

The Review and Future Development of the International Cooperation in Aviation Technology Education in Taiwan

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ABSTRACT: *Concerning the human resources demand of the Aerospace industry in Taiwan, the Aerospace Engineering Program Office (ASEPO) has been established since 1997. As far as curricula, facilities and instructors in aircraft maintenance field are involved, resources introduced from advanced countries in North America, Europe as well as Australia are urgently demanded. Based on the above consideration, Taiwan Ministry of Education has allocated budget to establish the academy-industry alliance of aircraft maintenance since 2001. Under the support of this alliance, the performance of aircraft maintenance education in Taiwan has been significantly enhanced and promoted. In the past two years, with the concerted efforts of the work team, the academy-industry alliance has made some great achievements. Furthermore, with the assistance of Taiwan Ministry of Education (MOE) and the Committee for Aviation and Space Industry Development (CASID), more international cooperation topics and actions about the aviation technique education will be continuously supported in the future, such as sister schools, exchange programs, visiting professors, research cooperation, intensive or certificated short courses, workshops, overseas expert courses, students' summer practical training, and meeting the criteria set by the Accreditation Board for Engineering and Technology (ABET).*

1 INTRODUCTION

As far as the safety of flights is concerned, both the management unit for civil aviation of every country and the International Civil Aviation Organization (ICAO) have defined many rigid regulations on the checking procedures of aircraft maintenance. According to this, our aircraft maintenance technicians should be qualified by the technology examination formulated by the European and American nations - the main members of the ICAO. Thus, the internationalization of aircraft maintenance has become the main trend of our aviation development.

The current policy of Taiwan aerospace industry is focused on becoming the aircraft maintenance center in Asia areas. Thereafter, various aircrafts will fly to Taiwan for regular maintenance or structure refit. Our maintenance members will therefore be strongly demanded to obtain the international qualified certificates for providing extensive service and more business chances. Apparently, the need of trained and qualified technicians will increase from the aircraft companies. For this, we look forward to developing the qualified maintenance education by way of the assistance from international resources and technology. Such an effort will not only meet the need from our aerospace industries but will also promote the technology level of our maintenance for ensuring more flight safety. To promote the progress of international exchange on aircraft maintenance, worldwide cooperation qualified and certified by ICAO is explored. The main objectives of this paper include : (a) materializing the internationalization of our industry alliance on aircraft maintenance, (b) integrating our internal resources and development plans between the industries and academic units during the process of implementation of international cooperation, (c) carrying out the international alliance with foreign aircraft-maintenance companies or training schools, (d) setting up an approved unit to effectively promote our technology education on aspects of aeronautic engineering, and (e) meeting the criteria set by the Accreditation Board for Engineering and Technology (ABET).

2 NHUST'S ACHIEVEMENTS

The educational aspects in the aeronautical engineering department of National Huwei University of Science and Technology (NHUST) include the aircraft mechanics and the avionics. It is focus on the aeronautical engineering and aircraft maintenance technicians different from the related university education. As described above, the NHUST provides the students with various training programmers and therefore that how to quickly promote the training level has conducted to the pressing needs of looking for the support from other countries. Since years, the improvement projects of aerospace education which were supported by the Consulting Office in the Ministry of Education in Taiwan is executed, an alliance relationship with many academic institutes, industries and domestic air companies has successfully been set up and many international cooperation programs related to aircraft maintenance have also been run. The NHUST obtained much significant achievement and is deemed as the aviation maintenance resources center of Taiwan. Considering the further development of internationalization on aircraft maintenance, international cooperation is the only way. We hope that the international cooperation can obtain sufficient training resources and skilled technologies from foreign nations, especially from America, Australia or Europe. In Addition, the operation of such a plan can also provide the alliance schools both resources and experience for integrating the vested resources and then programming the future development policy. In order to build the qualified maintenance technicians for providing support to our aerospace industry, it is aimed at enabling the NHUST to become an approved school with international training organization certificate. Based on this, we have obtained many achievements.

For implementing the aircraft maintenance to internationalization and obtaining the supports including the maintenance regulations, facilities and teaching resources, we have visited five foreign schools including Royal Melbourne Institute of Technology (RMIT university) and Kangan Batman TAFE in Australia, IAS in France, Tangin Institute of Civil Aviation in Mainland China and Purdue University in U.S.A. The foreign experts will be invited to come and give us some short courses or special speeches in the future. These teaching resources will be shared with our any other related school. By ways of the international cooperation, the new maintenance regulations, new facilities and new teaching materials will be introduced to Taiwan. In addition, with the assistance of above international cooperation our students will be allowed to learn some professional courses which are difficult to run by our facilities or qualified teachers. These courses may include aircraft maintenance programming, aviation management, aviation English and international regulations on aviation etc

3 THE AVIATION MAINTENANCE RESOURCES CENTER (AMRC)

Four industrial-academic alliances have been formed since 2001 under a government-supported industrial-academic strategy alliance project in the aviation-related fields, including aerospace quality assurance and certification, avionics, aerospace parts and components manufacturing, and aviation maintenance [1,2]. Aeronautical Engineering Department (AED) at National Huwei University of Science and Technology (NHUST) was are assigned as Resource Center School in Aviation Maintenance Alliance consisting of eight partner schools and several major airline companies in Taiwan. AED is responsible for making and carrying on strategic plans to promote the education quality of all allied schools. The strategy used to achieve the alliance goals includes:

1. Teaching strategy: all allied schools will re-examine cultivation mission and course design to meet the industrial requirement and teaching colloquiums were held to exchange teaching experience between faculty in all partner schools.
2. Curriculum strategy: the alliance has established the curriculum database providing faculty with extensive materials for curriculum design and many multi-media and e-learning curricula were developed and included in the database.
3. Facility strategy: eight departments in the alliance were funded to set up characteristic laboratories that could be accessed through share-mechanism between allied schools.
4. Industry-Academy strategy: the alliance developed the exchange programs between allied schools and companies. Faculty and students are sent to airline companies to receive training programs. Faculty are encouraged to cooperate with industrial experts in execute practical projects.
5. International cooperation strategy: Faculty and students visited international aviation-related schools and companies to learn more advanced professional experience. Many foreign experts are invited to

give short courses or lectures in the allied schools.

AED and other partner schools in AMRC have achieved profound success regarding in international cooperation, including

1. Faculty published more than ten papers regarding the aviation education in international conferences including ICEER and AMTE 2002.
2. Most of partner schools provided exhibition posts in the 2001 international aviation and education exhibition in Taipei.
3. More than 50 students were sent to study overseas.
4. AMRC held at least four intensive short courses by foreign experts from countries including France, USA, Canada, Australia, and China.
5. China Aviation School for training the aviation maintenance technicians was established through the joint cooperation between one of partner schools and Lufthansa Technical Training (in Germany).
6. The strong cooperation program were carrying on between partner schools and the Civil Aviation University of China (CAU) since 2001. The cooperative items are listed in Table 1.
7. Flysky Air Group (FAG) has signed the cooperative agreements with the international partner schools (listed in Table 2) and is developing cooperative program with the ARMC to help the student to obtain the pilot certificate or the mechanic's certificate. The corresponding numbers of graduated pilots and the Airframe/Power plant mechanics are tabulated in Table 3.

4 TAIPEI INTERNATIONAL AEROSPACE EDUCATION FAIR

The goal of "Taipei International Aerospace Education Fair" is to combine the industrial demand with aerospace educational achievements through industrial resources. In 2001 and 2003, a total of over 59 exhibitions joined this event, including Taiwan's aeronautical organizations, Taiwan's aviation industry, overseas colleges and aviation industry. This exhibition provided many oral presentations made by school, from Taiwan, UK, America, Canada, France and Australia. These presentations, helped international students, understand better the characteristics of school, their curriculum and application procedures. For the Exhibition, The CASID also invited many international Aeronautical and Academic Organizations to take part in these symposiums. It promoted the discussion, exchange between the organizations, and more intimate cooperation between companies and academies.

With aim of promoting international cooperation and fostering aerospace elite for Taiwan, The International Aerospace Technology and Education Fair will hold on by the CASID and the MOE in the 2005. This fair intends to offer students more information on study opportunities locally and overseas, in addition, it hopes to enhance international cooperation on aerospace education and promote the regional industry development.

5 THE INTERNATIONAL COOPERATION IN AVIATION TECHNOLOGY EDUCATION BETWEEN TAIWAN AND FRANCE

The International Cooperation in aviation technology education between Taiwan and France was established using the French Aeronautics and Aeronautics and Space Industry Award (FASIA) in 1998. In Taiwan, the MOE together with the CASID have been promoting the industrial-educational cooperation for many years. The goal is to combine the industrial demand with aerospace educational achievements through efficient use of industrial resources. In France, The IAS (Institut Aéronautique et Spatial) is responsible for running FASIA and provides Taiwan's institutions with a whole range of integrated support and training solutions in France. The comprehensive partner schools are listed below and the cooperation items are listed in Table IV.

In order to ensure participants' adaptation, IAS has put together an interated package of associated support. The cumulative students comming from Taiwan reach 16 persons in the different major study.

6 THE NHUST'S PILOT PROJECT FOR ENGINEERING EDUCATION ACCREDIATION

Under the support of the MOE, Aeronautical Engineering Department at NHUST has launched an ambitious project to improve its education quality to meet the international engineering education

standards. The initial goal of the program is to promote the AED education quality to meet the criteria set by the Accreditation Board for Engineering and Technology, Inc. (ABET). According to the criteria, AED will show the student have the following abilities when they graduate: (a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (c) an ability to design a system, component, or process to meet desired needs (d) an ability to function on multi-disciplinary teams (e) an ability to identify, formulate, and solve engineering problems (f) an understanding of professional and ethical responsibility (g) an ability to communicate effectively (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context (i) a recognition of the need for, and an ability to engage in life-long learning (j) a knowledge of contemporary issues (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

In order to carry out the project effectively, AED has set up a 7-faculty task force that meet every week on a regular basis to review and plan their education level in every aspect including faculty, facilities, institute support, finance support and so on. AED also invite many foreign and domestic experts to form an advisory council to provide the necessary information to help AED to improve the education quality. The schematics of the department have been reforming since the project began. Every faculty has been asked to participate in the program. The project has provided each faculty very good opportunity to go over their own teaching plan.

7 CONCLUSION

This paper provide suggestions to highlight the review and future development of the international cooperation in aviation technology education in Taiwan. The results from the being achieved items are that we obtain many experiences on aircraft maintenance from international cooperation in aviation technology education. And this will do help to improve our current training courses and facilities to meet the real needs of our aviation industries. The new project about the international engineering education standard set by ABET provide the good opportunity to improve its education quality. Both will efficiently promotes our education level of maintenance training and also do assistance to our students to get the certifications. These above significant results are all really pointing out the importance of international cooperation and exchange on aircraft maintenance.

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Table 1. The cooperative items between KYIT and CAU

Year	Summer Student Oversea Practice		Topics	Visiting Professor
2000	30 students	2 instructors	Avionics	1
2001	20 students	1 instructors	Avionics	1

Table 2. International partner schools of FAG

School	country	Items	Training Time
Omni Aviation school	Philippine	ICAO, PPL / CPL	200 days
Skywalker Aviation school	USA	FAA, CPL, CFI	200 days
Eastern Aviation school	China	CAAC, CPL	100 days

P.S.: 1. PPL: PRIVATE PILOT LICENSE

2. CPL: COMMERCIAL PILOT LICENSE

3. A/P L: AIRFRAME/POWER PLANT MECHANIC LICENSE

Table 3. Graduated pilots and mechanics from FAG

Graduated Pilot		Graduated Technician	
PPL	36	FAA A/P License	2
CPL	76		

Table 4. The International cooperation Items of the Aviation education between Taiwan and France

University	Aeronautical Topic	Degree
ESC	MBA	Master
ENAC	Communication, Navigation, Surveillance, Aeronautical Operations, Airport Management	Master
ENSAE, SUPAERO	Aeronautical Engineering, Space Engineering	Master
ENSICA	Aeronautical Maintenance and Production, Helicopter Engineering	Master
ENAC and ESC	Air Transport Management	Master
ENAC and ENSICA	Aircraft Airworthiness	Master

1. ESC (*Ecole Supérieure de Commerce*)

2. ENAC (*Ecole Nationale de l'Aviation Civile*)

3. ENSAE (*Engineering School of Ministry of Defense*)

4. SUPAERO (*Ecole Nationale Supérieure*)

5. ENSICA (*Ecole Nationale Supérieure d'Ingénieurs de Constructions Aéronautiques*)

6. CNES (*Centre National d'Etudes Spatiales*)