NEWS AND FEATURES ON CIVIL AVIATION-RELATED TRAINING DEVELOPMENTS - VOL. 8 - NO. 1

ICAO TRAINING REPORT

AVIATION TRAINING INTELLIGENCE™

SUPPORTING STRATEGIC PARTNERSHIPS

IN THIS ISSUE

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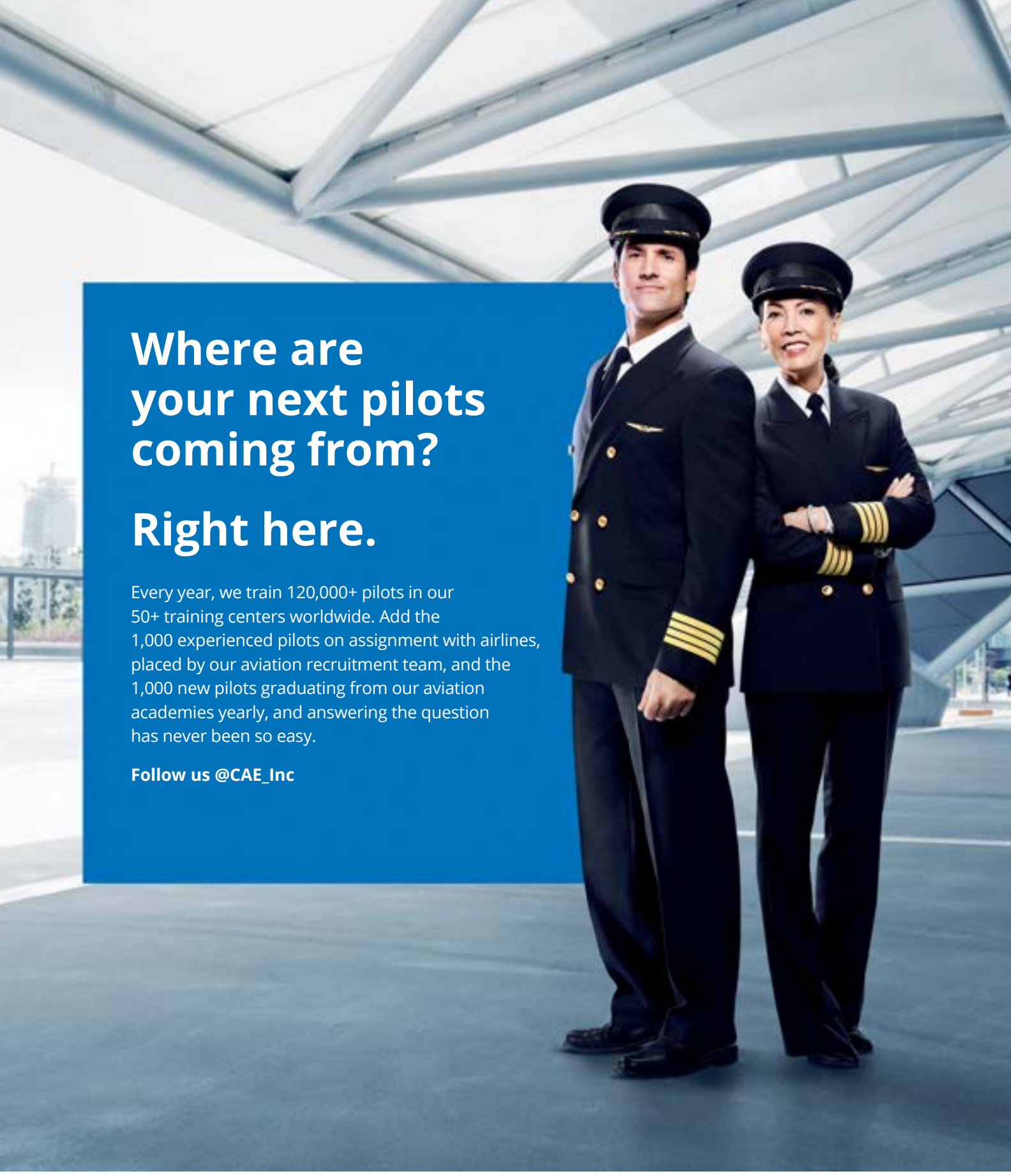
UNITING AVIATION



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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 Allisun Dalzell at unitingaviation@icao.int

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CONTENTS

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VOLUME 8, NUMBER 1, 2018

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GLOBAL AVIATION TRAINING
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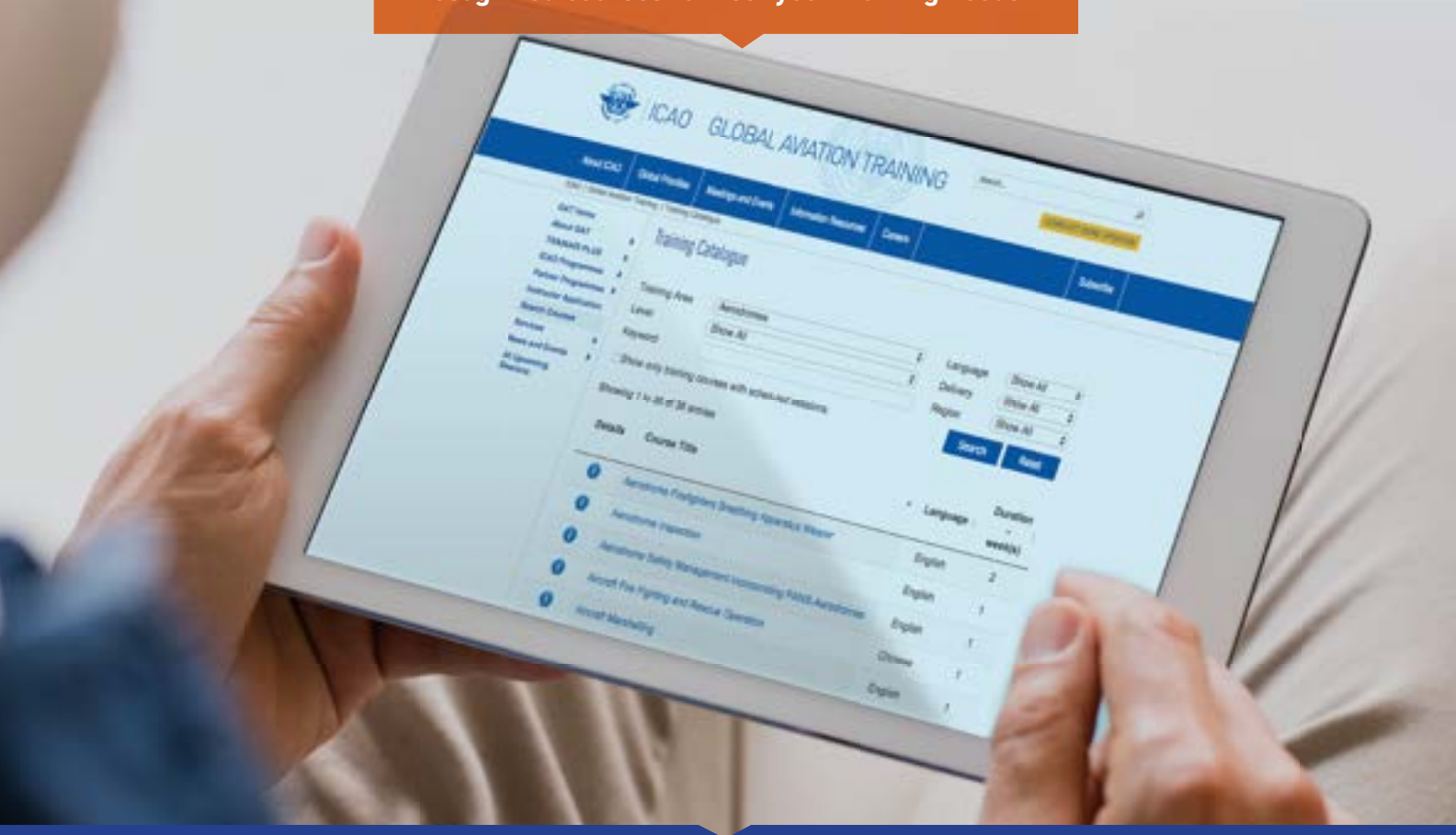

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HOW IS AVIATION TRAINING INTELLIGENCE HELPING THIS INDUSTRY?

Meshesha Belayneh,
Deputy Director, Technical Cooperation Bureau
and Chief, Global Aviation Training Office
International Civil Aviation Organization

To ensure we are ready to train the hundreds of thousands of qualified aviation personnel that will be required to meet the demands of the next two decades, we will have to clearly understand the evolution of learning.

We know the rapid rate that air transport is growing and that current projections indicate the number of passengers will double between now and 2036. Based on the regional and global projections for pilots, maintenance personnel, and air traffic controllers, this growth will create shortages of skilled personnel in these areas. But as we all know, there are hundreds of different professions in the air transport system. From jobs in the field of aviation medicine, to aviation security, accident investigation, air law, flight dispatching, aircraft design, the list goes on.

In the field of civil aviation training, it is critical that we identify the appropriate intelligence that will allow us to rapidly provide optimal aviation training solutions that meet the demands of this growth, and at the same time, maintain or exceed safety requirements.

We are faced today with an abundance of information that comes to us from various sources. New learning technologies in the form of wearable devices that attach to the human body and collect and deliver data, are one example of this. Augmented reality helmets replace an air traffic controller's paper flight strips with a digital presentation of the information superimposed on their work space. They can also present maintenance personnel with a digital view of systems that may not be visible because they are obstructed by covers or other components, or they can generate a digital representation of the ideal approach path for pilots.

Applications of Big Data are already being used in aviation training in the field of safety management programmes; training needs analysis; and in recruitment and selection practices that compare applicant attributes against competencies demonstrated by top-performing employees through predictive analytics. Additionally, data generated by artificial intelligence technologies can be used to guide the structure of the curriculum.

The key is to integrate the decision-useful information, known as intelligence, into training organizations in a coherent and functional way. More and more, civil aviation training centre managers, are required to practice decision making based on managing all available aviation training intelligence™.

"The key is to integrate the decision-useful information, known as intelligence, into training organizations in a coherent and functional way."

Consulting State master plans, organizational performance analyses results, training needs data, learner performance data, and post-training data as examples, are critical practices when building a training centre portfolio, and operational plans must respond to growth, professional training, and safety needs.

Aviation training intelligence™ is generated within extremely dynamic environments. Training centre managers should manage it by establishing integrated digital systems to structure, organize, and generate reports that will allow their organizations to make intelligent business decisions. TR

IMPROVED TRAINING BASED ON DATA-DRIVEN DECISIONS

In 2017, more data was generated than in the previous 5,000 years of humanity. This data explosion is drastically transforming the landscape, calling for organizations to visualize all incoming data for rapid decision making. Transportation, energy, healthcare, manufacturing, entertainment – data types are expanding in all sectors. The training environment has the potential to generate a lot of data; every question answered during a test, every evaluation, every search on the web for a course, every competence gained, every course started or abandoned, these are only a few examples of the data that are created.

The most commonly cited reason for not using data as the basis for decision making is that the necessary information was not available. The quality of data is the second biggest barrier to data-based decision making. This reflects a clear need for greater attention to data quality, and more efficient data governance. Privacy concerns might sometimes arise as a result of data intelligence gathering. Because most companies and organizations want to treat information as a future asset, it is critical that organizations invest in protecting its quality and value. This is why, in the next years, training organizations will have to focus on being able to either use data strategically to make important long-term decisions, or to make operational decisions in real time. There is no value to data being created if it cannot be used.

DEFINING THE PROBLEM

Learning to define the problem correctly is as important as solving it well. The key to making use of data is to develop a strategy that first identifies the problem to be solved, or the need to be addressed, and to then establish a procedure for collecting and analysing data that can solve it.

Asking the right questions is key to finding the way through a problem, to locating the right students and to identifying their specific needs. It helps avoid future difficulties, and ultimately results in the most appropriate training solutions. Questions also act as filters that help break down the key elements of a situation.

There are typically two types of questions that define the problem. Firstly, there are those questions that result in a choice:

A or B. Selecting a specific choice will result in a particular set of outcomes, and data can be used to support the decision made. On the other hand, there are questions that require prioritization: out of a list of N, X is to be prioritized over other options. Here, the ranking of several options would provide the priority of training to focus on.

Data is an important tool since it has the potential to solve specific problems and answer important questions. Data-driven decision making (D3M) involves making decisions that are backed up by data, rather than making decisions that are intuitive or based on observation alone. With technology advancing exponentially in recent years, data-driven decision making has become a much more fundamental part of many industries, including important fields like medicine, manufacturing and transportation. The process described in the chart on the right has been developed to maximize the effectiveness of D3M.

Asking a series of clear questions leads to precision. When questions are developed with this result in mind, they generate a natural sorting and sifting during the discovery process. It becomes possible to focus the research process to gather only the specific evidence necessary, only those facts that illuminate the main question at hand. This focus makes it harder to get lost in the process or mistake the secondary with what is central. Effective questions are powerful in the sense that they open the way to reflection and thinking. In training, data-driven oriented questions are typically "What training to develop next?" or "What are the top priority training needs?"

DEFINING TRAINING PROFILES

For training organizations, profiles are a good approach to organizing the information collected to constitute relevant data.

Profiles are essentially a set of values and indicators that qualify an entity. Entities in training are typically schools on one side, and students on the other. Schools may be grouped according to their State, region or domain of specialization, and students can be grouped by nationality, language, qualification or career path. For each profile there are a set of indicators related to performance, compliance or an activity that helps describe entities and measure their performance compared to others.

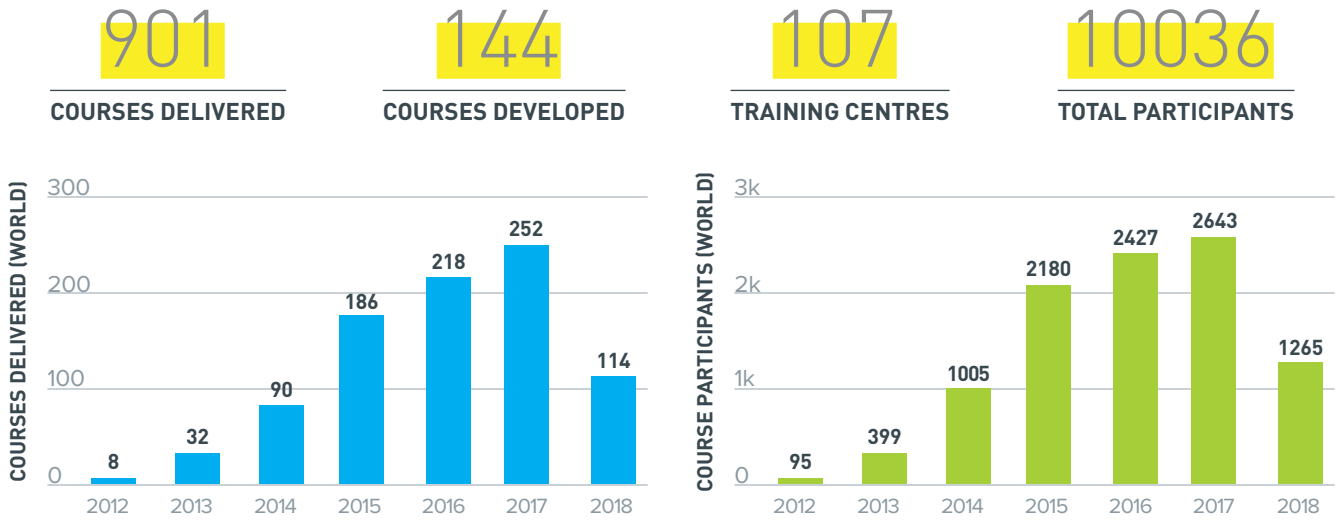
The TRAINAIR PLUS Member profiles in the Global Aviation Training application on iSTARS are a good example of this. Information regarding the number of recognized training organizations, the courses developed and delivered, and the number of successfully trained trainees per State or within a prescribed region, can be found in the form of State or region profiles.

The graphs in the application show that the 101 TRAINAIR PLUS Members around the world have developed 144 ICAO-recognized courses, and with more than a 100 ICAO-recognized courses currently under development. In total, 901 ICAO-recognized courses have been delivered to 10,036 participants.

The data displayed in the Global Aviation Training application can be used to answer a number of important training-related questions: "How many countries have ICAO-recognized training centres or courses?", "What country does not have any ICAO-recognized training centres?", "What region has the most ICAO-recognized courses are developed?" and "What region has the least ICAO-recognized courses?" are just a few examples.

These questions are an important first step in making data-driven decisions. Next, the challenge is to be systematic when asking and answering such questions. It is important to scan the environment for patterns, identify patterns that strike as being problematic, noteworthy, or that require decision making. Prioritizing observations and formulating a problem statement to clarify the decision that

The D3M Process: Major Steps



Global Aviation Training application: TPP Training activities around the world as at 31 May 2018

needs to be made, to later formulate a question that will help inform decision making, are a few essential elements related to later stages of the data-driven decision making process.

FURTHER POTENTIAL WITH DATA

Accessibility to cloud computing and advances in artificial intelligence (AI) algorithms have provided even more potential for training data. One ongoing project maps training courses to compliance audit protocol questions (PQs) from the Universal Safety Oversight Audit Programme (USOAP). With over 1000 PQs and hundreds of training course available, the possible combinations are impossible to map manually.

One approach to this problem would be to use a key word search machine learning algorithm to link words from each PQ to corresponding ICAO Annexes or Standards and Recommended Practices (SARPs). From this, intelligence can be derived and further links can be made to training courses using their course descriptions. The goal is to create a network where training courses can be linked to support a set of PQs. States with a set of unsatisfactory PQs would be able to readily identify the training solutions available. Training centres could also identify gaps where there is a lack of training available for certain PQs, thus ensuring that new course developments are relevant and address real needs.

Another approach to harnessing the power of machine learning would be to identify the best courses to compensate for a lack of competency identified through an USOAP audit. Instead of mapping specific courses to PQs, the findings could be considered as a group, with a training solutions package proposed by the computer. The computer needs to be "trained" with existing findings and training solutions, and learns how to match similar PQs to training. This supervised learning approach is continuously improved with more data, through a verification and validation cycle with findings and solutions.

Both approaches are currently being considered and explored, with great potential to transform the way training data can be used. However, regardless of the approach, the foundation of AI requires quality and structured data to teach the computer.

THE FUTURE IS HERE

The training community has an important interest in making use of the massive data it currently disposes of and will have collected over the years. The use of computer-based training will give even more insight regarding the needs, behaviours, problems and opportunities that are specific to training. Moreover, predicting the success or failure of students on a certain path will become possible through the use of artificial intelligence and deep learning algorithms. These models will most likely drive predictive decision making to allow students aspirations to be fulfilled to their fullest. There will be challenges as well, such as those related to the protection of personal information. In addition, while the massive quantity of data now available can be thrilling, it is important to be cautious about the quality of the data. Decisions based on inaccurate or unreliable data are pointless, or worse. Thus, one of the questions that will become increasingly critical as the data explosion goes on, is how to assess and improve data quality. TR

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AVIATION TRAINING INTELLIGENCE™

ORIGINS

In the early 1970s the International Telecommunication Union (ITU) began pioneering TRAINTEL (Telecommunications) training programme to develop their training courses. Building on their experiences, with the intent to globally implement competency-based training methodology, the United Nations Organization (UNO) launched the Train-X Programme in the 1980s.

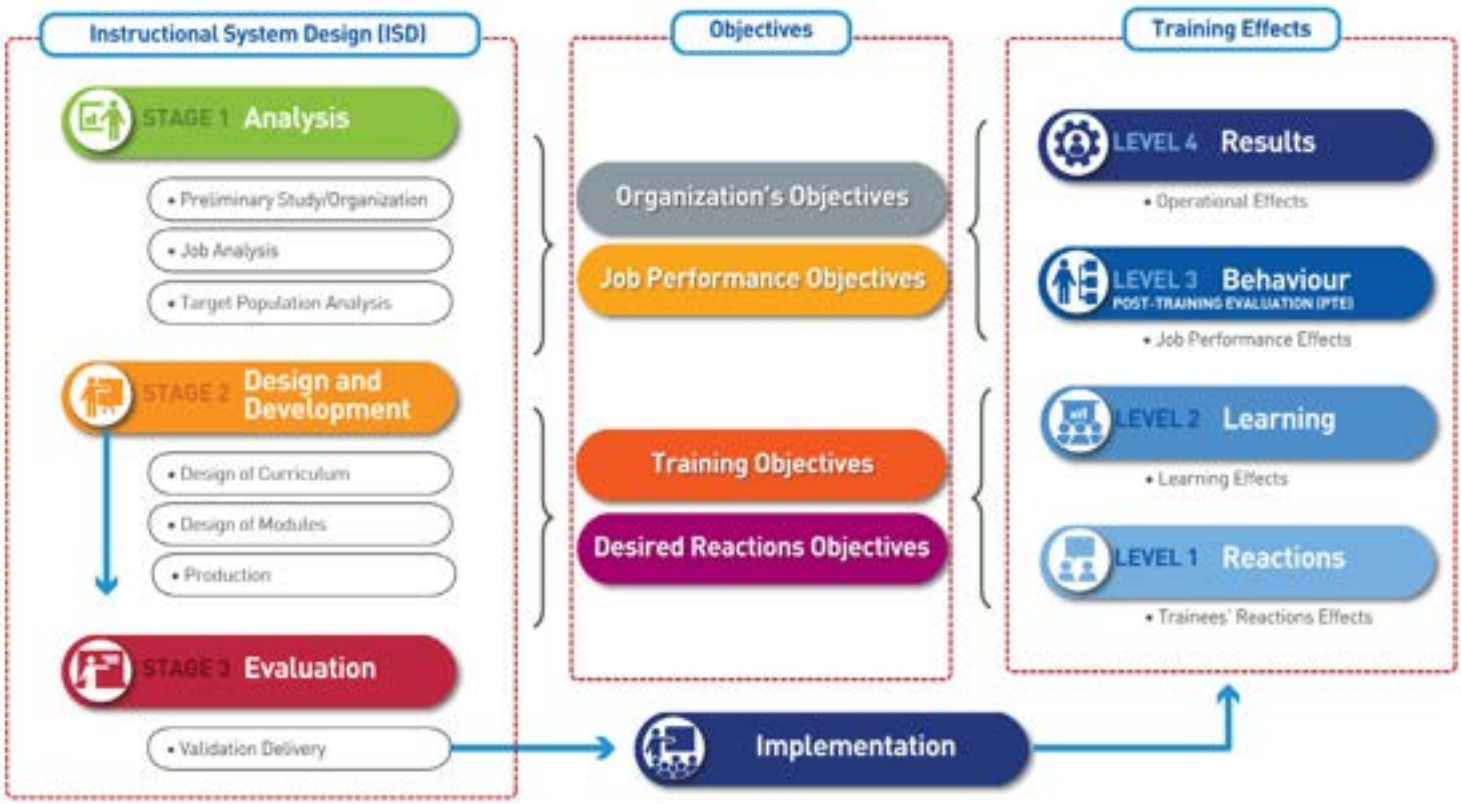
Train-X was very effective in terms of improving and modernizing the training carried out by the cooperative training networks of several UN agencies, including, among others, TRAINMAR and TRAINTRADE for the United Nations Conference on Trade and Development (UNCTAD) and CODETEL for ITU. Since 1992 four additional UN agencies joined the UN TRAIN-X Network: the United Nations established TRAIN-SEA-COAST; the United Nations Institute for Training and Research (UNITAR) established CC:TRAIN for Climate Change; the Universal Postal Union (UPU) established TRAINPOST for postal services; and the Food and Agriculture Organization (FAO) established TRAINFISH for fisheries.

The TRAINAIR Programme was created in the early 1990s to enable ICAO to cover training in all fields of civil aviation through global implementation of the Standardized Training Package (STP) concept, detailed in the Training and Development Guide (TDG), ICAO DOC 9941. In 2012, the TRAINAIR Programme evolved into the TRAINAIR PLUS Programme (TPP) which expanded to include the bigger aviation training community, international institutions and universities.

The TPP enhanced the competency-based methodology which is currently implemented in close to 80 States and used by more than 100 training centres and educational institutions. The TPP comprises a virtual library with close to 160 courses, including learning packages that generate career paths combining professional certification and academic degrees.

Training activities conducted within the realm of TPP, ICAO technical cooperation projects, and aviation safety and security training provided by ICAO Bureaux and

» **TRAINAIR PLUS Methodology - Instructional System Design (ISD)**



Regional Offices, laid the ground for the creation of the ICAO Civil Aviation Training Policy. In 2014, the Global Aviation Training (GAT) Office was established to harmonize standardization and management of training activities.

TRAINING CHALLENGES

In standardizing global training, several recurring challenges have been encountered. These include insufficient funding; lack of subject matter expertise and qualified instructors; poor specialized equipment; non-recognition of certificates between States (even in the same regions); and a lack of harmonization of curricula and licensing requirements.

Scenarios like these make it difficult to implement the ICAO Civil Aviation Training Policy. The policy provides for a global training standardization model which facilitates the effective and harmonized implementation of training in aviation, reduces costs, increases quality and efficiency and generate synergies between two important ICAO initiatives: the Next Generation of Aviation Professionals (NGAP) and No Country Left Behind (NCLB).

DATA-DRIVEN DECISIONS

These challenges are predicated on the absence of suitable and effective links between aviation data and aviation training planning and implementation. Making data-driven decisions is already applied in several aviation fields, such as safety management, passenger distribution, and aviation cargo, as examples. Data-driven decision making or D3M, is a process-driven approach to decision making that addresses issues leading to poor decision making. With D3M, effective and informed decisions are based on the results of pertinent data that has been collected and analysed.

Using valid and relevant data helps place the "problem" in the right context to determine a best-fit "solution". D3M provides credible evidence to stakeholders and management regarding strengths, weaknesses, opportunities, limitations and risks. It mitigates bias, influence and human error. Applying D3M in conjunction with organizational analyses, and training needs and impact assessment activities, becomes an important element of support to States facing challenges in aviation training.

As with any mathematical model, the more information that can be integrated in the model, the more useful it becomes for strategic and operational planning purposes, given that it reflects facts and figures from the field. Applying D3M to aviation training planning will lead to the development of targeted training portfolios that respond to identified human resource needs in aviation. Business cases can be developed to acquire the expertise, equipment or facilities necessary to operationalize the portfolio.

AVIATION TRAINING INTELLIGENCE™

To effectively apply D3M a management system and methodology needs to be adopted. Existing volumes of diverse information, and vast amounts of aviation data need to be managed. At ICAO, data tools such as iImplement, iSTARS, the Safety Solution Center, CAA HR-toolkit, Environment data, Economic Development and Aviation Business Analysis tools, Data+, traffic forecasting, statistics analysis, are transformed through a technology-driven process into an aviation training data management environment.

Applying the data-driven business process using the principle of analysing aviation and training data to provide actionable information for training decisions, provides executives, managers and other corporate end users with Aviation Training Intelligence™ (ATI™). This intelligence is used to make informed business decisions.

Training organizations that invest in technology tools and methodologies to collect, analyse and manage their ATI™ will grow in alignment with aviation growth and training methodologies that are rapidly evolving.

» **AVIATION TRAINING INTELLIGENCE™**

MANAGING AVIATION TRAINING INTELLIGENCE™ (MATI™)

Managing aviation training intelligence is the real challenge of aviation training organizations today. Activities involve continuous improvement planning; implementation of technology systems to manage aviation big data; State aviation forecasts; predictive analytics; needs assessment data; trainee, impact and collaborative data; as well as data generated from new learning technologies such as machine learning, artificial intelligence, augmented reality, gamification and more. Managing ATI™ is the practice of mapping methods, tools, systems, applications, needs and solutions for individuals and groups.

» AVIATION TRAINING INTELLIGENCE™ CONSISTS OF EIGHT ESSENTIAL COMPONENTS (EC)

AVIATION TRAINING INTELLIGENCE™ CONSISTS OF EIGHT ESSENTIAL COMPONENTS (EC):

The essential components shown above are integrated on logical flows, sequences and feedback mechanisms, providing the data sources leading to data-driven decision making.

INTEGRATED TRAINING MANAGEMENT SYSTEM (ITMS) AND MATI™ TOOLS

ATI™ must be collected, structured, processed, analysed, integrated and evaluated. An integrated information structure is required for conducting up-to-date and needs-based aviation training activities. For ICAO, the automation of training and capacity-building processes is key to providing States, TPP Members, and the aviation community, efficient and cost-beneficial support and solutions for their training needs and endeavours. Strategic and operational planning, business implementation, course development and delivery, are managed according to diverse data using a set of tools and methodologies, to make optimal aviation training decisions.

ICAO's Aviation Training Intelligence™ management system will integrate TRAINAIR PLUS systems such as the TPeMS (TRAINAIR PLUS Electronic Management System); a web-based Training Needs Assessment tool, Training Evaluation Portal, Instructional System Design (ISD) tool, Aviation Training and Education Directory (AETD), Subject Master Expert roster, and a Learning

» ESSENTIAL COMPONENT (EC: 4)

» INTEGRATED TRAINING MANAGEMENT SYSTEM

Management System (LMS) in a new, integrated network system architecture.

The integrated management system stores, structures and automates training transactions and decisions actioned by a variety of global users including trainees, managers, course developers, instructors, validators, and administrators.

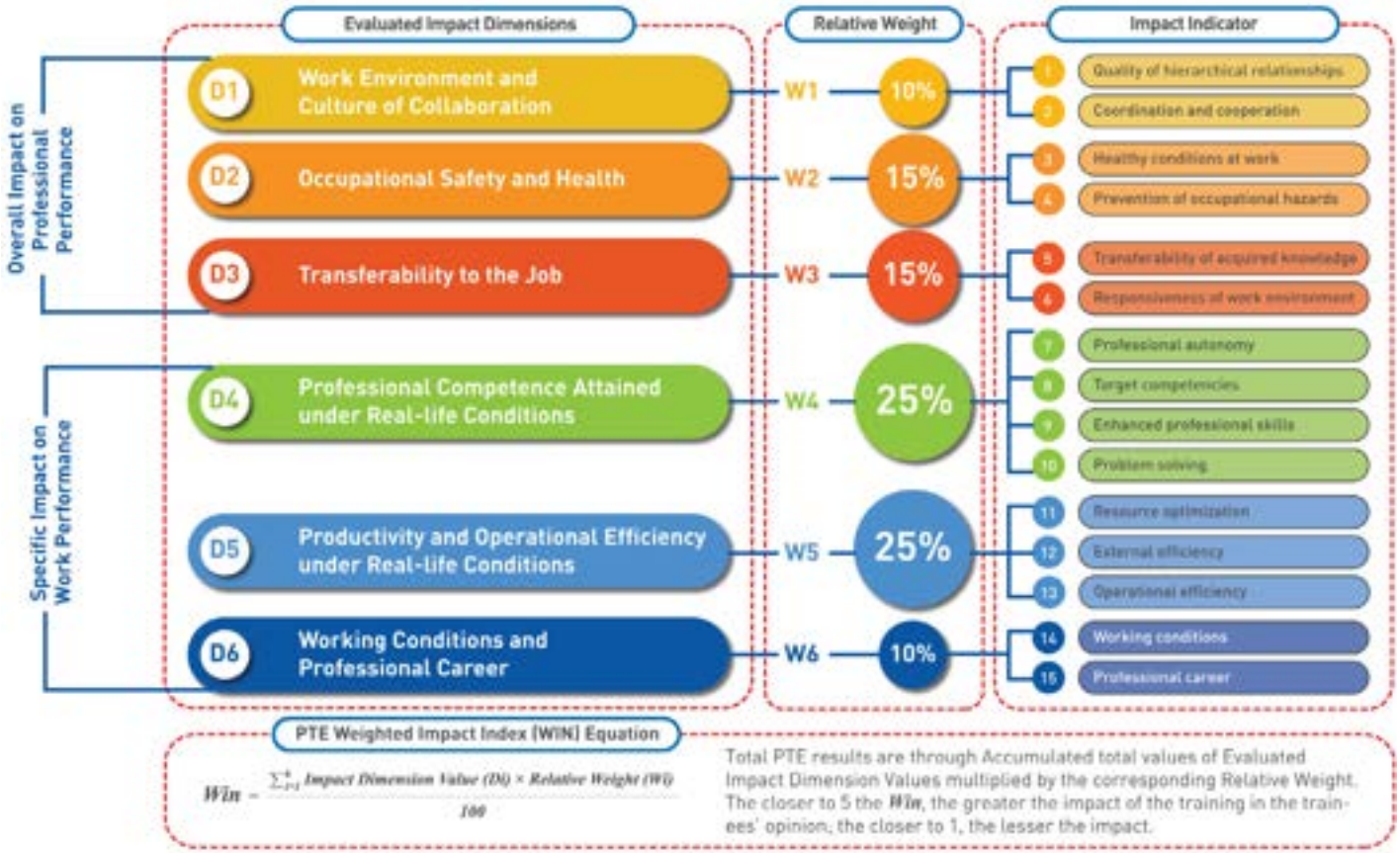
MATI™ FOR TRAINING EFFECTIVENESS

Excellent learning progression during a training course with positive feedback from trainees and instructors, appropriate facilities and equipment, can be a useless exercise and even worse, a waste of time and money, if there is no transfer of the acquired competencies to the workplace. The capability to measure the impact of training on professional performance is critical for personal and professional development, and organizational achievement.

Evaluation of the training effectiveness of each course using the ICAO TRAINAIR PLUS Post- training Evaluation (PTE) methodology follows a scientific basis for measuring the impact of training programmes developed under the guidelines set out in the TDG/Doc 9941. Given the inherent nature of the methodology and its competency-based approach, MATI™ integrates an evaluation procedure aimed to enhance the quality of training developed, the instructional processes used, and provides intelligence on the impact of the training as part of the continuous improvement of the TRAINAIR PLUS Programme.

The MATI™ PTE Weighted Impact Index™ (WIN™) equation is calculated by analysing the data collected after course deliveries (post three to six months), using the L3 PTE tool which is a standardized scale with 15 impact indicators related to six dimensions

» Level 3 Post-training Evaluation (L3 PTE) Methodology



of evaluation. The result obtained is a quantitative value of the real effectiveness representing the impact of the training on work performance.

The complete implementation of the ICAO training portfolio will be evaluated and reported based on the WIN rate from each course. It will be the mechanism used for continuously revising curricula to calibrate and correct technical, practical and useful content, and the instructional interactivity of the training.

MATI™ INTEGRATED PROCESSES AND IMPLEMENTATION

Managing your ATI™ necessitates engagement in diverse business practices and processes that generate data and information that will be used for decision making to optimize the training portfolio of your organization. The integration of each essential component is supported by an integrated system architecture with the compatibility and interoperability of projects, workflows, social media management, collaborative management with business networks and communities of practice, business processes, communication and connectivity.

MATI™ Essential Components (EC) are linked through the safety and air transport data collected (EC1, EC2), that are transformed into aviation training data (EC3) and used for training need analysis (EC4), identifying existing training solutions (EC5) or developing the missing courses (EC6), giving evaluation of its effectiveness (EC7) in the alignment with the State's Aviation Master Plan and Human Resources and Capacity Improvement (HR/CI) planning and development (EC8). MATI™ integrates a structured plan of actions to implement comprehensive and consistent human

resources development strategies to meet the State's strategic objectives, development goals, and the needs of the aviation sector.

BUSINESS EFFICIENCY MODELS

Aviation Data-driven Decision Making (AD3M) and Managing Aviation Training Intelligence™ (MATI™) are the new models for business efficiencies in a complex aviation training world. The ability to provide quality, standardized, competency-based training through a variety of media, that meets current and future needs of multiple stakeholders, requires multiple sources of data and information to be systematically collected, integrated and analysed by aviation training managers.

A deep dive into Aviation Training Intelligence™ reveals that its global implementation will strongly support the generation of strategic partnerships among government, education, academia, and industry, as well as a strong alliances among enthusiastic students, competent instructional teams, and committed training managers, to attract and transform each trainee into new, competent aviation talent for personal, professional, and organizational success.

These models will help training managers to continue to modernize their operations, better address the training challenges, and meet both the actual needs of the aviation sector, and the demands from industry. Managing Aviation Training Intelligence™ enables people and organizations to join the scenario where effective training goes beyond training solutions for performance, to improving safe, secure and efficient air transport connectivity as a key element to social, environmental and economic growth, supporting UN Sustainable Development Goals and 2030 Agenda.

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ICAO Global Aviation Training (GAT)

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THE SMARTS ON TRAINING EFFECTIVENESS INTELLIGENCE

Training needs are a moving target. Regardless of the industry, any given skill set has the potential to become irrelevant if it is not maintained and kept up-to-speed with the latest developments. This is even more painfully true in fields where compliance to standards and regulations is involved, or where technical skills drive business results. In the same way, as skill sets become obsolete, so too do the training programmes that nurture them.

For professional training organizations, it is critical to remain up-to-date and relevant to industry needs. To achieve this, it is crucial to establish an instructional quality management system that helps organizations to continuously monitor developments in the subject area; to anticipate impacts on industry activities; and to regularly update training programmes and products based on intelligence. That, we can say, is the foundation.

When that training hits the market, the next stage involves collecting input from all stakeholders in the learning ecosystem to measure training effectiveness and make informed decisions about what needs to be done to improve it. In this article, we will explore the sources and channels IATA Training uses to gather data on training effectiveness, and more interestingly, how we use it.

DATA IS GOLD AND WE DIG IT

Let's imagine a development effort for a classroom or self-study course. It has followed the instructional design process by the book and has yielded a perfectly structured course with each component of the course package, from lesson plans to assessment instruments, all finely aligned to meet the course objectives. How can we tell that this course will deliver on the expectations?

To answer this question we need to wear many hats to consider things from every stakeholder's perspective. Instructors, learners, and sponsors are our ears to the ground. Their evaluation of training effectiveness is the echo of how well we, as training suppliers, are doing.

At IATA Training, and for many other training organizations, instructors and faculty are the first-line validators of training effectiveness. This is why, after each training they deliver, we ask instructors to complete a comprehensive report which collects their appreciation of variables in key areas that can impact the quality and effectiveness of training. These areas cover the end-to-end process from the instructor's perspective before the training begins, all the way to learner assessment and grading.

For instructors, the work starts well before class begins so it's important that we get their feedback on the appreciation of the administration and logistical aspects of their experience. An instructor who receives the course material at the last minute, whose flight arrangements don't allow for enough rest before the training, or who has to teach in below par facilities, may be affected by situations that negatively impact training effectiveness, and vice versa.

Then of course, there is the course material. Whether the instructor developed the course or is delivering someone else's creation, every training session is an opportunity to gauge, for example, whether the course outline and lesson plans offer adequate support to manage the training, or whether the course content, activities and assessment instruments are relevant, up-to-date, and well aligned with the learning objectives. Is the content clear? Are there topics to remove or add? Is the theory/practice balance adequate? Are the activities engaging? Is the course too long or too short for the scheduled time? Are the exams too easy or too difficult? These are questions only the instructors can answer and, here again the information collected highlights what works well, what doesn't, and what can be improved.

Now onto the next stakeholder in the training ecosystem: the learner. As the ultimate beneficiary of the training products we create, their voice speaks the clearest when it comes to giving feedback on training effectiveness. Indeed, for self-study training programmes, the learner is the only source with information on training effectiveness we can tap into. Even though students very rarely have the training professional's critical eye on elements like course design or content validity, one thing they know better than anyone else is whether the training met their needs, gave them something they can use in the real world, and was good value for their time and money.

"For the training organization, the students are not the only customers. From the instructors who deliver the training, to the sponsors who patron it, client experience happens on many fronts."

To capture learner feedback, we use two different surveys: one for classroom courses and one for self-study courses. Of course, training quality and effectiveness in terms of course objectives, content and course material, course structure, and assessments are at the core of both surveys. Additionally, format-specific items are surveyed. This includes the instructor's level of subject-matter expertise; level of preparedness for the class; and presentation and class management skills. On the self-study side, students are asked to provide input on the registration process to the course and exam, the ease-of-use of course package, the exam relevance, difficulty, and length, etc. Exam results are also systematically scrutinized for validity and integrity, thorough item analysis yielding yet another set of precious insight on training effectiveness.

The next organism in our ecosystem, is the sponsor. Most times, they're the ones picking up the bill so we have to make sure they're satisfied with the results of the training! But exactly what affects their satisfaction level about the training they've sent their employees to? You got it! Return. Return on investment (ROI) – that is if they are able to really measure it, and the more qualitative and encompassing return on expectations (ROE). Sponsors want to see measurable on-the-job performance improvement, compliance to standards, behavioral, attitudinal, or cultural changes that drive tangible results for the business and link it to a training event or programme.

Because they have that business results mindset, and because the cost of training comes out of their budget, sponsors can feedback valuable data to the training organization. At IATA Training, aside from surveys, we reach out to sponsors in person. This allows us to better capture some of the intangible data a pre-formatted questionnaire cannot.

KNOWLEDGE IS POWER

For data to become knowledge – and then power – it has to be analyzed, interpreted, communicated and actioned. With steady, massive streams of qualitative and quantitative data coming from different channels, several resources must dedicate their time to collecting that information, making sure the appropriate

people are informed. Indeed, a significant benefit of the data crunching is the ability for multiple stakeholders to quickly gain visibility on key performance indicators and react in a timely manner.

For the Product Managers who own the courses, the intelligence gathered helps them make informed decisions about variables impacting the intrinsic value of their products, how well these meet the needs of the learners, how their instructors are performing, etc. It also helps them identify strengths to capitalize on and areas for improvement.

For the Quality Team, training intelligence means being notified of any rating below 3.5 on a scale of five that comes from any channel in our network, and it allows them to identify deficient questions in exams based on the item analysis reports. Whatever the quality issue, standard processes are in place to make sure it is investigated, documented, communicated to stakeholders, actioned, and resolved.

Depending on the root cause, the resolution process may include any actor in the training development and delivery value chain, and it may require a wide array of interventions. Issues related to the curriculum or the quality of course content or material, will trigger the course revision process and mobilize subject-matter experts, instructors, and the Learning & Development Specialist. In the same way, resolution of issues related to logistical, administrative, or technical considerations will be agreed, planned and actioned by the appropriate resources.

INTELLIGENCE AND HONORING IT

A commitment to quality training is essentially a commitment to training effectiveness as measured by each customer in the training ecosystem. For the training organization, the students are not the only customers. From the instructors who deliver the training, to the sponsors who patron it, client experience happens on many fronts. From the registration process, to the assessment of learning outcomes, these internal and external customers will interact with a variety of systems – instructional, administrative, and technological – which will all impact the results of their training experience. Creating channels for them to communicate their evaluation of the end-to-end experience we've created for them, constantly monitoring these channels, and making sure the intelligence we gather is used to concretely improve our offering to meet their needs, is the best way to stay relevant and effective. Because let's face it, in this age of communications, anything else would be an insult to our customers' intelligence. TR

MATHIEU KHOURY
Learning and Development Specialist
IATA Training

TRAINING AND CUSTOMER EXPERIENCE

AIRPORTS COUNCIL INTERNATIONAL

It would be fair to say that the aviation industry exists and continues to grow because of our customers, the traveling public. Aviation's ability to deliver quality, safe and secure customer service experiences hinges on factors that include how well-trained, qualified and knowledgeable our customer experience staff is. It is our responsibility to provide them with the best training tools available. To accomplish this, human resources and training professionals need to understand and identify the key drivers in customer experience (CX), and increase the positive interactions (experiences) with customers.

There are several approaches airports can take to train not only customer service staff, but all personnel who play a role in the airport community: concessions, airlines, security, janitorial, and customs and immigration. Training might include workshops, seminars and game activities. CX trainings are conducted to educate the entire airport community on the dynamic customer experience practices. Additionally, seminars and motivational speeches by CX experts can help staff gain perspective and get tips for enhancing their own performance.

BENEFITS OF EFFECTIVELY TRAINING CUSTOMER SERVICE STAFF INCLUDE:

SKILL ENHANCEMENT

Training customer experience staff can yield remarkable results in terms of enhanced personal performance, increased non-aeronautical revenues and ultimately, satisfied customers. As staff are exposed to new and emerging customer experience trends (this changes rapidly), they will be able to apply new methodologies and approaches in their daily work. Moreover, training helps to develop different skillsets and grow networks

"At ACI, our customer experience experts have developed an internal diagnostic tool for all airport staff, customer-facing, as well back-office. By measuring employee engagement though a series of pre-selected questions, the Employee survey for Customer Experience (ECE) helps airports determine their readiness in providing a more positive and unforgettable customer experience."

as classes bring together staff from the entire airport community. Not only does training help develop better communication skills and problem-solving abilities, but it also teaches ways to manage human relations more effectively. Training activities, particularly games, are usually fun and highly engaging, which is appealing for millennials. These games can help encourage teamwork and putting personal differences aside to achieve a common goal.

INCREASED EMPLOYEE ENGAGEMENT

Not only will keeping employees engaged boost motivation and job satisfaction, it helps employees create new bonds and an understanding of each other's challenges. If employees feel they are learning and continuously upgrading their skills, they will likely stay motivated and give 100% in their job. Employee engagement also helps to reduce communication barriers that might exist between co-workers and management and other personnel at the airport. This also translates to more satisfied customers.

At ACI, our customer experience experts have developed an internal diagnostic tool for all airport staff, customer-facing, as well back-office. By measuring employee engagement though a series of pre-selected questions, the Employee survey for Customer Experience (ECE) helps airports determine their readiness in providing a more positive and unforgettable customer experience. Airports can use this benchmarking online tool, year-after-year, to measure their performance and encourage their employees to strive higher.

The ECE is designed to help airports prioritize areas of improvement to work on an action plan toward the enhancement of the overall customer experience. Furthermore, it can help determine if there is a need to increase the commitment of airport staff to achieve the common goal of improving customer experience. While there are many benefits to implementing such a tool, key among them are enhanced performance and revenue growth. Taking the next step in the passenger service journey should therefore include a review of the factors that motivate employees to strive higher and contribute to the overall success of the airport.

IMPROVES PRODUCTIVITY

There are many studies that have demonstrated a clear link between training and increased productivity. A study conducted by the National Center on the Educational Quality of the Workforce (EQW) concluded that on average, a 10 per cent increase in workforce education level led to an 8.6 per cent gain in total productivity. Education and training inevitably equips employees to perform their tasks more effectively, which eventually leads to happier customers and more revenues for the airport.

INCREASED EMPLOYEE RETENTION

Employee turnover proves damaging to not only the outlook of the airport, but its service quality as well. As new employees are continuously inducted and trained, it impacts the airport's ability to maintain consistent customer service standards. Several HR articles indicate that employees who receive poor training leave their position within the first year. Providing adequate training and upgrading the skillset of all CX staff is likely to encourage them to stay with the airport, since it signals a potential for personal growth and development.

The next step in providing training in the customer/passenger experience area should incorporate a review of the factors. This should include the development of training programmes with the airport communities' partners, and understanding what motivate employees to strive higher and contribute to the overall success of the airport. TR

KEVIN CARON
Director of Capacity Building Programmes
ACI World

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ICAO TO LAUNCH THE NEW **AVIATION TRAINING AND EDUCATION DIRECTORY**

INTRODUCTION

As the civil aviation training industry continues its path of rapid growth, there is even greater need for States to implement training solutions that will ensure the international air transport system has the skilled workforce in place to meet the increasing demands.

While growth brings innovation and prosperity, it also brings challenges. Among them, an overload of inaccurate sources of information. Recognizing that States need access to reliable sources of training information in all areas of civil aviation, ICAO's Global Aviation Training (GAT) Office developed the Aviation Training and Education Directory (ATED).

The new ATED platform will play a crucial role in building a functioning and sustainable industry network with qualified and competent aviation professionals. It will improve the information base that serves aviation professionals by providing credible, centralized sources of aviation training information.

The ATED is a comprehensive online directory of government approved training organizations (ATOs) and accredited educational institutions that offer training courses and educational programmes. Evolving from ICAO's Aviation Training Directory (ATD) that was introduced in early 2000 with an annual, printed standardized listing of training organizations, the ATD transitioned in 2012 from a print to an online version that showcased basic profile listings of ATOs and their courses, with limited search functionality.

In 2017, the revamp of the ATD materialized into a more efficient and dynamic search tool for training and education information. The new, enhanced web version brings together training and education in a modern web platform, that is user-friendly, responsive and compatible for future integration with other ICAO training tools.

By providing a "one-stop-shop" for Member States and the aviation community with greater access to information, GAT is able to consolidate the global offer of ATOs and educational institutions. Users will be able to search for potential solutions to their training needs, across all areas of Civil Aviation, from a wide range of courses and programmes offered around the world.

HOW WILL THE NEW ATED WORK?

All ATOs and accredited educational institutions can promote their training portfolios on the new ATED platform. TRAINAIR PLUS Members and Corporate Partners can feature their complete training portfolios, including all ICAO recognized training, on a complimentary basis.

ATOs and educational institutions can subscribe to different listing plan options with basic to enhanced features, to showcase their organization profiles. The secure and reliable platform will provide organizations with greater visibility within the aviation community and ICAO's network of aviation professionals and stakeholders in its 192 Member States.

All subscriptions and listings undergo an approval and verification process to ensure the legitimacy of the organizations. All approved organizations receive usernames and passwords to complete and update their profiles in the ATED platform.

One of the benefits to subscribed organizations is that the search results are linked to ICAO's Training Needs Analysis web-based application (TNA tool). The tool is used by States and training centres to help their civil aviation authorities identify the training needs of their aviation professionals. Once the TNA process is completed for a job, the user is able to consult the ATED for the appropriate training solution.

Training centre managers can access the ATED as part of their initiatives in building and managing their aviation training intelligence, enabling them to optimize their operations and portfolios.

BENEFITS TO USERS IN THE AVIATION COMMUNITY

The launch of this search mechanism will help users in the aviation community identify potential learning opportunities. With its advanced search features, users will be better able to find training options that are in line with their respective career development goals.

ATED users will have access to a credible source for finding ATO/government accredited universities. All visitors will be able to navigate and browse, on a complimentary basis, through the search engine for relevant information of programmes or courses that will enhance competencies in all fields of civil aviation.

HOME PAGE

Training & education
Courses & programmes

PROFILE PAGE

Broader visibility
Manage & update
Feature courses & programmes

SEARCH PAGE

User friendly features
Search by regions
Training areas
& aviation disciplines

The overall ATED user experience has been improved with a more dynamic and responsive platform with a user-friendly search mechanism that includes advanced search functionalities that yield comprehensive and effective results.

KEY SEARCH FUNCTIONS AND FEATURES

Aviation Professionals will have access to advanced search functionalities, with more options to search: training centres; educational institution; training area; area of study; geographical location (local, regional, or international); delivery type (online, classroom, blended); course categories; topics; and more.

Training organizations and educational institutions will have access to subscription plans with a variety of features from basic to enhanced, including the listing of an organization profile page and course portfolio. Listing features include the ability to post multimedia (photos, videos, social media links), organization logo, contact information, geo mapping location, course descriptions and registration webpage links. The different listing features available will allow training centres and education institutions to create an appealing webpage on the ATED that captures the interest of potential students and trainees.

LAUNCH AND FUTURE IMPROVEMENTS

When the new platform is launched in the summer of 2018, ICAO will encourage all ATOs and educational institutions to get connected in the global aviation training and education community.

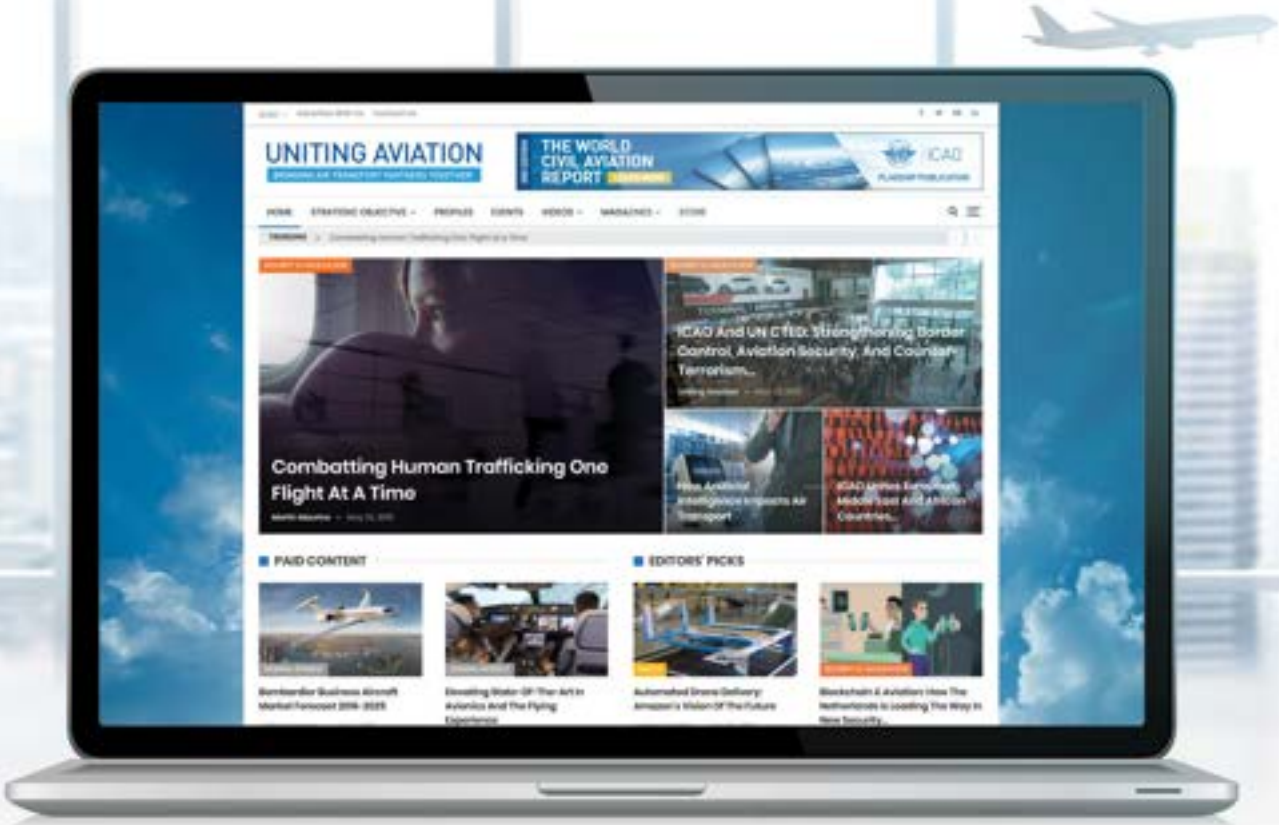
Improvements will continue, with upgrades to the platform, and with the features available to training organizations and educational institutions. Interactive features and new functionalities are planned for development in a second phase to enhance connectivity with aviation professionals through user exchange of information and knowledge.

For more information about the ATED or to learn how to register and list your training organization, please visit http://www4.icao.int/atd/ TR

PEDRO AVELLA
Training Business Development Associate,
ICAO Global Aviation Training (GAT)

UNITING AVIATION

Recently we launched **UnitingAviation.com**, our online, community-driven magazine that brings new aviation partners together and highlights the collaboration of existing ones.



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DEVELOPING WORLD-CLASS BUSINESS AVIATION PROFESSIONALS

Attendees receive valuable training at the 2018 Schedulers and Dispatchers Conference.

Recruiting, retaining and continually training aviation professionals is critical to maintaining a world-class workforce that provides a safe travel experience for passengers.

This mission is a central focus of the National Business Aviation Association (NBAA), an organization that supports companies that use general aviation aircraft for business purposes. The association offers a variety of professional development opportunities to help our industry's personnel refine their skills and succeed in their careers, including initiatives, like the Young Professionals in Business Aviation, specifically aimed at elevating and retaining the industry's young talent.

PREPARING THE NEXT GENERATION FOR FLIGHT

With global demand for aerospace professionals expected to rise in the coming decades, it's never been more important to effectively recruit the next generation of aviators. Working with partners across the industry, NBAA offers several programmes aimed at exposing students of all ages to the career opportunities within business aviation.

NBAA's internship programmes provides guidance and tools that help companies and universities provide hands-on learning opportunities for aviation students. Programmes like these help create ways for students to learn more about the industry and ultimately transition into professional careers.

Before students decide on professional studies is when they need to be exposed to the world of aviation. Annually NBAA invites middle school, high school and college students to a Careers in Business Aviation Day, which features inspiring speakers, student-focused programming and access to more than 100 aircraft on static display. Additionally, activities like a college/university roundtable enable older students to interact with industry leaders to learn about specific career paths, and to best prepare for a career in business aviation.

With industry support and participation in outreach events, students can discover business aviation career and scholarship opportunities in hands-on learning environments, such as career days hosted by regional business aviation associations and collegiate aviation programmes.

ADVANCED TRAINING FOR AN EVER-EVOLVING INDUSTRY

It's not only important to recruit future business aviation workers, but to continue to ensure that current professionals remain among the best-trained people in aviation through specialized conferences training programmes and a wide array of educational seminars.

In 2003, NBAA introduced its Certified Aviation Manager (CAM) programme for business aviation professionals. The rigorous certification process identifies qualified professionals to lead flight departments and companies that use business aircraft, tests candidates' knowledge and experience across five categories:

- Leadership
- Human Resources
- Operations
- Aircraft Maintenance and Facilities Operations
- Business Management

More than 400 industry members have demonstrated their managerial aptitude by earning certification through the programme, which is accredited by the National Commission for Certifying Agencies. CAMs represent a range of disciplines, from aviation department heads to flight attendants, and are based throughout the world.

Role-specific conferences focus on the day-to-day responsibilities of each type of business aviation professional. Throughout the year, NBAA offers multi-day events for schedulers and dispatchers, maintenance technicians, flight attendants and flight technicians, as well as two different seminars about tax and regulatory policy. Additionally, there are conferences focused on different aspects of the industry, such as international operations, organizational leadership, aviation security and regional advocacy.

Sessions at these specialized conferences are designed to assist attendees with specific aspects of their jobs. For example, a session last year at NBAA's Maintenance Conference provided an in-depth review of quoting, scheduling and managing maintenance, while the NBAA Schedulers and Dispatchers Conference featured a series of briefings about the nuances of planning operations in different global regions.

NBAA also partners with third-party subject-matter experts to host upwards of a dozen professional development programme courses across the United States each year. Covering topics ranging from emergency planning to cybersecurity risk management, these one- to two-day courses keep participants up-to-date on the latest best practices, and also offer credit toward CAM certification, or re-certification.

CONNECTING BUSINESS AVIATION AROUND THE WORLD

Aviation at its core is about connecting people. Incorporating this principle into personnel development can broaden employees' knowledge base and expose them to new ideas and best practices.

Building mutually beneficial global relationships is as important as facilitating productive professional relationships with new (or newly positioned) member of the workforce.

NBAA's Young Professionals in Business Aviation ("YoPro") group builds links between emerging leaders across the United States. The events the leaders plan each year bring the youngest generation of aviation professionals together and helps connect them with industry veterans in environments that encourage mutually beneficial transactions of knowledge and ideas.

An audience of middle, high school and college students listens to a presentation during the 2017 Careers in Business Aviation Day at NBAA-BACE.

1

2

1
Students explore the show floor during the 2017 Careers in Business Aviation Day at NBAA-BACE.

2
The industry's young talent connects at the 2016 YoPro Networking Session at NBAA-BACE.

Professional mentorships are another proven way to develop talent and guide people to successful careers within aviation. Through its Mentoring Network, NBAA matches industry veterans with individuals exploring opportunities in business aviation.

The initial group of mentees includes students trying to enter a business aviation career and people already in the industry looking to make a step up or change, such as transitioning to a new role, moving up from a turboprop to a jet or beginning international operations.

Industry response to the pilot programme has been enthusiastic, and the association is planning to do a full nationwide launch of the programme in 2019.

Around the world, more entrepreneurs and companies are utilizing business aviation than ever before. With this increased prominence comes expectations of excellence in all facets of business aircraft operations.

NBAA is dedicated to ensuring that the business aviation workforce continues to meet these expectations.

The association's investment in recruiting, retention and training efforts is essential to not only giving talented personnel the tools they need to succeed, but also to making sure the next generation is prepared to meet the high standards demanded of modern aviation. TR

ANDREW REILLY
Communications Editor
National Business Aviation Association (NBAA)

ICAO

AIRPORTS COUNCIL INTERNATIONAL

Global ACI-ICAO Airport Management Professional Accreditation Programme (AMPAP)

Best Practices | ICAO SARPs | Shared Expertise | Global Network

AMPAP

The Hallmark of Excellence in Airport Management

UPCOMING GATEWAY COURSES

ATS Port of Spain, Trinidad & Tobago
July 9 to 13, 2018
Hosted by Airports Authority of Trinidad & Tobago

ATS Delhi, India
July 23 to 27, 2018
Hosted by Airports Authority of India

ATS Moscow, Russia
October 29 to November 2, 2018
Hosted by Domodedovo Training

ATS Muscat, Oman
December 2 to 6, 2018
Hosted by Oman Airports Management Company

AMPAP *acronym:* The Global Airport Management Professional Accreditation Programme (AMPAP) is a strategic initiative of ACI and ICAO. The primary focus is to develop airport managers through a six-course curiculum that covers all functional areas of the airport business in key areas. AMPAP encourages participants to share best managerial practices in an interactive, cross cultural environment while estabilishing a global network of contacts.

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GOING AGAINST THE WIND: ONE WOMAN'S JOURNEY TO BECOME A PILOT

My name is Yashodha Bhattarai and this is my story.

I was born and raised in Kathmandu, the capital city of Nepal, after my father, a police constable with the Nepal police, was transferred to the city. I am the first of three children, our family of five lived in one small room. My father's salary wasn't enough to make ends meet, but my uneducated mother found work so they could enroll us in a private school. After I finished high school, I pursued science with the hope of becoming a doctor – and then one day my path changed.

It happened when my father took me to my ancestral village (Khotang), which is located on the eastern part of Nepal. As we were strolling through the village, he showed me the airport that was under construction, on the very site where my father and his brothers fetched wood as children. Manamaya Airport at Khanidanda was to begin commercial operations the following year, and it was there that I felt my first pull to aviation. Watching my father experience nostalgic feelings as he remembered his childhood was the moment I decided I wanted to be a pilot.

My initial plan to become a doctor was based on the scholarships the government provided. I encountered a painful truth when I discovered there wasn't government scholarships or bank funding for pilot training, I didn't have the fortune I would need to become one. Moreover, Nepal didn't have a pilot training school at that time. Though there was a flight training school called Siwani Air in Bharatpur, it had closed down due to lack of aircraft and a navigation system.

I quit my medical preparation and was going from one education consultancy to another trying to find out how much my flight training would cost: USD 40,000, close to four million Nepali Rupees. There was no way my parents could have arranged that amount of money, my dream of becoming a pilot was shattered. I don't remember how many days I cried. For months, I was consoling myself in meditation and books, until the day I read this: *"Everything you want is coming. Relax and let the universe pick the timing and the way. You just need to trust that what you want is coming and watch how fast it comes".*

I believed I would one day have the money. And then my prayers were answered. In 2009 my father was selected for a UN peacekeeping mission in East Timor. The salary he received wasn't enough to fund my training but it gave me confidence to borrow money from friends and relatives. After five months of agonizing I went to the Philippines for my training. I was the only girl in a group of eight males, seven from Nepal and one from South India. At the Philippines Pilots Academy, which was located in Plaridel, Bulacan Province, I was outnumbered. Most of the students came from upper middle class families and I was finding it difficult to get along with them. Often they said hurtful things that made me feel less worthy. They said I wouldn't make it past my first flight

and I wouldn't find a job back home. As a vegetarian, I found things challenging in the Philippines, and to make things worse, I lost my wallet, my return ticket and cell phone while travelling. Maybe things would get worse, but I told myself they had to get better.

I passed my exams before everyone else and was released for solo fight before them. I flew solo in a Cessna 150 with a call sign of RPC-1128. I can't express the happiness, the euphoria I felt the first time I flew solo. My love for aircraft and my passion to fly grew stronger. My perception of life changed the moment I was in the sky, and I became a different person in the aircraft. I was criticized over and over by my male colleagues when I tried to help them and I was made to feel that women could never become captains. Though there were already female captains working for reputable airlines like Yeti Airlines and Buddha Airlines in Nepal, the data showed that of the 214 commercial pilot licences issued by the authority, only 24 were female pilots.

There was this idea that men were superior to women because the society we lived in allowed men to be the dominant gender. That is because of practices and culture, men are generally viewed as providers, protectors of family and society. From ancient times, men were glorified in battle, preferred at birth, given priority everywhere. In my opinion, there is no superior gender. Men might be superior to women in certain tasks, but women are superior to men in others. Those who saw that men are better than women at certain tasks generalized that men are better than women. And though this stereotype is prevalent, the truth is none of us can survive without the other. It took me months to get over this, so I could move on.

I stayed a year in the Philippines to complete my training, earning my CPL in November 2009 and then I returned to Nepal. I finished my CPL written exam, which was valid for five years and if I could get a job, I would have a Nepali pilot licence in that particular type aircraft. In 2010, with the aviation industry in Nepal in a recession, getting a job as a commercial pilot was very difficult. There were hundreds of young men and women who had spent millions of rupees to undergo training to become commercial pilots, who were also unemployed and broke. My dreams failed to take off when I realised this truth. I had come a long way from desperately finding the money I needed for the training – I had broken many social barriers and challenged the patriarchal social structure – and to no avail.

The search for a job proved to be difficult. Many of those who found jobs got them not because of their talent, but because their parents pulled strings. According to one report, there were more than 250 unemployed pilots in Nepal, where there are only a handful of aircraft belonging to only a few airlines. My chances of getting a job were close to zero. The epaulettes on my white shirt with two golden stripes and the wing insignia on the pocket were the only things that remained of my dream as I remained unemployed for almost five years. I took on odd jobs to pay off loans and manage my expenses. My parents had gone beyond their means to support me, selling whatever they had to finance my training.

After five and a half years I was hired by Simrik Airlines. They had two Beechcraft 1900 and Dornier 228 aircraft. I was trained on the Dornier 228 and earned my Nepali pilot licence in June 2015. I was the only female pilot at Simrik Airlines. The Dornier 228 operated flights to remote STOL (short takeoff and landing) sectors like Lukla, Phaplu, Jomsom, Simikot, etc., carrying passengers and essential supplies like food and medicine.

Though there have been many female pilots who flew Twin Otter and Dornier to this remote sector, there has never been a female captain in the STOL sector. Men have long dominated STOL sectors in Nepal. Female pilots who were about to become captains were transferred to Non-STOL sectors like Biratnagar, Nepalgunj, Bhairahawa. When asked for the reason of this gender disparity some noted that it wasn't a job for a woman. It has been the management practices for decades not to release a female captain to STOL sectors, this is a reflection of where our country is moving in terms of gender equality.

As I write this article, I am the only female pilot in private airlines who flies to STOL sectors, mainly Lukla. About a year ago I moved to Tara Airlines, where I found hope. They are encouraging me to become the first female STOL captain. Though I can only imagine that day, I look forward to when I will become one.

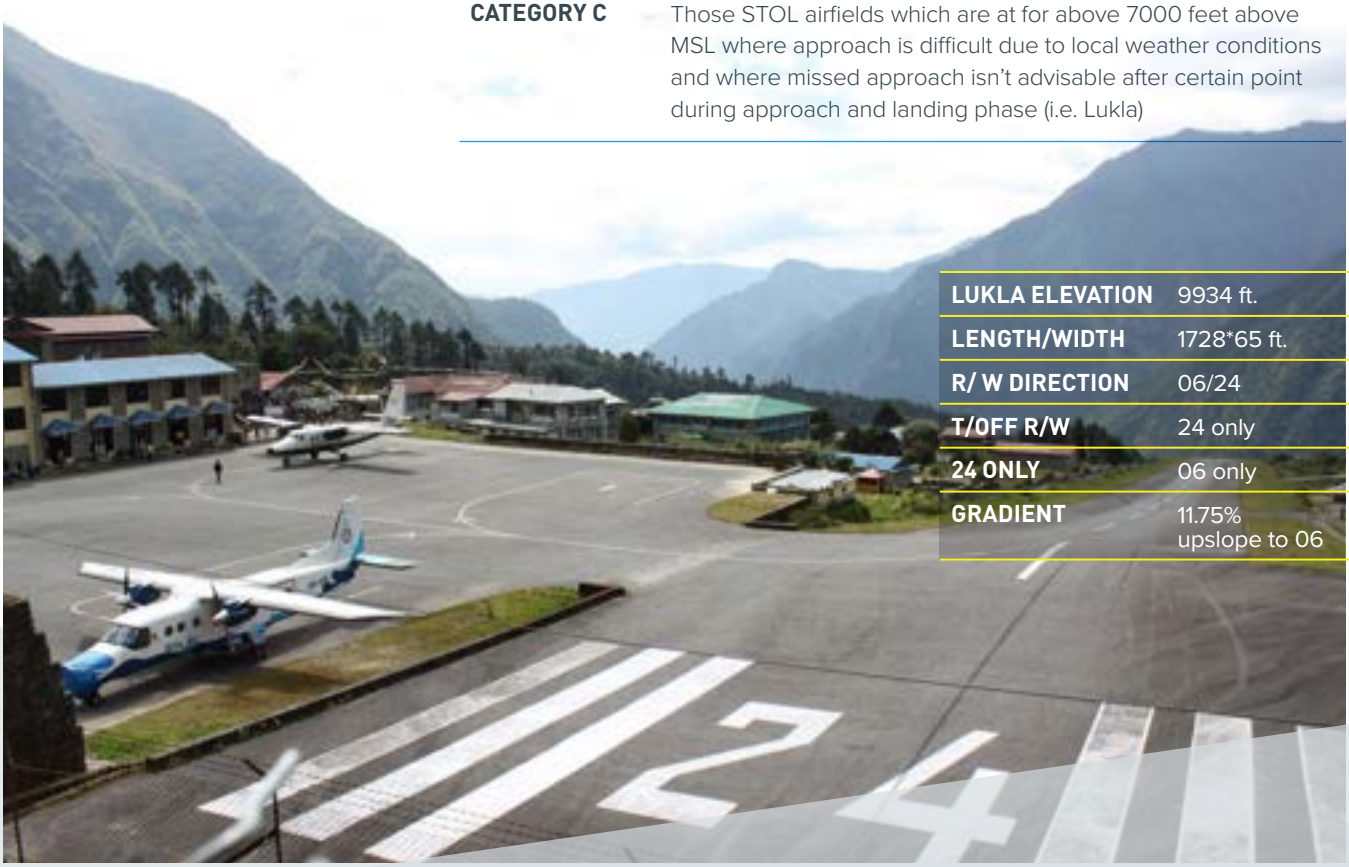
STOL sectors are filled with many challenges requiring that pilots are highly professional and disciplined. Despite being highly qualified, Nepal has witnessed many fatal airplane crashes involving commercial passenger flights. On 27 May 2017, I lost a good friend in a plane crash at Lukla. Though this incident hasn't held me back, I have a lot to improve, a lot to learn and a lot of challenges to face in the days and years to come.

Recently I married someone who is also a pilot flying J-41 in Yeti airlines. I feel fortunate to have a partner who understands and supports me. I am up for every challenge that I will face in my career, and I am excited for all of the good experiences and opportunities to come. TR

YASHODHA BHATTARAI
First Officer, Tara Airlines
Katmandu, Nepal

STOL sectors have unique challenges with upslope runways, high terrain, difficult approaches and unpredictable weather. There are three categories of STOL airfields:

CATEGORY A	Those STOL airfields which are below 5500 feet above MSL and where missed approach is possible.
CATEGORY B	Those STOL airfields which are at or above 5500 ft and below 7000 ft MSL and where missed approach is critical.
CATEGORY C	Those STOL airfields which are at for above 7000 feet above MSL where approach is difficult due to local weather conditions and where missed approach isn't advisable after certain point during approach and landing phase (i.e. Lukla)



LUKLA ELEVATION	9934 ft.
LENGTH/WIDTH	1728*65 ft.
R/ W DIRECTION	06/24
T/OFF R/W	24 only
24 ONLY	06 only
GRADIENT	11.75% upslope to 06

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DEVELOPING COMPETENCIES FOR OPERATIONAL SAFETY

We cannot improve operational safety and advance the modernization of air navigation around the world without all States doing their part to establish, review and address their safety priorities while promoting and monitoring the growth of the civil aviation industry. The International Civil Aviation Organization (ICAO) published Annex 19 - Safety Management to the Convention on International Civil Aviation, which contains Standards and Recommended Practices (SARPs) for managing operational safety, to assist Member States with this mandate.

Brazil's National Civil Aviation Agency (ANAC) and the Brazilian Aeronautical Command (COMAER), jointly established the Brazilian Civil Aviation Safety Programme (PSO-BR), to adopt ICAO's operational safety SARPs. The PSO-BR Safety Programme of the Brazilian National Civil Aviation Agency (PSOE-ANAC) provides a strategy for civil aviation safety through the implementation of specific programmes for ANAC and COMAER. Through this programme, directives, responsibilities and the structuring processes for the management of operational safety within ANAC, have been established.

Effectively implementing the concepts presented in the PSOE-ANAC depends on a variety of factors. Among these, it is important to highlight the ability of all ANAC employees to understand the purpose of the PSOE-ANAC, their respective roles, and the skills required to perform their duties.

CONSTRUCTION OF THE TRAINING PROGRAMME ON SAFETY MANAGEMENT

The current PSOE-ANAC (established in February 2015), included an important project portfolio which was directly sponsored by the Agency's Board of Directors. This priority project included safety training strategies for ANAC personnel in its scope.

Initially, the team responsible for developing training strategies carried out an internal assessment to evaluate the safety management training, so they could develop a training strategy. The assessment identified the following actions:

- A need for developing PSOE-ANAC training in various sectors of the Agency;
- Profiles based on the different levels of interaction with safety management systems (SMS) and PSOE-ANAC had to be identified;
- Training tracks for each identified profile had to be developed;
- Synergy, to avoid training duplication, had to be established; and
- Training activities, with a transition period determined for each profile, had to be outlined

Following this assessment, the project team developed am Operational Safety Management Training Programme for ANAC personnel based on the following structure:

- Basic guidelines;
- Competency-based training programme; and
- Training tracks

COMPETENCIES MAPPING

The proposed programme was based on the competencies mapping methodology already used by ANAC and other Brazilian government bodies.

In Brazil, Decree No. 5.707/2006 established a legal framework for developing policies and guidelines for public administration personnel. According to the Decree, the management of training activities shall

be based on competencies and shall be oriented towards the development of knowledge, skills and attitudes necessary for the performance of duties, in order to achieve institutional objectives.

Based on this legal framework and research carried out with Brazilian reference authors in the field of competency-based management, the project team began analyzing PSOE-ANAC. The Programme was used as a guideline for defining the objectives to be achieved, taking into account, throughout its construction process, the contributions of managers and technical experts at ANAC. This action mapped the technical and managerial competencies needed for the different identified profiles. The Human Resourses Department had a significant role in both using methodologies for competency mapping, and in guiding the development of training tracks.

The process of competency mapping related to the PSOE-ANAC was developed in four stages:

1. Identification of the organizational competencies needed to achieve the strategic objectives of the PSOE-ANAC.
2. Identification of the technical and managerial competencies that contribute to the sustainability of organizational competencies.
3. Inventories of existing competencies in the organization.
4. Identification of potential competency gaps.

PROFILES, TRAINING TRACKS AND LEARNING STRATEGIES

As a result of the competency mapping, the main profiles associated with the processes of PSOE-ANAC were identified and considered in the training programme. The initial focus was on the general profiles that were applicable to several areas of ANAC, and in avoiding detailing that would lead to additional profiles with a need for developing specialized tracks. This process resulted in the identification of the following profiles:

All ANAC employees
All employees of the Agency, including interns and outsourced personnel

Top Management
Board of Directors and Chiefs of all Departments

Managers
Managers and technical managers of all areas that carry out activities that impact on safety (Department of Flight Standards, Department of Airworthiness, Department of Airport Infrastructure and Department of Civil Aviation Inspection).

Safety Inspectors
All personnel trained to carry out inspection activities.

SMS Auditors
All personnel performing SMS audits, regardless of their working area.

PSOE-ANAC Auditors
All performing PSOE-ANAC audits, regardless of their working area.

Training tracks and strategies were built for each profile with a specific role in the implementation of the PSOE-ANAC. Establishing the training tracks ensured that orderly sets of learning resources geared towards the development of people were instituted. These took into account the desired results, and the various environmental and human conditions that interfere in the learning process, as well as different strategies, which were used to acquire competences. People acquire the same competencies in different ways. Learning resources included any tools that could be used to promote learning, resources that included courses, seminars, internships, books, videos and mailing lists, among others.

Based on these premises, using mapped data, the results of group discussions, consolidated information on skills, knowledge, attitudes and degrees of importance, the project team proposed different learning actions for each track. The team detailed programme content for each action; estimated schedules; proposed appropriate teaching methods (on site, distance learning or blended learning) for each target audience; defined mandatory or optional content for each track; and proposed references, readings and videos. The inclusion of these diversified training tools allowed for new ways to promoting education in the organizational environment. Detailed learning initiatives were not only present in the training programme, but they were detailed in the programme as well.

FINAL REMARKS

In a general evaluation of the PSOE-ANAC Training Programme, it is clear that the structure that has been developed effectively covers the identified needs for each profile, and that the training proposed in the programme actually contributes to the development of the competencies necessary for the effective implementation of the PSOE-ANAC. Since launching the training programme, hundreds of ANAC employees, from all hierarchical levels, have participated in training that was specifically developed for their performance profiles.

Currently, within the PSOE-ANAC Implementation Programme, there is a priority project that is dedicated to constantly reviewing mapped competencies and learning actions of the training programme. Improvements to operational safety, with evolving technology and air transport expansion in Brazil and around the world, is a continuous challenge. ANAC personnel must have the necessary competencies to face innovation expansion to guarantee all Brazilians civil aviation safety and excellence.

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ICAO NGAP

ICAO'S NEXT GENERATION OF AVIATION PROFESSIONALS GLOBAL SUMMIT

Every year more than 1.4 billion tourists travel across international borders using air transport, contributing economic lifelines for many cities, States and regions. This travel connects people and builds business relationships, with the economic gains and social benefits of aviation impacting most, if not all, industry sectors.

To meet the continuously increasing demands of the future air transport network, strategies must be developed to attract the best and brightest professionals to operate and manage it. In 2009 ICAO established the Next General of Aviation Professionals (NGAP) Task Force to identify long-term human resource needs and establish strategies to attract, educate and retain the next generation of aviation professionals.

In November 2017, ICAO brought more than 500 education and air transport leaders from 85 States together at ICAO Headquarters in Montréal for the Next General of Aviation Professionals Global Summit. ICAO's 2017 NGAP Global Summit participants represented a wide cross-section of concerned professionals and decision-makers representing industry, non-governmental organizations and academia. Also participating were officials from the International Labour Organization, the International Telecommunication Union, UNESCO, and UN Women.

Among the human resources solutions proposed during the event was the establishment of a network of educational institutions to support

related youth attraction initiatives and research and analysis on sector-wide human resources development metrics. Participants underlined the need for enhancing ICAO's leading role with respect to educational and training programmes focused on the needs of next generation aviation professionals.

A UNESCO 'Think Pink Hat' session was held on the sidelines of the Summit to create greater aviation awareness in high school and younger students. Speakers in the session spoke to 60 students from 19 schools about how important STEM education is, and about how many career opportunities in aviation there are in this exciting industry.

ICAO also conducted a Model ICAO Forum during the event. It aimed at raising university-level awareness on the role of the Organization on the international stage and the challenges associated with forging global consensus on air transport governance issues. Student Model ICAO participants also benefitted from speed mentoring sessions with attending professionals, and career exhibits by a number of air transport and industry organizations.

The government of Qatar supported the Summit's goals by formalizing a new Memorandum of Understanding (MoU) for a new aviation scholarship, and in a similar vein Ukraine's National Aviation University signed an MoU with ICAO for several new aviation internships.

A new strategic partnership with UNESCO also resulted from the Summit, enabling the two United Nations agencies to explore educational opportunities across a wider range of aviation professions, and to develop stronger links with the related United Nations SDGs. TR

OPERATIONAL IMMERSION:

IMPERATIVE IN ALL AWARENESS TRAINING

Air transport is an exciting, and very complex, ecosystem that runs in a 24 hour operating climate. The continuous movement during the day and night makes it difficult to assess and measure in terms of capacity.

When an aeronautical event occurs it sends signals, operational indicators that affect the ecosystem's safety management system (SMS), and the performance indicators of involved personnel who work for the air carrier or in air traffic control, maintenance, airport security or otherwise. When these indicators call for action or change, there might be a need for training, but conventional training isn't always the solution.

TWO TRAINING MODES

Conventionally, we are most familiar with **Proficiency Training** which allows for the acquisition of the skills needed to use new equipment to maneuver a device or vehicle. As we pursue optimal operational performance, we use training methods that rely on knowledge and know-how. Safety aspects are always considered.

Awareness Training aims to increase awareness and consciousness among frontline operators for various operational services address safety. There are three goals with awareness training: it provides business reality in terms of both operational context and constraints; it provides physical and psychological preparation (such as offering recovery solutions for jet lag, night shifts, etc); and it provides safeguard tools for operational traps (such as micro-sleep and the use of medications). This type of training calls for changing attitudes as opposed to changing knowledge and skills.

I am writing this article based on my experiences as the head of the human factors training and CRM department, and following the development of a specific training course on "Operational Arduousness" for a major airline.

Arduousness levels measure the labor or effort required to maintain stable and continuous operational performance when tasks/activities shift. Operational arduousness can be described as a measured effect that reaches a specific threshold before it impacts cognitive performance.

When I began developing the training course based on the Fatigue Risk Management System (FRMS), I recognized that fatigue can be confused with arduousness. Operational immersion became a key first-step when designing an awareness-training course. The observable and measurable parameters of "operational arduousness" related to two types of contributing factors: endogenous and exogenous.

Endogenous factors are science-based notions like human biology, diet and hydration, so the design of a course can be done in a classroom. Exogenous factors that are environmental and structural are operator specific, and are unavoidable. Key indicators can be found in the operational environment and not the academic one. (See Figure 1)

I could have developed the course in a pedagogically designed syllabus, comfortably sitting in my developer's desk, but I chose to take a more promising

and practical approach with operational immersion, to achieve the assessment level of operational arduousness.

Of course I left my desk armed with several tools and a prescribed precise plan, having reflected on these questions as a foundation:

- How can operational arduousness be defined through observation and measurement?
- What are the measurable key indicators (partial and impartial)?
- What are the human performances impacting exogenous factors?
- What are potentially related risks & hazards of this arduousness?
- What is the threshold?

I considered what prospective key indicators would be useful to the training module. A well-established protocol that was restricted, within scientific and transparent parameters, was needed. The approach and methodology had to be clearly defined and explained through media support and documentation where not only endogenous and exogenous indicators were defined, but the process for measuring them was also described.

Furthermore, and very importantly, the participation conditions of voluntary crew members was clearly defined, along with a management policy and one that protected the anonymity of the data collected.

HOW CAN OPERATIONAL IMMERSION HELP WITH TRAINING DESIGN?

Even when training might initially suggest solutions to operational indicators, we shouldn't be limited to Human Machine Interface (HMI), but should instead develop safety formulas tailored to the operational specifications of the operators (where complexities might arise). Within the FRMS, the count of working hours might be one example of a need that requires further investigation.

Something else that needs to be considered? Human Technology Operations (HTO). Only probed and measured indicators in the operational immersion process can provide solutions for some operations.

Awareness training goes beyond the trainee's professional role, it impacts corporate needs and contributes to operational safety.

The operational arduousness formula looks like: Fend + Fexo = CIOA

Fend = endogenous factors
Fexo = exogenous factors
CIOA = Combined Index of Operational Arduousness!

HOW DOES OPERATIONAL IMMERSION IMPACT AWARENESS TRAINING MODULE DEVELOPMENT?

Fundamentally, it changes the shape and content of the training. With the content, front line attendees provide feedback with measured indicators that help to generate reality indicators. These observations provide:

- Guidance for the type of training that is most practical (i.e., classroom or distance learning);
- Connections that can assist participants in real life operations;
- Guidance to attendees to best prepare their roles and responsibilities (i.e. work on night shifts);
- Reference to management to assist them with duty/crew assignments

HOW DO ATTENDEES PERCEIVE THIS TRAINING?

The interactive training style meets expectations and allows for structured and coherent discussions that enrich operations.

This training has set priorities and incorporates scientific factors with practical applications, based on feedback from measureable and observable indicators.

HOW CAN WE MEASURE THIS TRAINING IMPACT?

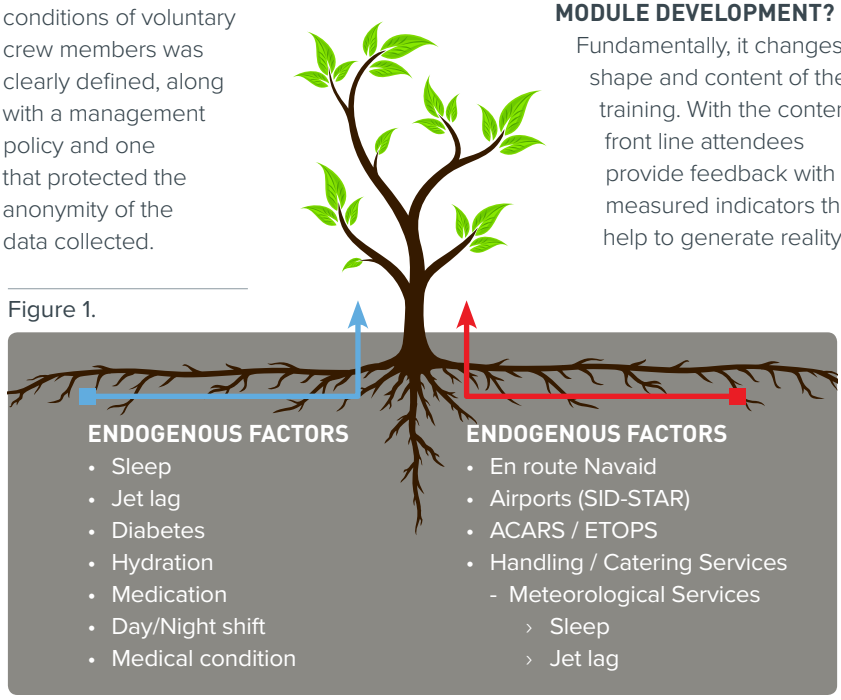
Impact is measured through follow-up that is conducted throughout the training process, based on anonymous feedback surveys with specific assessment questions. Results are collected over several months as the training is provided during operational performance workshops.

LOOKING TO THE FUTURE

The operational immersion approach positively impacts "awareness training" module development by bringing together three distinct areas: supervision, operations and training. The biggest benefit for not only the service provider, but the user, are the improvements to flight safety.

To establish and maintain a permanent day/night operational safety environment, one should consider the "operational immersion" input. This process incorporates "awareness training" material that improves and retains safety standards, human factors and operational field observations are key indicators and the cornerstone for all safety-related training. TR

Figure 1.



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