted extensive coverage to the crash beginning April 1, 1931.

Three days after his death, *The Washington Post* on April 2, reported the Department still lacked the ability to subpoena witnesses. Young, it said, had "urged revision of the air commerce act to give the Department the same authority the Interstate Commerce Commission has in investigating and assigning responsibility in railroad accidents." In an editorial on the next day, the Post laid the blame for the Department's inability to make public its findings squarely on the shoulders of Congress and an "absurd ruling made necessary by congressional neglect." The Department could not be expected to release information that might be used in civil suits and therefore the information garnered from investigations was of "no practical value" and changes were demanded.<sup>75</sup>

The *Chicago Daily Tribune* broke the story of Rockne's death with the headline, "ROCKNE TRAIN HERE TODAY." Numerous articles about the accident, his life, reaction to his death, and coverage of the funeral filled the paper. A full page was devoted to the first pictures from the crash scene. Rockne's death was featured prominently in the paper from April 1 to 6, and included and included a four-part installment written by the sports editor, Arch Ward, entitled "Knute Rockne—As I Knew Him."<sup>76</sup>

Likewise the Rockne crash occupied much of the attention of *The Washington Post* on April 1. Its headline read: "ROCKNE KILLED AS SHIP LOSES WING, CRASHES—All Passengers and Both Pilots Die Instantly on Kansas Farm." The bulk of the coverage was from April 1 to April 3 with numerous reports about the crash and Rockne's life. Again articles appeared listing the reasons for the Department's restrictions about accident disclosure.<sup>77</sup>

An editorial on April 3 observed that the accident had focused attention on safety issues surrounding commercial aviation. "Like many other tragedies of the air, the accident will remain a mystery, as far as the public is concerned." A lack of official information gave rise to different theories. One witness, D. E. Mann, a deputy sheriff, pointed to the fact that he had found ice in the shape of a U near the wreck of the airplane. Was ice the culprit that had caused the crash? Still others believed that Robert Frye, the pilot, in an attempt to recover the airplane from an unusual attitude, had overstressed the wing, causing it to separate from the aircraft.<sup>78</sup>

*The New York Times* headline read, "KNUTE ROCKNE DIES WITH SEVEN OTHERS IN MAIL PLANE DIVE." It, like the *Tribune*, devoted many pages to covering the story of the crash, Rockne's biography, public reaction and possible causes of the accident. Daily coverage ended on April 3. Articles covering new developments in the investigation of the crash and the examination of the airworthiness of the Fokker F-10 continued throughout April, May and June, however.<sup>79</sup>

In addition to the details of the crash events surrounding Rockne's death, *The Washington Daily News* published pictures of his wife and four children in its April 2 edition. "Widowed, Orphaned by Rockne Crash," ran the headline with a short caption under the pictures which, in part, read, "Knute Rockne may have been a miracle man to countless thousands of football fans, but he was something even greater—a loving husband and father."<sup>80</sup> Ernie Pyle reported many of the theories that abounded after the crash while he complimented the local TWA representative for his "honest and intelligent handling of queries on the crash."<sup>81</sup> The editorial of the same day, however, called on the Department to release accident reports:

This is high time—for the good of aviation if nothing else—that a different arrangement be made. It is high time the public is permitted to know why airplanes crash, instead of drawing hazy conclusions from rumors of explosions, storms, balky motors and disintegration.

The public is ready to believe in flying, if given half a chance.

Congress can give to the Commerce Department the authority for the publication of official crash reports. That should be one of its first acts when it meets in December.<sup>82</sup>

## The Surrender

As pressure mounted for an explanation, the Department of Commerce broke with its long-held policy and released information about the accident. The first press release of April 3 was reported in all four newspapers and in the May issue of *Aviation*. The Department commented that this accident had "caused universal, if not international comment," and the Aeronautics Branch, charged with aircraft accident investigations, was looked to by the

press, as well as other people in all walks of life for an explanation. The press release contained three paragraphs reiterating its explanation of past non-disclosure policy and a disclaimer: "The following statement is not to be construed as an official finding."

The Department blamed the crash on a broken propeller on the right engine. The investigators surmised ice had formed on the propeller hub, which may have broken loose, striking one of the propeller blades. The propeller blade broke, creating an unbalanced condition, which produced sufficient vibration to cause not only the hub and remaining blades to leave the engine but also accounted for the in-flight wing separation. Its analysis was based on the fact that after investigators had dug the engine out of the ground, they could not find the engine's propeller hub or blades.<sup>83</sup>

Then five days later, on April 8, another press release came out. On the basis of the latest reports, the statement read, the cause of the crash was not a broken propeller. In fact, the propeller and its hub were located "underground beneath the place where the engine, to which it had been attached, was dug out of the earth." A new cause was now assigned to the accident. The culprit was ice that had formed on the aircraft and had rendered inoperative the pilot's instruments while flying in the clouds. This caused the pilot to become disoriented and the aircraft to go into a steep dive. When the pilot reoriented himself, he overstressed the wing by too rapidly trying to correct for the unusual aircraft attitude. The additional stress caused the wing to separate. Ernie Pyle commented in his column on April 8, the following

Do you know the old expression, "eating crow"? Well, the Department of Commerce is "eating crow" today on the Rockne crash. And since I was thoroly [sic] sold on the Department's original explanation of the accident, I have ordered a nice plateful of crow for my own lunch.<sup>84</sup>

There was now an official cause for the accident. *The New York Times* on April 8 published the Department of Commerce's findings and made this observation.

This was the first time the Commerce Department had made public the findings of its inspectors. Officials indicated the reversal of policy was prompted by the tremendous public interest aroused by the sudden death of one of the greatest football figures of history.<sup>85</sup>

The influence of the press had been instrumental in bringing about a policy change in Aeronautics Branch, however, it was not until June 19, 1934, that Congress passed an amendment to the Air Commerce Act. The new act amended Section 2 (e) of the 1926 law and gave the Department of Congress the necessary legal protection it sought.<sup>86</sup> Additionally, the Department now possessed the authority to issue subpoenas and make public all investiga-

tions. It also disallowed any of its findings, statements or hearings as evidence in suits or legal actions.<sup>87</sup>

These principles have been, since 1934, the basis upon which all aviation accident investigations have been conducted. While the death of the legendary Rockne became the identifying force, the print media became the catalyst for policy change.

To ensure that [National Transportation] Safety Board investigations focus only on improving transportation safety, the Board's analysis of factual information and its determination of probable cause cannot be entered as evidence in a court of law.—NTSB, 1999.<sup>88</sup>

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8. *Air Commerce Act of 1926: Reprint from Official Act as Issued by the Government Printing Office* (New York: Aeronautical Chamber of Commerce of America, 1926), 1
9. "Knute Rockne Dies With Seven Others in Mail Plane Dive," *The New York Times*, April 1, 1931; and Nick Kommons, *Bonfires To Beacons: Federal Civil Aviation Policy Under the Air Commerce Act 1926-1938*, (Washington, D.C.: U.S. Government Printing Office, 1978), 184.
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14. *Congressional Record*, 69<sup>th</sup> Congress, 1<sup>st</sup> Session, 1925, 830.
15. Kommons, *Bonfires To Beacons: Federal Civil Aviation Policy Under the Air Commerce Act 1926-1938*, 91.

16. *Air Commerce Act of 1926: Reprint From Official Original Act as Issued by the Government Printing Office* (New York: Aeronautical Chamber of Commerce of America, 1926), 1.

17. William P. MacCraken was born in Chicago in 1888 where his parents both practiced medicine. He attended law school and shortly after entered the service where he became an aviator. After World War I, he returned to law and began working with the American Bar Association (ABA). He soon became chairman of the ABA's Committee on Aeronautics and was an advocate for aviation. He helped draft the Air Commerce Act and became the first Assistant Secretary of Commerce for Aeronautics. He held pilots license number 1. He left the Department in 1928 to enter industry.

Michael Osborn and Joseph Riggs, "Mr. Mac," (Memphis: Southern College of Optometry, 1970) 10-98.

18. *The Air Commerce Act of 1926*, (Aeronautical Chamber of Commerce, June 1926), 1; and Kommons, *Bonfires To Beacons: Federal Civil Aviation Policy Under the Air Commerce Act 1926-1938*, 179.

19. Clarence Marshall Young held the number two position in the Aeronautics Branch during MacCracken's tenure. Col. Young was an aviator in World War I and was shot down in Austria where he became a prisoner of war. He was a Yale graduate, lawyer and barnstormer after the war. He was a popular and respected figure among the aviation industry. After leaving the Department of Commerce in the mid 1930s, he joined Pan American Airways. "Chief of Airway," *Time*, March 14, 1932, 34.

20. U. S. Department of Commerce, *Annual Report of the Director of Aeronautics*. Washington D.C.: GPO, 1928, 45.

21. Senator Sam Gilbert Bratton was Texas born in 1888. He was admitted to the bar in 1909, first practicing law in Texas and then moving to Clovis, New Mexico, where he was eventually appointed a judge. He became an associate justice in the Supreme Court of New Mexico in 1923. He resigned shortly after to become the Democrat nominee for the United States Senate. Elected in 1924, he served from March 4, 1925, to June 24, 1933.

*Biographical Directory of the United States Congress 1774-1989*, 1989, S. Doc. 100-34, 146.

22. Transcontinental Air Transport (TAT) and Western Air Express (WAE) were merged on February 13, 1931, to form Transcontinental & Western Express (TWA). Joe Christy, *American Aviation: An Illustrated History* (Tab Books, 1987), 134-135.

23. *Congressional Record*. 71<sup>st</sup> Cong., 1<sup>st</sup> sess., 1929, 3669-70; and U.S. Senate. *Biographical Directory of the United States Congress 1774-1989*, 1989, S. Doc. 100-34, 146.

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30. "Blocks Air Crash Inquiry," *The New York Times*, October 1, 1929; and Congressional Record.
31. "Make The Report Public," *The Washington Daily News*, October 2, 1929.
32. Born in 1869, Kenneth Douglas McKellar had been a Representative and was now a Senator from Tennessee. Senator McKellar became the Democratic candidate for the Senate in 1916, serving from March 4, 1917 to January 3, 1953. He died in retirement on October 25, 1957. *Biographical Directory of the United States Congress 1774-1989*, 1989, S. Doc. 100-34, 1471.
33. *Congressional Record*. 71<sup>st</sup> Cong., 1<sup>st</sup> sess., 1929, 4790-1.
34. Col. Clarence Young to the Department of Commerce Solicitor, November 18, 1929, National Archives Branch Depository, Suitland, MD RG 237, FN 150.4.
35. "Accident Causes in the Spotlight," *Aviation*, December 7, 1929, 1097.
36. *Ibid.*
37. "Pushes Air Inquiry Bill," *New York Times*, January 21, 1930.
38. "Wreckage of Tri-Motor Plane in Which 16 Died," *The Washington Daily News*, January 21, 1930; and "Where 16 Died in California Airplane Crash," *The Washington Daily News*, January 24, 1930.
39. "Seven Persons Die in Plane Crashes," *The Washington Post*, January 28, 1930; and "Death Plane Hastily Destroyed at Night," *The Washington Daily News*, January 28, 1930.
40. *Congressional Record*. 71<sup>st</sup> Cong., 2<sup>nd</sup> sess., 1930, 2494.
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67. *Congressional Record*. 71<sup>st</sup> Cong., 2nd sess., 1930, 9044
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# **SERVICE QUALITY IN THE U.S. AIRLINE INDUSTRY: VARIATIONS IN PERFORMANCE WITHIN AIRLINES AND BETWEEN AIRLINES AND THE INDUSTRY**

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## **ABSTRACT**

This study examined the service quality of 25 U.S. airlines (1987-1996) using data from the Department of Transportation's Air Travel Consumer Report. After a total quality and total complaint rate was calculated for these airlines, a 95 percent confidence interval was placed around the yearly and company means calculated to examine those cases that were significantly different from the mean. Results indicate that while the major carriers are converging toward a higher level of quality, there continues to be significant yearly variation. The service quality of regional carriers was much lower than major carriers and showed much greater variation.

## **INTRODUCTION**

In a 1991 survey by Towers and Perrin, almost 90 percent of U.S. airline executives listed establishing their carrier as a leader in service quality as a

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top priority. One reason for the emphasis on service quality is a growing concern that air travel in the U.S. "will be reduced to a commodity status, and that the individual choice of airlines will be factored out of the buying decision" (Fraser, 1996, p. 61). To combat this prospect, airlines are seeking to establish brand identity and personality through focusing on quality strategies designed to create customer loyalty and to separate themselves from their generic competitors (Fraser, 1996; Nelms, 1997). Finishing first in the growing number of reports on airline quality has taken on new meaning for airlines and consumers as has the debate about which of these reports accurately reflects airline quality—the traditional consumer surveys or the weighted average that is the basis of the Airline Quality Rating approach (Johnson, 1998; Perkins, 1998).

There are at least two other issues that we believe should be considered. First, it is not clear whether these yearly quality rankings represent statistically significant differences in service quality within and between U.S. airlines. Is American Airlines' quality ranking in 1997 significantly different from their ranking in 1996 or merely a function of random error? If the industry's mean score for 1996 is calculated, how many airlines are significantly different from that mean?

Second, these quality studies have focused only on the major U.S. carriers even though regional carriers have doubled their number of enplaned passengers in the last ten years and many airports are served largely or exclusively by regional carriers (AvStat Associates, 1998). Given the concerns raised about the safety quality of regional carriers following the Valujet crash, it seems appropriate to examine service quality of regional carriers as well. Research on safety also suggests that differences in quality may be more pronounced between industry segments than within comparable groups (Rose, 1990, 1992).

The purpose of this study was to address these two issues. Unfortunately, it is not possible to recreate the different quality surveys or to test the significance of their findings based on published data. However, the Air Travel Consumer Report data which are used by the Airline Quality Rating Survey are publicly available beginning in 1987. For this reason, we have chosen to use this data to examine the variations within and between U.S. air carriers overall service quality.

## BACKGROUND

The U.S. airline industry was deregulated in 1978 based on a series of studies that concluded that regulation forced carriers to accept uneconomical load factors on many long-haul flights, prevented the establishment of economies of scale, and created fares on regulated routes that were in many cases

50 percent higher than unregulated intrastate routes. Unable to compete on price, carriers were believed to base competition on service quality (Caves, 1962; Jordon, 1970). If government policy forced prederegulation airlines to compete on the quality of their services rather than price, then Woerth (1995) has suggested that policy now focuses almost solely on creating cheap, below-cost air fares for consumers. To meet this challenge, U.S. carriers have engaged in a long, painful process of restructuring and consolidation. The result, at least for the major carriers that survived, is a cost competitive position that is well below their international rivals (Oum & Yu, 1998). This focus on cost-cutting has carried a price—increased customer complaints and a conspicuous absence from the service rankings of the top-ten international carriers (Zagat, 1992; Zellner, 1997).

### **Service Quality**

Berry, Parasuraman, and Zeithaml (1994) have described service quality as

a profit strategy because it results in more new customers, more business from existing customers, fewer lost customers, more insulation from price competition, and fewer mistakes requiring the reperformance of service (p. 32).

According to them, service quality is a function of ten elements: listening to customers, providing reliable service, paying attention to basic service, understanding service design, surprising customers, recovering from service problems, practicing fair play, encouraging teamwork, listening to employees, and creating servant leaders. Four of these elements—listening to customers, surprising customers, recovering from service problems, and practicing fair play—involve understanding customer expectations and perceptions and then meeting or exceeding them. These areas are typically the focus of consumer surveys of quality. Respondents are asked the importance of various aspects of airline service—food, comfort, entertainment, carry on space—and then are asked to rank airlines. Three of the elements—encouraging teamwork, listening to employees, and creating servant leaders—are activities that can only be indirectly observed by customers. These activities are assumed to improve employee morale and contribute to a total quality culture. The remaining three elements—providing reliable service, paying attention to basic service, and understanding service design—relate to the reliability and consistency of service provision and can be examined using the data in the Air Travel Consumer Report. It should be noted that in the 1997 Frequent Flyer Survey the top three factors driving overall airline satisfaction were on-time performance, schedule/flight accommodation, and airport check-in, which are issues of basic service and service design (Frequent Flyer, 1997, p. 25).

## Air Travel Consumer Report

The Air Travel Consumer Report is published quarterly by the Office of Aviation Enforcement and Proceedings, U.S. Department of Transportation (DOT). There are two parts to the Report. For the major U.S. carriers, the DOT gives information on the on-time percentage, number of mishandled baggage reports filed, and passengers denied boarding. The second part of the report is consumer complaints by category which includes such categories as flight problems, fares, refunds, customer service, and advertising. Complaints are reported for all carriers with more than ten total complaints in a calendar year. There are no complaint categories for issues such as food, comfort, in-flight entertainment, etc.

### METHODS

This study included data on 25 U.S. airlines in operation during the period 1987 to 1996. Of these airlines, twelve can be classified as major carriers (gross revenues over \$1 billion) and thirteen as regional carriers (gross revenues less than \$100 million). Fourteen airlines were not in operation during the entire period due to failure, consolidation or startup.

Data were collected from the Department of Transportation's Air Travel Consumer Report on the following measures: on-time performance, flight problems, denied boardings, fare complaints, mishandled baggage, ticketing complaints, refund complaints, advertising complaints, customer service complaints, credit complaints, and other complaints which include frequent flyer and cargo problems. Complaint data were available for all airlines with ten or more total complaints in a single year. For several years during this period, data for regional airlines were not available by category but only as total complaints. Generally, data on on-time performance, denied boardings, and mishandled baggage were available only for major carriers. Data on departures were collected from the Bureau of Transportation Statistics. These data were used to normalize the quality measures.

Rates were calculated overall and by category for all airlines. The total service quality rate represents the sum of the following data: number of late flights, total consumer complaints, total involuntary denied boardings, and total mishandled baggage reports. This number was then divided by the total departures for that airline in the given year. The total complaint rate represents the sum of all complaints divided by the total yearly departures. In a real sense, the derived rates are a measure of disquality and can be interpreted as the number of service quality problems per departure, i.e. a total quality rate of .353231 would translate into 35 quality problems per 100 departures. Means, standard deviations, and correlations were computed.

The calculated means represent the best estimate of the true mean for each airline and the industry as a whole for each year of the study. Due to sampling error, random variation, and small sample size, the calculated mean is expected to vary from the true mean. To examine the variation within airlines, a 95 percent confidence interval was calculated around each airline's mean quality performance for the years of operation. Variations between airlines and the industry were examined by calculating a 95 percent confidence interval around the mean industry performance for a given year. Thus, it can be said that there is a 95 percent chance that the calculated mean will fall within these boundaries. Means that fall outside this interval could be said to be statistically different from the true mean.

## RESULTS

Table 1 reports the calculated total service quality rates by firms and for the industry between airlines and the mean for the major U.S. carriers. Overall, total service quality improved from 1987 to 1996 with the industry mean dropping from 0.643809 to 0.428864, indicating that the industry as a whole had 64 quality problems per 100 departures in 1987 compared to only 42 quality problems per 100 departures in 1996. However, most of this improvement occurred during the early years of this study. Numbers with an asterisk represent airlines falling outside the 95 percent confidence interval for that year.

For 1987, the confidence interval was 0.5238 and 0.7638. Three firms (Eastern, TWA, United) fell below the lower limit, meaning that their service quality rates were significantly above the industry average. Three firms (American, Southwest, USAir) fell above the upper limit with service quality rates lower than the industry average. The confidence interval for 1988 was 0.4638 and 0.6388. Again, three firms (Eastern, Pan Am, TWA) fell below the lower limit while three firms (America West, American, USAir) fell above the upper limit. In 1989, only three firms fell outside the 95 percent confidence interval (0.4655, 0.6237)—two (Pan Am, Southwest) below the lower limit and one (Eastern) above the upper limit. There were six firms outside the 95 percent confidence interval (0.4059, 0.5917) in 1990. Pan Am, Southwest, and USAir were below the industry average service rate lower limit. America West, Eastern, and TWA were higher than the industry average service rate higher limit. Six firms also fell outside the 95 percent confidence interval (0.3504, 0.4636) in 1991. Pan Am, Southwest, and USAir were below the industry average lower limit. America West, TWA, and United were above the industry average upper limit.

In 1992, four firms fell outside the 95 percent confidence interval (0.3789, 0.4957). America West and Southwest had service quality rates

Table I. Variations in Total Service Quality Rates Between Major U.S. Airlines and the Industry, 1987-1996

Airlines	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Airline Average Total Quality
America West	.6631	.6654*	.5399	.6910*	.5035*	.3549*	.3693	.3991	.4296	.4148	.5031
American	.8078*	.6497*	.5851	.5444	.3799	.4424	.4149	.3664*	.3965	.4330	.5020
Continental	.6017	.4785	.4945	.4192	.3905	.4781	.4482	.4649*	.3320*	.2949*	.4403
Delta	.6252	.5970	.5710	.5007	.4435	.4858	.4634	.4364	.4657*	.5235*	.5112
Eastern	.3662*	.4255*	.7659*	.6588*							.5541
Northwest	.6457	.6240	.5509	.5281	.4072	.4157	.4072	.4239	.4637*	.4034	.4869
Pan Am	.5312	.3783*	.3364*	.2711*	.2950*						.3624
Southwest	.8211*	.4943	.3621*	.3030*	.3070*	.3063*	.3003*	.3395*	.3362*	.3110*	.3881
TWA	.5218*	.4374*	.6046	.6177*	.4927*	.5427*	.3353*	.4134	.4703*	.4674	.4903
United	.4928*	.4990	.6029	.5605	.5095*	.5097*	.5241*	.4881*	.4650*	.6169*	.5268
US Airways	1.0052*	.8152*	.5770	.3924*	.3414*	.4003	.3596	.4057	.3520*	.3949	.5044
Industry Average											
Total Quality By Year	.6438	.5513	.5446	.4988	.4070	.4373	.4025	.4153	.4124	.4289	.4742
Confidence Interval											
Upper Limit	.7623	.6388	.6237	.5917	.4636	.4957	.4559	.4505	.4579	.5056	
Lower Limit	.5238	.4638	.4655	.4059	.3504	.3789	.3490	.3800	.3668	.3522	

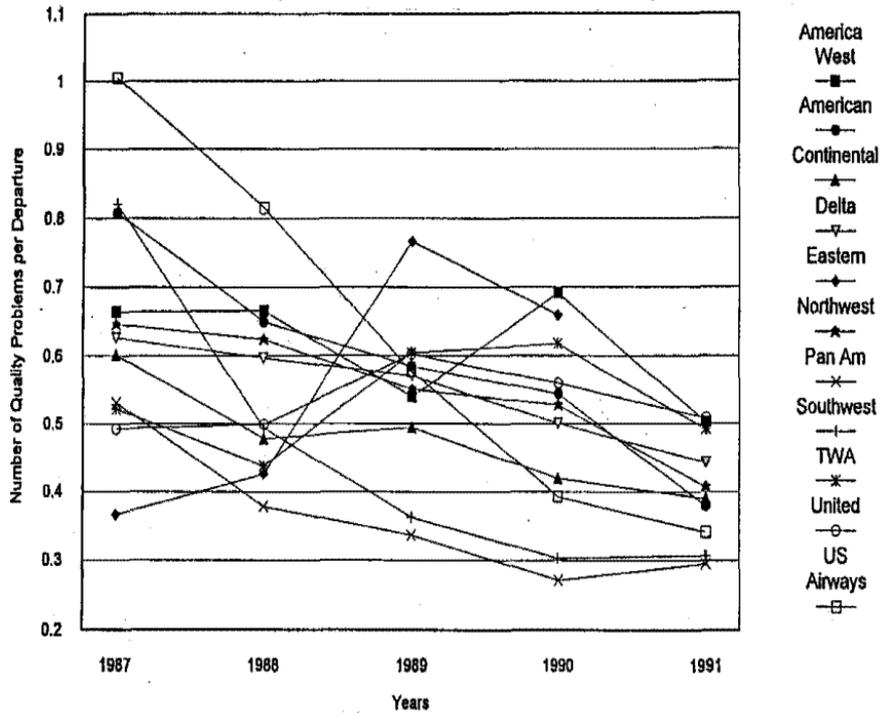
\* - Rate falls outside the 95 percent confidence interval of the industry for the year

lower than industry's average lower limit competitors. TWA and United had rates above the upper limits. Two firms (Southwest, TWA) fell below the lower limit of the 95 percent confidence interval (0.3490, 0.4559) in 1993. One firm (United) fell above the upper limit. There were four firms outside the 95 percent confidence interval (0.3800, 0.4505) in 1994. The service quality of American and Southwest were below the lower limits of the industry average. Continental and United were above the upper limits of the industry average. A total of seven firms fell outside the 95 percent confidence interval (0.3668, 0.4579) in 1995. Three firms (Continental, Southwest, USAir) fell below the lower limit. Four firms (Delta, Northwest, TWA, United) fell above the upper limit, but only by a relatively small margin. Four firms fell outside the 95 percent confidence interval (0.3522, 0.5056) in 1996—two firms (Continental, Southwest) were below the lower limit, two firms (Delta, United) were above the upper limit. Figure 1 graphically displays the results of Table 1 for the years 1987 to 1991. As it shows, the industry is increasingly converging on a standard quality level. Figure 2 increases the scale and examines service quality rates for the years 1991 to 1996. While Figure 1 clearly shows a convergence of service quality levels, Figure 2 shows that there does continue to be some variation between the major carriers within a narrowing range.

Table 2 reports the variation in service quality within the firms themselves. Asterisk numbers indicate years in which the firm fell outside the 95 percent confidence interval surrounding their mean service quality performance for the period. The most consistent performer of the major airlines was Southwest who fell outside the 95 percent confidence interval only once during this period. Southwest also had the lowest level of service problems of any of the major airlines in operation during the entire period of this study with only 39 service problems per 100 departures. America West was the least consistent performer, although in four of the seven years, they performed better than their average.

Table 3 reports the calculated total complaint rates by firm and for the industry and between airlines and the industry. The complaint rate considers only those complaints filed with the Department of Transportation. It excludes the number of late flights, mishandled baggage reports, and denied boardings that were included in the total service quality rate. Asterisk numbers indicate airlines falling outside the 95 percent confidence interval surrounding the industry mean for that year. For 1987, eight airlines fell outside the 95 percent confidence interval (0.0025, 0.0079). All but three (Continental, Eastern, Northwest) fell below the lower limit. The 95 percent confidence interval for 1988 was 0.0015, 0.0044. Nine airlines fell outside the interval. Continental, Eastern, Pan Am, and TWA had complaint rates above the industry average upper limit. Four carriers (America West, American, Delta,

Figure 1  
Total Service Quality Rates Between Major U.S. Airlines and the Industry 1987 - 1991



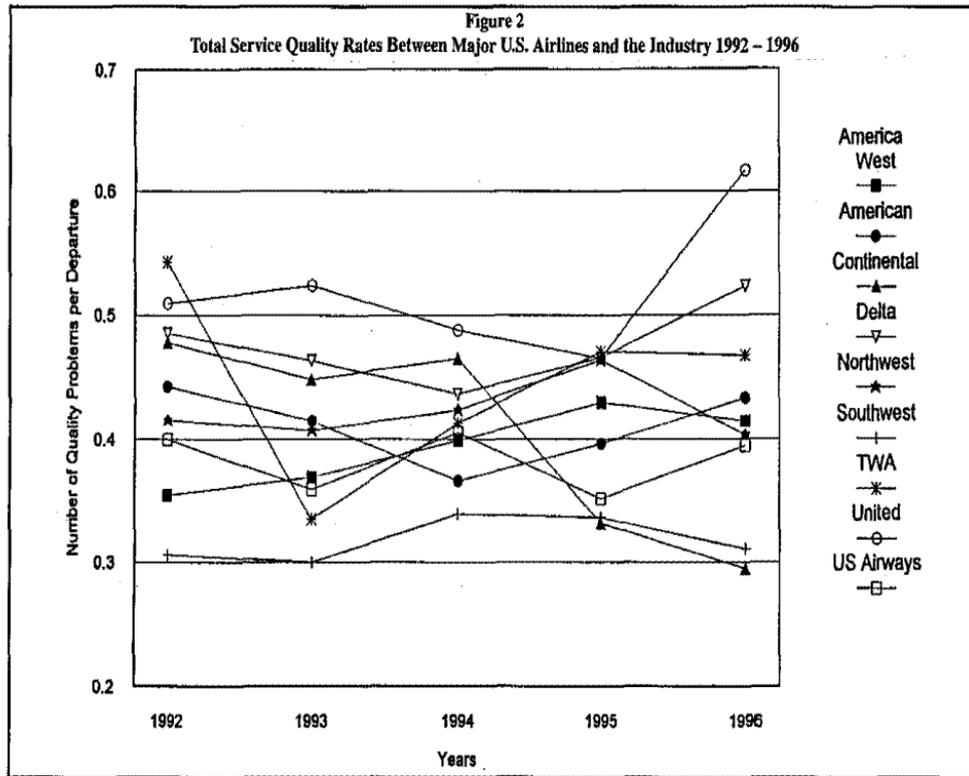


Table 2. Variations in Total Service Quality Rates Within Major U.S. Airlines, 1987-1996

Airlines	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Airline	Confidence	Confidence
											Average	Interval	Interval
											Total	Upper	Lower
											Quality	Limit	Limit
America West	.6631*	.6654*	.5399	.6910*	.5035	.3549*	.3693*	.3991*	.4296	.4148	.5031	.5962	.4100
American	.8078*	.6497*	.5851	.5444	.3799*	.4424	.4148	.3664*	.3965*	.4330	.5020	.6044	.3996
Continental	.6017*	.4785	.4945	.4192	.3905	.4781	.4482	.4649	.3320*	.2949*	.4403	.5026	.3779
Delta	.6252*	.5970*	.5710*	.5007	.4435*	.4858	.4634*	.4364*	.4657	.5235	.5112	.5585	.4639
Eastern	.3662	.4255	.7659	.6588							.5541	.8556	.2526
Northwest	.6457*	.6240*	.5509	.5281	.4072*	.4157*	.4072*	.4239	.4637	.4034*	.4869	.5440	.4199
Pan Am	.5312*	.3783	.3364	.2711	.2950						.3624	.4901	.2347
Southwest	.8211*	.4943	.3621	.3030	.3070	.3063	.3003	.3395	.3362	.3110	.3881	.5046	.2716
TWA	.5218	.4374	.6046*	.6177*	.4927	.5427	.3353*	.4134*	.4703	.4674	.4903	.5519	.4287
United	.4928	.4990	.6029*	.5605	.5095	.5097	.5241	.4881*	.4650*	.6169*	.5268	.5629	.4908
US Airways	1.0052*	.8152*	.5770	.3924	.3414	.4003	.3596	.4057	.3520	.3949	.5044	.6676	.3411
Industry Average													
Total Quality													
by Year	.6438	.5513	.5446	.4988	.4070	.4373	.4025	.4153	.4124	.4288	.4742		

\* - Rate falls outside the 95 percent confidence interval of the airline for the period

Table 3. Variation in Total Complaint Rates Between Major U.S. Airlines and the Industry, 1987-1996

Airlines	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Airline Average Total Complaint Rate
America West	.00147*	.00082*	.00055*	.00077	.00103	.00087	.00065	.00084	.00060	.00085*	.00084
American	.00238*	.00124*	.00083*	.00074	.00103	.00107	.00074	.00050	.00047	.00071	.00097
Braniff	.00268	.00277	.00255								.00267
Continental	.01318*	.00649*	.00178*	.00114	.00073	.00077	.00112*	.00134*	.00068	.00039*	.00276
Delta	.00175*	.00076*	.00045*	.00033*	.00031*	.00041	.00035	.00033	.00044	.00057	.00057
Eastern	.00884*	.00604*	.00413*	.00139							.00510
Northwest	.01078*	.00371	.00123	.00088	.00066	.00050	.00043	.00044	.00037*	.00063	.00196
Pan Am	.00793*	.00573*	.00401*	.00263*	.00295*						.00465
Southwest	.00062*	.00045*	.00039*	.00024*	.00025*	.00011*	.00009*	.00012*	.00011*	.00012*	.00025
TWA	.00716	.00487*	.00312*	.00331*	.00259*	.00175*	.00102*	.00095*	.00086*	.00086*	.00265
United	.00371	.00198	.00143	.00100	.00196*	.00082	.00064	.00058	.00065	.00062	.00134
US Airways	.00168*	.00108*	.00104	.00055	.00029*	.00043	.00034	.00044	.00063	.00044	.00069
Industry Average Total Complaint Rate	.00518	.00300	.00179	.00118	.00118	.00075	.00060	.00061	.00053	.00057	.00154
Confidence Interval											
Upper Limit	.0079	.0044	.0026	.0018	.0019	.0011	.0009	.0009	.0007	.0008	
Lower Limit	.0025	.0015	.0009	.0005	.0005	.0004	.0003	.0003	.0004	.0004	

\* - Rate falls outside of the 95 percent confidence interval of the industry for the year

Southwest) posted complaint rates that fell below the lower limit of the 95 percent confidence interval (0.0009, 0.0026) in 1989. In 1990, four carriers fell outside the 95 percent confidence interval (0.0005, 0.0018). Two fell above the upper limit—Pan Am and TWA. Two carriers fell below the lower limit—Delta and Southwest. Six carriers fell outside the 95 percent confidence interval (0.0005, 0.0019) in 1991. Delta, Southwest, and USAir had complaint rates that were below the industry average lower limit.

Only two firms fell outside the 95 percent confidence interval (0.0004, 0.0011) in 1992. Southwest fell below the lower limit. TWA posted a complaint rate above the industry average upper limit. Three firms fell outside the 95 percent confidence interval in 1993. Again, Southwest fell below the lower limit. Continental and TWA fell above the upper limit. The same three airlines fell outside the 95 percent confidence interval (0.0003, 0.0009) in 1994. Three airlines fell outside the 95 percent confidence interval (0.0004, 0.0007) in 1995. Southwest and Northwest posted complaint rates below the lower limit. TWA continued to fall above the upper limit. The 95 percent confidence interval for 1996 was 0.0004, 0.0008. Two firms (Continental, Southwest) fell below the lower limit. America West and TWA had rates above the industry average upper limit.

The asterisk numbers in Table 4 indicate the years in which the major carriers fell outside the 95 percent confidence interval surrounding their mean complaint rate for the period from 1987 to 1996. Overall, Southwest had the lowest complaint rate with only three complaints per 10,000 departures. The most consistent performer was Northwest, however, whose complaint rate was considerably higher than Southwest at 20 complaints per 10,000 departures.

Table 5 reports the calculated total complaint rates between the airlines and the industry for the regional carriers in this study. Overall, the complaint rates for this group are substantially higher than for the major carriers. In 1994 regional carriers reported 32 service quality problems per 10,000 departures compared to six per 10,000 departures for the major airlines. However, at least one of these carriers, Atlantic Southeast, has consistently posted complaint rates below the lower limits of the major carriers industry average. It has averaged only two complaints per 10,000 departures. Reno Air also compares favorably to the major carriers with an average of only seven complaints per 10,000 departures over the reported period. Tower Air posted the worst overall performance with an average of 31 complaints per 10,000 departures as compared to 40 per 10,000 departures for all regional carriers and six per 10,000 for the major carriers over the period from 1994 to 1996.

Numbers with asterisks indicate regional carriers falling outside the 95 percent confidence interval surrounding the industry mean for that year. In

Table 4. Variations in Total Complaint Rates Within Major U.S. Airlines and the Industry, 1987-1996

Airlines	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	Airline Average Total Complaint Rate	Confidence Interval Upper Limit	Confidence Interval Lower Limit
America West	.00147*	.00082	.00055*	.00077	.00103*	.00087	.00065*	.00084	.00060*	.00085	.00084	.0010	.0007
American	.00238*	.00124	.00083	.00074	.00103	.00107	.00074	.00050*	.00047*	.00071	.00097	.0014	.0006
Braniff	.00268	.00277	.00255								.00267	.0029	.0024
Continental	.01318*	.00649*	.00178	.00114	.00073	.00077	.00112	.00134	.00068	.00039	.00276	.0057	-.0001
Delta	.00175*	.00076	.00045	.00033	.00031	.00041	.00035	.00033	.00044	.00057	.00057	.0009	.0003
Eastern	.00884	.00604	.00413	.00139							.00510	.0101	.0001
Northwest	.01078*	.00371	.00123	.00088	.00066	.00050	.00043	.00044	.00037	.00063	.00196	.0043	-.0004
Pan Am	.00793*	.00573	.00401	.00263	.00295						.00465	.0074	.0019
Southwest	.00062*	.00045*	.00039	.00024	.00025	.00011	.00009*	.00012	.00011	.00012	.00025	.0004	.0001
TWA	.00716*	.00487*	.00312	.00331	.00259	.00175	.00102*	.00095*	.00086*	.00084*	.00265	.0041	.0012
United	.00371*	.00198	.00143	.00100	.00196	.00082	.00064	.00058*	.00065	.00062	.00134	.0020	.0006
US Airways	.00168*	.00108*	.00104*	.00055	.00029*	.00043	.00034*	.00044	.00063	.00044	.00069	.0010	.0004
Industry Average Total Complaint Rate	.00518	.00300	.00179	.00118	.00118	.00075	.00060	.00061	.00053	.00057	.00154		

\* - Rate falls outside of the 95 percent confidence interval of the airline for the period

Table 5. Variations in Total Complaint Rates Between U.S. Regional Airlines and the Industry, 1994-1996

<i>Airline</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>Airline Average Total Complaint Rate</i>
Air South		.00101	.00392	.00246
AirTrans	.00297	.00059	.00149*	.00168
Atlantic SE	.00004	.00006	.00022*	.00011
Carnival	.00244	.00249	.01038*	.00510
Kiwi	.00060	.00074	.00519	.00217
Markair	.00101	.01811*	.01067*	.00993
Mesa			.00011*	.00011
Midway	.00135	.00049	.00190	.00125
Reno	.00021	.00037	.00041*	.00033
Tower	.01990*	.00872*	.01359*	.01407
Valujet	.00055	.00101	.00303	.00153
Vanguard			.00249	.00249
WestPac			.00099*	.00099
Regional Airlines Average Complaint Rate	.00323	.00336	.00418	
Major Airlines Average Complaint Rate	.00061	.00053	.00057	
Regional Airlines Confidence Interval				
Upper Limit	.0081	.0075	.0069	
Lower Limit	-.0016	-.0008	.0015	

\* - Rate falls outside the 95 percent confidence interval of the industry for the year

1994, three carriers fell outside the 95 percent confidence interval (0.0016, 0.0081). Atlantic Southeast and Reno Air recorded complaint rates significantly below the average regional carrier industry lower limit. Tower Air fell above the upper limit. For 1995, there were three carriers (Atlantic Southeast, Midway, Reno) below the regional lower limit and two carriers (Markair, Tower) above the regional upper limit of the 95 percent confidence interval (0.0008, 0.0075). Seven carriers recorded complaint rates outside the 95 percent confidence interval (0.0015, 0.0069) in 1996. Atlantic Southeast, Mesa, Reno, and WestPac posted complaint rates below the lower limits for regional carriers. Carnival, Markair, and Tower posted complaint rates above the upper limits.

### DISCUSSION

Two general conclusions are apparent from this study. First, airline quality has improved for the major carriers since 1987. In fact, the major airlines appear to be converging on a quality standard well below the 1987 industry average. Problems related to overcapacity plagued the industry in the early eighties leading to industry consolidation beginning in the late eighties. Several of the carriers in this study were attempting to integrate purchased operations (Delta-Western, TWA-Ozark Air, Northwest-Republic Continental-Eastern). It should also be remembered that the U.S. airline industry lost in excess of \$10 billion in the period from 1990 to 1993. A number of the carriers in this study were either in bankruptcy or experiencing severe financial difficulties (America West in 1991, TWA in 1992, Continental in 1990, Eastern in 1989). This is not to say that there is not room for improvement, but given the conditions that prevailed, it is fortunate that service quality did not decline.

A second conclusion of this study is that service quality as measured by total complaints is far worse for regional carriers and the variation in performance is greater. There are several explanations for this difference. If firms learn by doing, then most of the regional carriers have not been in business long enough to get the basics of service quality down. Unfortunately, many will not have the time. Since deregulation more than 200 new entrants have come and gone (Rosen, 1995). A further problem for these carriers is the tendency for consumers to judge safety quality by service quality which is more easily observed by the average consumer (Rose, 1992). While no study has yet been done examining the relationship between service quality and safety quality in the airline industry, the perception of such a link could effect even the economy-minded consumers who often choose regional carriers for their low cost, low fare offerings.

This study did not specifically address the controversy over which type of quality measure is better, the opinion survey or the Airline Quality Rating (AQR) system. The data in this report are a subset of the data used in the Airline Quality Rating system. The AQR includes safety quality data such as the age of the fleet, the number of accidents, pilot deviations, and financial information such as load factors, average seat/mile cost, and financial stability (bond rating). Given these differences, those results are not directly comparable, but can be examined in general. The AQR 1996 rankings were as follows: Southwest, American, United, Delta, Continental, Northwest, USAir, America West, and TWA. The 1996 rankings for the Total Service Quality were Continental, Southwest, USAir, Northwest, America West, American, TWA, Delta, and United. It should be remembered, however, that only Continental and Southwest fell below the 95 percent confidence interval lower limits with service quality rates significantly better than their competitors while Delta and United posted rates above the upper limits for major carriers. The remaining five carriers, while listed in rank order, were not significantly different from one another. Their ranking can be attributed to random chance.

Consumer expectations are important in any industry. For airlines, the two most important issues are 1) the reason for travel (business or leisure) and 2) the class of preferred travel (first, business, economy). According to Airline Marketing News (1997), the business traveler whose higher fares create higher yields for the airlines have been the main beneficiary of most quality improvements. Unfortunately, it was not possible to examine complaint rates by class of preferred travel to determine if different classes experienced higher or lower levels of service quality. It should be noted, however, that both business and leisure consumers listed on-time performance, schedule/flight accommodation, and airport check-in as the most important factors in overall airline satisfaction (1997 Frequent Flyer survey).

There were additional limitations on this study. First, the DOT practice of reporting only airlines with ten or more complaints in a single year made it difficult to assess the quality performance of regional carriers. Data on mishandled baggage and on-time performance were also not available for regional carriers. A second limitation is the fact that complaint data probably seriously underestimate the level of consumer concern with quality. For example, there were 482,004 mishandled baggage claims filed with Delta during 1996 but only 127 actual baggage complaints were filed with the DOT (Air Travel Consumer Report, February 1996). Even assuming that the airline was able to quickly and satisfactorily resolve most of these reports, there remain a number of dissatisfied consumers who either did not trouble to file a DOT complaint or were unaware that they could do so.

## CONCLUSION

The service quality of the major U.S. carriers has improved over the last ten years and is considerably higher than that of regional carriers. More attention should be paid to the issue of statistically significant differences in rankings by all quality instruments. There is still a good deal of work to be done in this area, especially in regard to the service quality of regional carriers and in the differences between classes of passengers.

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# **AN EXAMINATION OF THE U.S. REGIONAL AIRLINE POLICIES REGARDING CHILD RESTRAINT SYSTEMS**

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## **ABSTRACT**

A prior study (Carstenson, Sluti and Luedtke, 1997) examined the policies of U.S. air carriers with regard to the use of infant restraint systems on board commercial aircraft. This study expands on that earlier study by examining the policies of commuter air carriers in the United States regarding the use of infant restraint systems. The management policy of the commuter air carriers has been investigated and officials of the commuter air carriers were surveyed to determine how the carriage of infants onboard their aircraft varied among commuter airlines. The topics investigated included seat space for infants, restraint systems for infants, and amenities for infant passengers. The results of this study have been analyzed to ascertain if any recommendations can be made to the commuter airlines regarding the carriage of infants onboard their aircraft.

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## INTRODUCTION

Major U. S. airlines are responding to the needs of parents and their children who are flying on their aircraft. Information is well publicized regarding what to expect when flying with small children, including the requirements for child restraints. Two examples of this important information reaching the traveling public include pamphlets by Southwest Airlines entitled "Baby on Board: Information You Should Know When Flying With Your Infant Or Toddler" and "Tips for Children Traveling Alone." The Federal Aviation Administration (FAA) now has a consumer information hotline (1-800-FAA-SURE) where the flying public can obtain a list of FAA safety recommendations for air travel by children. These are significant issues for parents traveling with small children which could influence whether the family flies or drives to their destination. These issues could even influence their choice in the selection of an airline.

Current Federal Aviation Regulations require everything in an aircraft to be strapped down for takeoff and landing—everything, that is, except infants less than two years of age (Title 14, 1995, Section 121.311). The Federal Aviation Regulations (FARs) specify that everyone on-board a commercial aircraft "...shall occupy an approved seat or berth with a separate safety belt properly secured about him or her during movement on the surface, takeoff, and landing" (Title 14, 1995, Section 121.311b). The regulations continue: "Notwithstanding the preceding requirements, a child may: (1) be held by an adult who is occupying an approved seat or berth if that child has not reached his or her second birthday...."

The FAA emphasizes the importance of child restraint systems in the Child Passenger Safety Resource Manual. In that manual the FAA states, "The Federal Aviation Administration recommends that young children ride in child safety seats during air travel. Child seats will not only enhance the child's safety in the event of a crash but will also protect the child from injury during in-flight turbulence and rough landings" (U.S. Dept. Of Trans., 1993). In the event of an airplane crash or even in cases of severe turbulence, an unsecured two-year-old becomes a human projectile, careening through the cabin and causing as much damage as an unsecured twenty-pound briefcase.

As long as the government continues to grant parents traveling with infants the option to either use infant restraint systems or to place their infants on the parent's lap (Title 14, 1995, Section 121.311c), the traveling public (and the airlines) will be confused about what they must do to insure the safety of those infants.

However, as stated above, it is encouraging that some of the major airlines are taking notice and are educating the public about these safety issues. In the Southwest Airlines pamphlet "Baby on Board: Information You Should

Know When Flying With Your Infant Or Toddler," information is presented and questions are answered regarding what is an appropriate child restraint device (CRD), what type of CRD is best, how a CRD should be used, whether infant carriers are permitted on the airlines, and whether discounts are offered for children under two years of age, among other suggestions. The information presented in this pamphlet educates parents and the public in general to the safety issues of infants when flying on this air carrier.

### **PURPOSE OF STUDY**

After examining the policies of the U.S. major commercial air carriers regarding the use of infant restraint systems on aircraft, the researchers decided to broaden the focus and conduct a second study to assess the policies of the regional airlines. The main objectives in this second study have been to ascertain the policies, practices, and opinions of executives of the commuter/regional airline industry of the United States regarding infant restraint systems for each individual airline.

### **BACKGROUND LITERATURE**

Carstenson, Sluti and Luedtke (1997) examined the policy of the United States major commercial air carriers regarding the use of infant restraint systems on aircraft. Since then, the White House Commission on Aviation Safety and Security's final report has been released (February 12, 1997). In Recommendation 1.13, the Commission suggests that the FAA eliminate the exemptions in the FARs that allow passengers under the age of two to travel without the benefit of FAA approved restraints. The Commission stated that it believes it is inappropriate for infants to be afforded a lesser degree of protection than older passengers (White House Commission).

Subsequent to that report, both the United States Senate and the United States House of Representatives introduced legislation in an effort to enact into law White House Recommendation 1.13. In the 105th Congress, first session, both the Senate and the House of Representatives proposed legislation requiring the use of child restraint systems approved by the Secretary of Transportation on commercial aircraft. The Senate introduced S 398 on March 5, 1997, the purpose of which was to direct the Secretary of Transportation to issue regulations requiring the use of federally-approved child safety restraint systems including weight and age limits on commercial aircraft (U.S. Senate Bill 398). On February 13, 1997, HR 754 was introduced before the U.S. House of Representatives. The House bill contains language similar to that presented in the Senate bill. Both bills have been sent to committee but no hearings or legislative action are scheduled for either bill. According to the Information for Public Affairs, Inc., a group that tracks all bills introduced in

Congress, the odds that the bills will pass are about one percent (1995 Information for Public Affairs, Inc.). No further action has been taken regarding either bill as of late Fall of 1998.

Four times since 1989, legislation has been introduced in both houses of congress in an effort to place restrictions on the carriage of infants on-board aircraft. However, none of this legislation has been successful. In December 1996, the FAA launched a campaign directed at educating the public regarding the use of seat belts for infants who fly onboard commercial aircraft. The campaign, identified as "Turbulence Happens," promotes the use of seat belts and child restraint systems onboard commercial aircraft (Towle, 1996).

### **NATURE OF THE PROBLEM**

In the past, if a family was traveling a certain distance (e.g., five hundred miles or less), it was more economical to drive than to fly. Many families considered traveling by air only if it was greater than a certain distance and then it would more than likely be on a major air carrier. As a result, the commuter/regional airline business has historically consisted primarily of the business traveler. However, as travel patterns change and regional airlines become more competitive, more families are likely to fly on these airlines. The problems of the infant safety issues and child seats will become more and more important to traveling parents with infants and, in turn, become more important to the regional airlines. For that reason, this additional study is necessary.

### **METHODOLOGY**

This study ascertains the policies and practices of the United States regional airlines regarding carriage of passengers under two years of age. To the authors' knowledge, such data is not available from secondary sources. Data were gathered from the primary source, which is the management of U. S. regional airlines. Selection of the survey population and data collection methodology are explained in this section of the paper.

The Annual Report of Regional Airline Association (RAA,1996) provides a membership listing of U.S. regional airlines. Information included in the RAA report includes the corporate officers, firm addresses and the number and type of aircraft flown by each carrier. The study focused on regional airlines that fly regularly scheduled flights and operate more than a single aircraft. One hundred and nine regional airlines met the criteria and are the focus of the study.

Selection of the method of data collection required consideration of several characteristics of these carriers and the environment in which U.S. regional carriers operate. The 109 regional airlines are dispersed across the

United States, making it impractical to visit individual sites for personal interviews. A mail survey was selected as the most appropriate means of data gathering from these widely dispersed airlines. This method provided the opportunity to participate to all regional airlines that meet the criteria. A mail survey allowed airline management the opportunity to answer the survey at their convenience, an advantage over using a telephone survey.

A survey instrument was developed to determine the policies and practices of U.S. regional airlines with regard to passengers under two years of age. The survey also offered management the opportunity to express opinions on the issue of infant safety on airlines. The survey instrument and its cover letter appear in an appendix to this paper. The survey instrument was modeled on a prior survey of major U.S. air carriers (Carstenson, Luedtke and Sluti, 1997) modified to account for differences between major carriers and regional airlines. Surveys were mailed to 109 regional airlines in April, 1997. Reply envelopes were coded for respondent identification. A second mailing was sent to non-respondents one month later.

## **SURVEY RESULTS**

Forty-six surveys were completed and returned. An additional survey was returned uncompleted by one airline which had recently ceased operations. The response rate, based on 108 potential respondents, was 42.6%. Responses to individual questions total less than 46 where management did not respond to a particular question. In several cases, respondents checked multiple responses to categories given in Questions 1 through 3. In these instances, the response totals may exceed 46. Responses to questions 4 through 14 of the surveys are summarized in Table 1. Responses to Questions 1 through 3 and question 15 are summarized separately, since they were of a different response format than yes/no. Thirteen of the respondents report use of flight attendants on the majority of their regularly scheduled flights. Twenty-nine reported that they do not use flight attendants. Three airlines reported that they have an even mix of flights with and without flight attendants. One respondent failed to indicate a response to this item. Table 2 compares the responses of those airlines using flight attendants with those who do not use attendants.

Responses to Questions 1 through 3 are summarized in three categories: airlines who stated that they use flight attendants (FA), those who do not (NFA), and those who indicated that about half of their flights use flight attendants (B).

Responses to Question 1, concerning airline policy with regard to infant passengers traveling with an adult, were mainly that an infant flies at no charge with no seat space guaranteed (11 FA, 23 NFA, 3 B). Two airlines,

both NFA carriers, stated that infants fly at no charge with seat space being guaranteed for the infant. One FA, one NFA and one B carrier responded that the infant may pay a discounted fare and receive a separate seat. Four carriers (1 FA, 2 NFA, 1 B) answered that a normal fare may be paid for an infant to guarantee a separate seat. However, for these carriers the option of flying at no charge was indicated, with the exception of the one FA carrier. The "other" category response (1 FA) was that "The parent may buy [a] seat [for the infant] if they are using a FAA approved child seat"; otherwise, the infant will sit on the adult's lap.

Take-off and landing infant restraint policies (Question 2) exhibited the greatest response variety of any of the first three questions. Three NFA carriers advised that infants must be restrained using the adult's seat belt. The most frequent response (5 FA, 19 NFA and 3 B) was that infants are not required to be restrained. One NFA carrier stated that infants must be restrained in a rear-facing child seat. Two FA, seven NFA and two B carriers stated that infants will be secured in a vacant seat if such a seat is available on the flight. For "other" category responses, seven FA carriers and two NFA carriers stated that the parent must restrain the child without using a seat belt.

Emergency landing and turbulent condition restraint procedures (Question 3) also resulted in a variety of responses. One NFA carrier stated that these procedures were the same as for any other passenger, since their airline guarantees infant seat space. Three FA, nine NFA and two B carriers responded that infants are placed in a vacant seat if one is available. Eleven FA, twenty-four NFA and three B carriers replied that infants are to be placed on the parent's lap. None of the regional carriers reported following the policy of at least one of the major air carriers (Grosscup, 1997) which is to place the infant on the floor of the aircraft in emergencies.

Responses, shown in Table 1, indicate that regional airlines vary in their practices and policies in several areas with regard to carriage of infants. Percentages are calculated from the yes/no/not applicable responses and are not inclusive of unanswered questions. While 95 percent of regional airlines do not provide child seats, other policies are not as homogeneous. Thirty-eight percent of the airlines consider child-seats as one of the fare-paying passenger's carry-on allowance items and 56 percent count strollers and/or diaper bags as part of the carry-on allowance. Nearly 20 percent carry oxygen masks which are designed for infant use. Twenty percent of the airlines have extra oxygen masks available for use by infants when all seats have been filled by fare paying passengers.

Table 2 uses the same response data as shown in Table 1; however, the data are grouped by those airlines that reported using flight attendants as compared to those who do not. The data for the three carriers categorized as B carriers are not included in Table 2. Statistical tests of significant differences in

**Table 1: Policies, Practices and Management Opinion**

<i>Survey Question</i>	<i>Yes</i>		<i>No</i>		<i>N/A</i>	
4. Airline provides child seat	1	2%	41	95%	1*	2%
5. Seat counts as carry-on	16	38%	26	62%		
6. Diaper bags and strollers count as carry-ons	22	56%	17	44%		
7. Infant oxygen masks	8	20%	18	44%	15	37%
8. Extra masks	9	21%	20	46%	15	34%
9. Infant injuries	0		45	98%	1	2%
10. Agree with FARs	14	37%	24	63%		
11. Unacceptable danger in FARs	16	39%	25	61%		
12. Need legislation	16	39%	25	61%		
13. Agree with FAA position	23	55%	19	45%		
14. Decide issue on cost/benefit basis	8	21%	30	79%		

\*The single n/a response here and for question 9 was given by an airline which has not yet begun flying scheduled flights.

responses are not possible due to the limited sample size. The sample comprises nearly half of the total of U.S. regional air carriers that met the study's selection criteria. It can be argued that a general pattern can be discerned from these responses as to the policies, practices and opinions of the regional carriers.

With one exception, commuter airlines do not provide infant restraint seats. There is little difference between the FA and NFA groups with regard to their agreement or disagreement with FARs on the issue of infant restraint during take-off and landing. No respondents report having infant injuries during the past five years. One carrier proudly reported that it has had no infant injuries in its 30 years of operation.

Response categorization differs significantly for the two groupings on the rest of the survey questions. Thirty percent of FA carriers count child seats as a carry-on and 36 percent of NFAs do so. The disparity was more pronounced for diaper bags and strollers where 73 percent of the FAs say that these items count as carry-ons, while slightly less than one half the NFAs view these items similarly. FAs are comparatively more liberal than NFAs in allowing child seats as non-carry-ons while FAs are more restrictive in the allowance of diaper bags and strollers. Not surprisingly, the responses to the two questions that focused on oxygen masks varied greatly between the two groups. Sixty-four percent of FAs report having oxygen masks suitable for infants, while only 11 percent of NFAs carry such masks. Extra masks are available on 72 percent of FAs and only 4 percent of NFAs. However, more than half of the NFA carriers reported that their aircraft do not require the use of passenger oxygen masks, which explains the large number of not applicable responses for NFA carriers.<sup>1</sup>

**Table 2: Policies, Practices and Management Opinion**

<i>Survey Question</i>		<i>Yes</i>		<i>No</i>		<i>N/A</i>	
4. Airline provides child seat	FA	1	8%	11	92%		
	NFA			28	997%	1	3%
5. Seat counts as carry-on	FA	3	30%	7	70%		
	NFA	10	36%	18	64%		
6. Diaper bags and strollers count as carry-ons	FA	8	73%	3	27%		
	NFA	13	48%	12	44%	2	7%
7. Infant oxygen masks	FA	7	64%	4	36%		
	NFA	3	11%	9	33%	15	56%
8. Extra masks	FA	8	72%	3	28%		
	NFA	1	4%	11	39%	16	57%
9. Infant injuries	FA			12	100%		
	NFA			29	100%		
10. Agree with FARs	FA	4	40%	6	60%		
	NFA	10	37%	17	63%		
11. Unacceptable danger in FARs	FA	6	55%	5	45%		
	NFA	9	33%	18	67%		
12. Need legislation	FA	6	55%	5	45%		
	NFA	9	33%	18	67%		
13. Agree with FAA position	FA	4	36%	7	64%		
	NFA	17	61%	11	39%		
14. Decide issue on cost/benefit basis	FA	1	9%	10	91%		
	NFA	7	27%	19	73%		

FA = airline uses flight attendants

NFA = airline does not use flight attendants

Opinions on child restraint systems and policies exhibits the same dichotomy of response associated between the FA and NFA groupings. FA carriers came out in support of legislation on this issue by a small margin. Fifty-five percent favored legislation, while 45 percent did not seek legislation. NFA carriers saw only 33 percent favoring legislation. While 36 percent of FAs are in agreement with the FAA position that no policy change on infant restraints is presently needed, 61 percent of the NFAs agree with the FAA stand. A majority of both groups stated that other considerations besides cost/benefit should be taken into account when deciding on the policy of child restraints. Interestingly, there is a large disparity between the FA and NFA carriers in response to this question. Ninety-one percent of FA carriers feel that factors other than cost/benefit should be considered, while 73 percent of the NFAs felt that other considerations should be considered.

## COMPARISON OF SURVEY RESULTS OF REGIONAL AIRLINES WITH MAJOR AIRLINE

Comparing the answers to questions asked of the regional airline personnel with the answers given by management and the reservations agents of the major airlines (Carstenson, Sluti and Luedtke, 1997) produced some interesting results. When members of management of the major airlines were asked to explain the policy of their airlines with regard to infant passengers traveling with an adult, the majority of them said they thought that the child flies on a discounted ticket. However, all ticket agents of the major airlines who were questioned said that no ticket is necessary for an infant passenger who is held on the lap of the adult. Agreement on the policy with regard to the restraint of infant passengers during takeoff and landing was more consistent among the members of management and the reservations agents of the major airlines, all of whom said that no restraint of infants was required.

When the position of management and reservations agents of the major airlines regarding their procedure for the handling of infants during an emergency landing was examined, some variations surfaced. Although most members of management who responded to that question indicated that the infant passenger sits on the lap of the parent, reservations agents were unanimous in their explanation that infants do sit on the lap of the parent.

No members of management of the major airlines said that they provide infant restraint systems for use by their passengers, and virtually all reservations agents agreed. In one question, not asked of management of the major airlines, 87 percent of the reservations agents said that child seats count as a carry on for the adult passenger.

Unlike the questionnaire method utilized by the authors in the earlier research paper, the regional airline survey also gave the respondent an opportunity to provide additional comments regarding the issue of child restraint systems and policies. Several respondents provided such commentary. These comments are summarized below.

*Infants should be restrained, provided a seat, oxygen mask and required to pay the least expensive seat fare.*

*If space is available, infants should be given a seat with proper restraint. If the aircraft is full, it would be desirable to have an on-the-lap alternative restraint system which fits the present mountings but gives the child independent restraint. By using the suggested restraint system...restraint would add considerable child (infant) safety with very little cost...*

*Infant restraint should not be an issue unless the fatality rate for infants is shown to be significantly higher than the total rate for others.*

*Our policy is...to remain competitive. ...infant restraint systems should be required.*

*Parents bringing an infant on a flight should be required to provide or rent an approved seat and buy a ticket for [a] child. People bringing pets onboard an aircraft are required to provide a container or rent one... It is the parents' responsibility since they have the kids and are traveling with them, not the transportation company's [responsibility].*

*....anyone under two should be required to have a seat. The FAA is not the company that would be sued if there was a death of an infant.*

*At a minimum, infants should be held by a capable adult and should not be under parent's seat belt.*

*Airlines should enact their own policy. We do not need more regulations. Although our 17-seat operation would suffer if non-paying passengers were required to have a dedicated seat and restraining system, the safety of infants is a far more important consideration. We would likely institute a charge for infants if they were required to take a seat.*

## IMPLICATIONS AND CONCLUSIONS

It appears from the survey results that significant diversity exists regarding the policies, practices, and opinions of executives of the regional airlines involving infant restraint systems and other safety issues for infants. The majority of the airlines that answered the survey indicated that infants traveling with an adult could fly at no charge but with no seat space guaranteed for the infant. However, there was significant variety in policy among regional airlines regarding take-off and landing procedures as well as emergency landing and turbulent condition restraint procedures. As indicated earlier, the diversity among the regional air carriers regarding several issues appears to be affected by whether or not there are flight attendants onboard. This is not surprising since the flight attendants will be most familiar with the space requirements and limitations of the aircraft and what is available for the infants. Also, the safety issues for the infants will be more apparent to the flight attendants since they deal with the public one-on-one.

One of the concerns (besides the economic concerns of the airlines) of mandating that infants be restrained during take-offs and landings is that this would force parents to drive instead of fly (because of the airlines charging for the extra seat used by the infant), thus leading to more deaths. The variety of comments on question 15 of the survey conducted by the authors demonstrates that this continues to be a hot topic with the regional airlines as was the case with the major air carriers. As indicated previously, some major air carriers and the FAA are trying to educate the traveling public regarding the use of infant restraint systems on commercial aircraft. If the regional airlines want to attract more families to fly with them, they must address this issue as well. There is no question that the variety of policies by the different airlines

is daunting and confusing to a majority of families flying with young children.

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# **FLYING LESSONS: LEARNING FROM RYANAIR'S COST REDUCTION CULTURE**

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## **ABSTRACT**

Through radically improving the value equation for airline customers, Ryanair has served to shake-up established norms and practices in European aviation. Underpinning its price leadership and market success is a vigorous and relentless cost reduction ethos and resultant low break-even load factor. Ryanair has lowered European airline cost structures considerably, shattering existing cost floors. Few competitors are able to follow, either because they do not know how or they are unable due to social settlement obligations or service commitments. At the same time, the company has maintained high average load factors on its flights. Taken in conjunction with its low break-even load factor, this results in consistently high overall profit margins. On this basis, Ryanair is likely to remain a significant competitor and increase its market presence and success across Europe.

## **INTRODUCTION**

This paper examines the cost reduction techniques of one of Europe's most successful low fare airlines, Ryanair, and advances an operational model for other small and medium-sized carriers in Europe. Section one examines the Southwest Airlines-Ryanair cost reduction model and advances it as a prototype for low cost competition in Europe. The second section comprises a critical assessment of Ryanair's cost reduction methods and their success in terms of achieving a consistent decline in unit cost. Specifically, the following two questions are addressed: first, how authentic are the cost reduction methods pursued by low fare airlines such as Ryanair and are these techniques sustainable over time and in the face of vigorous competition? Second, what best practices can Europe's low fare airlines emulate from the Southwest-Ryanair model? The main argument advanced is that through refining the set of techniques of U.S.-based Southwest Airlines,

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Ryanair pursues an authentic and successful cost reduction strategy. This enables the company to redefine European airline cost structures and floors and consistently provide the lowest prices and best value to its customers. Through emulating Ryanair's best practices, European low fare and regional airlines can strengthen their market position and remain a viable competitive challenge to the larger, more established airlines.

Despite the cyclical nature of the airline industry, the European market appears to be buoyant.<sup>1</sup> The U.S. experience indicates that the large number of low fare carriers that emerge in the wake of market deregulation will dwindle over time and only a handful will ultimately survive. Many are driven out of business by insufficient access to landing slots or by predatory activity on the part of larger airlines. Others simply cut prices further than they can afford, effectively pricing themselves out of the market. This is likely to happen in Europe too, particularly with the 1998 launch of British Airway's low cost subsidiary. It is not yet clear which of the cheap carriers will triumph. Ryanair would appear to be a front runner for survival and growth. What is evident is that a place in the market will be assured for cost efficient and reliable low fare airlines. As Ames and Hlavecsek argue, long-term market success is mainly attributable to being a lower cost supplier than all others providing equivalent products or services (1990, p.140). When product distinction fades, as it will inevitably for Europe's low fare airlines, being the low price leader will be one of the few means of achieving sustainable advantage.

The next section will analyse the reasons for Ryanair's likely long-term success and the lessons that might be provided for other low fare companies attempting to create sustainable advantage. This analysis begins by examining the cost reduction model pioneered in Europe by Ryanair, based on that developed by the U.S.-based Southwest Airlines in the 1970s.

### **THE RYANAIR-SOUTHWEST AIRLINES MODEL: A PROTOTYPE FOR LOW COST COMPETITION**

#### **Southwest's Formula for Success**

Commencing service in 1971 with three Boeing 737-200 aircraft and flights to Houston, Dallas, and San Antonio, Texas, Southwest Airlines has grown to become the fifth largest U.S. airline, flying over 50 million passengers a year to fifty-two cities around the U.S. Year-end results for 1998 marked Southwest's twenty-sixth consecutive year of profitability and its seventh consecutive year of record profits.<sup>2</sup> Southwest became a major player in 1989 when it exceeded the billion-dollar revenue mark. The company was the only major U.S. airline to make net and operating profits during the first three years of the 1990s, when the U.S. airline industry experienced a major

downturn in growth and sales revenue. Southwest is the U.S.'s only major short haul, low fare, high frequency, point-to-point carrier.

Southwest Airlines serves price and convenience sensitive travellers. The essence of its strategy is in the activities—choosing to perform activities differently or to perform different activities than rivals. For instance, Porter provides evidence that Southwest tailors all its activities to deliver low-cost, convenient service on its particular type of route. Through fast turnarounds at the gate of only fifteen minutes, Southwest is able to keep planes flying longer hours than rivals and provide frequent departures with fewer aircraft (1996, p.64). Southwest does not offer meals, assigned seats, interline baggage checking, or premium class of service. Automated ticketing at the gate is thought to encourage some customers to bypass travel agents, allowing Southwest to avoid agent commissions. A standardised fleet of 737 aircraft boosts the efficiency of maintenance.

Southwest has staked out a unique and valuable strategic position based on a tailored set of activities. On the routes served by Southwest, a full service airline could never be as convenient or as low cost (Porter 1996, p.64). Collins and Porras argue that genuinely successful companies understand the difference between what should never change and what should be open for change, between what is truly untouchable and what is not (1996, p.66). Southwest is an example of such a company, regularly innovating and constantly differentiating itself from the competition but resisting the urge to tamper with the fundamental features of their strategy formula.

Southwest's rapid gate turnaround, which allows frequent departures and greater use of aircraft, is essential to its high-convenience, low-cost positioning. This is achieved in part due to the company's well-paid gate and ground crews, whose productivity in turnarounds is enhanced by flexible union rules. The bigger part of the answer lies in how Southwest performs other activities. With no meals, no seat assignment, and no interline baggage transfers, Southwest avoids having to perform activities that slow down other airlines. It selects airports and routes to avoid congestion that introduce delays.

The Southwest model is not necessarily easily transferable. Continental and United Airlines both attempted to copy the Southwest model for their low-cost U.S. subsidiaries. They were able to duplicate the route structure and other observable and quantifiable elements but they failed to emulate the Southwest culture (or organisational capabilities)—the key to its success (Couvert, 1996, p.61).

### **Ryanair: The Southwest of Europe**

From its inception, Ryanair has purposefully and openly emulated the Southwest formula—albeit in a form 'refined' for the European context. With the advent of European airline liberalisation, many more low cost carriers

have entered the market. Companies like Virgin Express, Debonair, and easyJet also pursue a low fare, no frills service. They, like Ryanair, look for airports with lower charges and shorter turnaround times, with little concern for interline connections. However, as the UK Civil Aviation Authority point out, the underlying approach of these companies seems generally more like that of ValuJet in the U.S. than of Southwest. Most visibly, they place less emphasis than Southwest or Ryanair on providing a high frequency of operation in all of the markets they serve (CAA 1995, p57). Most of the other start-up airlines such as Jersey European Airways, Spanair, EuroBelgian, and Air Southwest, also offer a limited service and operate on a small number of routes. Therefore, it may be argued that Ryanair is the only true Southwest clone operating in Europe (although easyJet is rapidly gaining ground). This is sustained in a report conducted by U.S. equities research firm, the Robinson-Humphrey Company, who conclude that:

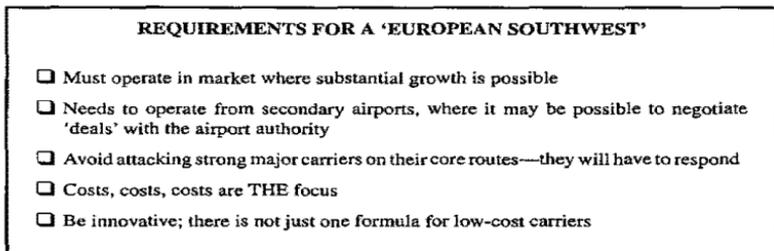
Ryanair is the Southwest Airlines of Europe...in its current stage of development in the European market, Ryanair's market position is analogous to that of Southwest in 1978 when it operated within the state of Texas only. It has the remainder of the United Kingdom, Continental Europe, and Scandinavia in which to expand (1997, p.1).

Like Southwest, Ryanair has a single fleet type, the Boeing 737 aircraft, and is the lowest cost scheduled operator on all its routes. It has high annualised load factors system-wide and unique low cost franchises (aircraft, suppliers, staff). The company's effective use of outsourcing has numerous benefits, serving to lower its long term capital investments, increase its flexibility, and significantly leverage its key capabilities (Quinn and Hilmer 1995, p.63).

Ryanair meets all of the criteria listed as requirements to be a European Southwest (Figure 1), with the possible exception of not invoking vigorous competition with a major carrier on its core routes. On the Dublin-London route in particular, Ryanair has gone head-to-head with Aer Lingus in the competition for air traffic. Whilst not initially flying to the same London airports (Stansted versus Heathrow), Ryanair did pose a significant threat to Aer Lingus's dominant position, prompting the state carrier to launch a low cost competitor in the form of Aer Lingus Commuter. Ryanair management argues that this offshoot carrier does not pose any significant challenge to them and that they are in fact usually vying for different market segments.<sup>3</sup>

Commentators point to a number of infrastructure problems that make it difficult to apply the Southwest model to the European air transport market. These include the high costs of European air traffic control, and landing and ground handling fees (Guild 1995, p.68). Ryanair has largely overcome such competitive impediments through negotiating deals on fees with airport authorities, particularly those seeking to increase their rate of air traffic. The

Figure 1



Reproduced from Sara Guild, 'Not so easy,' *Airline Business*, p. 71, 1995.

company has proven that the Southwest model can be applied in Europe, and, like Southwest, it has operated in what may be termed a niche market for the first few years, 'getting it right,' according to CEO O'Leary (Guild 1995, p.73). Once this base was consolidated, it was only a matter of time before Ryanair would embark on the next step of the Southwest strategy: expansion.

Ryanair is the European pioneer of low fares, no frills service and consistently delivers the majority of growth in all markets in which it operates. A Morgan Stanley report illustrates that typically passenger traffic on a route grows at an enormous rate after Ryanair's entry, often doubling or even trebling the existing traffic within a few years (1997, p.15). The airline pursues steady route network expansion: five Ireland-UK routes in 1992, which had grown to eight by 1994 and twenty-seven by 1998. Ryanair has certainly been a causal factor in the growth of traffic on major routes such as Dublin-London. In the decade prior to Ryanair's launch, passenger numbers on this route grew at a minuscule rate, going from 800,000 to around 1 million people per annum. Since 1985, this figure has soared, reaching the 4 million mark by the late 1990s. Similar growth rates are evident on other routes such as Dublin-Manchester and Dublin-Glasgow.

Ryanair has no formal association with Southwest but possesses many informal links. The company believes that it is more low-cost and more driven by low cost strategy than Southwest. Ryanair management acknowledges though that this may be a time factor—Southwest is established longer and not as eager as Ryanair is to expand and grow.

Southwest and Ryanair's aforementioned rapid gate turnaround, which allows frequent departures and greater use of aircraft, is essential to their high-convenience, low-cost positioning. The main factor behind this is the way in which the companies perform other activities. With no meals, no seat assignments, and no interline baggage transfers, they both avoid having to

perform activities that slow down other airlines. They select airports and routes to avoid congestion also, thus further decreasing the likelihood of delays. Possessing a standardised fleet further contributes to this advantage.

Thus, Southwest and Ryanair's competitive advantage derive in large part from the way their respective activities fit and reinforce one another. As Porter (1996) argues, fit locks out imitators by creating a chain that is as strong as its strongest link. Southwest/Ryanair's activities complement one another in ways that create real economic value and achieve substantial cost reductions.

Southwest's sense of regional focus (on the southwestern United States) and its development of its route network from that base, is also key to its competitive advantage (Couvret 1996, p.63). Similarly, Ryanair's regional focus is the UK/Ireland market and although it has begun to branch out from there to other parts of Europe, its focus on the home base remains clear and committed. As long as this continues, Ryanair will not be seriously threatened by competitors seeking to emulate its success. A danger may be if Ryanair expands too far, too quickly—losing sight of its regional base and entering into an industry position where it may be in danger of being sandwiched between the large, global carriers and the more focused regional carriers. Southwest has developed well beyond its original focus of the southwestern United States, offering services to other geographical locations such as Baltimore-Washington and Florida. There is no reason why Ryanair cannot do the same, provided its new routes are built on the solid base of home territory.

### **A COST STRUCTURE ANALYSIS OF RYANAIR**

The logical next step in this analysis is to examine Ryanair's cost structure and clearly establish the authenticity of its cost reduction tactics. Are lower operating costs achieved through a genuine strategy of lowering the cost of fuel and ticketing or in-flight services and increasing productivity levels, or through an artificial form of cost reduction based on, for example, salary freezes or introducing more part-time positions? How sustainable is the Ryanair model if lower costs are achieved through lower service standards and lower wage rates? In addition, the author will explore the management of airline cost drivers. Holloway (1997) describes this as, in large part, the interplay between improved asset utilisation and increased employee productivity:

Unit costs are influenced by the absolute level of input prices and by the productivity of inputs used. High productivity can go some way towards countering the adverse impact of high input prices, but the ideal is clearly to combine in a single production process both high productivity and low input costs (Holloway 1997, p.188).

Previous studies support the argument that factors such as the number of aircraft types in a fleet, the range of markets served, remuneration packages, the level of service, and traffic charges, all contribute to higher operating costs for airlines (Seristö and Vepsäläinen 1997, p.12). On the first of these variables for instance, evidence derived from Seristö and Vepsäläinen's study of forty of the world's largest airlines shows that airlines with the most uniform fleet (Southwest, Singapore, Cathay Pacific) also have shown some of the best results in recent years. One reason for this is that:

the higher the number of aircraft per aircraft type, the smaller the number of flight crew needed per one aircraft. This again would imply that the more uniform the fleet of airline, the more efficiently the airline can utilise its pool of pilots (Seristö and Vepsäläinen 1997, p.17).

In addition to lower overall maintenance costs, a uniform fleet leads to savings in flight operations costs. Ryanair operates a single type aircraft fleet, comprising only Boeing 737s. Consequently, its overall employee per aircraft ratio is one quarter that of its traditional rival, Aer Lingus.<sup>4</sup>

Moreover, the company serves a limited number of markets, links employee salaries to performance, provides a basic—no frills service, and incurs the minimum in traffic charges. It therefore meets many of the criteria deemed necessary to bring about an authentic reduction in its operating costs.

Since 1995, Ryanair has managed to reduce costs annually in all areas of expenditure, with the exception of personnel and depreciation.<sup>5</sup> Increases in depreciation reflect the increase in the number of aircraft operated by the company (an average of 17 during 1997, compared to 11 during 1996 for example).

It should be noted that in parallel with a rise in overall operating expenses, Ryanair witnessed a significant increase in overall passenger numbers and in the number of routes served. The route network more than tripled between 1995 and 1998. During the period 1995 to 1998, Ryanair's annual number of passengers increased from 2.3 million to just over 4 million. Equating these numbers with the comparable annual operating expenses<sup>6</sup> to get a rough average of expenses per passenger head, demonstrates that the airline has in fact succeeded in successively lowering its operating expenses.

### **Checking for Consistency in Cost Reduction**

Figure 2 lists the areas in which Ryanair has successfully pursued cost reductions. Some, such as maximising aircraft utilisation, are not particularly innovative and can be emulated relatively easily by competitors. Other techniques, such as the no frills service or offering a through service with no baggage interlining facilities, are more difficult to copy, particularly for larger carriers with reputations for high quality service.

Figure 2

**Ryanair's Cost Reduction Techniques**

1. *Secondary airports* (lower charges and less congestion means airline can increase punctuality rates and gate turnaround times).
2. *Standardised fleet* (lower training costs and cheaper parts and equipment supplies).
3. *Point-to-point services* (direct, non-stop routes; through-service with no waiting on baggage transfers).
4. *Maximise aircraft utilisation* (fewer aircraft used to generate higher revenue; leads to higher passenger capacity and greater staff productivity).
5. *Cheaper product design* (no assigned or multi-class seating; no free food or drink).
6. *No frequent flyer programme* (costs money to manage and to implement).
7. *Non-participation in alliances* (code sharing and baggage transfer services lowers punctuality and aircraft utilisation rates and raises handling costs).
8. *Minimise aircraft capital outlay* (purchase used aircraft of a single type).<sup>1</sup>
9. *Minimise personnel costs* (increase staff-passenger ratio; employee compensation linked to productivity-based pay incentives).
10. *Customer service costs* (outsource capital intensive activities, e.g. passenger and aircraft handling; increase direct sales through telephone reservation system).
11. *Lower travel agent fees* (reduce associated travel agent commission – 9 to 7.5%).

<sup>1</sup>This cost reduction technique is no longer valid in light of Ryanair's 1998 order for 45 new aircraft.

Ryanair configures its aircraft with 130 seats, with very little space dedicated to anything else other than a bar and duty free service. By optimising the space available for seating, the airline achieves about a 30 percent increase in seating compared to Aer Lingus. The company now has a twenty-five minute gate turnaround, compared with thirty minutes in 1996. This increases aircraft utilisation and flight crew efficiency and productivity by about 15 percent. This means for instance that on the Dublin-London route, Ryanair can get ten flights a day, compared with seven for Aer Lingus. Most companies show their fares to rise annually; Ryanair attempts to stay level or even move down, believing that is where the future for their business is—lower fares, more travel, easier travel, and more spontaneous decisions to travel.

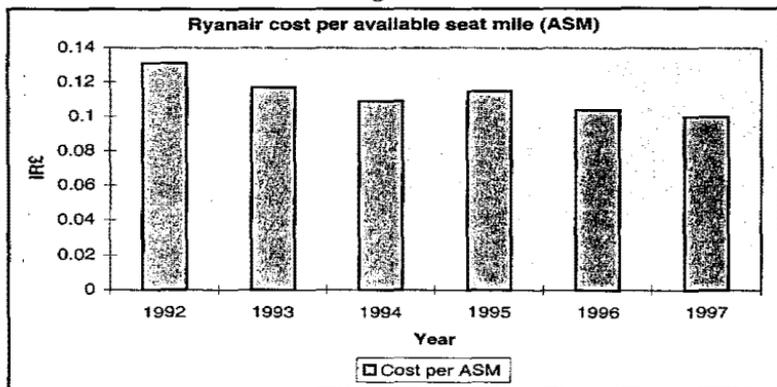
The British CAA argues that Ryanair's strategy seems to be working well, particularly in terms of stimulation of new demand. They conclude that:

it remains to be seen whether this concept will be taken up successfully by other airlines or will readily translate to those other markets in Europe which do not have the rather special characteristics of that between the UK and Ireland (CAA 1995, p.34).

The most solid evidence for the genuine success of Ryanair's cost reduction strategy is evident in the company's cost per available seat mile (ASM) over the past number of years (Figure 3).

Estimating cost, or operating expenses, per ASM is an efficient ratio for calculating an airline's unit cost outlay. The average cost for Ryanair compares very favourably with the European industry norm and is substantially lower than many of its immediate competitors on the routes it operates. Aer Lingus, British Midland, and KLM UK all have unit operating costs of about IR£0.15—roughly 50 percent more than those of Ryanair. Indeed, as a 1997 Morgan Stanley report argues, the other European carriers can produce unit costs equivalent to or below Ryanair's only when the average stage length (journey distance) is at least five times longer than Ryanair's.<sup>7</sup> This suggests that their unit costs on the short-haul routes, which are Ryanair's mainstay, will be substantially higher—a proposition which is borne out by the evidence. Ryanair's unit operating costs are significantly higher than most U.S. low fare carriers, most notably the low fare benchmark, Southwest Airlines (\$0.14 versus \$0.75). The difference is partly due to longer stage lengths in

Figure 3



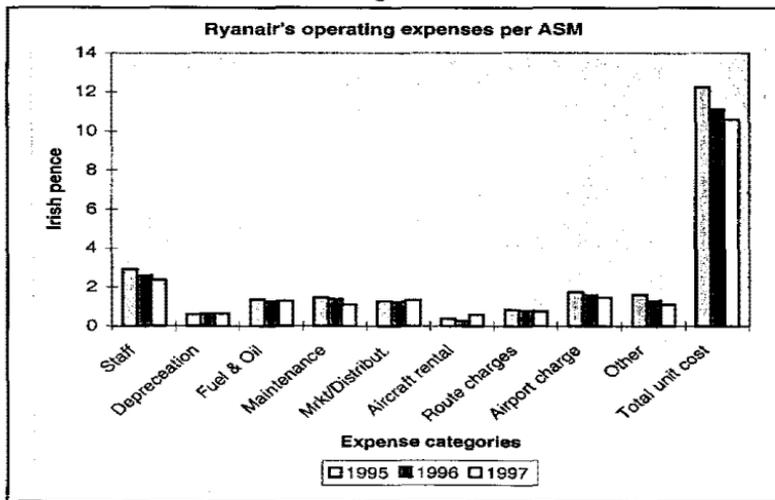
Source: company data

the U.S. (521 miles average for Southwest compared with a Ryanair average of 251 miles). It is estimated that if Southwest had an average journey length commensurate with Ryanair, its cost per ASM would be in the region of \$0.12. Another explanatory factor is the generally lower infrastructure costs and fuel prices in the U.S. (Morgan Stanley 1997, p.33). Estimates put operating costs in Europe at some 55 per cent higher than in the U.S. (Robinson-Humphrey 1997, p.13). Given that carriers operating in Europe are all constrained by these factors, it is difficult to see how unit costs comparable with Southwest could be achieved in the European industry. As such, Ryanair's competitive advantage in unit operating costs would appear secure.

If we deconstruct the overall cost per ASM for Ryanair over a period of time, we can establish whether or not the airline has achieved genuine and successive reductions right across its cost base (Figure 4).

Some anomalies exist in this data, e.g. aircraft rentals increased as a fraction of unit cost between 1996 and 1997. Such increases are generally outside of the direct control of Ryanair in terms of cost control activities. Overall, the figures illustrate that Ryanair in fact succeeds in progressively lowering most of its costs, even in the context of a rapidly expanding route network and fleet size and increased staff bonuses.

Figure 4



Source: company financial reports

Figure 5  
Ryanair operating expenses as a percent of operating revenues

1994 - 89.7%	1996 - 82.2%
1995 - 83.4%	1997 - 82.4%

Costs have fallen faster than yields within Ryanair, allowing profits to rise consistently. Expressed as a percentage of operating revenues (Figure 5), operating expenses declined steadily between 1994 and 1996 and increased only marginally in 1997, despite above average rises in personnel and maintenance costs.<sup>8</sup>

This evidently translates into steadily increasing operating profit margins in the same period, going from 10.3 percent in 1994 to 17.6 percent in 1997.

#### Personnel Costs: Maximising the Return on Human Capital

Personnel costs account for the largest share of Ryanair's cost pie, as with all airlines. These accounted for 24 percent of operating expenses in 1995, 23.4 percent in 1996, and 22.3 percent in 1997. Such a large fractional cost is inevitably a prime target for reduction in outlay and has been gradually pared back. In absolute terms, Ryanair's staff costs have increased each year due to the release of accrued and unpaid staff bonuses and compounded by the growth in Ryanair staff from 698 to 988 employees during the same period.

The airline is, of course, bound to have a lower staff cost compared to its larger competitors because they have scaled down operations (their network is not as extensive) and the company has implemented more performance-related pay schemes. It has to be noted that personnel costs are an area where Ryanair has focused particular attention on cost cutting. For example they outsource their maintenance and customer service activities, other than cabin and flight crews. This move alone has reduced their headcount considerably, and provides an advantage over their competitors who bear the full cost of their own customer service, although their competitors are offering a full-service to their customers which may well mean having to carry out their own customer service activities. Such outsourcing of customer services has drawbacks also, with Ryanair passengers often are not receiving the same degree of support service which customers on competitor airlines receive.

On employee productivity, Ryanair again fares well (Figure 6). This is one of the most significant differences between Ryanair and other airlines. The graph clearly shows the astounding differences between the airlines.

These figures indicate overall that Ryanair generates more money per employee than its competitors, in part by utilising their aircraft more effec-

Figure 6

EMPLOYEE PRODUCTIVITY, 1996 versus 1997				
	Ryanair		Aer Lingus	Southwest
	1996	1997	1997	1997
Employees per aircraft	55	52	201	88
Revenue per employee (IRÚ)	185	186	116	87
Passengers per employee	3,967	4,377	666	2,247

Source: Ryanair internal company documents, 1997.

tively and therefore generating more revenue, which thereby means a greater return is made for the initial asset cost. The company also employs the capital initially invested so well that they receive more return on that investment by increasing its value.

The main conclusion to be drawn following consideration of company accounts and other financial information is that Ryanair has managed to hold down their employee costs and maximise productivity, largely through performance-related pay schemes. Considering that this particular cost is their largest outlay, its control would probably have a significant impact on the profit margins. Nonetheless, Ryanair is more efficient in its operations, compared to many competitors, despite its scaled down operation.

### **Operational and Relational Cost Reductions**

Internal company sources<sup>9</sup> indicate that Ryanair is targeting all areas for constant cost reduction but distribution is under particular scrutiny. This includes computerisation systems, ticketing systems, travel agencies costs and internal reservation costs. Maintenance is another area targeted for constant cost reduction. A long-term strategic relationship exists with providers such as Lufthansa and Airmotive Ireland. Giving them large volumes of extra work, and on that basis, Ryanair expects to see significant reductions in their unit costs.

The company is also unhappy with current airport and handling costs. The management believes that there is always room for further cost reductions. Many smaller, expanding airports (e.g. Bournemouth) offer much better deals than do the likes of Stansted. These airports benefit by having a much higher volume of traffic. Ryanair drives a hard bargain because they believe that airports have relatively low cost margins and can provide a low tariff for handling and landing costs. Airports can and should concentrate on earning profits from the revenue generated by passenger traffic. For instance, it is estimated that the average spent by Ryanair customers in Bournemouth Air-

port is over st£20. Airlines should get the cost base and airports get the revenue base. The lesson to be learned is that airports should provide the lowest possible tariffs to airlines and focus on the airlines' passengers for profit generation. A mutually beneficial sequence thus develops: airlines can reduce airports costs and can therefore reduce ticket prices; passengers get cheaper flights and can consequently spend more at airports and on in-flight gift items; airports get higher revenue generated by the passengers.

Since Ryanair's drive to reduce travel agent commissions, relations with this sector are described by Ryanair management as 'fraught if not bad'. There are some agents who won't sell seats on their flights but most of the major agencies are earning significantly more revenue from Ryanair each year and it is therefore in their interest to keep on good terms with the airline. Thus, travel agents get less commission from Ryanair but are getting increased capacity; therefore, they end up earning more from the company in the long run.

Fundamentally, cost is of the essence for Ryanair. There is nothing unique in an airline having such a corporate ethos. As Morrell argues, surveys of airline finance directors in Europe, North America, and Australasia illustrate that control of costs is the most pressing financial issue (1997, p.10). There are nonetheless, a few 'holy grails' that the company does not touch—safety for instance. Ryanair has a perfect safety record and regular aircraft maintenance and safety checks. The Irish Aviation Authority closely audits its safety and maintenance procedures.

### **Low Costs and High Profits**

Ryanair performs well on standard determinants of revenue maximisation, defined by Seristö and Vepsäläinen as passenger load factor, weight load factor, passenger yield, cargo yield, and traffic composition (1997, p.12). Ryanair has shown continuous improvement in its figures since the early 1990s (Figure 7) and although its operating revenue is lower than route competitors such as British Midland or Aer Lingus, its costs are also in proportion, hence the airline's ability to maintain low price fares.

Ryanair has been consistently profitable since 1991. The carrier has average load factors of 72 percent<sup>10</sup> and is driving yields down. The load factor measures the percentage of an airline's output that has been sold (Holloway 1997, p.437). In layman's parlance, it means basing an airline's financial strategy on the average number of seats sold per flight. This is distinct from yield management, which focuses on the average revenue generated per unit of output (seat) sold. As Ryanair CEO Michael O'Leary states, 'we do not manage yields, we manage the load factor...our budgets are based on driving costs down by x per cent next year' (Airline Business, June 1995, p.73). Managing load factors is not enough to ensure profitability. As Holloway illus-

**Figure 7**  
**Ryanair operating revenues and profit margins\***

<i>Year ended</i>	<i>31 Mar. '95</i>	<i>31 Mar. '96</i>	<i>31 Mar. '97</i>	<i>31 Mar. '98</i>
Operating revenues	86.1m	110.1m	136.4m	182.6m
Adjusted net income <sup>1</sup>	14.0m	20.0m	23.0m	30.7m
Profit after tax <sup>2</sup>	12m	13.4m	21.4m	30.2m

Source: Ryanair annual financial results

\*All figures given are in Irish punts. The value of the punt to sterling was approximately 89p Irish to £1 sterling during 1998.

<sup>1</sup>Adjusted net income includes non-continuing management bonuses and other 1998 bonuses

<sup>2</sup>Adjusted for the staff flotation bonus in 1997, which amounted to IR£1.3 million, net of tax.

trates, in 1993 for instance, Aer Lingus achieved a load factor of 70.4 percent and failed to make a profit, whereas both British Airways and Cathay Pacific had passenger load factors of 69.9 percent and 70.0 percent respectively and both made a profit (1997, p.442). The issue is rather one of relating the average load factor to the break-even load factor. Improving this equation is the objective of every airline. Selling seats on flights must be combined with overall cost reductions if an airline is to be profitable. Figure 8 illustrates that for Ryanair, the margin of difference between average load factor and break-even load factor has been consistently positive during the mid- to late-1990s.

Furthermore, the gap between these two sets of figures has increased annually, allowing the airline both further latitude in price-cutting and ensuring continued increases in absolute profit figures. Although Ryanair may periodically experience declining yields, it also secures falling costs, suppresses its break-even load factor, and therefore consistently turns a profit. To date, costs have consistently fallen by more than sales, resulting in overall net profits. From the evidence, it is therefore apparent that Ryanair's cost reduction strategy is accomplished through authentic means and is clearly achieving real results in terms of sustaining the company's price leadership strategy and ensuring profit maximisation.

**Figure 8**  
**Passenger load factors (PLF) and break-even load factors (BELF) compared**

	<i>1995</i>	<i>1996</i>	<i>1997</i>
PLF	76%	73%	72%
BELF	72%	68%	64%

## CONCLUSIONS

Low fare airlines have succeeded in revolutionising the European airline industry's price norms and costs structures. The leading industry shaker has been the independent Irish-based carrier, Ryanair. Through initially following the example set by U.S.-based Southwest Airlines, Ryanair has pursued an authentic and successful cost reduction strategy. This has enabled the company to achieve low break-even load factors and high overall load factors. This consequently allows the airline to provide consistently low prices to its customers, whilst simultaneously sustaining high profit margins. Ryanair's main cost reduction techniques include first, operating a standardised fleet; second, flying exclusively from or between secondary airports and establishing a secondary route dominance; third, operating a point-to-point service; fourth, offering a cheaper, no frills product (no seat classes or free food and drink); fifth, non-participation in restrictive alliances or expensive frequent flyer programmes; sixth, productivity-based pay schemes; seventh, an extreme focus on aircraft utilisation, leading to high load factors; eighth, reduced travel agent commission rates; and ninth, reduced customer service costs through outsourcing ground passenger and baggage handling for instance. Through emulating Ryanair's cost reduction practices and achieving similar low break-even load factors, European low fare and regional airlines can strengthen their market position and remain a viable competitive challenge to the larger, more established airlines.

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## ENDNOTES

- 1 European air traffic grew by 11 per cent between 1996 and 1997 (*Financial Times*, October 22nd 1997).
- 2 Southwest Airlines Fact Sheet, May 1998.
- 3 *Financial Times*, op cit.
- 4 These statistics are taken from a Ryanair internal company document, 1997.
- 5 Ryanair's company accounts illustrate this fact.
- 6 The annual operating expenses were IR£71.9 million for year ended (FYE) 31 March 1995, IR£90.86 million FYE 31 March 1996, IR£112.4 million FYE 31 March 1997 and IR£149.5 million FYE 31 March 1998.
- 7 Unit costs naturally reduce as the journey distance gets longer as taking off and landing are relatively expensive compared with flying along at altitude. It is therefore important to take journey length into account when comparing unit costs.
- 8 Increased maintenance costs were caused by the acquisition of eight new aircraft during 1997/8.

9 Interview with Ryanair's Director of Operations, Dublin, September 1997.

10 This is considerably higher than the estimated European average load factor of 62 per cent.

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# CULTURE IN THE COCKPIT—CRM IN A MULTICULTURAL WORLD

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## ABSTRACT

Crew Resource Management (CRM) is fundamentally a method for enhancing personal interactions among crewmembers so that safety and efficiency are increased, and at its core involves issues of culture and social interaction. Since CRM is increasingly being adopted by foreign carriers, it is important to evaluate standard CRM techniques from a cultural standpoint, especially if some of these techniques may be enhanced by adapting them to particular cultures. The purpose of this paper is to propose a model for an ideal CRM culture, and to suggest ways that CRM may be adapted to suit particular cultures. The research method was a simple literature search to gather data on CRM techniques and multicultural crews. The results indicate that CRM can be tailored to specific cultures for maximum effectiveness.

## INTRODUCTION

Crew Resource Management (CRM) has been adopted by virtually every major U. S. airline as a highly effective method of training airline crews to be safer and more efficient. One of the fundamental tenets of CRM is to improve communications and interpersonal relationships between crewmembers. While this idea has been one of the reasons CRM has succeeded in developing better flight crews, it is also very dependent on cultural values, and many critics have questioned the effectiveness of CRM when applied to non-U.S. flight crews. Since the world is rapidly becoming a global workplace, with an exponential growth in air travel, it is vital that foreign carriers foster the same level of safety and crew coordination that has been achieved in the U. S. via the methods of CRM. But if cultural differences invalidate the fundamental precepts of CRM, then trainers are presented with a dilemma. Do they con-

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tinue to apply CRM even though its basic concepts may be lost on crewmembers from other cultures, or do they attempt to adapt the proven principles of CRM to be culturally specific? For the purposes of this study, culture is defined more specifically as *national culture*. While organizations and professions tend to have their own cultures also, these will not be addressed. The focus of this study is strictly upon cultural differences arising from nationality.

## BACKGROUND

The classic definition of crew resource management is “the effective utilization and management of all resources—information, equipment and people—to achieve safe and efficient flight operations” (Pettitt, 1995). The widespread introduction of CRM techniques into airline operations in the United States began in the late 1970s, primarily because of a combination of airline crashes due primarily to crew error, and the results of some groundbreaking research conducted by NASA into the causes of airline accidents. NASA’s research indicated that more than 70 percent of airline accidents involved some degree of human error, and most of these errors were due to failures in communications, teamwork and decision making (Helmreich, 1997). A variety of programs were subsequently developed, collectively known as crew resource management, to deal with the emerging realization that most accidents could be prevented by improving crew interactions. CRM is grounded in social, cognitive and organizational psychology, as well as in human factors research (Helmreich, 1997), and has become a fixture in every major U.S. airline’s training program. One of the basic assumptions of CRM is that human error is a universal phenomenon, and the techniques of CRM thus serve as a “safeguard for the limits of human performance” (Merritt & Helmreich, 1996, p. 2).

While it’s difficult to quantify CRM’s effect on the safety records of U.S. airlines, the Federal Aviation Administration (FAA) is sufficiently convinced of its value that it has made CRM training mandatory for all major and regional U.S. carriers (Helmreich, 1997). While the FAA exercises jurisdiction over all U.S. airlines, it has no authority over foreign carriers. Nevertheless, many foreign carriers have also implemented CRM training for their crews, and many more will certainly follow suit. This is certainly encouraging, but some CRM experts have raised the question of whether CRM’s techniques are based upon cultural values that are unique to Western European society and so may not be applicable to other cultures. With the explosion in international air travel, and the growing trend toward forming alliances between multiple U.S. and foreign carriers, there is a growing concern with the issue of CRM vs. national culture, and with finding ways to adapt CRM so that it is universally applicable to all cultures.

## DEFINITION OF CULTURE

Culture is defined as “the values and practices that we share with others that help define us as a group, especially in relation to other groups” (Merritt, 1993, p. 13). There can be many different types of cultures (national, organizational, occupational, etc.), but in this study only national culture will be considered. Cultures can also be thought of as a system of interconnected, hidden rules. The rules of one culture usually do not mix well with those of another culture. As a result, when a person tries to interpret another culture using the rules of their own culture, they find it strange, irrational, uncontrollable and unpredictable (Jones, 1996). In light of these definitions of culture, it is quite obvious that CRM, which at its fundamental level addresses issues of human behavior, should probably be tailored to fit the culture in which it is applied. The challenge then is to classify the multitude of national cultures that exist on our planet in such a way that CRM techniques may be effectively tailored to each culture. The first question that must be answered if we are to do this is: Can national cultures be grouped in such a way as to make this task more manageable? Fortunately, the answer is yes.

## OVERVIEWS OF VARIOUS NATIONAL CULTURES

In his ground-breaking research on the role of national culture in relation to flight crew behavior, Hofstede identified three aspects of national cultures which are particularly relevant to CRM—the relationship between subordinates and superiors (“power distance” or PD), the ways that different cultures deal with uncertainty (“uncertainty avoidance” or UA) and the extent to which individuals’ behaviors are influenced and defined by others (“individualism–collectivism” or IND) (Hofstede, 1991). Power distance can be further defined as the extent to which the less powerful expect and accept that power is distributed unequally. Other research has indicated that there is also a significant inverse relationship between PD and IND. Cultures that score high on individualism tend to score low on power distance, while cultures that score high on collectivism (i.e., low IND) tend to have much greater power distance. While Hofstede’s research did not indicate a similarly strong correlation between UA and either PD or IND, later research indicates that there is a correlation. Specifically, cultures which score high on UA (indicating a preference for rules and set procedures) tend to score high on PD and low on IND (Merritt, 1998). Countries which fall into this category include Korea, Taiwan, Malaysia, Brazil, Mexico and the Philippines. Conversely, those cultures which score low on UA (indicating a greater tolerance for ambiguity and a desire for more flexibility) tend to score low on PD and high on IND. The United States, New Zealand, South Africa, Ireland, Great Brit-

ain, and Australia all fall within this category. Figure 1 gives a graphical example of these correlations.

Another convenient way to classify national cultures is “high context” versus “low context.” In high context cultures, much more emphasis is placed on communications, although they tend to “talk around” rather than directly state their point. They also tend to focus more on the people they are dealing with, rather than on the goal or task that is to be accomplished. Also, *who you are* is more important than *what you do*. Examples of high context cultures include Russians, Asians, Southern Europeans, and Central and South Americans. Low context cultures, which include Germans, Scandinavians, Northern Europeans and Americans, communicate much less, and tend to be direct and to the point in their communications. They also focus primarily on the goal or task, rather than the person—what you do is more important than who you are (Jones, 1996). In general, high context is associated with high PD, low IND, and high UA, while low context is associated with low PD, high IND and low UA.

These aspects of national culture strongly affect the level and nature of communications and social interaction among flight crews (Merritt, 1993). Since communications and crew interaction form the basis of CRM, national culture must certainly be considered when attempting to implement CRM in a multi-cultural environment.

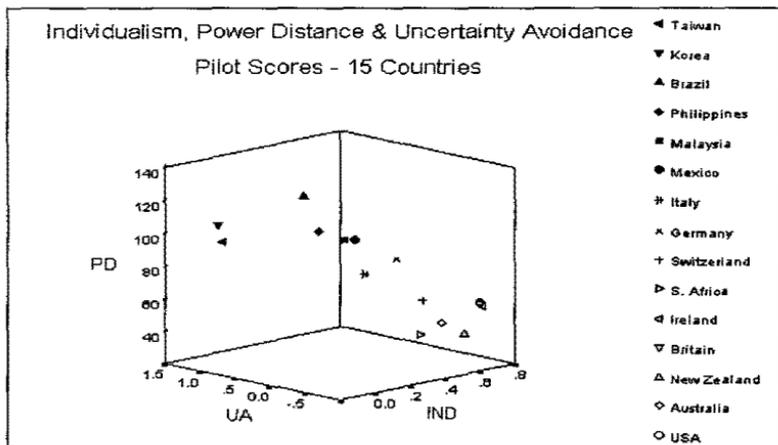


Figure 1. IND, PD and UA for Different Cultures (Merritt, 1998)

## ASPECTS OF NATIONAL CULTURE RELEVANT TO FLIGHT CREWS

Crew members from individualist, low context cultures will tend to be much more independent and self-reliant, and prefer more individual responsibility with open and direct communication only as needed (Merritt, 1993). These characteristics fit in well with the CRM concepts of assertiveness and questioning the decisions and actions of superiors. On the other hand, low context cultures are less likely to respond to CRM's call to share responsibilities and improve interpersonal relations. In fact, a U.S. airline captain once referred to these aspects of CRM as "hot tub harmony" (Helmreich and Merritt, 1997, p.1)

In contrast to low context cultures, crew members from collectivist, high context cultures prefer much more interdependence and group oriented activities, with more indirect and a greater volume of communications (Merritt, 1993). Pilots from these cultures will tend to do very well at communicating, sharing responsibility, and building group cohesiveness, but will almost universally avoid, sometimes to an extreme degree, questioning the actions or decisions of their superiors.

As a practical example of the differences in national culture that may affect the success of CRM training, consider the following findings from Merritt and Ratwate (1998). Brazilian pilots rated advancement to high level positions as the most important work value. Taiwanese pilots ranked it next to last, while Anglo pilots (U.S., Australia, Ireland, etc.) ranked having sufficient time away from work for personal or family life as the number one work value. Korean pilots feel greater shame when they make a mistake in front of other crewmembers (one Korean crew chose to remain in their burning cockpit following a crash rather than face the humiliation of having crashed their aircraft). Filipino crews view their airline as a large family and expect their captains and management to behave in a benign, paternalistic fashion. Taiwanese pilots show the strongest preference for rules and set routines. These are just a few examples of the cultural differences found among international airline crews. No wonder many CRM professionals are calling for CRM training that is specifically adapted to the culture of the crews being trained.

## UNIVERSALS ACROSS ALL CULTURES

Having sufficiently established that there are significant cultural differences among flight crews of different nationalities, one may ask the question—Are there any universal values shared by flight crews from all cultures? Recent research indicates that there are. In a survey of pilot attitudes about cockpit management, measured via a Cockpit Management Attitudes Questionnaire (CMAQ), researchers found that pilots from every cultural group

surveyed strongly agreed that coordination and communications (briefing and verbalizing plans, coordination between cockpit and cabin crews, etc.) were vitally important (Helmreich and Merritt, 1997). This is encouraging since communications between crewmembers is a key element of CRM. On the other hand, another key element of CRM—questioning authority—turned out to not be universally accepted among all cultures. The study found that there were extreme cultural differences as to whether junior crewmembers should question the actions of captains, with low context cultures strongly agreeing that junior crewmembers should question their captains and high context cultures strongly disagreeing.

Given these results, we may conclude that there is definitely universal acceptance across cultures for some CRM elements, while others are not universal at all. In light of this fact, it is probably not possible to develop a universal CRM curriculum. Fortunately, as discussed previously, research also shows that cultures generally fit into one of two categories—low context or high context—so that rather than develop a multitude of different CRM approaches, only two should suffice. The challenge then is to develop a tailored CRM that stresses the universals that all cultures agree upon, while presenting the other key elements in a way acceptable to the particular culture in question.

### **TAILORED CRM FOR DIFFERENT CULTURES**

Before considering how CRM may be adapted for various cultures, first consider whether there is an ideal national culture that is best suited to CRM. Since the primary goal of CRM is to reduce crew errors by improving interpersonal communications and by promoting a more healthy working relationship between junior and senior crewmembers, the ideal culture would be one which scored low on both IND (which indicates a greater tendency to be group-oriented and to emphasize interpersonal communications) and on PD (indicating less of a gap between superiors and subordinates). A high UA score would probably also be desirable, especially for airline crews. So then, a crew with low IND, low PD and high UA would probably be the ideal crew from a CRM perspective. Unfortunately, no such crew exists, because cultural characteristics seem to preclude the right combinations of IND, PD and UA. Perhaps the best one can hope for is a culture that falls into the midrange for all these variables. If so, then figure 1 indicates that German crews would be best (with approximately mid-range values for IND, PD and UA).

Having established that there is probably no national culture that perfectly suits the basic principals of CRM, then we must decide which techniques will work best for each culture. There are numerous anecdotal stories about CRM instructors encountering problems with crewmembers from non-Western

European cultures. For example, one Japanese airline captain wrote,

Japanese modesty is not seen as a virtue in the American culture. In the team discussions during the CRM seminars, I felt that the Americans did not easily accept another person's opinion, whereas Japanese tend to accept another person's opinion whether right or wrong in order to preserve harmony within the group (Yamamori, 1986, p.76).

On the other hand, the same pilot wrote, "Authority is rarely challenged in a group-oriented society [like Japan]. But as we in the airline industry know, this kind of attitude has led to many fatal accidents" (Yamamori, 1986 p. 79). CRM classes that stress questioning authority, and the need to decrease PD, would probably be most beneficial to Japanese crews. At the same time, the heavy emphasis on interpersonal communications and group cohesiveness probably would not be necessary, since this comes natural to the Japanese. The Japanese are generally representative of a high context culture, and so the lessons learned with them are probably applicable to other high context cultures also.

As indicated by the Japanese pilot, Americans (and other low context cultures) would probably benefit from more emphasis on interpersonal communications and less on questioning authority. Even though good crew coordination is one of the universals defined above, crews from low context cultures still find it hard to practice the extensive communications that typifies high context cultures. On the other hand, questioning authority seems to come natural to these cultures. Consequently, emphasizing communications and group relationships would be more beneficial to low context cultures.

Does this mean that traditional CRM will not work unless it is culturally adapted? No! But it does imply that perhaps CRM can be adapted to both take advantage of the strengths of a particular culture and to strengthen its weaknesses.

## RECOMMENDATIONS

There are several recommendations that may be made based on the results of this study. First of all, CRM could be made more effective by adapting it to the culture in which its being taught. Since cultures can broadly be divided into two distinct types (low and high context), the simplest approach is to design two different CRM curriculums. While these would not be exactly customized for every culture, they would be broadly applicable within the two cultural categories. Specifically, CRM for high context cultures should focus on lowering the typically high PD value that characterizes these cultures. The communications aspects (IND) of CRM could be correspondingly de-emphasized in high context cultures (although not eliminated).

As for pilots from low context cultures, the traditional CRM emphasis on questioning authority and making your opinion known could be de-emphasized somewhat in favor of more training in interpersonal communications. This would also take advantage of the universally acknowledged (even among low context pilots) importance of good communications in the cockpit. In other words, CRM for these pilots should focus on decreasing their IND while maintaining their already low PD numbers.

### CONCLUSIONS

CRM is a proven method for enhancing the safety of airline crews, and thus airline operations. However, CRM does suffer somewhat from a cultural bias toward Western, "low context," cultural values. When CRM methods are taught to airline crews from other cultures, the effectiveness of the training could be enhanced by tailoring CRM to the culture of these crews. While this may appear to be an impossible task given the multitude of cultures that exist on the planet, research has shown that cultures may generally be classified as either "high context" or "low context." Because of this, it is very feasible to adapt CRM to either of these cultural groups, and thus to greatly enhance its usefulness and value.

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## BOOK REVIEW

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Andersson-Skog, L. & Krantz, O. (Eds.). (1999). *Institutions in the Transport and Communications Industries*. Canton, MA: Science History Publications. Pp. xix + 359. ISBN 0-88135-201-2. U.S. \$49.95 hard cover.

Reviewed by Andrea E. Goldstein, OECD Development Centre, Paris, France

Transport history is cardinal in Economic History research. Interrelated changes in the economy and the technology of transport and communication colored the birth of industrialization. It would be impossible to imagine the expansion of Europe and the United States in the nineteenth century without railways; the growth of international trade and the incorporation of the settler economies of the Americas and Oceania into the world economy without shipping; the on-going globalization of production and consumption without airplanes. Nowadays, huge and rapid progress in information and communication technology are shaping the latest structural changes in mature industrial systems, while also putting the seeds for the growth of the new and ever more sophisticated forms of the service economy.

Wider data availability has made it possible to make considerable progress in most fields of transport history, in particular as refers to the early industrializing period, roughly 1750 to 1914. Here, we have a vast understanding of the impact of canals and inland waterways, railways, and shipping on industrialization. The influence of the so-called New Economic History tradition in the 1960s—of which 1997 Nobel laureate Robert Fogel is the undisputed symbol—has been particularly important. The goal was to integrate neoclassic econometric methods into the study of economic history, focusing on the question of the importance of railways in economic development. Even though this approach initiated an important international debate on social savings that continued for more than a decade, it did not widen the scope of transport history on a permanent basis. More recently, transport development during the inter-war period—in particular motor transport, both public and private, and civil aviation—has also attracted attention. However, it can be argued that this emphasis on the relation between different modes of transport and their economic performance has been accompanied by a relative neglect for the analysis of the relation between transport and political economy. Transport history has often remained a question of numbers—measuring freights, prices, cost and revenues, and productivity, even if more

sophisticated quantitative methods sometimes are used—with scant attention to other theoretical and analytic considerations.

By relying on different strands of recent economics literature—new institutionalism and evolutionary theory in particular—this book is a commendable contribution to fill this gap. The main assumption identified by the editors and the authors is indeed that the historical development in the transport sector itself brought the state back in. In many countries the government's active engagement in the industrialization process came through the promotion of canals, roads, railways, and, later on, air transport infrastructure. In other cases, where private initiative dominated, the state still had an important role in upholding institutions and sometimes also as a creditor. Before and after WWII, the making of new regulatory orders, by nationalization or subsidization, has been a frequently used policy to cope with the crisis of the railroads, the increasing use of motor vehicles for public and private transport, and the development of air transport. During the 1980s, regulatory changes once more swept through the world, although this time a wave of deregulation re-established the private initiative. In the long term, political decisions concerning state regulatory behavior in areas such as property rights, contractual arrangements, regulations of the services supplied, and tariffs have deeply influenced corporate practices in different countries, irrespective of whether private or state-operated enterprises dominated.

The political context thus accounts for the financing of technological renewal and change, infrastructure investment, organizational patterns, and regulations. The changing performance on the transport market called for exploration and explanation from economic historians and other social scientists. Thus, the scope of transport history has slightly altered from economic, organizational and technological performance to political economy and political history. Beside the historical development itself, the theoretical traditions in several disciplines in social sciences (for example, economics, political science, sociology, business history, and economic history) concurrently showed growing interest in matters of institutional change, regulatory patterns, and path dependency. As a result, the importance of political actors as well as that of business interests in the making of regulations has been scrutinized. This expanding theoretical framework has shown itself to be fruitful for a vivid cross-disciplinary debate. Here, transport history can be regarded as a fruitful research field of great and mutual interest.

This book shows how the awareness of a broader institutional discourse helps both in rephrasing old themes and in discovering new issues in transport history. Economic historians, together with distinguished scholars from other disciplines, here present the fabric of a modern transport history in the light of the general theoretical influences sketched above, together with more traditional approaches. The focus of the chapters is either on the establish-

ment of regulation in an industry, or the long-term process bringing about a shift from one institutional pattern to another. The character of the empirical studies varies with the nature of the political and social systems examined. The scope of investigation is selective. Some studies concentrate only on economic processes and ignore the political dimension; others attempt to illuminate the interaction between political and economic processes but only for a single industry. Some studies start from, and never abandon, the traditional neo-classical model, even though the model has been adjusted to include a political dimension. Other studies are of a completely different origin, especially those dealing with norms, customs, and cultural behavior in various institutional settings. Hence, the book presents a wide variety of theoretical approaches. An unintentional effect of this theoretical multitude is a certain inconsistency, or even vagueness, that sometimes characterizes the concepts used.

The book consists of three parts. The contributors to the first section, *Transport Actors and Institutional Patterns in International Comparison*, take a cross-country perspective to analyze how the institutional framework influence the shaping of national institutions in transport. The papers in this first part all have in common the premise that seemingly similar processes should not be accepted at face value, that they need to be put into a national context of institutional patterns, bearing in mind the influences of national features imposed on actions taken by distinct actors. The focus of the first three papers is on railways, and in particular on the Prussian/German experience, which is compared to Japan (Tipton, Braach-Maksvytis, and Newell), the United States (Dunlavy), and the Netherlands (Fremdling). The fourth paper, by a well-known air transport historian, Peter Lyth from the London School of Economics, will be of particular interest to JATWW readers. In less than 30 pages, the author provides an accurate synthesis of the main principles, policies, and problems of the world air transport industry, from its formative stage to deregulation. Or, as Lyth puts it, of the transformation of airlines "from flag-carriers to people-carriers, from national undertakings to global concerns" (p. 108).

The second theme, *Market and Transport Regulation in Europe*, concentrates on long-term market changes and regulatory patterns and responses to these challenges in various European countries. Not surprisingly, the focus is again on railways, in the United Kingdom (Gourvish on regulation and Crompton on nationalization) and Spain. The two other studies in this section deal with shipping in the United Kingdom (Armstrong) and Germany (Kunz).

As it pertains to a book edited by Swedish economists, the five contributions to the last part, *Transport Institutions Used as Politics—The Swedish Case*, focus on the role of the public sector in the development of the Swedish

transport sector. Talking of the state as an actor does not equate to analyzing the state as a homogenous agent—on the contrary, the contributions repeatedly stress the complexity of the political system and its institutional settings. This also highlights the fact that different interest groups have been able to use public regulations and also influence the making of policy decisions at their own discretion. The paper by Jan Ottosson on the origins of SAS, the Scandinavian airline, is very informative in this respect, showing the role played by political economy factors—namely lobbying by private investors and pressures from foreign competitors—in bringing about the birth of a multinational carrier endowed with monopoly landing rights.

The task of transport historians is far from completed—it has just begun. Taken together, these themes offer us an intriguing and illuminating view of today's research in the economic history of transport. Conceptual clearness and consensus will appear when both the traditional and the new institutional approach have matured. This book also raises new questions about the role of transport and communication in the ongoing transformation of the industrial society. Increasing internationalization of markets, as well as the creation of new political entities, influence the organization and performance of transport industries. The editing of this book is very accurate, not a common feature in many academic books these days, although the English used by some contributors could have been improved. Finally, it is unfortunate, at least for this reviewer, to find that the air transport sector *per se* is not analyzed in part 2 and that French experiences are not included at all.

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## BOOK REVIEW

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Groenewege, A.D. (1999). *Compendium of International Civil Aviation* (2nd ed.). Montreal: The International Air Transport Association (IATA). Pp. 1136. ISBN 92-9171-118-7. U.S. \$229.

Reviewed by Atef Ghojbrial, Georgia State University.

The international civil aviation industry has seen drastic changes during the past nine decades. Despite the numerous articles and books on the history of aviation, there exists a need for a more thorough and comprehensive compendium as a source of information and reference on all issues, aspects and developments of civil aviation. The Compendium at hand, undoubtedly, serves this purpose.

Mr. Groenewege certainly has the qualifications to write the first comprehensive Compendium of International Civil Aviation. He started his aviation career with KLM Royal Dutch Airlines, where he was responsible for negotiating transatlantic fares and rates agreements through the International Air Transport Association (IATA) Tariff Conferences. He joined IATA in 1955 to coordinate the planning and implementation of new cargo activities and services, and was Secretary of the IATA Cargo Development Committee. In 1962, Mr. Groenewege was appointed Director Cargo Services and Secretary of the IATA Composite Cargo Tariff Conference. In 1972, he was appointed Director Traffic Services with overall responsibility for IATA passenger and cargo service, including airport handling and IATA Multilateral Interline Traffic Agreements. Mr. Groenewege became Director Industry Affairs in 1982 to develop and implement new IATA membership services, and was instrumental in establishing IATA Programme for Developing Nations (PDNA). He has lectured throughout the world, written numerous papers on a wide range of airline subjects, and is also the co-author of the book *Air Freight—Key to Greater Profit* published in 1984. Mr. Groenewege established the International Aviation Development Corporation (IADC) to provide consultancy and training services. In the past few years, the development and continued updating of the Compendium has been his major undertaking.

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Atef Ghojbrial is a Professor of Transportation and Aviation Studies at the School of Policy Studies at Georgia State University. He received a Master of Business Administration (MBA) and Ph.D. in transportation from the University of California at Berkeley. He has published in many transportation journals and participated in many conferences. Dr. Ghojbrial has also consulted in many projects in the U.S. and abroad.

The Compendium of International Civil Aviation, at nearly 1,150 pages, is divided into seven major parts and seven appendices and does an excellent job of surveying the aviation industry. The Compendium can be used as an academic course on aviation history and developments and also by professionals in the aviation business.

In Part 1: Milestones in International Civil Aviation, the author presents a thorough overview of the main events and developments in international civil aviation. These events include technical developments, conferences, and airline start-ups. Part 2: The Structure of International Civil Aviation includes a thorough analysis of the development and structure of the international civil aviation. The author presents detailed discussion of the different conventions and agreements that took place since the Civil Aviation Conventions of 1919, 1928 and 1933. In Part 3: Partners in International Civil Aviation, the author surveys the main associations and organizations throughout the world that are actively involved in the development of civil aviation. In Part 4, the book provides a detailed overview of the roles of the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA), and Société Internationale de Télécommunications Aéronautiques (SITA) in promoting and servicing the aviation industry.

Part 5: The Language of International Civil Aviation contains a wealth of concepts, definitions and terms (in alphabetical order) that are commonly used by the international civil aviation community. Part 6: The Basic Library of International Civil Aviation contains comprehensive descriptions of the purpose and contents of numerous publications by ICAO, IATA, ACI and other organizations. This publication covers all main developments, policies, standards, and practices of different activities of the international civil aviation industry. Part 7: Abbreviations, Acronyms, Codes and Initialisms, contains over 17,000 entries of different abbreviations and acronyms that are an essential part of the aviation language as an accurate, convenient, economical and speedy means of communications worldwide.

The seven parts of the Compendium are complimented with seven appendices including listings of world airlines, airports, world countries, capitals, populations and currencies, air transport developments and statistics, air distances, aircraft classification, and conversion tables for weights and measures. These appendices add to the completeness of this valuable information resource.

Overall, the Compendium seems to be the first and only reference that provides a thorough overview of international civil aviation. Given the dynamic nature of the aviation industry and the political and technical changes affecting the industry, it is expected that the Compendium will be updated regularly to include these changes.



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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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## Additional Information

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