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INTERNATIONAL CIVIL AVIATION ORGANIZATION
Vol. 2, No. 1 – Jun/Jul 2012

TRAINING REPORT

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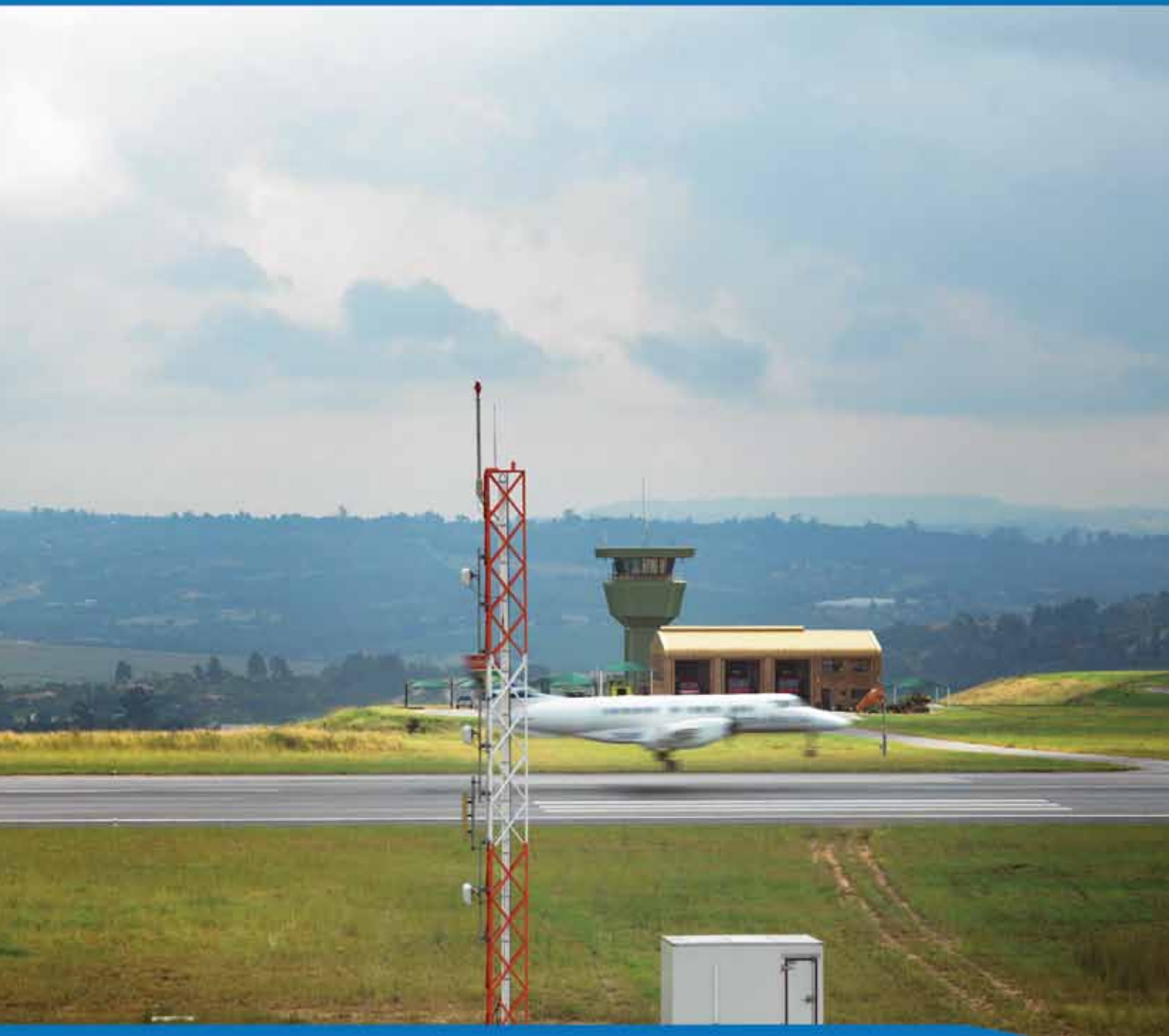

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ICAO TRAINING REPORT
VOLUME 2, NUMBER 1, 2012

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Submissions
The *ICAO Training Report* encourages submissions from interested individuals, organizations and States wishing to share updates, perspectives or analysis related to global civil aviation. For further information on submission deadlines and planned issue topics for future editions of the *ICAO Training Report*, please contact Dawn Flanagan, Editor-in-Chief at: dflanagan@icao.int

The publishers extend their thanks to the companies, organizations and photographers who graciously supplied photographs for this issue.

Published by
International Civil Aviation Organization (ICAO)
999 University Street
Montréal, Québec
Canada H3C 5H7

Printed by ICAO

Contents

Raymond Benjamin, *ICAO Secretary General*

RALLYING THE AFRICAN AVIATION TRAINING COMMUNITY

One of our key roles in ICAO is to bring representatives of States, industry and international organizations together to foster consensus around solutions that help to realize a sustainable global aviation system. At the heart of these solutions are the people whose performances are critical to realizing this progress. Individually and as teams, these workers need to be competent – the travelling public depends on it – and though there are many ways to improve human performance the best of these is through training.

In addressing the 2nd *Pan-African Aviation Training Coordination Conference* in Cairo on 22 June 2010, I shared my concern about preliminary data we were analyzing. The related figures suggested that, between 2010 and 2030, Africa would need approximately 3500 new pilots every year despite a reported annual training capacity of only 1000 pilots per year.

These figures, along with the realization that a considerable number of institutions in Africa that have been training pilots, air traffic controllers and mechanics for decades now do not possess the critical mass of resources and clientele to meet an increasing demand, were bound to make us re-assess the path we had chosen. This was why I suggested in Cairo that pooling and connecting strengths and resources of institutions through harmonization, standardization and quality assurance represented the most productive and effective option.

In ICAO's view, this represents an approach where everybody wins – regulators, industry, training institutions and, of course, the travelling public and citizens at large.

Another difficulty which the aviation training industry needs to address is its lack of organization and ability to speak with one voice. Although training has taken on huge proportions worldwide, it is still not represented globally by an umbrella body. A formal association would allow training organizations to effectively and collectively make their positions and concerns known in international forums and before government regulatory authorities, including ICAO. Similar organizations formed to represent airlines, airports, controllers and pilots have made it possible to develop widespread consensus on harmonizing and implementing policies, significantly improving the efficiency of the global aviation system.

Looking back, what has been achieved in Africa since the launch of the AFI Plan on the eve of the 36th Session of the ICAO Assembly in 2007 is remarkable. There was no doubt in my mind that the successful development of regional safety organizations could serve as a model for regional training organizations that could make full use of the experience, expertise and networks of Africa's individual training centres.

I was therefore delighted to attend a meeting in Kenya, in April of this year, on the creation of the Association of African Training Organizations (AATO). By coming together to create this association, the African aviation training community is giving itself an effective instrument to promote common values, interests, Standards and the harmonization of aviation training. Furthermore, the Association will play an active role in liaising with other international and regional organizations in order to deal effectively with the lack of qualified and competent aviation personnel in many States and the potential shortage of qualified professionals at a global level.

Under the leadership of ICAO, the international aviation community is determined to assist, yet solutions must be proposed and realized by Africans, for Africans. We have just seen a shining example of how African training organizations have risen to the challenge. ■

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SOLVING LOSS-OF-CONTROL IN-FLIGHT THROUGH EFFECTIVE INTEGRATED TRAINING

DR. SUNJOO K. ADVANI
is an aerospace engineer with nearly 30 years experience in flight simulation research, development and application. He has been involved in upset prevention and recovery training and simulation for nearly ten years. He is a member of the Royal Aeronautical Society Flight Simulation Group, the International Committee for FSTD Qualification, and the AIAA Modeling and Simulation Technical Committee.

Training and technology have made commercial aviation the safest mode of transport. A good example of this is how the implementation of the Enhanced Ground Proximity Warning System has drastically reduced controlled-flight-into-terrain incidents. The Traffic Collision Avoidance System is another example of these technical contributions. However, the current number one cause of commercial jet transport fatalities, Loss-of-Control In-Flight (LOC-I), cannot be simply solved through technology, or through current pilot training paradigms. How can properly trained pilots flying modern airplanes fail to recognize and prevent upset situations, and even fail to recover from them? Maybe we need to think differently to solve Loss-of-Control.

The most common causes leading to airplane upsets are inadvertent stalls, pilot disorientation, and system failures. Much can be learned from actual examples. In Colgan Air Flight 3407, a Bombardier Dash-8 Q400 reduced power when preparing for final descent and approached a stall with the airspeed continuing to drop. At a critical angle-of-attack, with the airplane's protection systems firing both the stick shaker and pusher, the crew, perhaps startled, allowed the aircraft to enter a fully-developed stall. The wing dropped in the *opposite* direction to pilot input, possibly confusing the crew even further. They appeared to attempt to maintain altitude, thereby further increasing angle-of-attack. They never recovered.

Weeks later, in the Turkish Airlines Flight 1951 accident, a 737-800 was on approach and the crew was unaware of a malfunctioning radio altimeter (causing the autothrottle to enter its "retard" mode reducing engine thrust to idle position), and entered the glide slope "hot and high". At glide slope capture, airspeed bled off, the aircraft stalled, and the crew was unable to recover in time.

Other examples include the Pinnacle Flight 3701, a CRJ on a ferry flight that stalled at FL410. The crew made several mistakes, including improper stall recovery techniques. This is similar to the West Caribbean Flight 708, an MD-82 that stalled at FL330. In both of these accidents there were secondary stalls which complicated the situation. Unfortunately, both aircraft and all occupants were lost.

Despite the best efforts of the industry and the flying community, current training paradigms appear to have limitations which, in a developing upset event, can fail. Today, we train the pilot based on assuming the aircraft is within its normal operational envelope and in a non-agitated flight condition. We also assume that situational awareness and information can always be accurately correlated by the pilot with respect to the observed instruments and flight condition, that the airplane

handling skills and strategies established by regulatory licensing can directly resolve an escalating condition, and that human psychophysical response is predictable and reliable. As an upset develops, the aircraft and pilot may enter an area outside of their normal training envelope, and into completely unfamiliar territory. The skill sets that are taught for operation in the conventional flight envelope may not apply, or may even lead to a worsening situation, if applied in the presence of an upset.

How can we teach proper awareness and avoidance strategies and, when necessary, recovery techniques?

ICATEE

In 2009, the Royal Aeronautical Society created ICATEE, the International Committee for Aviation Training in Extended Envelopes. By involving 80 plus participants from over 45 organizations including government bodies, safety agencies, airframe manufacturers, operators, training providers, simulator manufacturers and researchers, ICATEE laid out a mission: to define the limitations of current training, and to deliver a comprehensive long-term strategy to reduce the rate of Loss-of-Control In-Flight accidents through enhanced Upset Prevention and Recovery Training.

ICATEE's inauguration was timely: The initial meeting coincidentally took place on 1 June 2009, the day of the Air France 447 loss, and in mid-2009, the FAA initiated several lawmaking initiatives to improve training as a result of the Colgan Air Flight 3407 accident.

UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

By creating a comprehensive training requirements matrix, the potential hazards, required learning elements, potential training media (including academic knowledge, airplanes, and flight simulation training devices) and the license level to which this would apply were delineated. There are two key findings of this evidence-based approach.

"During stall events, evidence has shown that pilots may tend not to concentrate on the single most critical reaction: aerodynamically unloading the aircraft wing. The reduction of the angle-of-attack can be challenged by distractions such as reduced lateral stability and roll-off. Respecting the aircraft prevention systems, such as stick shakers and pushers, needs to be understood."

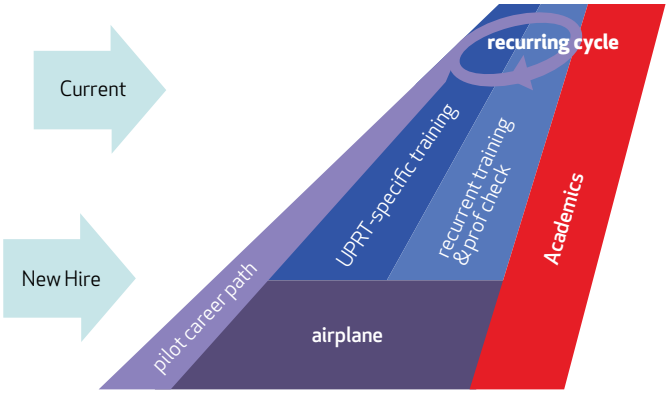

Figure 1: New-hire pilots would be presented with a limited element of on-aircraft training at the initial licensing level. Current pilots would receive a specific recurrent session in a FSTD, dedicated to UPRT, followed by the standard airline proficiency check, incorporating ICAO recommended UPRT elements and scenarios. ALL pilots would be required to receive the academics portion regarding the aerodynamics and flight dynamics of upsets. Airplane-specific UPRT would be part of the type-rating training.

First, prevention itself requires an intellectual understanding of the fundamentals of flight, and the escalating conditions and warnings leading to fully-developed upsets. However, prevention training *alone* is not enough. A brief, yet carefully instructed familiarization with the all-attitude, all-envelope environment in an aerobatic-capable airplane (with a trained instructor) can and should be used to teach the cognitive and skill-based behaviour in dealing with upsets. This is recommended at the multi-crew or commercial pilot licensing level for an airplane.

Second, for proper familiarization and the development of the required preventive knowledge and skills, there exists no single, accurate training environment capable of presenting the cognitive, physiological and psychological challenges related to these extreme events. Integration of the knowledge, developed through academic training, and the practical skills through the Flight Simulation Training Device (FSTD) and the airplane, are critical.

During stall events, evidence has shown that pilots may tend not to concentrate on the single most critical reaction: aerodynamically unloading the aircraft wing. The reduction of the angle-of-attack can be challenged by distractions such as reduced lateral stability and roll-off. Respecting the aircraft prevention systems, such as stick shakers and pushers, needs to be understood. Hence, ICATEE developed a two-stage simulator stall training strategy:

1. The candidate is made familiar in a fully-controlled, non-penalty manner to aircraft handling in a stall. The several possible indications leading to the stall are shown (aircraft system warnings, buffet, reduced control authority, and roll-off). This limited-exposure provides appreciation of the warnings and lethality of the stall.
2. Secondly, during subsequent training and/or checking exercises, the candidate is required to initiate recovery at the first indications of stall, having been exposed to several such indications in the earlier "familiarization" exercise. The candidate is primarily taught that, despite the unpredictable nature of the stall, recovery must be immediate and at the first indication.

ICATEE has developed the process defined in Figure 1. New-hire pilots would be presented with a limited element of on-aircraft training at the initial licensing level. Current pilots would receive a specific recurrent session in an FSTD, dedicated to UPRT, followed by the standard airline proficiency check, incorporating ICAO recommended UPRT elements and scenarios. ALL pilots would be required to receive the academics portion regarding the aerodynamics and flight dynamics of upsets. Airplane-specific UPRT would be part of the type-rating training.

FLIGHT SIMULATION TRAINING DEVICE (FSTD) EVOLUTION

ICATEE recommends standardizing the usage of current simulators for UPRT through a more comprehensive set of scenarios related to upset events, and particularly the introduction of surprise during these scenarios. In a further step, we recommend the development of instructor feedback capabilities on the aircraft operational limits, the valid FSTD envelope, and pilot control input during the manoeuvre. Finally, longer-term recommendations include enhancements to FSTD stall models and pilot cueing.

DELIVERABLES

ICATEE is developing a comprehensive Manual of Upset Prevention and Recovery Training with sections pertaining to pilots, instructors, training providers and regulators. The first edition of this Manual will be presented to ICAO around October 2012. It will be referred to in ICAO Annex 1 and Annex 6. Specific text will also be added to ICAO Doc. 9868 PANS-TRG.

An addendum to ICAO Doc. 9625 Manual of Criteria for the Qualification and Testing of Flight Simulation Training Devices will include the FSTD recommendations mentioned above.

URGENCY

It appears that many of today's 230,000 commercial airline pilots have insufficient training on how to recognize, avoid and recover from airplane upsets. The LOC-I accident rate has remained static for years now, and unless and until we provide training solutions to this challenge, we are unlikely to change this negative trend. It's time to be proactive and maintain control of our aircraft – and our own safety record.

CONTACT

For more information on ICATEE, please see www.icatee.org or contact s.advani@idt-engineering.com. ■

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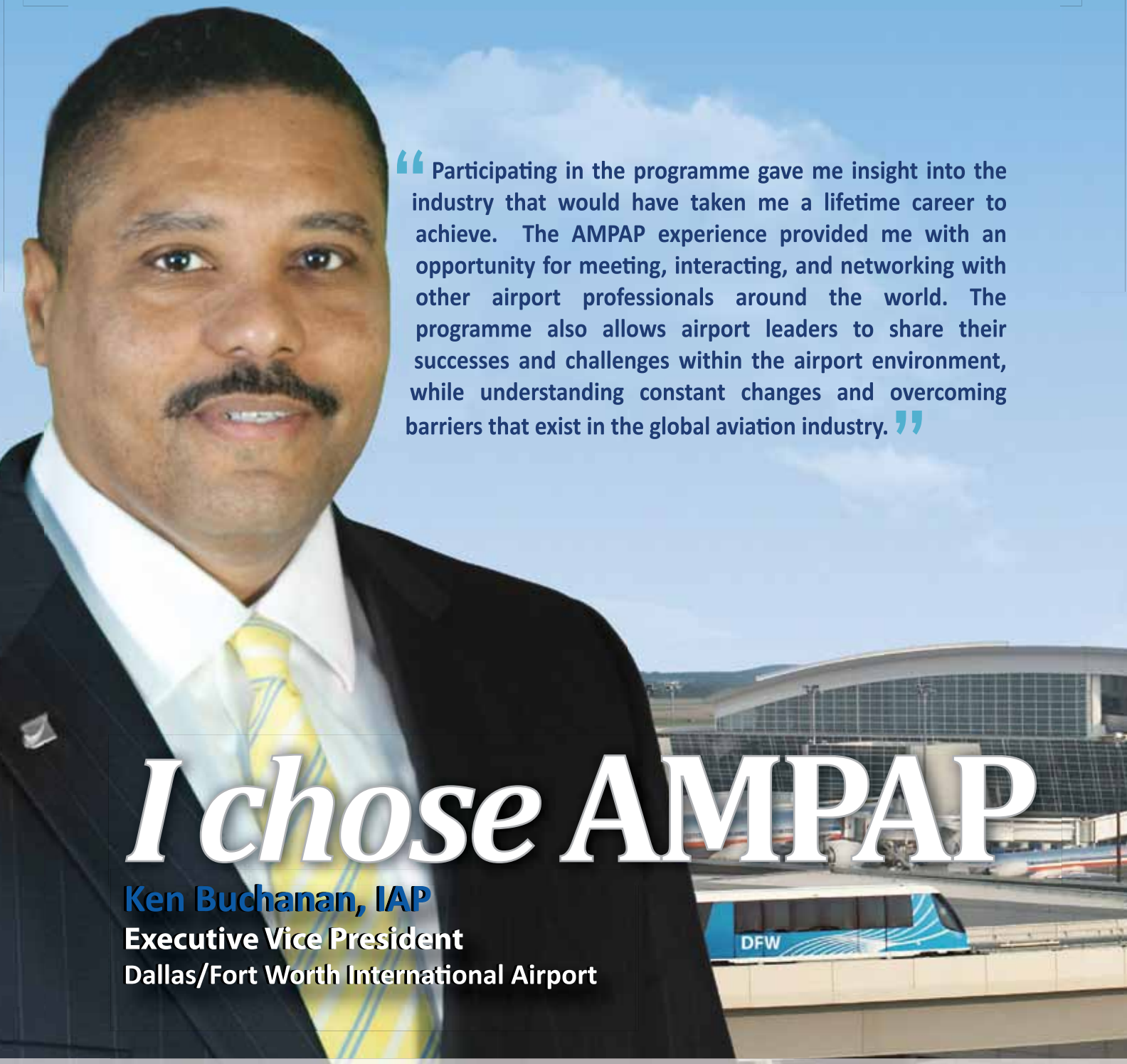

"Participating in the programme gave me insight into the industry that would have taken me a lifetime career to achieve. The AMPAP experience provided me with an opportunity for meeting, interacting, and networking with other airport professionals around the world. The programme also allows airport leaders to share their successes and challenges within the airport environment, while understanding constant changes and overcoming barriers that exist in the global aviation industry."

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THE PURDUE APPROACH

Purdue University's Department of Aviation Technology navigates the winds of change by partnering with industry and the Flight Safety Foundation

STEWART W. SCHRECKENGAST, *Ph. D., Associate Professor, Aviation Technology Department, Purdue University*

Dr. Schreckengast is a Visiting Associate Professor in the Aviation Technology Department of Purdue University where he conducts aviation safety and security research. Prior to joining Purdue in 2008, he worked at ICAO and provided technical support, training and assistance to ICAO member States in the implementation of ICAO Standards and Recommended Practices (SARPs). Specific areas of interest included Aerodromes, Accident Investigation and Flight Operations oversight. He is an ICAO Safety Management System (SMS) Instructor and graduate of the ICAO Safety Oversight Assessment Training Programme. He was also the Membership Chairman for the Montreal Branch of the Royal Aeronautical Society and coordinated numerous lectures and Branch events.

Dr. Schreckengast holds a Commercial Pilot Certification with single and multi-engine airplane, rotorcraft and sea plane ratings. He is also a certified flight instructor in those aircraft.

CAPTAIN KEVIN L. HIATT, *Chief Operating Officer, Flight Safety Foundation Alexandria, Virginia*

Kevin joined the Flight Safety Foundation in July 2010 as Executive Vice President. In November of 2011 he was promoted to Chief Operating Officer. Prior to coming to FSF, he served as Vice President at World Airways, Inc., where he led the Corporate Safety and Security Department and was responsible for flight, ground, technical operations and administrative safety, security and compliance. Prior to joining World Airways, he served as Captain and Chief Pilot, International Operations for Delta Air Lines, Inc. During his 26 years at Delta, he was an integral part of the safety department, holding the positions of Flight Safety Coordinator, and Manager of Line Operations Safety for a total of eight years. Kevin is a graduate of Purdue University's Professional Aviation Technology programme.

Academic institutions strive to predict the future in order to provide their graduates with all the knowledge and experience needed to be successful in their aviation careers. This is vital for the aviation industry because of the rapid changes in technology, regulations and training obligations.

Working closely with industry leaders, especially alumni in key positions, is essential to achieve proactive improvements in an already excellent system. Furthermore, most aviation education programmes receive accreditation from a regional or international body that requires them to be responsive to the present and future needs of their respective industry. How is this accomplished?

WORKING CLOSELY WITH THE INDUSTRY

Purdue University's Department of Aviation Technology has worked to develop extensive and long-term relationships with its industry partners. Recently, it has taken significant steps to strengthen these relationships.

As part of its Aviation Accreditation Board International (AABI) reaffirmation process, the Department periodically invites its Industry Advisory Board (IAB) to provide its oversight of existing programmes, its insight into what the industry is looking for in the near term and what the industry will need in the long term.

"By bringing future employers into the academic environment, we receive immediate input into what we have been doing well, and guidance in making appropriate modifications to stay on track," said Dr. Stewart Schreckengast, Visiting Associate Professor of the Department of Aviation Technology. "As well as updating these industry leaders on our research capabilities, it puts them in a better position to collaborate on emerging technologies and creates a sounding board for response to potential regulatory and training mandates."

More often than not, comments that have emerged from the IAB have been elegant in their simplicity: "Graduates must realize that you cannot take "effort" to the bank and expect to be paid for it. You can only take an outcome – a product that meets the needs of the client," said one IAB Member.

Another industry leader commented that perhaps our education system has become accustomed to working toward multiple

Providing an opportunity to help students experience what they will be doing in their working careers and learning the practical aspects of how the job functions are executed helps to motivate these students to remain on a chosen career path.

choice answers and noted that "learning needs open-ended challenges that perhaps do not have an answer at this time. As President Kennedy noted in his inaugural address, 'America is going to the moon with materials that have not been invented yet.' And we did!"

CONNECTING STUDENTS TO THE INDUSTRY

Getting students connected to the industry early in their curriculum is important. This can be accomplished by bringing industry leaders into the classroom, visiting them during industry workshops, and having them join in as judges at university competitions.

Many of Purdue's courses require significant research and the publication of papers in international journals in addition to presenting research at industry forums. This promotes active networking and encourages the development of professional contacts with industry leaders. It also provides Purdue's academic body with access to the latest industry technology.

These contacts often result in the development of life-long relationships. To facilitate industry networking, the Department has an active mentoring programme and a number of student competitions and organizations, including: Women in Aviation, the American Association of Airport Executives, Alpha Eta Rho, and Purdue Professional Pilots.

THE FIRST STUDENT CHAPTER OF THE FLIGHT SAFETY FOUNDATION

Recently, the University made a joint announcement with the Flight Safety Foundation to establish the Foundation's first Student Chapter at Purdue. "The Foundation is internationally recognized as the voice of the airline industry and the selection of Purdue for its inaugural student chapter is a significant recognition of our impact on the aviation industry," said Dr. Schreckengast, the Student Chapter's Faculty Advisor.

By forming this alliance with Purdue and other universities worldwide, the Foundation will be able to promote aviation and aviation safety to new aviation professionals as they rise through the ranks. This is of critical importance because industry predictions indicate a huge shortage of educated and qualified people in the supply chain for all aviation positions.

The need for practical application of learned academics to industry will be crucial to addressing this shortage. "By forming student chapters and membership at the Foundation, we can bridge that gap," said Dr. Schreckengast. "Students will be working on specific technical and Safety Management System (SMS) issues with oversight from the Foundation and industry leaders. Committees at the Foundation are comprised of some of the leading experts in the aviation industry who are ready to cultivate, share and integrate new ideas from the students."

Students will benefit from this type of practical experience by working alongside the industry experts and by learning the practical applications of what they have studied in their particular field of aviation. While colleges and universities are very good at providing knowledge, cooperative relationships with industry,

(Photo with permission of the Flight Safety Foundation)

(from left to right) Dr. Stewart Schreckengast, Chapter Advisor; Captain Kevin Hiatt, COO FSF, Mr. Scott Winter, Ph.D. candidate, Chapter President and Dr. Gary Bertoline, Dean of the Purdue University College of Technology announced the creation of the Flight Safety Foundation's first Student Chapter.

trade groups and foundations are needed to assist students in understanding how this knowledge fits within the practical, applied aspects of the industry.

OVERCOMING BARRIERS TO ENTRY

Whether students have studied to become pilots, mechanics, air traffic controllers, or aviation operations managers, barriers exist that prevent them from naturally progressing into their chosen field of study. For pilots, obtaining a formalized structured education and the requisite hours of flight time are major issues. Mechanics must obtain the appropriate certifications and experience and air traffic control students must do the same. Management students must gain some practical experience in order to compete for job positions.

The other barrier is cost. The ever escalating fees and living expenses for university and college level education are preventing new entrants from pursing an education in aviation-related activities. Students want to see a path to their professional future and, if there isn't any practical application of what they are learning along the way, they will look in another direction. Providing an opportunity to help students experience what they will be doing in their working careers and learning the practical aspects of how the job functions are executed helps to motivate these students to remain on a chosen career path.

Another advantage to the formation of a student chapter and membership is the possibility of forums and seminars that bring students together to learn, share and discuss the aviation issues of today and the future. Guided by experts in the industry who are willing to share research, experience, and practical knowledge, the forums and seminars become beneficial for both groups. New ideas are introduced to help find solutions to both the existing and emerging issues that face the industry.

> By forming this alliance with Purdue and other universities worldwide, the Foundation will be able to promote aviation and aviation safety to new aviation professionals as they rise through the ranks.

The Flight Safety Foundation was formed 65 years ago to pursue continuous global aviation safety improvement through research, education, advocacy, and publishing. "Purdue's chapter will facilitate aviation research opportunities between our graduate students and the aviation industry worldwide," said Captain Kevin Hiatt, the Foundation's Chief Operating Officer.

Captain Hiatt, who is a former Boeing 767ER Captain, Delta Airlines International Chief Pilot, credits Purdue for helping prepare him for a highly-successful career in the aviation industry. "The Foundation and the University both strive to develop global solutions to key aviation challenges," said Hiatt. "Purdue is a key partner in our mission to promote and facilitate the global application of leading aviation safety assessments, standards and practices."

Captain Hiatt announced that among the benefits of the Student Membership is the possibility of academic internships, graduate student research, and becoming directly involved with the Foundation's technical projects and activities. Other benefits include a subscription to *AeroSafety World*, member discounts to seminars and access to all Foundation resources, including the soon-to-be launched *Members Only* area of the website.

Other schools who wish to develop Student Chapters are welcome to contact the Membership Department at the Flight Safety Foundation for more information. ■

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NURTURING TOMORROW'S PILOTS

The future dynamics of US civilian-military aviation

Virtual Flight Academy

JOHNNY J. WEISSMULLER *is the Director of the Innovation Center for Occupational Data, Analysis & Practices (ICODAP). His non-profit specializes in large-scale occupational analysis and transfer of personnel research technology from the US military to managers and researchers worldwide. Johnny has been a member of the steering committee of the International Military Testing Association, chaired the Psychometrics Committee of the Performance Testing Council, presided as President over the Founding Chapter of the International Society for Performance Improvement, and co-founded the Institute for Job and Occupational Analysis. He currently works as a personnel research psychologist for the US Air Force and has a strategic role in reshaping its pilot selection policy for 2016. Since 2005, Johnny has been tracking Flack Maguire and the genesis of the Virtual Flight Academy for improving the diversity of US military aircrews.*

Statisticians study past data to predict the future. Times, however, are changing. Today we are on the cusp of a number of trends that will profoundly affect the future of both US civilian and military aviation.

In the past, the major US airlines relied on the military as a primary source of pilots. According to a January 16, 2009 USA Today article, "roughly 28 percent of pilots hired by major US carriers in 2008 had military backgrounds, compared to around 90 percent in 1992."

Many of these pilots are retiring. In 2007, to forestall a major loss of senior expertise, the US Federal Aviation Administration (FAA) raised the mandatory retirement age for airline pilots from 60 to 65. But, by the end of 2012, the US will again be facing a major loss of expertise through retirement.

A June 21, 2011 USA Today article predicts that "After a four-year drought of job openings, the US airline industry is on the brink of what's predicted to be the biggest surge in pilot hiring in history."

PREPARING FOR THE NEW WORLD

Greater international demand by civil aviation, the availability of commercial simulators, and emerging aviation programmes at universities and trade schools may divert potential military student pilot applicants directly into the private sector. If so, the US military will be competing for, not providing, civilian pilots.

The other factor that may change the training landscape significantly is the fact that the US Military is embracing the Unmanned Aerial Vehicle / Remotely Piloted Aircraft (UAV/RPA) model.

With an aging inventory of manned aircraft and budget constrained purchases of multi-million dollar modern weapon systems, more military pilots in the future may find themselves qualified as "RPA-only".

The FAA has the entire range of RPA issues under study. DOT/FAA/AM-07/3 addresses *Unmanned Aircraft Pilot Medical Certification Requirements* with projected application areas including surveillance, payload, orbit and transport. At present, the FAA is managing over 150 active civilian applications of RPAs in the National Air Space (NAS) as waiver-based projects. Until the anticipated boom in the RPA civilian market really takes off, prospects of transitioning from military RPA pilots to civilian aviation will remain a clouded future.

Given all the future forces reducing the attractiveness of military aviation, what can be done to offset a reduced "propensity to serve"? As the US embarks on its second century of military aviation, perhaps there is a need to reconsider some of the assumptions in the current military pilot selection and training model.

THE LOST DECADE

No professional league would consider introducing its top athletes to the sport at the age of 22. Why then accept this as standard practice for training US military pilots who could be flying in life-threatening missions while flying aircraft worth many millions and sometimes over a billion taxpayer dollars?

There is a full decade between the time that military pilots typically report that they first dream of becoming a pilot (age 12) and their introduction to a military flight training programme (age 22). Within this vacant decade, few opportunities to pursue a career in aviation exist except for the fortunate few.

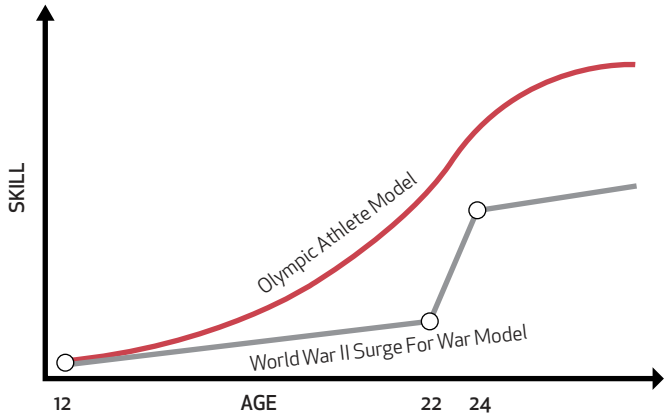
THE VIRTUAL FLIGHT ACADEMY (VFA) VISION

The Virtual Flight Academy (VFA) promises to be the program that saves millions in taxpayer dollars, develops far better aviation candidates, and actualizes equal opportunity for military pilot selection.

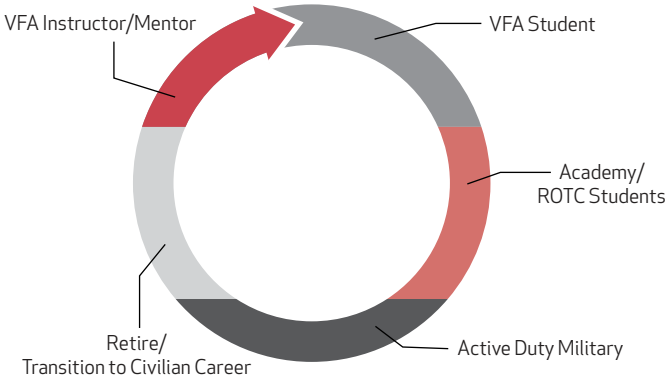
The VFA is a civilian non-profit youth aviation programme designed to address multiple issues – how to maintain or increase the influx of highly qualified US military aviation applicants and, at the same time, increase the diversity of those applicants regardless of background, race or gender.

The VFA effectively jumpstarts instruction for aspiring aviators as young as age 12. Once enrolled in the VFA programme, the VFA works with local schools, provides mentors and leverages local community programmes to sustain a long-term relationship of training and preparation with students from middle school through college.

> " 'Luck' is where the crossroads of 'Preparation' and 'Opportunity' meet." Seneca the Younger, First Century AD.



Expertise Development versus Fire Hose Method



Military Aviation Circle of Training

The objective is to design a fun and stimulating environment that increases proficiency and aviation knowledge much earlier than 22 years of age.

THE VFA MODEL

The VFA model uses early entry flight training augmented with individualized "flight plans" to help navigate the course of non-flying requirements to a 4-year university degree in the Science, Technology, Engineering or Math (STEM) disciplines.

For those who do not see a degree programme in their future, there is an emerging career as a Sensor Operator (SO). The SO is an enlisted career field which only requires a high school diploma. The SO sits to the right of the pilot in the RPA ground stations. This is a real "at-the-front-line" job.

In the VFA programme, failure is not really an option. A key goal for the VFA is skill and character development of the student, in addition to aviation skills. Even if a student ultimately chooses to forgo the military pilot path and pursue a civilian aviation or other career, he or she will leave the VFA with an enhanced skill set and improved self-confidence to better contribute in the civilian workforce.

"The Virtual Flight Academy (VFA) promises to be the programme that saves millions in taxpayer dollars, develops far better aviation candidates, and actualizes equal opportunity for military pilot selection."

VFA TODAY

Although he has been actively pursuing this vision in various ways over the past 15 years, in recent times, founder and former Naval Officer Flack Maguire kept a low public profile on the VFA concept until all the technological pieces were in place. In February 2012, Flack went public with news about progress, recent successes, and upcoming events.

Progress

At present, the VFA is preparing to teach its first six classes in partnership with the US Navy League Sea Cadets utilizing the official US Navy pilot introductory training course curriculum. In time, more and more flight school classes will be added.

The VFA has also tackled the issue of high-cost flight simulators by modifying low cost consumer flight simulation software to create an integrated hardware / software solution. The VFA flight simulator offers high fidelity realism, flying over digitally captured, 3-D rendered real-life terrains and specific training airfields.

To address military training needs, the system supports multi-aircraft formation interactivity with instructors and students flying together in the same virtual cockpit even though they may reside in different states.

The entire package is provided free of charge to aspiring aviators and allows students to work with seasoned former military aviators as volunteers.

Recent Successes

Recent successes include the launch of the VFA programme at the Wentworth Military Academy in Lexington, Missouri and plans to expand the programme to Kearny High School in San Diego, California.

The Wentworth Academy programme is run in partnership with the Falcon Foundation. The Falcon Foundation specializes in granting scholarships to students seeking admission to the US Air Force Academy.

The VFA programme at Kearny is an emerging partnership with the local Army Junior Reserve Officer Training Corps (Jr ROTC) programme. Kearny High School began its transformation from a traditional high school in 2004 to a set of smaller, special focus schools. This system of smaller schools is funded by the Bill and Melinda Gates Foundation, which supports innovative educational programmes.

Virtual Flight Academy Three Monitor Simulation Station

Virtual Flight Academy Three Monitor Simulation Station with student

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Future Events

Flack Maguire is scheduling VFA presentations in Seattle, Colorado Springs, San Antonio, Washington DC, and St. Louis with VFA Sim-Squadron Stations to be deployed in Colorado Springs, Washington DC, and San Antonio, Texas.

CHALLENGES IN EQUALIZING OPPORTUNITY

Despite its best efforts over the past decades, the US military has been unable to achieve its goal of having the military pilot corps fully reflect the balance of racial and gender diversity found in the general US population.

In his book, *Talent is Overrated*, author Geoff Colvin argues that the average person is apt to "explain away" their lack of excellence because he or she did not have the luck to be born with enough talent. Colvin goes on to demonstrate that the top performers in just about every field earned this status through long-term dedicated, focused and mentored practice starting at a young age.

One of the most difficult hurdles for the VFA programme is to inspire the student to believe in himself or herself – to stick with the training programme and use mentor advice to make the right real-life decisions. "Embrace the distal vision, navigate the flight plan, live the dream."

THE IMPACT OF THE VFA

The US military "ab initio" training for fighter pilots takes about a year and costs between $1.7 and $3.6 million per pilot. How will the VFA affect this model? This remains to be seen…

While flight hours in simulators aren't counted in some US military pilot selection systems, the VFA programme will increase selection probabilities. VFA graduates will demonstrate improved hands-on proficiency and a greater mastery of and appreciation for aviation subjects.

In fact, the VFA simulator platform may prove BETTER than actual flying hours in the future in the RPA air space. Simulators can emulate the RPA environment by demanding more reliance on instrument monitoring because there is no audio or kinesthetic feedback.

Military selection tests also use recognition of aircraft orientations which are more appropriate to simulated aerial dogfights than to normal general aviation experiences.

The "Virtual" aspect of the VFA makes the programme scalable using Internet connections supported by relatively affordable high-end PCs for flight simulators. The VFA platform can be set up in just about any school (middle to university) in America.

VFA & MILITARY ALIGNMENT

Military recruitment programmes are prohibited, by US laws, from making contact with minors under the age of 17. They also prohibit any selection programme which references race or gender.

Model for Military Aviation Pre-Training

University scholarships for Reserve Officer Training Corps and admission into the service academies are highly competitive. Even when allocating scholarships by geographical regions, the quality of the local high schools can make a slight difference.

As Malcolm Gladwell explains in his book, *"Outliers"*, those who start ahead tend to stay ahead. Slight differences in apparent ability translate into more day-to-day practice opportunities and, eventually, into even faster development. This is not a case of gender or race bias, but rather of slightly better preparation winning out.

In the 1990s, the US. Air Force sponsored a study into what makes a student actively seek the career of pilot. The truly "driven" military pilots reported that they first had the dream of being a pilot when they were 12 or 13 – at least four years before any military recruiter could legally approach them.

The study interviewed only those who actually survived the decade-long process by staying the course through university graduation, into the military, and finally through pilot selection and training.

These were the lucky few. As the adage goes – *"Luck" is where the crossroads of "Preparation" and "Opportunity" meet.*

The VFA programme is determined to provide unprecedented preparation and operationalize equal opportunity for those willing to dream the dream.

In much the same way as a young person's basketball talent may be nurtured, the VFA is designed to provide aspiring aviators from all backgrounds with an opportunity to demonstrate their excellence and passion at a young age by developing real aviation skills.

Many recent research references on military/civilian aviation can be found at http://www.stormingmedia.us/keywords/pilots.html . This includes *A Bibliographic Database for the History of Pilot Training Selection* by Howse and Damos, AFCAPS-FR-2011-0010, 2011. ■

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INSPIRING THE NEXT GENERATION OF FLYERS IN SRI LANKA

DEV KOWSALA SAMARAJEEWA *is a winner of the recent ICAO Next Generation of Aviation Professionals (NGAP) YouTube Contest. Participants submitted their best 30-second videos promoting aviation to youth. He gratefully acknowledges the assistance of Capt. Menaka Fernando, Sri Lanka's first female pilot, and the children and supporting team (Ashan, Lakmal, Sukitha and Chaminda) in producing the video.*

As he accepted his award at the World Aviation Training Conference and Tradeshow (WATS) in Orlando, Florida, Dev Kowsala Samarajeewa also expressed his appreciation to those who have assisted him in realizing his dreams. "I wish to convey my sincere gratitude to Hon. Piyankara Jayaratne, Minister of Civil Aviation in Sri Lanka, H.M.C. Nimalsiri, Director General of Civil Aviation and Chief Executive Officer, Gen. Rohan Daluwatte, Chairman of Civil Aviation Authority of Sri Lanka, Members of the Authority and all other staff members who have helped us in various ways. I would also like to take this opportunity to convey my thanks to the entire ICAO team who organized this wonderful competition and selected me as the winner. The WATS Conference was a great opportunity for me to meet the professionals in the field of aviation."

From the initial founding of the Guwansara Aviation Education Magazine and the Guwansara Aviation Website, Dev Samarajeewa has acted as the Editor in Chief for both media. His goal is to provide education and guidance to youth by creating and expanding new avenues of knowledge related to the field of aviation in Sri Lanka. He is the Vice Chairman of the Civil Aviation Development and Education Committee.

The desire for flight in Sri Lanka can be traced back some 6,000 years to distinctive narratives of mythical attempts to slip the bonds of gravity and soar in what was imagined to be the unlimited sky. The *Ramayanaya* depicting the *Dandumonaraya* is one classic example of such a storyline in Sri Lanka's ancient past.

While promoting the notion of flying may be firmly rooted in the Sri Lankan culture of the past, it is not something that the country's media finds particularly salient today. Very little print and electronic coverage exists to inspire a new generation to involve themselves in the industry. In addition, another obstacle to promoting aviation is the issue of language deficiencies and the unavailability of the Sinhala language as a medium in attracting and arousing the interest of the vast majority of Sri Lankans in a field that is advancing by leaps and bounds on an almost daily basis.

CHANGE IS THE ONLY CONSTANT IN TODAY'S FIELD OF AVIATION

In recent years, the image of civil aviation has changed and is being viewed in a very different light. That flight is an essential link not only for international travel and trade but also for providing connectivity to different parts of the country, is an inescapable and undeniable fact. Aviation is, by its very nature, a critical part of the infrastructure of Sri Lanka and has important implications for the development of tourism and trade, providing access to remote areas of the country and providing stimulus to business activity and economic growth.

The domestic growth trends in the civil aviation industry and the need to articulate a national aviation policy have created major implications for the institutional role of the Civil Aviation Authority of Sri Lanka (CAASL). Managing the growth of the civil aviation industry in line with national and international requirements and priorities is its main responsibility.

In view of the inadequacies and disparities that have existed throughout the country, the Authority's mission is to enhance and improve the image of the aviation industry by the general public. To this end, CAASL launched and publicized the Civil Aviation Development Programme.

REACHING YOUTH

As part of its outreach programme, the Civil Aviation Development and Education Committee (CADEC) was created by the CAASL in 2010. Its objective is to increase aviation knowledge amongst school children and to generate enthusiasm by youth for a career in aviation in order to meet the future needs of the industry. This committee is headed by H.M.C. Nimalsiri, Director General of Civil Aviation and CEO, who is assisted by both the Senior and Corporate Directors.

As the CAASL began conducting a number of general education programmes on civil aviation, the demand for similar activities increased tremendously. As a result, the

"As part of its outreach programme, the Civil Aviation Development and Education Committee (CADEC) was created by the CAASL in 2010. Its objective is to increase aviation knowledge amongst school children and to generate enthusiasm by youth for a career in aviation in order to meet the future needs of the industry."

Image from winning NGAP Youtube video

CADEC began to publish a quarterly magazine called *Guwansara (Fly in the Air)*. The magazine is distributed to schools where Advanced Level classes are conducted, with a view to creating awareness of civil aviation, especially among younger students. This magazine has received extremely encouraging responses from its readers. Due to the popularity of the publication, the CADEC has expanded the publication from four to five issues per year and distributes it free of charge to all universities, airlines, travel agents and government organizations, in addition to the Advanced Level schools of Sri Lanka.

The CADEC is also conducting a specially developed Aviation Awareness Programme in schools. Of the 25 districts and 92 Educational Zones in Sri Lanka, the CADEC has already conducted Aviation Awareness Programmes for 11 Educational Zones. The programme includes an Aviation Awareness Seminar for school children by an aviation professional. The objective of

Image from winning NGAP Youtube video

this session is to introduce school children in rural areas to aviation. Following the seminar, a Practical Session allows students to practice what they have learned during the seminar and a quiz is conducted to refresh the knowledge gained from the other two programmes. Finally, a Hot Air Balloon Demonstration and a Model Aircraft Show completes the programme. Many children in the rural areas of Sri Lanka have never seen a real aircraft or even a model aircraft. Thus, the great interest in this event.

Once the programme is completed, interested schools are invited to establish an Aviation Club. Currently, there are 157 Aviation Clubs in schools throughout Sri Lanka. Special programmes for established Aviation Clubs include more advanced seminars and classes on subjects such as *Theory of Aircraft* and *History of Aviation*, aviation-related competitions including *Quiz, Art*, and *Essay* and island-wide kite competitions. Winners of the competitions are awarded special prizes, which include air tours, hot air balloon rides, sea plane tours and helicopter tours. This year CADEC is organizing an Aviation Colours Night, a special opportunity for the Schools' Aviation Clubs to meet the aviation professionals of Sri Lanka.

As a result of these activities, school children have become very interested in aviation and would like to absorb more information about this industry. Unfortunately, because Sri Lanka is a developing country, there are very few sources of information available to those who are interested. However, as the need becomes more obvious, the pressure to satisfy this need intensifies. Already, the CADEC is planning the creation of a civil aviation-related library and a museum to increase the base of available information. Also, an aviation website created by the CADEC was launched in August 2010. It is in the Sinhala language now and will be offered in English in the near future.

The promotion of civil aviation to Sri Lankan youth has come a long way. ■

CONGRATULATIONS TO THE WINNERS OF THE NGAP YOUTUBE CONTEST *AVIATION: THE FUTURE IS YOURS*

DEV SAMARAJEEWA FROM SRI LANKA AND VLADIMIR KLYUSHEV FROM RUSSIA

HONOURABLE MENTION:
Jens Adam Hedegaard Hansen – Denmark
James Christopher Sampson – United Kingdom

ICAO, IATA AND HALLDALE MEDIA GROUP WOULD ALSO LIKE TO RECOGNIZE THE FOLLOWING PEOPLE WHO SUBMITTED VIDEOS TO THE CONTEST. THANK YOU!

Alex Bowen – United States

Scott DeNoma – United States

Luke Hall – United States

Adam Penner – Canada

Sameer Syed Ali – India

Martin Kofi Anim Asare – Ghana

Tharindu Udara Liyanage Hawpe Liyanage – Sri Lanka

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Nikalos Bray and Robert McDonald – United States

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Maria Barcenes Duvier Lopez – El Salvador

Michelle Ancona Reynolds – Mexico

Mohamed Amine Ghariani – Tunisia

Pranas Drulis – Lithuania

Daniel Orlando Zamudio Higuera – Columbia

Sergio Fernandez – Columbia

REGIONAL COOPERATION: SUPPORTING PRESENT AND FUTURE AVIATION TRAINING NEEDS OF SOUTHERN AFRICAN STATES

CLIFF ELBL's *career as a pilot includes military flying in the United States Navy and serving as an instructor pilot for Japan Airlines, All Nippon Airways and Lufthansa pilot training programmes. Subsequently, he was recruited as an inspector by the FAA where he served as a principal flight operations inspector, supervisor and manager of various posts connected with the certification and surveillance of air operators. After retiring from the FAA, he embarked on a second career with ICAO as a TRAINAIR Course Developer and Instructor. He was the principal course developer of the ICAO-Endorsed GSI – Operations and Approved Training Organization Certification courses. Before his selection as Project Coordinator for the COSCAP-SADC project, he served as Team Leader on an ICAO project in Cairo, Egypt. He holds an FAA airline transport pilot certificate with type ratings in various reciprocating engine, turbo-propeller and turbojet powered aircraft. He also holds rotorcraft-helicopter, glider and lighter than air ratings and is a current certified flight and ground instructor.*

As signatories to the Convention on International Civil Aviation, also known as the Chicago Convention, most Southern African Development Community (SADC) States face the same challenges as other developing States that are members of the International Civil Aviation Organization (ICAO): garnering the necessary resources to comply with ICAO Standards and Recommended Practices (SARPs).

A major challenge faced by Civil Aviation Authorities (CAAs) is the lack of funding provided by the government to support civil aviation safety activities. Funding is usually insufficient to enable the CAAs to carry out their ICAO obligations.

There are legitimate reasons why insufficient funding is a challenge. However, the bottom line is that insufficient funding affects a State's ability to train and retain enough qualified CAA personnel to carry out its certification and safety oversight responsibilities.

One solution to this challenge is for States to come together on a regional level to pool their resources in order to comply with ICAO SARPs. These organizations can supplement and augment individual ICAO member State obligations and serve as a training source. Two mechanisms in which States can come together are through the establishment of a Cooperative Development of Operational Safety and Continuing Airworthiness Programme (COSCAP) or a Regional Safety Oversight Organization (RSOO).

COSCAPS AND RSOOS: MECHANISMS FOR REGIONAL COOPERATION

COSCAPs are sub-regional programmes administered by ICAO. International experts and regional flight safety inspectors that staff COSCAPs are recruited by ICAO and approved by the member States. The inspectors serve in the areas of flight operations, airworthiness, personnel licensing, aviation law and air transport economics. COSCAPs are funded by contributions from their member States and are found around the world. Some examples are:

- COSCAP-SEA (South East Asia);
- COSCAP-NA (North Asia); and
- COSCAP-SADC (South African Development Community).

The primary objective for COSCAPs is to strengthen regional cooperation and, in some cases, to establish an RSOO, which is a more formalized institution that can

provide safety oversight on a regional level. COSCAPs can serve as forerunners to RSOOs that can be established in the COSCAP's sub-region.

COSCAPs facilitate regulatory and procedural harmonization, perform mock audits of their member States' regulatory activities, and are a source for training. They facilitate formal training opportunities, provide on-the-job training (OJT) and may deliver formal training when their staff members are qualified to do so. COSCAP-SADC, for example, has two regional flight safety inspectors qualified to deliver ICAO-Endorsed Government Safety Inspector (GSI) – Operations and Airworthiness training. As a result, COSCAP-SADC actively engages in establishing training of this kind in the SADC sub-region.

ADDRESSING COSCAP-SADC TRAINING NEEDS

COSCAP-SADC addresses the regional needs of SADC Member States (Angola, Botswana, Democratic Republic of the Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe). It provides technical assistance in the areas of certification and surveillance, facilitating training opportunities, and delivering training. COSCAP-SADC also actively participates in the AFI Cooperative Inspectorate Scheme (CIS), where national and regional inspectors are members of an Africa-wide pool of inspectors that can provide short-term technical assistance to States throughout the African continent.

COSCAP-SADC Regional Flight Safety Inspector (Airworthiness) James Danga is seen in the foreground. FAA Aviation Safety Inspector (Operations) Ed Harahush is seen delivering this particular module.

One of the goals of the COSCAP-SADC project is to train government flight safety inspectors and supervisors to improve their levels of knowledge and skills related to the certification of operators and organizations.

COSCAP-SADC works with ICAO, the SADC Secretariat, Donor States, individual SADC member States and industry to pursue a strategy of arranging training opportunities for the SADC CAAs at no cost to the recipient.

This year, 21 inspectors and supervisors graduated from a GSI-Operations course delivered jointly by the Federal Aviation Administration (FAA) and COSCAP-SADC. The training event included four instructors that completed their on-the-job training requirement for ICAO approval as GSI – Operations course instructors.

The instructor candidates were from the CAAs of Egypt, Uganda and Kenya (two candidates). Their approval as ICAO GSI Instructors increases the capacity of African States to facilitate ICAO-Endorsed GSI training, independent of diminishing Donor State contributions.

COSCAP-SADC also secured a commitment from the FAA and its Academy to bring the following courses to SADC CAAs free of charge beginning in late 2012:

- Inspector Training System
- Safety Management Systems
- Resolution of Safety Concerns

"By pooling resources, cooperating with governments, industry and other capacity-building projects in Africa, and actively participating in the actual delivery of training, the COSCAP-SADC project supports its own regional training needs, while helping to build up the GSI inspectorate and instructional capacity of the African continent as a whole."

WORKING WITH INDUSTRY AND POOLING RESOURCES

The COSCAP-SADC project also promotes cooperative working relationships with industry to bring needed training to the SADC member States.

COSCAP is working with the Boeing Company to provide Aging Airplane Maintenance Programme Training relevant to Boeing airplanes. Dates for this training should be provided shortly.

Additionally, COSCAP-SADC's role as a facilitator of training includes cooperation and collaboration with other projects ongoing in the SADC Region. For example, COSCAP-SADC is actively cooperating and coordinating with a European Union (EU) funded project that is focusing on the provision of technical assistance to the Zambian aviation sector. The COSCAP advises the EU-funded project of its training opportunities available to Zambia at no cost. In turn, the EU cooperates with COSCAP-SADC by funding the travel and accommodations for Zambian inspectors to participate at training locations outside of Zambia.

COSCAP-SADC is also collaborating with the CAA of Zimbabwe and ICAO to deliver an ICAO-Endorsed GSI – Airworthiness course in Harare in July, 2012 with ICAO approved instructors, including an instructor from the COSCAP-SADC programme. This will provide another opportunity for instructor candidates to receive the on-the-job training they need to receive ICAO approval to instruct this course. This will significantly increase the GSI instructional capacity in Africa.

By pooling resources, cooperating with governments, industry and other capacity-building projects in Africa, and actively participating in the actual delivery of training, the COSCAP-SADC project supports its own regional training needs, while helping to build up the GSI inspectorate and instructional capacity of the African continent as a whole. ■

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EUROPE

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Tel: +44 0 7977 43 9908 – **URL:** www.emery-roberts.co.uk

Emery-Roberts Aviation English Training Limited (ER) is an internationally-recognised leading provider of aviation English language education and assessment services. ER provides a wide range of scheduled and bespoke language training and testing solutions for the aviation industry. Services are delivered at our training centre in the UK, or at the customer's preferred location. In keeping with ER's reputation for innovation, 2012 sees the launch of 'Aviation English Live'- live interactive practice in the Emery-Roberts Virtual Aviation English Academy.

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Macmillan Education is a leading publisher of materials for learning English. In 2008 Macmillan was one of the first publishers to produce materials for pilots and air traffic controllers to achieve and maintain level 4 of the ICAO language requirements. Aviation English and Check Your Aviation English were authored by experts in the field, Henry Emery and Andy Roberts, and are ideal preparation for any aviation English exam.

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NORTH AMERICA

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The ICAO document, Doc. 9941, "TRAINAIR *PLUS* Training Development Guide" (TDG) provides the aviation industry with a methodology for the preparation of training materials. Intended as a tool to support international cooperation in the exchange of training courses, the TDG promotes a competency-based methodology for the development of high level training courses and programmes to ensure a mutual acceptance by training institutions.

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TRAINAIR *PLUS*

NORTH AMERICA

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One Step Ahead

Email: aviationtraining@cae.com – **Tel:** +1 514 341-2000 – **URL:** www.cae.com

CAE is a global leader in modelling, simulation and training for civil aviation and defence. The company employs close to 8,000 people at more than 100 sites and training locations in approximately 30 countries. CAE offers civil aviation, military, and helicopter training services in more than 45 locations worldwide and trains approximately 100,000 crewmembers yearly. In addition, the CAE Oxford Aviation Academy offers training to aspiring pilot cadets in 12 CAE-operated flight schools. CAE's business is diversified, ranging from the sale of simulation products to providing comprehensive services such as training and aviation services, professional services, in-service support and crew sourcing. The company applies simulation expertise and operational experience to help customers enhance safety, improve efficiency, maintain readiness and solve challenging problems. CAE is now leveraging its simulation capabilities in new markets such as healthcare and mining.

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Contact: École nationale d'aérotechnique – **Tel:** +1 450 678-3561 – **Fax:** +1 450 678-7465 – **URL:** www.college-em.qc.ca/ena

The ÉNA (National Institute of Aeronautics) is the largest college-level aeronautical institute in Canada and the only educational institution in Québec that trains technicians in aircraft manufacturing, aircraft maintenance and avionics. The school accepts over 1,000 full-time students each year and over 2,000 technicians in continuing education. It is one of the few schools in Canada authorized by Canada's Department of National Defence to provide aircraft maintenance training to military personnel.

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Contact: Mr. Ismail Albaidhani, Head, Global Partnerships & Learning Innovation – **Email:** albaidhani@iata.org
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NORTH AMERICA

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SOUTH AMERICA

PUNTA DEL ESTE FLIGHT SCHOOL (URUGUAY)

Open your wings into the sky of Uruguay

Contact: Mr. Rodrigo Valetta, International representative – **Email:** r.valetta@puntaflightschool.com
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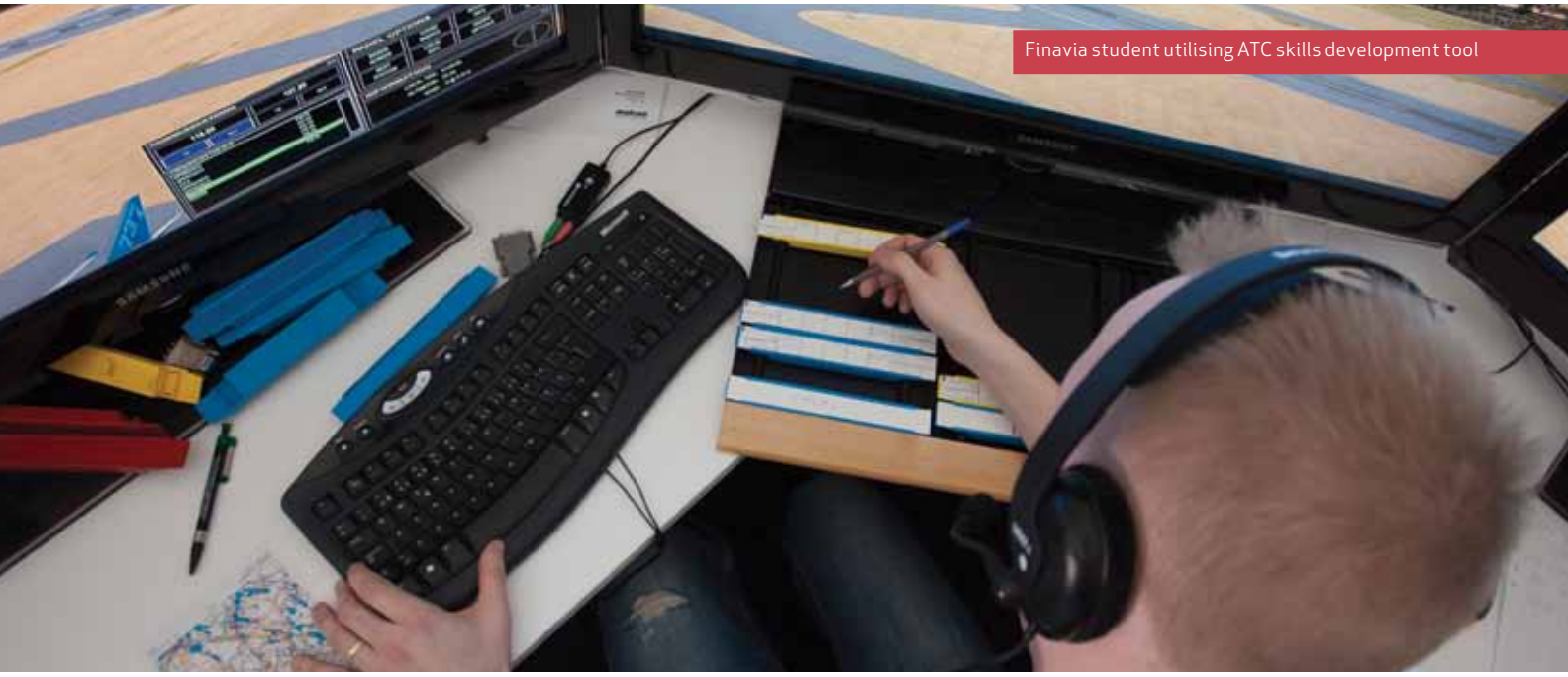

Finavia student utilising ATC skills development tool

FINAVIA'S INNOVATIVE APPROACH TO LEARNING PRODUCES SURPRISING RESULTS

Where "involved" learning is integral to the training process

MARK BLANCHARD
is an Air Traffic Services (ATS) Specialist at Finavia. Mark has been an operational Air Traffic Controller (ATCO) in the UK and the Middle East, as well as an Air Traffic Control (ATC) Instructor in Finland. He has also held various positions in Air Traffic Management both in the Middle East and Finland.

From the very first day of their initial training course, Finavia's new Air Traffic Control students are made aware of what they can expect from the course and, equally important, what is expected of them; not just what they are required to learn, but also what they are expected to contribute to the whole process.

Education in Finland has always been highly regarded globally, with excellent results in the Programme for International Students Assessment (PISA) studies. These high standards of achievement and methodology are also carried into Finavia's ATM Training courses.

The underlying concept of learning; where the student's own active involvement and interaction with educators, fellow students and the learning environment, is extremely important. Students process and interpret the information that they absorb on the basis of their prior knowledge structures. This is why it is important to focus and apply the correct learning methods from the very beginning of the initial course, onwards.

During the Finavia courses, which are all developed based on EUROCONTROL Common Core Content requirements, students are challenged to have a broader

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understanding of the subjects, beyond simple retention of the material, by involving them in discussions and group exercises.

Two weeks of independent thesis work is also allocated to each student at the end of the initial training. The student can choose any subject to study and develop for their thesis, whether this is something they have just studied or something that was previously covered in their studies. If requested, course instructors will guide students through this process and may allocate specific tutors or specialists to provide help with the chosen thesis subject.

VENTURING BEYOND THE BOOK

The purpose of the thesis is to show, within their individual area of interest, proof of understanding of the subject matter and the ability to develop the subject beyond the scope of what is covered within the course. As a result, students become interested in making direct contributions to the learning methods and tools used to deliver topics during a course.

Contributions are not limited to the ATM field. Because Finavia maintains a network of 25 airports in Finland, as well as the air navigation system covering the entire country, students can elect to work on a variety of aspects of airport operations, environmental issues, Safety Management Systems (SMS), etc.

Three Finavia students were asked to comment on their experiences performing this thesis work. Maija Lagerstam is still involved in the project, while Riku Korte and Leena Vuorivirta have completed their work.

The students stated that they understood the rationale behind the thesis work and agreed that it supported and expanded their knowledge in their chosen subjects. They felt that it allowed them to work intensively in a specialized area that they were interested in, rather than having the subject assigned to them by an instructor. When it came to why they had chosen their specific subjects, responses varied widely, from previous work experience, to continuing education subjects studied prior to their air traffic training, to simply a general interest in the subject matter.

INDEPENDENT THINKING TO MEET REAL NEEDS

Riku Korte, who has just been validated as an Area Controller at Finavia's Air Control Centre (ACC), said that he was given the opportunity to develop a 3D model of the entire Finnish airspace. He believes that if a learning tool of this kind had been available when he started his training, it would have greatly improved his understanding of this sometimes complex issue.

Using freeware, Riku created an electronic visual representation of the complete Finnish airspace, laid out on a virtual Aeronautical Information Publication (AIP) chart, with user selectable areas that can be manipulated easily to rotate both vertically and horizontally, as well as zoom in and out. His completed project was of such high quality with an outstanding user interface, it is now used in Finavia training courses. His work has directly benefitted other students and will continue to do so far into the future.

Leena Vuorivirta was particularly proud of the fact that the Environment Department of Finavia was able to use her thesis

Finavia student under training in 360 degree tower simulator.

work on Continuous Descent Operations (CDO) after it had been completed. "A comprehensive summary on approach procedures supporting CDO at major European airports was a valuable part of Leena's work. The literature study on approach noise mitigation included in the work has served as a basis for a night noise management plan of Helsinki Airport," said Mikko Viinikainen, SVP Environmental Management at Finavia.

Maija Lagerstam said that her thesis work on Safety Management Systems helped her to better understand her position within air traffic control and the role it has in the bigger picture of airports and aviation in general. She said that she had previously studied Work Psychology and Business Process at university, which led her towards her project.

Maija has attended courses in Socio-Technical Systems, Safety Management and Group Dynamics while at university and was looking for specific ways to align her studies with her chosen career. Although Maija has only just started her thesis work project, she has already increased her understanding of aviation safety management systems and is looking forward to where this knowledge will take her in the future. She hopes that this Finavia project will contribute towards her final Master's thesis at university.

POSITIVE FEEDBACK, PERSONAL SATISFACTION

All three students appreciated the support provided to them from within Finavia and its training organisation. They felt that it kept them on track and helped to ensure the value of the final thesis work. Riku said that, from the first draft of his project through to completion, the feedback he received was both supportive and encouraging, which motivated him throughout the process.

Personal satisfaction in their projects was also highlighted by the students. Riku felt personally rewarded that his 3D work is now being used within the training organisation to assist other students.

Maija summed up the views of all three students perfectly when she said: "I find it important to be interested in the subject that I have chosen, because you never know what it might bring you in the future."

Due to their positive experiences with these projects, all of the students stated that they looked forward to participating in other projects within their working careers. This is a great achievement for any organisation; that new members are already motivated to actively participate in projects, as well as a positive sign for collaboration across the whole aviation industry.

STUDENTS AS INNOVATORS

Allowing students a relatively free hand to develop subject matter, results in some innovative thought processes and "outside-the-box" solutions. Every year, the students' capacity to handle technology in new and innovative ways increases.

Helsinki Airport, Finland

If educators can learn to encourage this process, then the prospect for better training solutions, as well as motivated and better educated staff, at all levels, can and will become a reality. Kimmo Loiske, Finavia ATM College's Head of Training, while commenting on the importance of the thesis work, said that Riku's airspace 3D model is a good example of where a former student can understand, remember and relate to a newcomer's problems in learning, or try to see the bigger picture and then find an innovative student-orientated solution to that particular issue. As Kimmo put it: "Students will tackle the challenge of learning from different angles compared to our experienced instructors. We are just trying to give them a chance to help their fellow students."

The next generation of students is upon us right now. As each new course begins, an ever increasing knowledge of technology (and the ability to manipulate it) is being made available to us courtesy of our own students. They have the ability to provide input that is often nothing short of astounding.

We, as educators, have an obligation to allow our students to show us what they can do. ■

EVIDENCE BASED TRAINING COMES OF AGE

Leveraging flight and simulator data for a more objective training analysis

In his role as Chief Safety Officer of CAE, **CAPTAIN LOU NÉMETH** *is responsible for flight safety in the CAE aviation training enterprise, with 35 training centres globally, more than 170 full flight simulators and over 600 instructor personnel, for pilot Type Rating Training Organization (TRTO) and ab initio training, maintenance and in-flight training programmes.*

Captain Németh is chairman of the Federal Aviation Administration (FAA) Aviation Rule Making Committee (ARC) which has made recommendations to the FAA on how pilots can better manage stall situations. He is also the training committee co-chair of the Royal Aeronautical Society (RAeS) International Committee for Aviation Training in Extended Envelopes (ICATEE).

Captain Németh is well published in the application of technology and data management / metrics to cognitive learning outcomes in aviation. He is type rated on the A320, A330, B727, B737, B757/767, MD90, Learjet, Gulfstream 5/550 and the Lockheed T-33 Shooting Star.

You're probably familiar with FOQA – Flight Operations Quality Assurance, or flight data monitoring and analysis for improving safety and operational efficiency. FOQA programmes have helped airlines and business aircraft operators worldwide to reduce or eliminate certain safety risks, as well as minimize deviations from regulations and standard operating procedures.

Have you also heard of SOQA – Simulator Operations Quality Assurance? It, too, is a means of mitigating risk and enhancing safety and efficiency for civil aircraft operators.

The emerging concept of SOQA involves leveraging data from a simulator event, much as a flight data recorder (FDR) captures information for aircraft in flight. The data can then be analyzed, as with FDR data, to identify latent unsafe indicators and root causes, to address risk mitigation and other operational priorities, and to adapt fleet training curricula.

The full-flight simulator (FFS) is a rich source of data, capable of outputting thousands of parameters. Using CAE Flightscape software originally developed for aircraft flight data analysis, we have successfully demonstrated that a SOQA

The online LOC-I training scenario for simulator instructors features an attempt to recover from a nose-low, high-bank upset condition in the Boeing 737 FFS.

The visual nature of the animation plus the objective identification of events – delivered within seconds of completing the simulator session – provides a powerful teaching aid.

programme has the capability to provide a more precise picture of training performance. How? By combining an objective, data-generated analysis with the knowledge, skill, experience and subjective evaluation of the simulator instructor. We believe the integration of objective simulator data has the potential to improve pilot acceptance and represents a major innovation for evidence-based training.

We have recently applied SOQA techniques and data to two research projects at CAE SimuFlite in Dallas, Texas. Both projects made use of a CAE Flightscape-equipped Boeing 737 FFS.

VALIDATING SOQA

The first project was designed to demonstrate the validity of the SOQA concept. Flight crews flew the Boeing 737 FFS to evaluate traditional takeoffs, landings, wind shear events and engine fire events, as well as real-world mishaps mocked up in the simulator. Among the events evaluated against SOPs were high approach speed, excessive bank angle, ground proximity warning system terrain cautions, high pitch attitudes during takeoff, and many others. The system automatically identified events of interest (similar to FOQA events) during the FFS session.

Since the SOQA system applies the same tools used for FOQA event detection and analysis, it provides crews with the ability to experience actual problem flights from the aircraft. Immediately following the simulator session, the SOQA data was used to generate a unique brief/debrief presentation, combining cockpit video and audio synchronized with a flight reconstruction of flight controls, avionics displays and an outside view of the aircraft in flight.

The visual nature of the animation, plus the objective identification of events – delivered within seconds of completing the simulator session – provides a powerful teaching aid that is much appreciated by students. User response to the video/animation reconstruction playback was universally positive. We believe the added objectivity of software-generated analysis has the potential to improve pilot acceptance and reduce controversy when compared with current subjective-only assessments by instructors.

Comparing FOQA and SOQA results, the effectiveness of the simulator training programme can also be measured more objectively, identifying areas where the simulator is being flown differently than the real aircraft. Simulator session data can be used to optimize training, identifying areas where more effort is

"The emerging concept of SOQA involves leveraging data from a simulator event, much as a flight data recorder (FDR) captures information for aircraft in flight. The data can then be analyzed, as with FDR data, to identify latent unsafe indicators and root causes, to address risk mitigation and other operational priorities, and to adapt fleet training curricula."

required or where unnecessary training may be occurring. The system allows instructors to spend more time on higher-value subject aspects of the training, such as crew resource management, since the software takes care of the objective measurements.

SOQA-generated data analysis can also alert pilots to anomalies that instructors and students might otherwise miss, especially during complex scenarios when the crew (and observers) become task-saturated. FFS flight data can also help confirm that an exercise has been mastered more quickly than a subjective-only evaluation. The time saved could be applied to additional simulator exercises, further enhancing training value.

ONLINE LOC-I TRAINING

CAE and Aviation Performance Solutions (APS), which has trained thousands of pilots in comprehensive upset recovery skill development, have also applied CAE Flightscape software and the SOQA approach to create a web-based tool targeting loss of control in-flight (LOC-I) situation awareness. A goal of the project is to help standardize how simulator instructors teach fundamental LOC-I and upset recovery. LOC-I, of course, is currently the leading human factors cause of fatal aircraft accidents.

The CAE-APS instructor training tool is based on industry – FAA guidance in the *Airplane Upset Recovery Training Aid (AURTA), Revision 2.* CAE and APS previously collaborated on an AURTA e-Learning course designed to improve the ability of business jet pilots to recognize, avoid and, if necessary, recover from LOC-I flight situations.

Similar to the SOQA validation project, the new online multimedia presentation for simulator instructors uses high-definition video, graphic representations of avionics displays and aircraft controls, and an outside view of an animation of the aircraft in flight.

The online training scenario features an aircraft upset event in which a pilot-in-training is attempting to recover from a nose-low, high-bank upset condition in the Boeing 737 FFS. A video of the scenario can be viewed at http://www.apstraining.com/cae/caeaps-ffs-ip-standardization-session-1-1/.

The new online tool provides a way to effectively deliver a standardized level of theoretical knowledge to a large number of instructors efficiently and quickly.

CONNECTING FOQA TO TRAINING

SOQA connects the benefits of FOQA to simulator training, utilizing the same software toolset for both the safety and training environments. We believe that comparing long-term statistical trending of simulator session data with aircraft FOQA trends will better enable simulator sessions to reflect real-world issues.

FOQA programmes are widely established in aircraft operations and have proven their worth in helping to make aviation safer. Nonetheless, incidents and accidents continue to happen to pilots of all experience levels. In order to further improve pilot situational awareness and skills, there should be increased emphasis on using the results of FOQA and SOQA programmes to improve flight training.

CAE is also extending FOQA and SOQA applications to ab initio training to further embed a safety of flight culture in new cadets. At CAE Global Academy Phoenix, Arizona we are implementing a programme which incorporates flight data recorders as well as high-resolution video and audio recording devices in the cockpits of training aircraft. The recording system will capture roll, pitch, speed, position, altitude, acceleration and engine parameters. The audiovisual system will yield high-resolution images of cockpit instruments, use of checklists, lighting conditions and crew interaction.

The system will provide instructors with a means to routinely debrief students after a flight with a flight reconstruction of all data sources. We will also collect statistics to identify unsafe trends over the longer term and, if necessary, to investigate any aviation occurrence.

Moreover, the recording equipment in the ab initio aircraft has the effect of a "virtual instructor / observer" in the cockpit, especially for solo training flights.

To our knowledge, this is the first application in a global ab initio training network where a flight recording system will be leveraged for the multiple purposes of occurrence investigation, FOQA and flight / mission debrief, as well as a stepping stone for evidence-based training. ■

The SOQA system applies the same CAE Flightscape tools used for FOQA event detection and analysis.

THE ASPECT OF SAFETY IN AVIATION TRAINING – OVEREMPHASIZED OR DOWNPLAYED?

Elsabe Wait – Senior Manager Regulatory Training ATNS

Although aviation is among the safest modes of transportation in the world today, accidents still happen. In order to further reduce accidents and improve safety, proactive approaches must be adopted by the aviation community and should form an integral part of all aviation training programmes.

The International Civil Aviation Organisation (ICAO) has mandated that all of its member States implement Safety Management System (SMS) programmes in their aviation industries, and the Air Traffic and Navigation Services Company (ATNS), South Africa's Air Navigation Service Provider (ANSP) has also adopted such a programme.

ATNS introduced SMS training for all air traffic service personnel and recurrence training programmes have also been implemented. In the first quarter of 2012, 108 controllers attended these SMS programmes either on-site at Air Traffic Service Units (ATSUs) or at the Aviation Training Academy (ATA).

SMS may be defined as "a dynamic risk management system based on quality management system (QMS) principles in a structured scaled appropriately to the operational risk, applied in a safety culture environment." – Safety Management Systems in Aviation, Alan J. Stolzer, Carl D. Halford, John J. Goglia, 2008, Ashgate

Aspects of safety in aviation training should neither be overemphasised or downplayed within training, but should be integrated in all learning processes and activities regardless of whether these take place in a simulated training environment or whether they happen as part of on-the-job training or, for that matter, in the daily execution of tasks.

ATNS has adopted the following safety culture components (Reason, 1997) in order to integrate a safety culture in all aspects of service delivery and training:

REPORTING CULTURE

Safety Management Systems depend crucially on the willing participation of the workforce. To achieve this, it is necessary to engineer a "reporting culture" to create an organisational climate in which people are prepared to report their errors. Such a reporting culture allows people to voice safety concerns which in turn are analysed in order for appropriate action to be taken.

INFORMED CULTURE

An informed culture is a safety system that collates data from accidents and near misses and combines them with information from proactive measures such as safety audits and climate surveys. An informed culture allows people to understand the hazards a nd risks involved in their own operation and staff members work continuously to identify and overcome threats to safety.

FLEXIBLE CULTURE

A flexible culture is one that successfully manages safety during change due to external demands, such as, for example, increasing technological complexity of an operating system, or increasing general or peak capacity in the Air Traffic Management (ATM) network, or major organisational changes (e.g. privatisation). Collecting this information is futile unless it is used to enhance the safety performance of the organisation.

LEARNING CULTURE

A learning culture is needed to draw appropriate conclusions from the information collected along with the will to implement changes to procedures and equipment as deemed necessary.

In a learning culture, people are encouraged to develop and apply their own skills and knowledge to enhance organisational safety. Staff members are updated on safety issues by management. Furthermore, safety reports are fed back to staff so that everyone learns the lessons.

The basic model of learning is an excellent representation of describing the learning process of an employee. Learning starts from experience and from the fact that the individual has the desire to learn from experiences. The desire to learn is based on curiosity. Adequate time for reflection is needed. Time to deliberate and to acquire knowledge connected to the experience is required.

JUST CULTURE

A "Just Culture" refers to a way of safety thinking that promotes a questioning attitude, is resistant to complacency, is committed to excellence, and fosters both personal accountability and corporate self-regulation in safety matters. A "Just" safety culture, then, is both attitudinal as well as structural, relating to both individuals and organisations. Personal attitudes and corporate style can enable or facilitate the unsafe acts and conditions that are the precursors to accidents and incidents. This requires not only actively identifying safety issues, but responding with appropriate action.

CONCLUSION

There is a need to learn from accidents and incidents through safety "investigation" so as to take appropriate action to prevent the repetition of such events. In addition, it is important that even apparently minor occurrences are investigated, in order to prevent catalysts for major accidents. Safety analysis and 'investigation' is a necessary and effective means of improving safety, by learning the appropriate lessons from safety occurrences and adopting preventative actions. It is therefore important that an environment exists where occurrences are reported; the necessary processes are in place for investigation and for the development of necessary preventative actions such as re-training, improved supervision, etc. ■

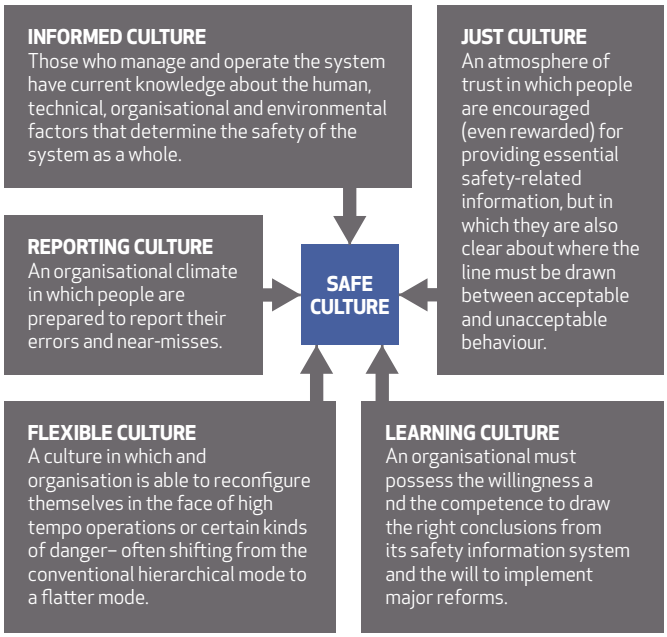


Figure based on Reason (1997), The Components of Safety Culture: Definitions of Informed, Reporting, Just Flexible and Learning Cultures

Jane Hupe, *Chief, Environment Branch, ICAO*

MOVING TOWARD A SUSTAINABLE FUTURE FOR AVIATION

State Action Plans will help reduce CO_2 emissions for international aviation

ICAO's member States reached a landmark global agreement on aviation and climate change at the 37th Session of the ICAO Assembly in October 2010. This agreement represented an important step towards aviation's sustainable future and made the international aviation sector the first to commit to a set of global environmental goals to increase fuel efficiency and stabilize CO_2 emissions in the medium-term. The agreement provided a concrete framework for ICAO and its member States, in collaboration with the air transport industry, to continue to identify and pursue global solutions to address CO_2 emissions from international aviation. ICAO is undertaking the necessary actions to facilitate further progress towards this

objective and, in addition to its technical and operational work, is focusing on four strategic building blocks:

- State action plans;
- Sustainable alternative fuels for aviation;
- Market-based Measures (MBMs); and
- Global aspirational goals.

ICAO's member States have collectively agreed to compile individual, tailored action plans to reduce CO_2 emissions from international aviation. States have also agreed to voluntarily submit their plans to ICAO by June 2012, which in turn, has led to a dynamic shift in the Organization's policy outlook on the environment, from a standard *policy setting* phase to a more action-oriented *implementation* mode. States will identify the measures to be adopted in the action plans, in addition to specifying additional support and assistance required from ICAO. As a result, ICAO will address both the assistance needs of States, as well as assess the progress toward the achievement of the global aspirational goals adopted by the 37th ICAO Assembly.

STATE ACTION PLANS

Measures to limit or reduce the impact of international aviation on the environment should be an integral part of the broader sustainable development priorities and objectives of a State. This contributes towards promoting the sustainable growth of international aviation, while ensuring consistency with any overarching CO_2 emissions limitation or reduction efforts in the State.

Action plans are intended to assist States in a number of ways. Firstly, they standardise the reporting of States' international aviation CO_2 emissions. Secondly, they provide a framework to develop, outline and implement national policies, actions and measures to reduce States' international aviation CO_2 emissions. Thirdly, the framework is designed to be tailored to reflect respective national capacities and circumstances, thereby allowing States flexibility to meet their obligations. Fourthly, they allow States to identify gaps in terms of the assistance required to develop and implement policies and actions related to international aviation and climate change, including technical guidance, knowledge sharing, capacity building, supporting innovation, technology transfer and financing.

ICAO will use the details provided in the action plans to compile information in relation to the achievement of the global aspirational goals. ICAO will also facilitate the dissemination of studies and best practices related to aspirational goals among States, including the provision of guidance and other technical assistance. In addition, ICAO will be able to identify and respond to States requirements for additional assistance across a number of themes.

Action plans are designed to incorporate information on activities that aim to address CO_2 emissions from international aviation, including national actions, as well as activities implemented regionally or on a global scale in the context of or as part of bilateral and regional/multilateral agreements. Most of these

ICAO regional hands-on training workshop for State action plans on CO_2 emissions reduction activities (Bangkok, Thailand, 25-27 May 2011)

measures will affect both domestic and international operations, but where possible, States shall separate the information provided for international aviation. The impact of measures on domestic aviation may be considered as a co-benefit of ICAO's global aspirational goals.

CO_2 emissions from airport and/or ground support equipment operations are considered as domestic emissions and are beyond the scope of the ICAO Assembly agreement. However, some States may address the issue of international aviation by taking a holistic approach and consider the aviation sector as a whole. In such cases, States shall provide relevant additional information to help explain their strategies.

TRAINING TO DEVELOP STATE ACTION PLANS

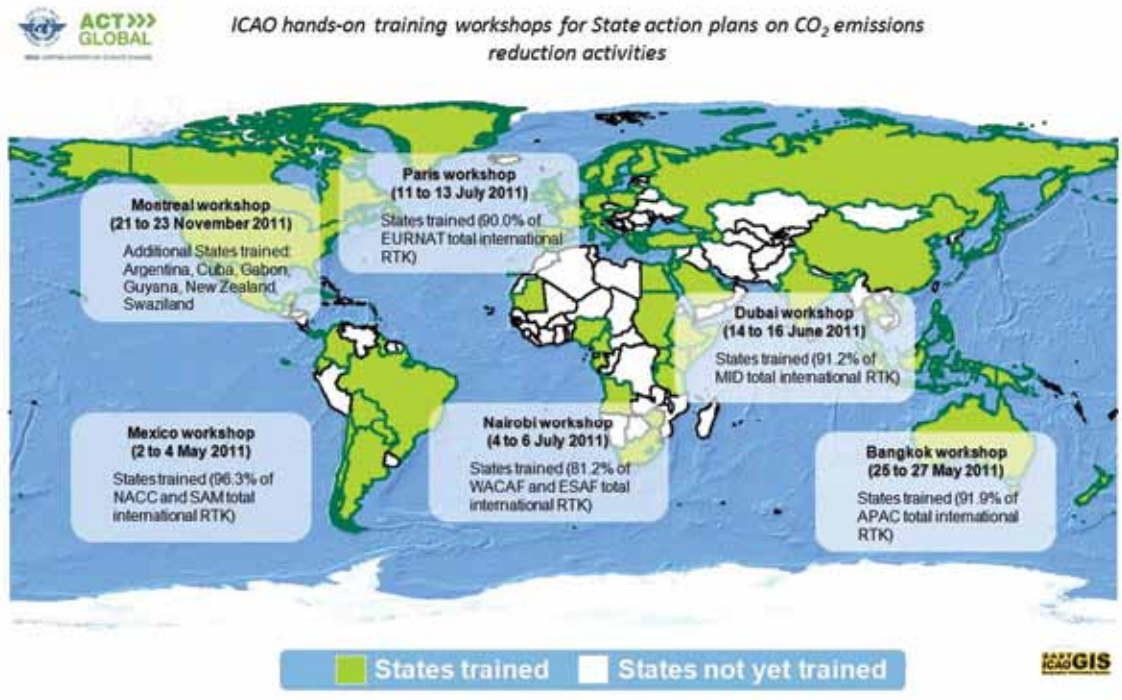
The role of State action plans is integral to meeting the challenge of the Assembly Resolution and this article focuses on its scope, expectations and design. In less than 6 months, ICAO developed comprehensive guidance material, a specialized interactive website, specific tools and a training schedule. This was a significant achievement for the Organization, matched by the interest and level of participation of Member States. Regional workshops on State action plans were held across the ICAO Regions, in Bangkok, Dubai, Mexico, Montréal, Nairobi and Paris. More than 200 representatives from 81 States representing 92 percent of global revenue tonne kilometres (RTK) attended the workshops.

Each ICAO member State has nominated at least one focal point. The focal points are, in turn, responsible for establishing a national team to plan, draft and devise their respective State action plan. This requires the support of various national stakeholders including airports, airlines, air navigation service providers, aviation regulators, transport and environment policymakers, fuel providers, manufacturers, community representatives and others. The focal points were expected to undertake a consultation exercise, identify a range of possible measures and determine the scope of each option. Although each State's plan will vary, it is envisaged that a range of qualitative and quantitative measures will be identified and specified.

The focal point training exercise was led by experts, was interactive and provided comprehensive information. Initially, focal points were led through the expectations of the hands-on training workshops, the resources and guidance available – including the ICAO web interface. The key steps of the planning process were also highlighted, including:

- Administrative and organizational arrangements;
- Identification of national conditions;
- Estimation of national historical CO_2 emissions from international aviation;
- Identification of national actions to mitigate CO_2 emissions; and
- Determination of the State's voluntary contribution to the set of ICAO global aspirational goals.

Focal points were taken through each of the steps during a series of presentations led by three ICAO experts, supplemented by interactive web workshops, industry presentations and Q&A



ICAO hands-on training workshops for State action plans on CO_2 emissions reduction activities

sessions. The guidance material detailed the issues in each of the key steps and the experts highlighted how the specialized website was set up to mirror each step. Moreover, focal points were briefed on undertaking the work prescribed in the steps, in addition to organizing it and then preparing the action plan using the website tools. A series of examples and templates were used to highlight a number of scenarios, options and approaches for focal points to take.

GLOBAL COMMITMENT

To date, six workshops have taken place where more than 200 representatives from 81 States representing 92 percent of global RTK attended. ICAO is working very closely with State focal points as they prepare to finalize and submit their action plans in 2012. It is expected that these action plans will be continually updated and refined as new measures are implemented and results announced. As a result, ICAO will continue to liaise with States across a range of issues. These next steps will include tailored support for implementation of measures, capacity building, additional workshops and training assistance. ICAO is currently planning a special seminar on assistance for climate change action to address the issues of capacity building, technology transfer and financing by providing a platform to share and exchange information and expertise. A further imminent development is a new training programme for the ICAO Fuel Savings Estimation Tool (IFSET), in collaboration with the Civil Air Navigation Services Organisation (CANSO).

Air transport is focused on meeting its sustainable development responsibilities, maximising its role in economic development, reducing its environmental impact and consolidating its social benefits. Through increased use of low-carbon technology, environmentally friendly materials, new aircraft systems and sustainable energy sources, the air transport sector is making significant progress across a range of sustainability issues. State action plans form a key element in the response to mitigating the sector's environmental impact and ICAO welcomes the opportunity to help States develop their individual plans.

As we face the challenges ahead, we must remember that air transport ties the economic, environmental and social pillars of sustainable development together, across the globe. The sector must be allowed to grow in a sustainable manner, continuing to ensure freedom to travel, access to mobility, and facilitating the exchange of cultural and educational experiences. In cooperation with other UN bodies, ICAO and its member States are committed to the development of global solutions for the sustainable future of international aviation. ■

QUALITY SYSTEMS, TRAINING AND COURSE DEVELOPMENT

A conversation with Alfredo Paredes, Director of the Dominican Republic's *Academia Superior de Ciencias Aeronáuticas (ASCA)*

The Dominican Republic's Academia *Superior de Ciencias Aeronáuticas* (ASCA) is among Latin America's most modern training centres supported by a strong course development unit (CDU).

While the Academy obtained its TRAINAIR *PLUS* Associate Member status in 2011, it established its CDU in May 2009 when its first group of 10 TRAINAIR course developers graduated and took on the task of developing the Academy's first Standardized Training Packages (STPs) entitled *Preparation and Processing of the ICAO Flight Plan* and *ATS/ARO Basic Course*. The CDU was established as part of an ICAO Technical Co-operation Bureau (TCB) project.

ASCA is currently developing three new STPs: the Performance-Based Navigation (PBN) Management Course, the Notice to Airmen Systems (NOTAMS) Preparation, Analysis and Interpretation Course and the AIS Aeronautical Cartography Specialist Course. The Academy's two existing STPs on Flight Planning and Aeronautical Information are being updated.

The ICAO Training Report interviewed Alfredo Paredes, Director of ASCA.

ICAO TRAINING REPORT: Can you provide us with a brief overview of aviation in the Dominican Republic?

Alfredo Paredes: ASCA was founded in 2009 by the Dominican Republic's Civil Aviation Authority, the *Instituto Dominicano de Aviation Civil* (IDAC), to fulfil an obvious need for training in the region. The Dominican Republic has 10 airports, five of them international. The country handles approximately 200,000 flights by 49 international carriers, in addition to its 17 domestic airlines. Additionally, 9.7 million tourists vacation here. Aviation-related industries employ about 5,000 Dominicans. The Dominican Republic regards flight as an integral part of the overall tourism customer experience, thus, the domestic need for well-trained personnel. In a highly competitive tourism market, for the Dominican Republic, service excellence is extremely important. However, for training and course development purposes, our target market is all of Latin America.

How do you analyse the training needs in your country and in the region?

We identify the needs of the country through training needs research that we conduct in conjunction with the IDAC, as well as polling the local aviation industry. Our knowledge of the needs in the region also is enhanced by collaboration with Civil Aviation Training Centres, planning groups and task forces throughout the region, as well as reports from ICAO plans and projects for the region. We plan our training focused on these themes.

You mentioned earlier that your target market is all of Latin America? Could you expand on this?

The Centre attracts instructors and students from Ecuador, Mexico, Cuba, Costa Rica, and Chile, among others. Because the Academy has been accredited by the *Ministerio de Educación Superior, Ciencia y Tecnología* (MESCyT), it has the authority to award Superior Technical Level degrees, academic certificates and diplomas in technical areas of education and aeronautical training, which are recognized throughout the region.

ASCA has agreements with the *Office National de L'Aviation Civile* (OFNAC) in Haiti and the *Autoridad Aeronáutica Civil de Panama* to provide training on its ATC simulators. Plans are underway to offer a dual degree programme in conjunction with the University of Oklahoma. The Academy is also developing a

virtual classroom to combine e-learning with face-to-face classroom instruction.

Could you explain the quality systems the Academy has put in place?

ASCA has developed a Manual of System Management for Quality and Procedures, which identifies the document and record requirements for the organization in order to ensure the quality of planning and operation of training. The manual includes the scope, the description of documented procedures established and the description of the interaction between the processes of the system through process maps. The process maps are classified into three groups: support processes that specify all administrative activities, operational processes through which ASCA has established and implemented standardization and quality of training activities, as well as control and improvement processes intended only for the internal management of the academic procedures.

ASCA, as part of its strategy of institutional development, is certified under ISO 9001-2008 which, together with the TRAINAIR *PLUS* membership, ensures high quality for the courses prepared by the CDU.

What is the composition of your CDU and how are your developers selected?

The ASCA TRAINAIR *PLUS* Course Development Unit is headed by Rolando Tamayo de los Reyes, an Aeronautical Engineer with a Masters of Technical Sciences. He has a team of six full-time course developers who are all trained in the TRAINAIR *PLUS* competency-based training methodology. This team is supported by 15 part-time course developers from a variety of technical aviation specialties. These part-time course developers belong to different areas of the Academy and different technical divisions of IDAC. This depth of knowledge gives the Academy's CDU the capacity to develop STPs on a wide range of subjects.

ASCA has developed a Structural Logic Scheme for the preparation of TRAINAIR *PLUS* course developers and instructors. We identify those professionals who have a high level of expertise in their specialties and who have certain skills for the design and delivery of courses. Those who show an aptitude for design are entered into the database for possible selection to participate in the TRAINAIR *PLUS* Training Developers Course. Those who show aptitude for teaching and instruction are selected for the TRAINAIR *PLUS* Training Instructors Course. Our strategy is to train a steady stream of developers and instructors over the short, medium and long term.

You mentioned that your CDU has developed courses under both the previous TRAINAIR system and the new TRAINAIR *PLUS* methodology. What differences have you noticed?

The improved analysis process offered by the TRAINAIR *PLUS* system helps our developers to objectively identify training needs and separate them from those that are not addressed by training. This allows us to generate more specific proposals in both design and training activities. The TRAINAIR *PLUS* Training Developers Course has strengthened the knowledge and skills of our course developers, enabling greater control of processes and more astute management of assigned projects.

In your opinion, what are the major challenges faced by Latin American States as we move forward to train the next generation of aviation professionals?

First and foremost, there is a tremendous need for cooperation between States generally, and training institutions particularly. We need to share our expertise and our knowledge of training needs regionally to develop consistency in the courses we offer. The TRAINAIR *PLUS* Programme takes us a long way in this direction. The competency-based methodology and the STP sharing programme help satisfy these needs.

Second, but equally important, we must put quality systems in place to ensure that the quality of training we offer is of the highest level, while also coordinating with industry and the regulators in order to ensure that the training is relevant to today's training needs and remains timely to address needs as they evolve. We live in a very fast-paced world. What may be relevant today may not be tomorrow.

I might add that our challenge as a training centre and a CDU is to strengthen our technical and professional expertise and the pedagogical mastery of our training staff to remain up-to-date with regard to current trends in aviation training.

How can ICAO be of assistance in this regard?

The Training Developers Courses offered by ICAO have been instrumental to establishing our CDU. If anything, we need more Training Developers Courses conducted within the region, not just for our centre, but for all of the centres in Latin America. We should be considering Civil Aviation Training Centres as strategic partners in a universal plan to upgrade the skills of our course developers.

We were privileged to be involved in the test of ICAO's new e-management system for the exchange of STPs. The TRAINAIR *PLUS* on-line library will allow centres throughout Latin America to easily and effectively share expertise. ■

ADDRESSING THE NEED FOR AVIATION PROFESSIONALS IN THE MIDDLE EAST

The Gulf Centre for Aviation Studies is helping to build "home-grown" talent

THE IMPLICATIONS OF GROWTH

Despite the economic issues that the world has faced in recent years, the aviation industry continues to grow. The latest figures from IATA show that passenger traffic increased by 8.6 percent in February 2012 versus the same month the previous year. Looking further into the future, an IATA report indicates that by 2014 there will be some 3.3 billion air travelers, up 800 million from 2009. This is fuelling the rapid expansion of the global aircraft fleet, nearly doubling from around 19,400 aircraft today to more than 39,500 aircraft by 2030.

IATA expects the Middle East region to have the fastest growth rate in the world, averaging 9.4 percent from 2009 to 2014. The United Arab Emirates (UAE), Kuwait and Jordan will be among the top 10 fastest growing countries, with the UAE ranked 7th for international passengers at 82.3 million by 2014.

Countries in this part of the world are planning for this growth with long-term investments in airport and related infrastructure which, at the most recent estimate, totalled about US$ 104 billion. This will significantly drive up airport capacity, especially in major Middle Eastern hubs such as Abu Dhabi, Dubai and Doha and will help support the ambitious growth plans of Middle East airlines.

These growth figures pose an interesting conundrum for an industry that is one of the least profitable in the world, yet must keep spending to upgrade infrastructure and equipment as well as enhance the skills of its employees. With aircraft becoming more and more efficient and airports becoming mini-cities where automation is of paramount importance, the human element of travel appears to be taking a back seat to technology.

CHALLENGES AND SOLUTIONS

Current aviation compensation levels are driving the best talent to other industries. Lack of interest and engagement from the existing workforce is also a serious concern, with employer and employee expectations constantly shifting. Lack of recognition for airport professions is another key concern. An important issue for the industry (especially in the Middle East) has been the use of obsolete aviation training standards and methodologies.

In the Middle East, the traditional method of meeting employment requirements has been to recruit experienced staff from other regions of the world to fill the human resource needs resulting from the rapid growth in the region. Governments are now realizing that this approach is not sustainable in the long term. The focus is now on attracting, recruiting and grooming talent from within the region. This is radically different from the current "hire and work" strategy that has been adopted for many years.

In the past, because no single aviation training institution was able to cater to the various training needs in the region, employees were being sent to other parts of the world for training. This not only entailed significant costs, but also imposed time constraints on employers and employees alike. The region is now taking a dual approach to tackling this issue – establishing training institutions such as the Gulf Centre for Aviation Studies (GCAS) to deliver a blend of "traditional" training, while ensuring that technology is leveraged to deliver training "on demand". This blended approach is significant in a region where airport operations are 24/7, 365 days a year and allows employees the flexibility to access training through a variety of channels (e.g. classroom, CBT and mobile) as well as to manage the pace of learning.

Technology is also driving collaborative training, enabling employees to manage, share and discuss training material not only within their own teams but also horizontally and vertically across their organization. This collaborative approach is significant as multi-tasking increasingly becomes the norm in the industry and is supplementing and enhancing traditional on-the-job training (OJT) and coaching.

A CULTURE OF SHARING

The Gulf Centre for Aviation Studies was established to address this training void and to provide world class training for the Middle East aviation industry, with tailor-made training programmes that are relevant to the region's needs.

The aim was not to compete with established training institutions and global organizations, but rather to work closely with them to ensure not only the exchange of best practices and sharing of knowledge, expertise and resources, but also to build a network of centres of excellence around the globe with the capacity to meet future training needs.

The Centre's belief is that there must be a common approach to training globally; ICAO's TRAINAIR *PLUS* initiative is a significant step in this direction. While technology, systems and processes have become more or less standardized across the world, training is one area where significant disparities continue to exist. Thus, standardization not only in the delivery of training but also in its development helps to ensure that training programmes are relevant and updated.

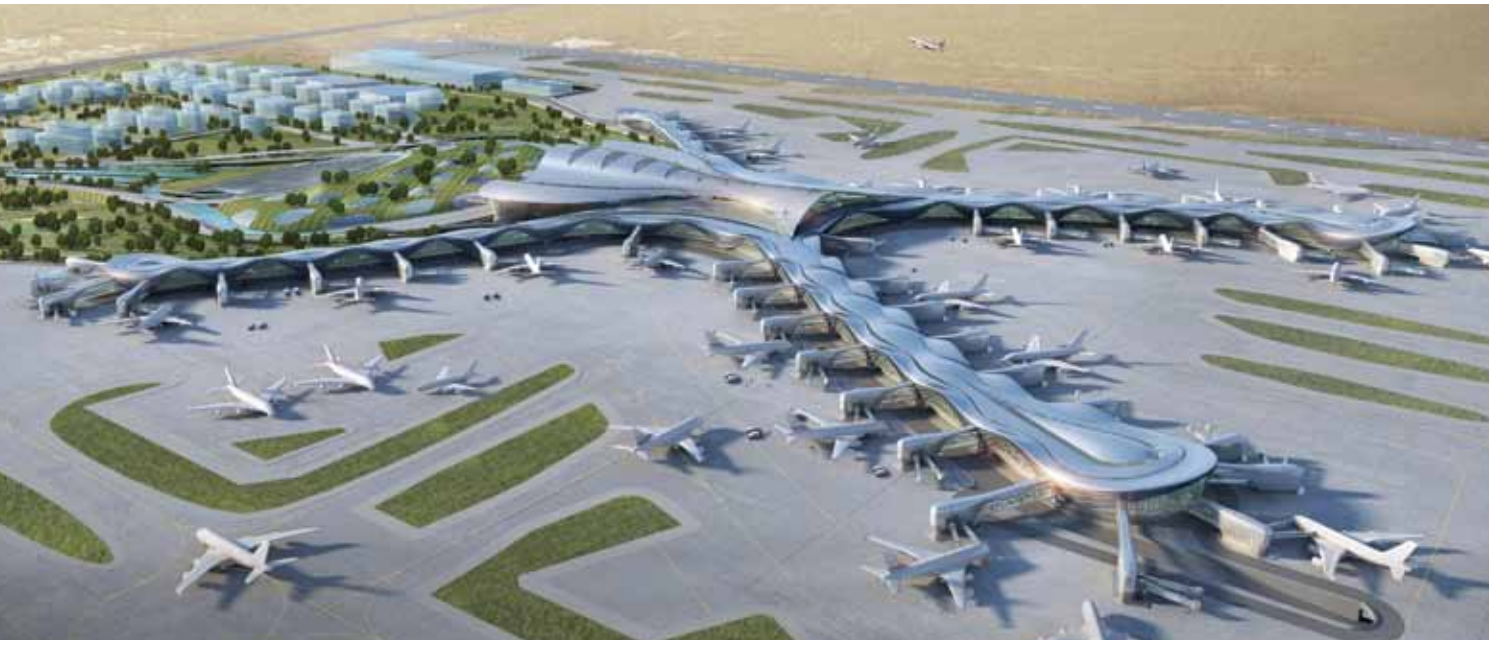
Local expertise is actively involved in providing technical input to the development of standardized training packages and is being used to deliver training at GCAS. While programme creation and delivery is rooted in the specific needs of this region, becoming a member of TRAINAIR *PLUS* ensures that the Middle East can now also share training material and expertise with other parts of the world.

How will training be structured and delivered in the future? Even today, computer-based training (CBT) is rapidly giving way to mobile training. Traditional classroom training is often inadequate, given the complexity of systems and technology. To address these issues, training must adopt a "culture of sharing" and introduce practical applications that are integrated with real work scenarios.

Work has shifted from "hard work" to "teamwork" to the latest iteration, which is "network". Critical to success in this region will be the ability to attract the younger generation to the industry and to develop home-grown talent to take up key operational roles and leadership positions. Naturally, this will not be achieved overnight. It will involve careful planning, implementation and follow up.

ENHANCING TRAINING THROUGH PARTNERSHIPS

Training must be closely intertwined with the actual business environment. Here, GCAS has the advantage of being one of the very few training institutions located at an operational airport,



Abu Dhabi International Airport

Al Bateen Executive Airport. It provides students with access to learning experiences that are not available in traditional training environments. Course delivery is not just focused on knowledge transfer in the classroom; students have the opportunity to experience and apply their new-found knowledge in an operational airport during the course itself. This fusing of classroom and OJT has proven very successful, as it ensures that students are able to apply concepts and theory immediately.

The Centre's close association with Abu Dhabi International Airport also offers trainees access to one of the fastest growing airports in the Middle East. Students are able to conduct an audit module at the airport as part of their Safety Management Systems course. Another example is the incorporation of visits to Abu Dhabi International Airport and Al Bateen Airport, which serves as an integral part of the Aerodrome Certificate course. GCAS, by virtue of its association with Abu Dhabi Airports Company, is able to ensure that its course curriculum is kept relevant to current airport operational requirements and to deliver blended modules consisting of classroom training, OJT, coaching and development.

PREPARING THE NEXT GENERATION

In addition to upgrading the skills of existing employees, the Centre focuses on providing new-comers with a hands-on approach to all aspects of the industry. The overarching aim is to define training by what it actually delivers on the job, not just by what is taught in the classroom. The objective is to motivate and inspire the next generation of aviation professionals to study and pursue aviation careers where strategic talent management will be a driver and, for the region, building talent instead of buying it will be the norm.

While a number of traditional training institutions have focused on enhancing and developing already existing professional capabilities, GCAS has aimed to go one step further by developing programmes where new staff are trained, groomed and developed from scratch and where the focus is not just on delivering individual training courses, but on creating training that is linked to long-term career progression and enhancement.

GCAS has positioned itself as a one-stop aviation training institution where new employees are offered a long-term integrated training programme that covers most key personal and professional job requirements. The new employees are exposed to a range of issues: induction programmes, English language skills (whether conversational or aviation English), customer service and soft skills, regulatory and professional courses, leadership and development programmes. New employees, through exposure to this structured training, receive a clearer picture of their career path.

While the industry has grown by leaps and bounds in this region, development of human capital cannot be managed overnight and requires institutions that are willing to focus, not only on the current requirements of today, but on the long term. Although technology will continue to drive and dictate evolution on the operational front, human capital development will continue to be rooted in a strong training culture which integrates experiences of the past with the requirements of the future, with training that not only delivers operational effectiveness but also caters to the dreams, aspirations and ambitions of individuals looking for a long-term career in aviation. ■

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