Chairman
Council of Ministers

Kathmandu, Nepal

Message

I am happy to know that Civil Aviation Authority of Nepal (CAAN) is celebrating fifteenth anniversary of its establishment. On this occasion, I would like to extend my hearty congratulations for the accomplishment of successful years and express thanks for the contribution in the tourism sector of Nepal.

Government of Nepal is committed in developing aviation infrastructure in the country, and is open to cooperate and work in the areas of civil aviation with aviation partners. Given the landlocked disposition of Nepal, the instrumental role of air transport is more apparent as air transport has been an essential vehicle to connect Nepal with other countries of the world. Similarly, the communities living in the diverse topography within the country are facilitated by the air transportation. The sustainability of Nepalese tourism and economy cannot be guaranteed without air transportation, and thus, CAAN has to be more creative and proactive in its objective.

I am hopeful that CAAN will further forge a collaborative partnership with respective stakeholders at national and international level to ensure safe, reliable, efficient and affordable air services in Nepal in the days ahead. I would like extend my best wishes for the success of CAAN and its officials in all positive endeavors.

(Khil Raj Regmi)

December, 2013

Government of Nepal

Hon'ble Minister of Culture, Tourism & Civil Aviation
Personal Secretariat
Singhadurbar, Kathmandu, Nepal

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Ref .No.: 67/070-71

Message

I am delighted to know that the 15th Anniversary of the Civil Aviation Authority of Nepal (CAAN) is being observed on this day of 31st December. Personally and on behalf of the Ministry, I would like to offer my congratulations to CAAN on this special occasion.

Since civil aviation is dynamic, highly technical and basically international in character, its policies, rules, regulations as well as working methods and approaches need to be proactively and timely adopted. Adjusting to the realities and demands of a rapidly changing world necessitates a much consolidated focus on improving growth and competitiveness while moving to a new level of development. Globalization followed by an era of information dictate that our endeavors should concentrate in technological advancement through collective efforts and sharing of knowledge, information and ideas among all concerned.

The efforts put forth by CAAN in keeping pace with the changing environments of technological development and service standards by deploying skilled manpower, modern equipment, sufficient finance and proper procedures is really commendable. Keeping in mind that growth in today's world is directly proportional to the development of aviation infrastructure in any country, Region or State, the Government of Nepal is determined to help CAAN in managing and developing the airport facilities to more advancement so as to ensure further growth in the Nepalese aviation sector.

I wish to express best wishes to CAAN on the occasion of its Anniversary.

R. K. Mhaskey

Minister
Ministry of Culture, Tourism and Civil Aviation

Government of Nepal
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Singhadurbar, Kathmandu
Nepal

Ref. No.

Message

I am pleased to learn that Civil Aviation Authority of Nepal (CAAN) is observing its 15th Anniversary, and as part of various activities, it is publishing a special Souvenir magazine as well as CAAN Report to mark the occasion.

Aviation is a complex industry and is one of the life lines of our country since we depend to a large extent on aviation for tourism. Aviation is the pillar framing and shaping up the tourism sector in Nepal. Therefore, expansion and modernization of aviation infrastructure has become the topmost priority of the country. Our unique geographical diversity makes the decisions we will inevitably take regarding the expansion of our aviation infrastructure very important for it to remain sustainable and viable.

In a developing country like Nepal where the role of air transports is quite crucial to channel the remote areas to the mainstream of national development, CAAN has a big role to play in regulating and promoting healthy growth of air transport industry while also ensuring increased level of quality services and facilities to benefit the traveling public domestically as well as internationally.

I am confident that CAAN will stand high in all of its responsibilities being committed forever to the sustainability of aviation sector.

At the end, I congratulate CAAN for its successful completion of 15 years in service and wish it all success in its endeavor in days ahead.

Sushil Ghimire
Secretary
Ministry of Culture, Tourism and Civil Aviation

International Civil Aviation Organization
Organisation de l'aviation civile internationale
Organización de Aviación Civil Internacional
Международная организация гражданской авиации
منظمة الطيران المدني الدولي
国际民用航空组织

Message

It gives me much pleasure to extend my sincere congratulations to the Civil Aviation Authority of Nepal on the occasion of its fifteenth anniversary on 31 December 2013.

CAAN as part of the civil aviation community certainly plays an important role in fostering the safe, secure and sustainable air transport. I look forward to the strong commitment and continued contribution of CAAN to make civil aviation *growing to meet the challenges of 21st century air transport.*

I take this opportunity to express my warm wishes and assurance for the continued and full cooperation at all times from the ICAO Regional Office for Asia and Pacific.

Yours sincerely,

Mokhtar A. Awan
Regional Director
24 December 2013

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EDITIORIAL NOTES

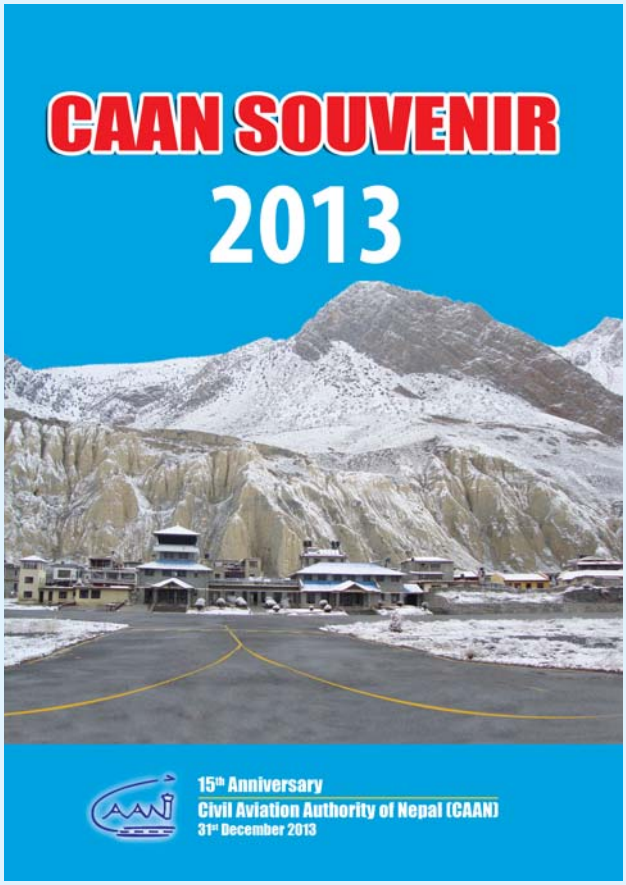
Once again the graceful serenity of the winter has brought in joys in our hearts as we are on the verge of celebrating the fifteenth anniversary of CAAN. With all the enthusiasm we have been experiencing through these years on every thirty first day of December, we have published 'CAAN Souvenir 2013'. It is one of our small efforts to promote the noble cause of sharing of knowledge, ideas and opinions. The publication has also etched in us the feeling of cohesive bond among all involved in this sensitive field.

We feel that it is an appropriate time to assess ourselves with respect to our past performance, achievements so far and our points of strengths and vulnerabilities. This would help us use our best of strengths in moving ahead in this dynamic sector.

Safety and Security as our mission, we are gearing up to meet all the challenges by adopting prudent and proactive measures. We vow to scale greater heights in the days ahead and contribute in creating a global village through safe connection to various parts of the world.

This Publication Committee would like to express sincere gratitude to the writers and contributors together with all providing their valuable suggestion and support to this souvenir.

Wish you all a very happy and prosperous new year!!!



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FOREWORD

Er. Ratish Chandra Lal Suman
Director General

INITIATIVES OF CIVIL AVIATION AUTHORITY OF NEPAL

Civil Aviation Authority which was established on December 31, 1998 pursuant to the Civil Aviation Authority Act 1996, with an objectives of ensuring safe, reliable and regular air transport in Nepal. Since its establishment it has witnessed many changes and has evolved to present stage. With its dual role of service provider in aerodrome and air navigation at one hand and regulator in other hand, it has taken several initiatives in different sectors.

CORPORATE SOCIAL RESPONSIBILITIES

Nepal, being a mountainous country with many remote places still inaccessible by roads where the air transportation is life line, air transport is the basic necessity not a luxury. In such contexts, social responsibility is one of the goals to serve the nation with construction of new airport in remote places and maintaining them while the business sense is also prime factor since CAAN is autonomous agency and cannot run in irrecoverable losses for long. In spite of the fact that the investment in the remote airfields cannot be justified in terms of investment returns, still CAAN has spent millions in the hilly airports for blacktopping of runways, extension of runways, developments of terminal building, communications system and meteorological facilities fulfilling the social responsibilities to serve the remote areas.

CAPACITY INITIATIVES

In terms of infrastructure, various airports in Nepal are being upgraded with blacktopping of runways, construction and upgrading of terminal building and facilities. Manang, Simkot, Salle airport runways are already blacktopped and runway extended. Other runway blacktopping in progress are Dolpa(Jupahal), Phaplu, Taplejung, Khanidanda, Rumjatar, Dang, Bajura, Rara, Bhojpur, Ramechhap and Chaurjahari. In addition, the terminal buildings of Dhangadhi, Dolpa and Phaplu airports are upgraded and communication and navigation equipments are installed.To cope with the growing passenger traffic, the domestic terminal at the Tribhuvan International Airport, and Janakpur are in the process of upgrading. The process of Tribhuvan International Airport runway improvement is already taken with the technical help of international consulting firm INECO.

Human resource is biggest asset and CAA Nepal is taking serious initiative in the continuous training of the human resource with need basis in accordance with newly developed training policy and program. Each year several staffs are trained in Nepal and abroad to gain the knowledge and skills that are vital for the highly sophisticated, dynamic and multidisciplinary sector like civil aviation.

In communication and navigation sector, VOR/DME at Simara, Nepalgunj and Bhairahawa airports are upgraded. The communication and meteorology equipment of Rukum, Dolpa and Phaplu airports are upgraded with modern consoles and equipments while the same is in progress in Dhangadhi, Simikot and Manang airport.

SAFETY INITIATIVES

Safety is the prime concern for all regulatory authorities and CAAN is not an exception. The State Safety Program (SSP) is developed to fulfill the obligations of latest ICAO Annex 19 on safety management. Safety Management System Requirement is already issued by CAA Nepal and all service providers are implementing SMS so that the hazard can be identified and

associated risks can be mitigated to enhance the overall aviation safety. Several trainings, workshops, seminars, interactions on SMS are conducted to educate personnel of CAA Nepal, airlines and aerodromes. With the ongoing maturity of SMS, Nepal is preparing to determine the acceptable level of safety soon.

In order to address the deficiencies in Nepalese aviation system as indicated by ICAO, CAAN has formed a rapid action team to expedite the resolution of the deficiencies. In addition, international flight operations expert is being hired in short term basis and more international flight operations and airworthiness experts are being hired in this regard. Close coordination is maintained with the various international agencies like ICAO to assist Nepal in the enhancement of aviation safety in Nepal with various means.

AVIATION SECURITY INITIATIVE

Nepal has committed to comply with the security standard, policies and procedures set by ICAO. We are aware of the reality that because of the globalization of aviation and globalization of threat against the safety of civil aviation, a concerted effort by all States has become a necessity. As a major stakeholder in this field CAAN is committed to do everything best at its disposal to strengthen AVSEC system in Nepal. Aviation security is one of the pillars of civil aviation authority of Nepal. Modernization of security measures is always challenging and CAA Nepal is working with close coordination with Home Ministry, Nepal Police, Armed Police Force and Nepal Army to fulfill the obligation of standards and recommended practices of Annex 17.

What follows is the synopsis of the major initiatives taken in strengthening Aviation Security during 2013.

Process of strengthening aviation security legislative framework has been accelerated with the proposed amendment to AVSEC Management Regulation approved by National AVSEC Committee (NCASC) meeting last held in the month of Magh, 2069 and awaits Govt formal approval. Likewise, 4th amendment to National Aviation Security Program (NCASP) was adopted by NCASC on 22/1/2013 which incorporates almost all of the recommendations made by Second Cycle of ICAO AVSEC Audit held in 2010. Similarly, this edition formally designates DG CAAN as an appropriate AVSEC Authority by giving legal status to the requirement long due under Annex 17. In similar fashion, latest 13th amendment to Annex 17 has been adopted by CAAN which basically deals with supply chain security of cargo items. Accordingly, now onwards all Cargo Handling Agents are mandatorily required to obtain CAAN approval . Both scheduled and non-notice audits, inspections, tests etc. are the part and parcel of AVSEC Department's regular quality control function. ICAO second cycle of AVSEC audit was conducted in November 2010 and Nepal has already submitted the Corrective Action Plan to ICAO and has, by now, implemented the majority of ICAO recommendations through newly formulated NCASP and AVSEC Rule(to be approved by Govt), 4 new SOPs, new Quality Control Program under formulation, 3 inline baggage x-ray equipment planned to be installed soon in future at TIA Airport, among others.

To facilitate the travelling passengers, hold baggage X ray machines have been installed at the Pokhara and Biratnagar airport. It is a relief for the air travelers at Pokhara airport with the installation of hand baggage X ray machine.

EFFICIENCY INITIATIVES

The RNP AR approach in Tribhuvan International Airport Kathmandu is one of the major achievements for efficiency for the airport and airline apart from the safety factor. Qatar Airways Airbus A320 has already started with the RNP AR approach in TIA and same is in progress for A330 and B737. RNP approach has already been established at Biratnagar airport and same is in pipeline for Chandragadhi and Dhangadhi airports in coming days. Newly introduced Automatic Message Handling System with has improved the message handling capacity. Some of the proposed air routes based on the PBN procedure in Nepal will greatly improve the efficiency of the pilots and controllers and congested airspace will be better used.

ENVIRONMENT INITIATIVES

Nepal is joining hands with ICAO in its initiatives in the environment issues, particularly in the aviation emission and noise. Nepal has prepared a national action plan and submitted it to ICAO. The better use of the PBN routes is believed to shorten the conventional routes thereby lowering the Co2 and NOX emission and help to save our environment.

MIGRATION TO GREEN AVIATION: AN ECO-AIRPORT PERSPECTIVE

Mahendra Singh Rawal
Dy Director General
CAAN Head Office

BACKGROUND

Aviation has now grown so much that environmental protection has become a mounting challenge for aviation regulators all over the world. Although much emphasis has been placed on the issues of aircraft emissions and aircraft noise, a new dimension has evolved in recent times with regard to environmental as well as economic sustainability of airports and aircraft operations. Due to rapid pace of airport constructions and tremendous increase in air traffic, environmentalists and designers in aviation have conceived a new design thinking , on the basis of which aviation in general and airports in particular have become worthy of being intervened with a new technological concept aimed to make airport sustainable and eco-friendly. So, besides the idea of environmentally sustainable aircraft operations, attention has also been given to experimenting a more innovative eco-friendly airport designs and provisions that could confirm to social need of sustainable aviation. The new innovative concept is called Eco-Airport, which could be a major contributor to making aviation the most eco-friendly, safe and sustainable social arena.

Nepal, being one of the most popular tourist destinations, has several pristine, vulnerable and exotic sites in remote areas of the country which are mostly accessed by air. Seen from the perspective of eco-tourism and eco-airport, it is prudent to think, well in advance, towards transforming the existing remote airports into eco-airports and developing new ones in similar mode in future.

WHAT IS ECO-AIRPORT ?

Eco-Airport adds new dimension to the conventional definition of airport. Apart from serving as platform for the emplaning and deplaning of passengers, goods and mail, an Eco-Airport is the one where measures can be taken to conserve the environment and to create a healthy environment in and around the airport. Therefore the fundamental blueprint for an Eco-Airport involves 7 factors, namely, Air, Noise, Vibration, Water, Soil, Waste, Energy and Natural environment. Importantly, an Eco-Airport is a double edged concept. It is more transformative in nature as it has two facets -- *Ecology and Economy.* It means - airport which is environment-friendly; and Environmental Policy/measures at or around the airports. Feature-wise, an Eco-Airport not only helps cut the operation costs by saving energy at airports, but also bolsters the image of a country (airport is the Face of a country). The benefits that an Eco-Airport offers are manifold. It is good for global warming, and regional environment together with airport operation and management. Its main motif is to detoxifying and cleaning deposits caused by air, water, noise and human behavior and mobility. Its significance and concern

is thus obviously associated with ecological and economic survival of our mystic tourist sites. Development of these attractions and corresponding airfields constitutes a very important aspect of Eco-Airport.

RELEVANCE IN NEPALESE CONTEXT

Relevance of Eco-Airport in Nepalese context is describable against several vulnerable factors such as climatic and atmospheric changes, Ecosystems, Eco-tourism, natural resources and livelihood. Nepal's climate change policy 2011 states that the country is responsible for only 0.025 per cent of carbon emissions in the world. Despite its low share in emissions, it stands to be disproportionally affected by climate change. As such millions of Nepalese are vulnerable to Glaciers Lake Outburst Floods (GLOF), droughts, intense rainfall and changing weather patterns. According to expert observation, Himalayan glaciers are melting at an accelerated pace due to black carbon deposits on the Tibetan plateau. The US government has also warned that this fast melting has close links to the incomplete combustion of carbon from major Indian and Chinese cities. Given these facts, Nepal, which is most at risk, could do well to embark on a challenging trilateral diplomatic initiative with regard to threat posed to mountain lives (The Kathmandu Post, 28 Nov. 2013). A cabinet meeting held at Kalapatthar has also adopted a 10-point Everest Declaration to draw international attention on effects of climate change on the Himalayas at an altitude of 5,242 meters surrounded by the world's highest peaks and glaciers.

The Hindu Kush Himalayan System forms a complex ecosystem of which mountainous Nepal is a part. The Hindu Kush Region is known as the "third pole" due to its inaccessibility and the amount of water stored in the form of ice and snow. As the source of ten of Asia's longest rivers, the Hindu Kush Himalayan Region is known as the "Water Tower" of Asia and is the source of life and livelihoods for over 1.3 billion people. In the recent years, the Hindu Kush Himalayan Region has begun to witness the degradation of forests, wetlands and rangelands brought about by population growth, migration, urbanization and climate change. Atmospheric changes are increasingly affecting the wellbeing of people and ecosystems in this region. Therefore, there is an urgent need to develop adaptation and coping mechanisms to prepare the nations and people of the region to manage these changes and take advantage of emerging technologies.

The third world is rich in forest resources and can benefit financially from carbon trade. However, as experts have pointed out, the real solution to climate change is not carbon trade but a switch to clean energy. For the short term, carbon trade can be helpful in addressing climate change to a certain extent while encouraging developing and least developed countries to invest in clean energies and pursue clean development.

Most of the airports/STOL ports in Nepal are located in the hilly mountainous region of the country. Some of them are located in the Himalayan foothills as high as over 12, 000 feet above sea level.

The grotesque facts and vulnerabilities stated above are also closely linked to Eco-Tourism, whose essential infrastructure of tourism is our airports in the hilly regions. Eco-Tourism is a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas intended as low impact and often small scale alternative to standard commercial (mass) tourism. The integral part of ecotourism is the promotion of recycling, energy efficiency, water conservation and creation of economic opportunities for local communities. Since ecotourism means conservation and community development, establishment of eco-airports can immensely contribute to the environmental sustainability and people's wellbeing. Where Ecotourism is the blend of economics and ecology, Eco-Airport is about economy and ecology.

INITIATIVES AND INDICATORS

ICAO has three environmental goals related to reducing the impact of aircraft noise, aircraft emissions on global climate and local air quality. In 2010, the 37th Session of the ICAO Assembly adopted two goals – improvement on fuel efficiency and check on the carbon emissions. As far as the case of Nepal is concerned, the new ATS Route L626 which is shorter by 21 nautical miles than the existing Route B345 has saved fuel consumption. Moreover, if the proposed Trans-Himalayan Routes -- Himalaya 1 and Himalaya 2 -- could be implemented, it would significantly contribute to environmental savings of tones of Carbon dioxide. However, the carbon footprint of Nepalese aviation needs to be determined. The carbon footprint represents an important policy tool to understand the sources and magnitude of Carbon dioxide emissions, identify areas for intervention, make comparison, formulate emission reduction policies and assess progress. In 2012, the DGCA of India has completed the first ever detailed carbon foot-print of Indian Aviation for the year 2011. Nepalese Civil aviation should also determine the foot-print by making carbon trading arrangement. In order to minimize the environmental impact of aviation it is crucial to work with the entire chain including aircraft and airport operations. Now the most important component that is directly linked to eco-friendliness and sustainability of aviation in Nepal is the development needs of airport under the Eco-Airport conceptual framework. In the 50th Conference of the Directors General of Asia Pacific Regions held in Bangkok on 1-4 July 2013, as well as in the 38th ICAO Assembly, Japan presented a discussion paper on Japan's Cooperation and Technology in Airport Sector including Eco-Airport. Although the paper shares Japan's cooperation to ASEAN countries.

Some Green Facts

- One of the world's most environment-friendly airports is Logan Airport in Boston, which is LEED certified by the US Green Building Council. Almost the entire terminal is made up of recycled materials from runways to the passenger areas. Plug-ins allow planes to generate electricity while boarding without having to use an auxiliary power unit.
- Denver International Airport, Seattle Tacoma Airport, Zurich airport, San Francisco International Airport, and East Midlands Airport in England are other major airports that have gone green.
- East Midlands Airport in England uses wind turbines to generate electricity to the tune of 100000 kilowatt hours annually, equal to 3 per cent of the building's energy needs.
- Since 2003, Japan has launched various initiatives to create hospitable environment at the airports under the motto of "Eco-Airport".
- The "Indonesian Green aviation Initiatives on Mitigation of Climate Change and Reduction of Green House Gas Emission" includes 3 such focus areas as *Green Flight, Green Airspace/Corridors, and Green/Eco-Airports.*

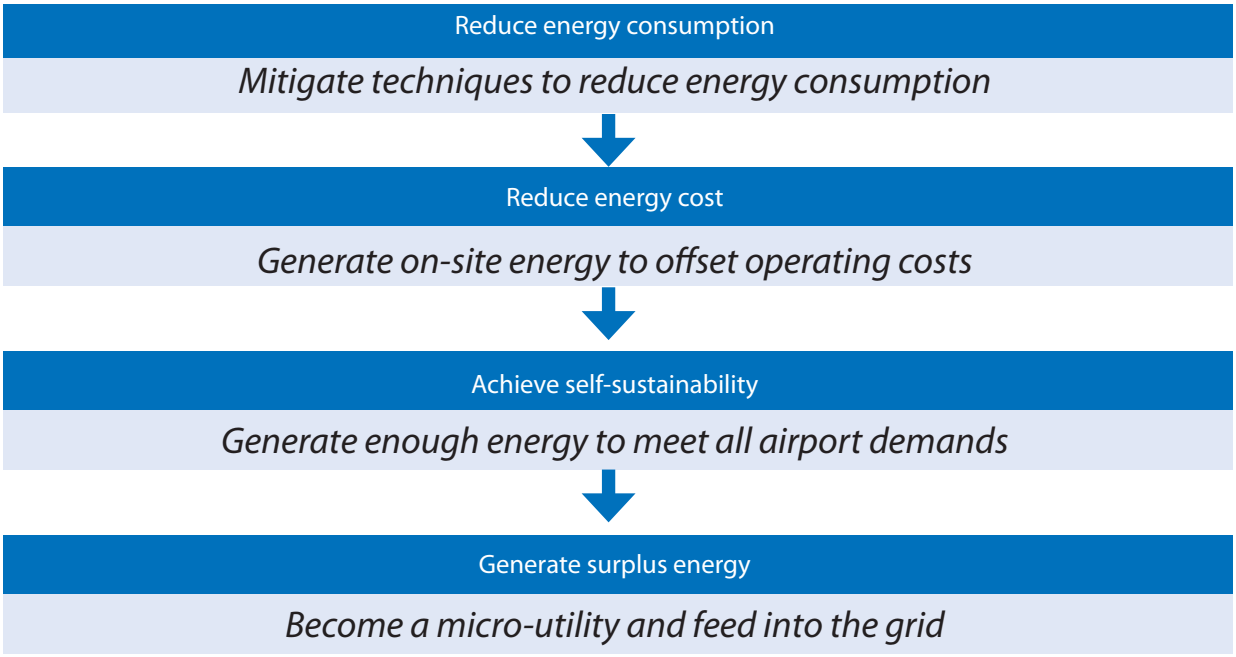
Since initial efforts require funding, the government should think of taking initiatives towards making airports eco-friendly. Though conceptualization of eco-airport began in 2003, it is gaining increased success in the application of scientific and technological innovations. Japan's assistance to foreign airports includes a wide variety of items, ranging from planning and construction of new airport, improving existing airport functions, providing support for the introduction of environmental measures and developing human resources of the airport sector. Airports

share a vision for sustainable and environmentally responsible aviation, one based on expertise, professionalism and service excellence. A large range of measures are in place to minimize environmental impact in terms of atmospheric pollution, noise, vibrations, water, soil, waste matter and energy. Eco-Airport is not only confined to airport design. Holistically, it encompasses supply and disposals, terminal building and parking, and surrounding environment. Some of these considerations are:

Building Energy Management System (BEMS), Waste water recycling, Geothermal and underwater heat harnessing for use, Water heat storage, NAS batteries, and Gas-based cogeneration. Similarly, for building and parking, considerable measures are Rainwater collected for use; Solar power generation, Reduced load on terminal building, Top lighting using natural light, Air-conditioning for occupied areas, Natural ventilation system, etc. Other surrounding measures include Minimized infrastructural facilities; Use of eco-materials, Restrictions on SOx, NOx, Greenery network, Ozone layer depletion factors, etc.

Airports are becoming more environmentally responsible while remaining competitive and economically sustainable. The evolving green movement is now well touchable to airports which are a major part of the urban environment and they must continue to find innovative ways to be green and become sustainable. In this perspective outlook for renewable energy is bright.

The four stages of green and renewable energy at airports are shown in the following chart:



A 4 Stage flow chart of green and renewal energy

CONCLUSIONS AND SUGGESTIONS

Air transportation in Nepal is still considered as the lifeline and catalyst of development, especially for the people living in the remote, mountainous regions of the country. It has bigger role to play for better connectivity inside the country as well as with rest part of the world. National air transportation development policy in the country

should always take into consideration the ICAO environmental initiatives and objectives. The air transportation system in the country should develop in a sustainable way taking into account the vulnerability of the mountainous ecosystem. Nepal has presented CO2 emission action plan to ICAO and has expressed its commitment to work on the mission to reduce Green House Gas emission from the aircrafts that are operated in Nepal. Nepal has also planned to reduce carbon emission by implementing direct ATS routes and implementation of Air Traffic Flow Management concept. Since Nepal is the world destination for culture and nature based tourism, it is embracing ecotourism for the sustainable development and poverty reduction in the fragile and important destinations like Rara National Park and the likes. Hence, Nepal should promote ecotourism and concept of eco-airport in a well concerted fashion to harmonize the development activities in sustainable manner. While developing tourism infrastructure like hotels, airports, roads, and others in such vulnerable areas, due attention should be paid to the local environmental issues and strive to maintain balance in socio-environmental economic process. Therefore, keeping in mind the environmental issues of that area, it would be more prudent to introduce the Eco-Airport concept for the development of airports in the country. In this context, some of the other airports like, Chandragadhi Airport in the far-east and Dhangadhi Airport in the far-west should be developed as model Eco-Airports, with gradual extension of the application of the concept to all other airports in the country, including TIA. Similarly, Japan's offer to share cooperation regarding Eco-Airport technology in various ICAO international forums may be worthy of being considered for green migration of our airports. Nepal should not lag behind joining hands with international agencies including JICA for the transfer of Eco-Airport technology in the up-gradation and development of airports in Nepal.

TIA Outside Departure Terminal

CHANGE PROCESS IN CIVIL AVIATION

Need For Caution

B.B. Deoja
Infrastructure Specialist
Former Secretary MOTCA
Former DGCA

BACKGROUND

Civil Aviation Authority of Nepal (CAAN) has since its birth 15 years ago withstood the turbulence of political changes and has come through on its own contributing to the growth of air traffic and liberalization of air services. It has now come to a stage where the single runway of the only international airport, the Tribhuvan International Airport (TIA), and the bowl shaped air space of the Kathmandu Valley are becoming serious constraints for further development of civil aviation, particularly concerning international air services to and from Nepal. These constraints may induce negative growth in international air services and tourism activity, if appropriate measures are not taken in time. CAAN had since its inception identified and advocated the need for a second international airport at Nijgadh about 76 km south of Kathmandu but the incessant political instability has dampened the priority for urgent and accelerated actions in this area. Privatization of the highly profitable existing international airport and separation of the regulatory functions from the airport operation and air traffic and air navigation functions are generally perceived as the obvious actions for urgent reforms even though the risks associated with hasty implementation of the adhoc plans in these areas could be quite high. Besides, pressure is building up on CAAN for assuming responsibility for the funding of secondary international airports such as at Pokhara and Lumbini without adequate homework on sustainability of CAAN whose only reliable revenue source is TIA. Ad-hoc planning and non-professional decision making thrive under unstable political climate. Imperfect handling of the change process in Civil Aviation may create bigger problems. It is beyond the capacity of CAAN to visualize and implement a long term national plan covering i) new international airports, ii) large scale public-private partnership on the existing airports, and iii) major restructuring of policy, safety, and service provider related civil aviation organizations in Nepal. Ministry of Culture Tourism and Civil Aviation (MOCTCA) has a very important role to play from the national perspective in order to ensure that decisions on such key issues are based on national vision and a framework of long term and mid-term plans. Since the MOCTCA itself is not structured and staffed to carry out such tasks in detail, it needs to address these issues through a panel of matured and independent expert-advisers and international consultants. The following discussion is aimed at alerting the decision makers on the need for appropriate change process in civil aviation in Nepal.

HISTORY OF CIVIL AVIATION

In the past 20 years, there has been 4 to 7 fold increase in the passenger and aircraft movements in Nepal. The budget has increased 8 fold whereas the revenue has increased 28 times. The following data presents a glimpse

of the developments in the civil aviation sector in Nepal.

- Air services in Nepal had started in 1950
- Civil Aviation Department, MWCT came into being for the first time in Nepal in 1957
- Civil Aviation Act 2015(1959AD)
- Nepal became member of International Civil Aviation Organization in 1960
- Air Traffic Control by India 1950 to 1971
- In 1983, from the MOWCT to MOT
- MOT to MOTCA in 1994-1999
- MOTCA to MOCTCA-MOTCA-MOCTCA during 2000 - 2013
- CAAN Act 1996
- DCA to CAAN in 31 Dec 1998
- Budget Rs 626 million in 1993-94 to Rs. 4,969 million in 2012 (2068-69). Ratio : 7.9
- Revenue Rs. 114 million in 1993-94 to Rs. 3,042 million in 2012. Ratio : 26.68 (average 92% per year)
  - non-aeronautical revenue = less than 20 % of total revenue
  - in profit since FY 2003-2004, profit in 2010-11 - Rs 740 million
  - TIA revenue NRs 2,764 million = 91 % of total CAAN revenue
- Pax 996,895 in 1991 to 4,283,872 in 2011. Ratio : 4.29
  - Intl 780,943 in 1991 to 2,700,027in 2011. Ratio 3.46 (7%/yr av)
  - Dom 215,952 in 1991 to 1583,845 in 2011. Ratio 7.33 (11%/yr av)
- A/C movement 19,285 in 1991 to 102,052 in 2011. Ratio 5.29
  - Intl 7,474 in 1991 to Intl 22,792 in 2011. Ratio 3.05
  - Dom 11,811 in 1991 to 79,260 in 2011. Ratio 6.71
- Air Seats 1.9 million1995 to 12 million per year both ways. Ratio : 6.3
- Total regular staff strength was 1065 in 2000 and is about the same in 2012. There are however, about 700 additional support staff working on contract basis.

OBJECTIVE OF CAAN

The preamble of CAAN Act 1996 defines the need for it as *"to develop and expand civil aviation in Nepal and to provide safe, regular, quality, and effective service in air flight, air communication, air navigation, and air transportation for the national and international air contacts".*

The purpose of the establishment of CAAN is stated in Article 3 of the CAAN ACT 1996 as "*to provide safe, regular, quality, and effective service in air flight, air communication, air navigation, and air*

transportation".

Article 4 of the CAAN Act states *that CAAN shall be an autonomous and corporate body with perpetual succession.*

Article 5 of the CAAN Act includes the following for the work, duty, and authority of CAAN, relating to **regulatory function:**

> Issue of AOC; licensing civil aviation training institute; approval of maintenance organization and licensing of the technicians, approval rating and licensing of air operators personnel; recognizing license and rating issued by ICAO member country or its authorized organization; registration of aircraft, issue of Air Worthiness Certificate; prescribing conditions for the use of aircraft for transport of goods and passengers; inspection of aircraft parking maintaining and overhauling place; overflight in the Nepalese air space, entry and exit of aircraft in the Nepalese air space, fixing air routes; provision of fire fighting and research and rescue service in the airport and the designated airport area; providing ground handling services; setting VFR and IFR conditions and preparation of aeronautical charts, and providing weather forecasting services; maintenance of its own aircraft for technical examination of air transport and related services; ATS, FIS, Alerting Service, ATAS, ATCS, air navigation service and facilitation, Area Control Service, Approach Control Service, Aerodrome Control Service; Setting standards of air communication, signals, and equipment; Noise control and environmental pollution control; transport of dangerous goods; Flight permission and fixing the duty hours of pilots; recommending the air fare to GON; use of airport, airport area and the services for proper use and maximum economic benefit; Implementing the SARPs issued by ICAO and ratified by GON; Insuring the assets of CAAN; Other activities directed by GON.

Article 6 of the CAAN Act includes the following for the work, duty, and authority of CAAN, relating to the **development and expansion of Air Transport Services:**

> Airport construction, rehabilitation, development, expansion, maintenance with prior approval of GON for new airports; operating air transport services; providing navaid- com and other equipment; use of latest and most modern technology in air transport service; development and expansion of national and international air routes; providing standard services to air passengers; high level training and studies in air transport services; works related to airport, airport areas, and civil aviation to support tourism industry ; other works related to above works.

Article 18 of the CAAN Act clearly provides for the adoption of **commercial principles** in executing its functions with due consideration of the interests and safety of the air service industry and air passengers.

COMMERCIALIZATION OF CAAN

CAAN Act provides for sustainability of CAAN through adoption of the commercial principles. Commercial principles for CAAN mainly implies recovery of costs since profit maximization cannot be the motto of an essential service organization like CAAN.

From the duties and responsibilities of CAAN as provided by the CAAN Act, it is necessary to first identify what areas can be covered by cost recovery principles and what areas need cross subsidy or government supports. Issues like whether the government agencies such as customs, immigration, police and intelligence need to pay

the rent charges for the space used by them inside the airport terminal and whether the expenses for police and army providing security at the airport needs to be borne by the airport operator/CAAN should be made clear.

Methodology for cost recovery needs to be established so that all criticisms and pressures can be consistently and logically responded and political and populist interventions to lower the charges below the level of costs incurred can be averted. Cost recovery can be achieved by calculating the life cycle cost for each and every item of service or by adopting a mix of aeronautical and non-aeronautical revenue so that any deficit in aeronautical revenue is made up with the increase in non-aeronautical revenue. In any case, the system of ad-hoc charge fixing should be replaced by a scientific approach of calculation of costs and establishment of charges.

Non-aeronautical revenue constitute 30 to 65 percent of total revenue in other international airports whereas it is about 13 percent of the total revenue in case of TIA. TIA is not yet a transit airport and has limitation for growth due to geographical location. Therefore the size of the total revenue shall soon reach a saturation and the contribution of non-aeronautical revenue cannot go beyond 30 percent.

PERFORMANCE OF CAAN

At present, the cost of regulatory services and the CAAN head office costs are borne out of the surplus revenue from the commercially viable airports. Similarly CAAN is bearing the cost for construction and operation of commercially non viable airports. Overall, it is seen that CAAN has proved sustainable because it is in profit since last 6 to 7 years. In the year 2010-011, the total revenue was Rs 2.72 billion and the net profit was Rs. 740 million. Revenue has increased about 28 fold since last 20 years. Traffic has increased by 346% for international and 733 % for domestic in the last 20 years. It is interesting to note that the approved staff strength has not changed in the entire 20 years though the trend of contract staff seems to be increasing.

CAAN seems to be running in profit because the staff size is not increased, salary and remunerations are not substantially attractive, major investment in nav-aid and ATS equipment has not been made, major investment in improving the level of passenger services such as furniture, toilet, telephones, IT facilities, rest rooms, air conditioning, transit facilities, day room etc are not made to the international level, and major investment in commercially non-viable airports are not yet incurred.

Despite growing traffic and geographical constraints of the only operating international airport, CAAN has coped up with the basic requirements in conformity with ICAO requirements, but there are now demands for further improvement of the level of aviation safety, security and passenger satisfaction of air transport services; and construction of several international airports. The findings of the Safety Oversight Audit , 2009 under the Universal Safety Oversight Audit Programme (USOAP) of ICAO have proposed a number of corrective actions in all the eight areas of critical elements of a USOAP. The eight areas of critical elements are primary aviation legislation; specific operating regulations; state civil aviation system and safety oversight functions; technical personnel qualification and training; technical guidance, tools and the provision of safety critical information; licensing, certification , authorization /and or approval obligations; surveillance obligations; and resolution of safety concerns.

CHALLENGES OF CAAN

Taking out civil aviation from regular civil service umbrella by creating CAAN about one and half decade ago was the first step towards professionalizing and corporatizing civil aviation agency covering regulatory, air navigation and air traffic service, and airport development functions in Nepal. While the growth in domestic and international air traffic in Nepal is an indication of the success of civil aviation agency, the challenge posed by the growth is considerable. The challenges currently facing CAAN are many, for example: i) growing work load in safety oversights and regulatory functions ii) saturation of TIA due to single runway and traffic congestions, iii) need for repayments on the investments and to make new investments on commercially non viable domestic airports, iv) pressure on investments for Pokhara, Lumbini and Nijgadh international airports, v) composition of the CAAN Board and lack of adequate proactive professional inputs from the CAAN Board, vi) lack of mid-term and long-term business plan, vii) growing interventions of the staff unions in the management of CAAN, viii) high rate of interests on grants and loans passed on to CAAN, ix) pressure from the private sector for a long term takeover of TIA without a proper value for money analysis by the public sector , x) inability of CAAN to optimize non-aeronautical revenue, for example, the failure to involve the private sector to operate the Cargo terminal completed more than a decade ago under Asian Development Bank Loan, xi) growing vulnerability of pressures and interventions on procurements, type certifications of aircraft and day to day CAAN functions and xii) inadequate professional and proactive supports from the concerned Civil Aviation Ministry.

The scope of CAAN in the CAAN Act, 1996 for the development of new international airports and new remote area airports now seems to be too much a burden for CAAN and a threat on the sustainability of the CAAN itself.

RISKS OF RESTRUCTURING

There seem to be interests from the national and international private sectors for the takeover of the operations of TIA on a long term contract based on PPP or BOT under the slogan of privatization even though in privatization, strictly speaking, there is no transfer back to the public sector and the ownership is fully transferred to the private sector. The profit of TIA is the main attraction. TIA is earning about Rs 3 billion per year and does not need investor for its capital works. What it needs is a high level of professional management. Privatization or PPP of TIA without rigorous analysis of a long term integrated business plan of all existing and proposed international airports, and the establishment of linkages and working relationship with the several public agencies such as civil aviation, customs, security police, army posts, intelligence agencies, ground handling agencies my eventually create many force majeure situations and risks transfer to the public agency. Excessive investment in TIA will be counter-productive because of the limitation of ground space for additional runway and the congestion of the bowl shaped air space over the TIA. Further investment in TIA will not be able to increase its capacity commensurately. It will never be possible to develop TIA into a modern airport city or an aeropolitan because of population density and physical constraints of Kathmandu. There are also recommendations from national and international agencies on separation of the regulatory and airport operation functions. This may lead to splitting of CAAN into Civil Aviation Safety Authority Nepal (CASAN) dealing with regulatory and safety oversight functions, and Airport Authority of Nepal (AAN) dealing with airports management, air navigation services, and air traffic services.

The split looks inevitable but a hasty split may create more problems for safety oversight and airport development. Shortage of funds for the would-be-CASAN to carry out regulatory functions to the international level as per

ICAO requirements/recommendations, and the vulnerability of the low paid staff of CASAN to collusion with the air operators and the airport operator could create major problems in safety standards, quality of services, and healthy growth of civil aviation. It may be noted that in India, the gross salary per month of the DGCA officers in 2011 was: DG IRs103,027, Deputy Director IRs 50,000 to 100,000, Airworthiness Officer IRs.55,000 to 93,000. The salary levels in CAAN are less than half of the salary levels in India.

For the probable Airport Authority (AAN), nature of problems shall be different for commercially viable airports such as TIA and 5 other domestic airports and commercially non-viable airports such as Pokhara International Airport, Gautam Buddha International Airport, Nijgadh International Airport, and 45 other domestic airports. The proposed AAN cannot be sustainable if resources are not allocated by the government for the development of the new airports. Attempts to divert resources from the TIA to other international airports would adversely affect the quality of TIA operation itself. In any case, an integrated AAN would likely be a hugely complex organization highly vulnerable to non-commercial and non-professional management unless exceptional statutory mechanisms are built-in to protect it from funding and management crisis.

Regarding PPP or BOT of commercially viable airport, the private sector may bring efficiency but will also have to maximize its profit and may not be able to make a desired level of timely investment. Supervising the private party, ensuring standards of services, and maintaining the level of investments required by a long term contract will be an extremely difficult task given the level of professional and ethical standards generally prevalent in Nepal. In the case of domestic privatization, the private sector company such as KUKL (Kathmandu Upatyaka Khanepani Limited) established about 5 years back has a negligible injection of equity or shareholding investment by private sector and is always hungry of government supports and investments. In case of foreign investment in a large undertaking in Nepal, the investor is likely to be dictating its terms at the cost of the value for money for the public sector. Such conditions defeat the very purpose of privatization and introduce a confusion and mismatch in the overall management of the PPP projects. Privatization or PPP in the absence of adequate value for money (VfM) exercise and proven good governance has the potential of creating bigger liabilities to the public sector and become detrimental to the very purpose of privatization.

Regarding the commercially non-viable airports, private sector involvement is very unlikely. They cannot be operated without subsidy from the government, otherwise they remain neglected. If they are not to be neglected or the private sector is to be attracted, the approach would be to identify the construction, maintenance and upgrading, and operation requirements for a twenty year period, assess the viability gap, and invite competitive proposal from the private sector for the government grant as equity support or annuity for 20 year period based on BOT or DOT. This approach is likely to give a lot of problems to the potential AAN in ensuring that the private party fulfills its commitment, particularly in case of remote area airports. Another approach for remote area airports would be to hand over the airports to the Army in a so called Civil Enclave model such as in India. Government support and stimulation through VGF modality is essential to improve the viability for PPP/BOT of all airports other than TIA and four domestic airports in Nepal.

The Ministry of Culture Tourism and Civil Aviation is the nodal Ministry responsible for the formulation of national policies and programmes for development and regulation of Civil Aviation and for devising and implementing schemes for the orderly growth and expansion of civil air transport in Nepal. Its functions also extend to overseeing airport facilities, air traffic services and carriage of passengers and goods by air. No matter how many autonomous bodies are created to regulate and mange civil aviation in Nepal, certain non-commercial functions, like accident

investigation, national aviation security committee, air service negotiations and agreements, and oversights of the performance of the autonomous bodies, remain with the government. The trends in the MOCTCA have been to involve more in operational aspects, business decisions and day to day activities rather than policy and oversight functions. It is the responsibility of the Ministry (MOCTCA) to oversee that the provisions of the CAAN Act are working well or need revisions and that the CEO and Board members of CAAN appointed by the Ministry are performing to the expectations of the CAAN Act. MOCTCA now needs to be more proactive than ever before.

If the restructuring is done without adequate homework, the development civil aviation in Nepal may be affected adversely because except, TIA and six domestic airports, no other airport is commercially viable. TIA is the only source of income that funds the administration and management of CAAN headquarter, the civil aviation academy, air worthiness regulations and aviation safety oversight activities, participation in ICAO and other international meetings, seminars and conferences.

Before any restructuring of CAAN or a major commitment by CAAN for the loans for construction of new international airports constructions, the MOCTCA must find answers to the following questions and make necessary legal and structural provisions.

- Is it necessary to seek private sector investors for TIA improvements since TIA is already earning surplus revenue and is receiving soft loans from Asian Development Bank ? What kind of PPP would be most appropriate for TIA?
- Will not the introduction of a private sector for a long term PPP in TIA encourage delays in the start of Nijgadh International Airport construction which is more urgent from Nepal's tourism growth potentials?
- Are there well laid out vision plans of the GON for the development of civil aviation and airports in Nepal?
- Are there duly approved medium term and long term business plans for CAAN based on the vision plans of the Government?
- Is adequate resource for regulatory and safety oversight functions assured?
- Who is going to pay the gap between repayments and revenue for the Pokhara, Lumbini, and Nijgadh international airports and the politically demanded new domestic airports ?
- Are there existing guideline for cost estimating of Design and Build, EPC, and PPP contracts?
- Are there standard Bidding Documents developed for a EPC, PPP or BOT models procurement of Airports?
- Is there a capacity to assess the value for money in preparing a PPP project for the airports?
- Is there a mechanism or instrument or panel of independent experts guiding GON to develop the scope of works, appropriate concession agreement, and a complete bidding document in the PPP/BOT programs?
- What safeguards are taken in mitigating the risks of excessive claims and arbitration awards as seen in the trends in major ICB contracts in Nepal.
- What is the safeguard against the politically influenced decision making by the CAAN Board or the proposed new organizations?
- Does the proposed organization have fully built-in and competent groups of proven professionals in the field of infrastructure development?

- Are the long term national interests properly addressed by the traditional approach of staffing, human resource deployments and mobilization of consultants? Is there a body of matured and independent professional advisors to oversee the fulfillment of long term national interests in the traditionally developed plans and projects?

PRIVATIZATION

Privatization is necessary to attract private investment, improve the level of services, and decrease level of charges. These are believed to be possible due to creativity, innovativeness, technical and managerial experience, financial capacity and efficiency of the private sector. But the task of defining the scope of work, developing a proper agreement, and monitoring the implementations is crucial for a successful privatization. A basic assumption in the success of privatization is that there is a healthy competition in the market and there is good governance in the country. A wholesale privatization such as full transfer on BOO (build own operate) basis is not possible for international airport such as TIA due to strategic concerns. Private sector participation based on PPP/BOT/DOT is very risky if the capacity to design and implement a PPP/BOT does not exist and that makes it even worse if the political instability is persisting. Good governance is a most essential precondition for a success of major PPP program.

The notion of privatization as a remedy for lack of funds or for the projects not viable commercially is incorrect. If the private sector cannot make money it is not going to come to invest. Therefore for a successful privatization it is first necessary to make the project viable. The objective of privatization is to increase the value for Money. Depending upon the size of investment required, it may sometimes be necessary for the government to help the private sector with investment supports such as the viability gap funding (VGF). If investment is not a factor, management contract could be the best form of private sector participation for airports like TIA.

AIRPORT DEVELOPMENT AUTHORITY (ADAN)

A separate Authority called Airport Development Authority of Nepal (ADAN) may be created under an Ordinance to build the three new international airports namely, Nijgadh International Hub Airport, Pokhara International Airport and Lumbini International Airport and future domestic airports. The sources of funds shall mainly be the GON funds or foreign grant or loan funds. The probable ADAN could involve private sector participation based on the BOT system using competitive proposals for the Viability Gap Funding (VGF) grants or annuity payments or government share holding or a combination of these support mechanism. CAAN may have the freedom to buy some share in the investment programs of the Airport Authority.

The maintenance and operation of the commercially non-viable domestic airports may also be done by the proposed ADAN on the DOT basis supported by VGF or through the Nepal Army. Budget for the VGF needs to be provided by the GON in its annual budget.

RESTRUCTURING CAAN

For now and until another 10 to 15 years it would be ideal if CAAN continues to carry out regulatory functions and flight safety oversights, manage the civil aviation academy, and operate the TIA and the five commercially

viable domestic airports. The air traffic services and air navigation services could be handled for all airport by TIA. The TIA operations and improvement may be done through one or several international management contracts, with clearly defined outputs, standards, base revenues, and incentives as a percentage of the revenue for the revenue above the base revenues, covering air traffic services, air navigation services, ground services, aeronautical communication services, fire and search and rescue services, and engineering. Local counterparts must be associated with each contractor for a complete technology transfer at the end of the Contract. The improvement and operation of the commercially viable domestic airports may be based on competitive proposal for a management contract or a DOT. The regulatory and flight safety and aviation security oversights functions can be separated within the CAAN itself. Separate organization such as Airport Development Authority of Nepal (ADAN) is needed to handle the other international and domestic airports. Civil Aviation Safety Authority (CASA) and TIA Authority may be created under the CAAN. Each of the five commercially viable domestic airports may also be treated as an independent body under the CAAN umbrella. Full time Board members without conflict of interests is necessary to ensure due focus on proper implementation of all aspects of the objectives of CAAN.

URGENCY AND PRIORITY

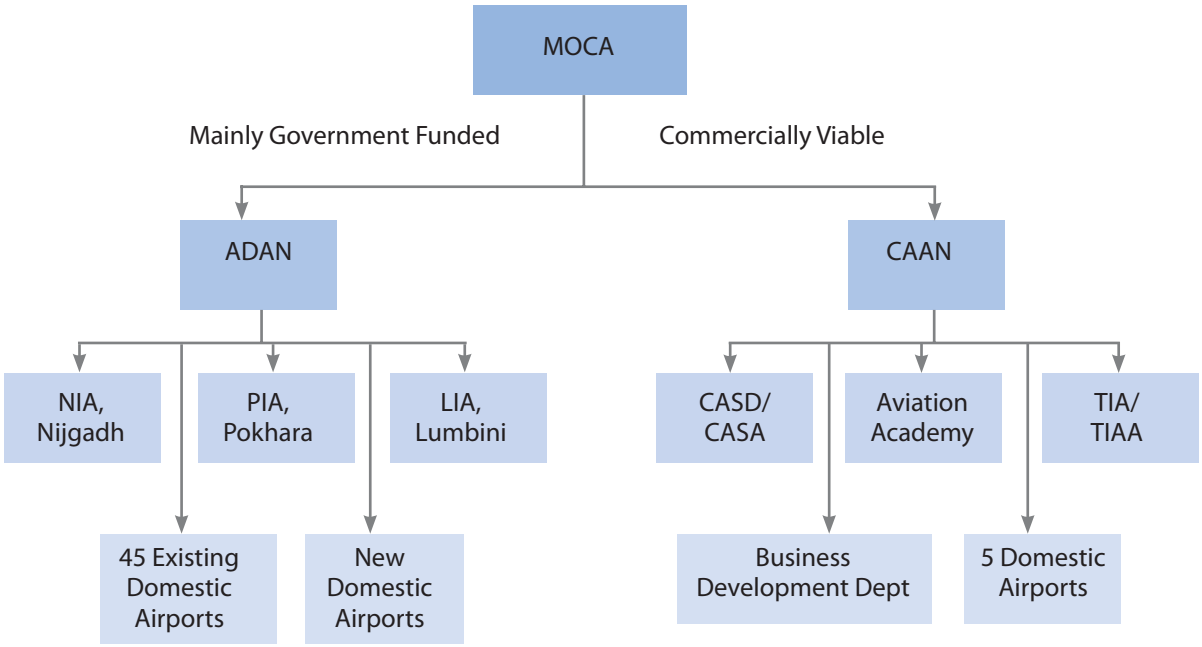
Secondary international airports such as Pokhara International Airport and Lumbini International Airport cannot be substitute of the TIA because of their inherent constraints of location, limitations for expansion, and narrow air space. TIA is already at saturation and has no room for continuing expansion. Therefore urgent action is needed to start the construction of a new primary international airport at Nijgadh(NIA), if tourism and potential of the aviation sector for its contribution to the development of Nepal are to be fully exploited. A PPP approach could be considered for the NIA but the possibility of attracting major foreign investors is very low as it can be observed from the attempts for a PPP/BOT bid invitation for the Kathmandu-Nijgdh-Pathlaiya Expressway just a few months back. There are many approaches that could be adopted for making the PPP for NIA successful. For example, i) BOT based on forty percent government funding through 25 % equity and 15 % VGF grant; or ii) Annuity based BOT with 20 % government grant for construction; or iii) an EXIM bank loan and an EPC Contract and a separate contract for operation. It will be necessary to ensure that the Kathmandu - Nijgadh Expressway (KNE) is completed not later than the NIA. An integrated package of NIA and KNE would be more appropriate and attractive to the private investor if the government support of 25 % equity and 15 % VGF is applied for both the Airport and Expressway. Any attempt to pump in over investment and privatize TIA for a long term will amount to deferring of NIA and restricting the growth of aviation and tourism in Nepal. A combined PPP package for NIA and TIA could be considered but this will have the effects of slowing down NIA and de-motivating the CAAN staff and local capacity building.

Primary International Airport at Nijgadh and the Expressway connecting it with Kathmandu is undoubtedly the only realistic vehicle for accelerated economic growth of Nepal and they must receive the highest national priority for their completion in the next 5 to 7 years. The real change in civil aviation plans, policies and organizational structures shall be believed to have occurred only when the change facilitates the implementation of such infrastructures in a fast track mode.

INDICATIVE REORGANIZATION

The following organization chart presents a conceptual restructuring of Civil Aviation agencies in Nepal.

Indicative Restructuring of Civil Avialtion and CAAN



MOCA - Ministry of Civil Aviation; ADAN - Airport Development Authority of Nepal; NIA - Nijgadh International Airport; PIA Pokhara International Airport; LIA - Lumbini International Airport; CASD - Civil Aviation Safety Department; CASA - Civil Aviation Safety Authority; TIAA - Tribhuvan International Airport Authority;

TIA/TIAA may also serve as a central Air Traffic Services and Air Navigation Services organization for all present and future airports.

Jomsom Airport

SAFETY ENHANCEMENT THROUGH ENVIRONMENT PROTECTION AROUND AN AERODROME

RR Dali
Former Director General, CAAN

BACKGROUND

All aircraft flying over the territory of a state needs to follow *rules relating to the flight and manoeuvre of aircraft,* as stipulated in International Civil Aviation Organisation (ICAO) Annex-2, for the protection of persons and property on ground. Similarly, no hazard and obstruction that endanger lives and property of the aircraft operation should be present at and in the vicinity of an aerodrome. ICAO has published guidance materials in the form of annexes, manual, documents and circulars to regulate the Civil Aviation activities worldwide. Contracting States are encouraged to use the text of those documents in national regulation including any additional local regulations that are important for the safety or regularity of air navigation.

The tremendous growth in air traffic around the world during the 21st century has created enormous challenges to maintain safety standards for airlines and aerodrome operators. Similarly the population growth has developed people's natural trend of moving for their settlement towards the open area near aerodromes. These scenarios have created a great impact in encroachment of and non conforming use of such land, which are hazardous to air traffic movements. Due to these reasons, lots of emerging obstructions have reduced the size of the area available for the landing, taking-off and maneuver of aircraft in an aerodrome.

An aerodrome requires huge area of open land and the safety enhancement challenges need to be planned and managed properly. So time has come to initiate some action plan for survey and protect environment around aerodrome area. It is therefore necessary in the interest of the public health, public safety, and general welfare that an organization be established to regulate the environment of an aerodrome and its surrounding areas for safe regular and economical air transportation.

It is further required that effective procedures should be implemented for the control and prevention of pollution generating source, elimination, removal, alteration, mitigation, or marking and lighting of existing aerodrome hazards. As a last resort, for the elimination of such non-conforming activities, it is necessary that even acquiring land or property around the aerodrome should be considered.

FACTORS AFFECTING ENVIRONMENT AND SAFETY

As the aviation industry grows, the impact of air traffic operations on the global atmosphere becomes more difficult to protect from noise and air pollution. On the other hand due to increase in settlements of people near the aerodrome area the non-conforming land use by them has created obstacles which has jeopardised safety.

To overcome these problems the location, size and configuration of the aerodrome need to be co-ordinated with the patterns of residential, industrial, commercial, agricultural, and other land uses of that area. The effects of people, flora, fauna, atmosphere, water courses and other facets of the environment on the aerodrome should be taken into consideration for safety operation of aircraft. In addition, the expectation of future extensions of social and economic activities, together with the environmental effects around the aerodrome must be evaluated. This will ensure that the aerodrome environs are compatible with the aerodrome and conversely, that the physical development and use of the aerodrome is compatible with the existing and proposed patterns of land use.

The need for control of the land in the vicinity of an aerodrome was recognized usually as height control of possible hazards or obstructions to flight into or out of aerodrome. Later on, the growing population around aerodrome created new concern for their life style, which has been identified as new environmental obstructions. This situation has created the need for applying certain type of control over such non-conforming use of land. Some of the activities are listed below:

- Use or installation of equipment which would cause electrical interference with radio communications and navigational aids,
- Installation of any light which might confuse pilots in the clear interpretation of aeronautical lights or result in glare in the eyes of pilots,
- Creation of different types of smoke which reduces visibility,
- Aircraft noise and aircraft engine emissions have significant influence on atmosphere,
- Natural or man-made obstacles penetrated specified limit above aerodrome level,
- Any activity which might attract birds and wild animals,
- Agricultural use or any other industrial activities which might affect aircraft operation.

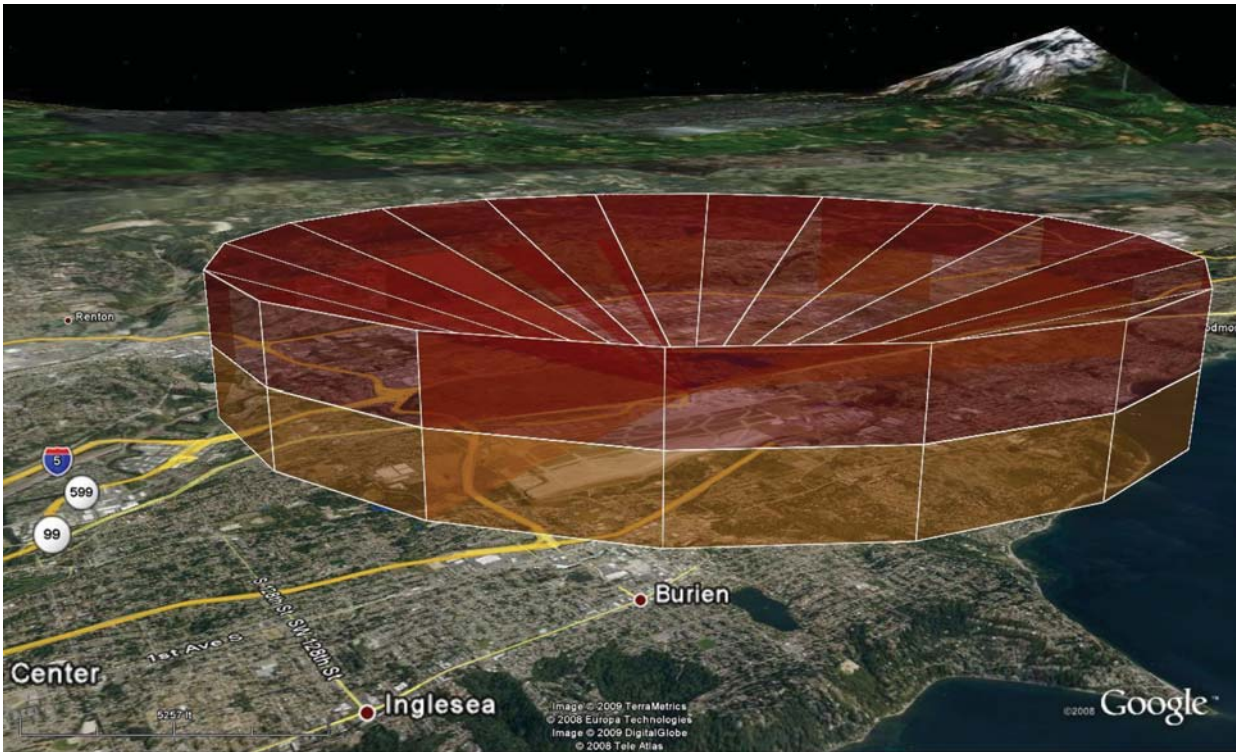
Annex 16 (Volumes I and II) deals with the protection of the environment from the effect of aircraft noise and aircraft engine emissions. Aircraft noise was already a matter of concern to general public residing near aerodrome area and this concern increased with the introduction of the first generation jet aero planes in the early 1960s. In 1971, the Assembly adopted another resolution recognizing the adverse environmental impact that may be related to aircraft activity and to the achievement of maximum compatibility between the safe and orderly development of civil aviation and the quality of the human environment.

Future concerns about the role of aviation in both climate change and local air quality are largely due to the projected continued growth in this sector. While past technological improvements have reduced the growth rate of emissions, the total emissions will continue to increase. To address this issue, implementation of CNS/ATM systems under the Global Plan will generally provide benefits in three areas: improved aerodrome capacity that reduces delays at congested aerodromes, shorter cruise times through the use of more direct routes, and an increase of unimpeded taxi times. These benefits will have substantial fuel savings and aircraft emissions reductions for improvements in local air quality.

METHOD OF PROTECTION

Environment protection is a worldwide concern which requires to be addressed timely by the concerned authority before it is too late to control. Now-a -days pollution reduction is everybody's concern. So it has been shown keen

interest by government and non government organisations of international, regional and national level so that a proper step is taken to limit the pollution. We have highlighted some of the measures taken in the field of Aviation. The zoning system when applied for aviation activities also solve immediate problem of environmental encroachment. The following photo shows an example of protection of airspace and ground encompassed by the airspace. This is an example of zoning of approach plan for aviation purpose.



Environment Protection around Aerodrome (Approach Plan)

INTERNATIONAL

Needless to say, pollution has increased along with the growth in air traffic volume particularly, with the introduction of commercial turbojet aircraft operations in aerodromes. Furthermore, in recent years there has been increase in public awareness regarding environment protection and public opinion has emphasized the need of applying effective measures to abate aerodrome, urban and industrial pollution. Since hazards to environment are generated within and in the area surrounding the aerodrome, environmental controls should be applicable to the aerodrome and its environs so as to enhance safety for air traffic.

Since pollution is also hazardous to public health and misbalances the ecology of the environment, controls are frequently necessary to either curb pollution at its source or to reduce its effect. Controls take different forms such as: aircraft engine noise limits, obstacles limitation, aircraft and ground vehicle engine emissions standards and any activities which might affect smooth operation of aircraft. Through the application of these measures and in conjunction with land use planning, aerodromes maybe located and operated so that they fit harmoniously into their local community.

ICAO has published documents which provide the guidance for land use planning in the vicinity of an aerodrome. Some of the points raised in the documents are as follows;

- to provide for aerodrome needs, e.g. obstacle limitation areas, future aerodrome development , etc; and
- to ensure minimal interference to the environment and the public e.g. by locating residential areas away from zones subject to excessive noise or other pollution, by preserving parklands etc.

And in order to prevent the aerodrome environ through land use planning, ICAO has suggested adopting aerodrome zoning regulations which will impose reasonable requirements and restrictions that are necessary to effectuate the purposes by considering followings factors:

- The type of flying operations expected to be conducted at an Aerodrome;
- The nature of terrain within the aerodrome hazard area;
- The character of surrounding neighborhood; and
- The uses to which the property to be zoned is put and adaptable.

The aforementioned factors must be shown on the "Aerodrome Layout Drawing" and "Aerodrome Airspace Drawing," collectively referred to as the Approach Plan (see photo above). This Approach Plan should be considered as the official map to be used in determining those areas that require special aerodrome height regulations and use restrictions.

If in case any nonconforming structure or tree is required to permit the installation, operation, and maintenance, then as specified in Annex-14, marking and lights shall be displayed to indicate to the aircraft about the presence of aerodrome obstruction. This implies that permit is required for land use and erection of any structures near by aerodrome area as specified by appropriate authority.

Thus uniform application of ICAO guidance is that the land uses in the vicinity of aerodromes must be reserved for compatible purposes. Then only depending upon the evaluation of aerodrome hazards which are adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating, the aerodrome will be designed for appropriate instrument and visual operations.

NATIONAL

In Nepal the environment protection requirement has been recognised during the establishment of Civil Aviation Department through the Civil Aviation Act in the year 1959.Later on during May 1960 Nepal became the member of ICAO, which provides proper guidance to regulate the operation of Civil Aviation within their member states through the publication of annexes, manuals and documents. But its implementation is still weak because of lack of establishment of proper controlling authority.

The CAAN act 2053 has specified the responsibility of CAAN to control the sound of aircraft and to restrict pollution in air and the environment due to aircraft operation which is in accordance to the ICAO Annex-16. Similarly if any obstruction or hazard is identified around the aerodrome, CAAN has to impose restrictions on constructing, erecting or increasing the height of any building, house, shed, tower, pillar, tree or any other thing taller than the specified height mentioned in ICAO Annex-14. The method of controlling such hazards is to remove or lower the height or shift such hazardous obstacles to those places where it will not be an obstacle to aircraft movement. But if such obstructions are immovable or permitted to remain at the place by appropriate authority then those obstacles should be marked or lighted as per International standard. So it is essential that in Nepal there should be national regulation to prescribe the terms and condition to be complied for controlling the environment and must survey regularly for restricting non conforming land use in the vicinity of aerodromes of Nepal. This will enhance the safety of aircraft operation in the aerodromes.

Similarly Civil Aviation Regulation, 2058 has enacted some of the topics regarding the management of solid waste and has specified that no person shall store and throw solid wastes openly around at least within three kilometre area of the aerodrome which may pollute the environment. In the same way it has provisions related to the protection of Cultural Heritage, Airspace and environment.

So subject to the provision of prevailing act and regulation, CAAN may issue necessary order or instruction to the concerned body, organisation and persons for the execution of Annex, Manual and Documents or any part thereof, issued by the International Civil Aviation Organization.

With this vision now time has come to establish the authority to implement and develop awareness program to general public for the protection of environment for their health and at the same time to maintain safe operation of air transportation in Nepal.

CONCLUSION

Considering the theme topic of protecting environment in and around aerodrome we need to understand the challenges faced by the civil aviation to maintain the balance between the natural environment protection and the environment hazard created which might jeopardise the safety operation of aircraft. On one hand the growth of aircraft operation has polluted atmosphere which may affect public health. On the other hand, non-conforming use of land and obstacles in the vicinity of aerodrome to facilitate air transportation for people has jeopardised the safe operation of air traffic.

So we have some conclusion derived below:

- The planning of aerodrome zoning should be established with the proper coordination with all concerned authority of government and local community.
- The land use plan should be published for restriction of activities which might affect the safety of aircraft.
- For the protection from the hazard of birds and wild animals, the area of 13 kilometres from the aerodrome must be kept clean from land fill site and similar activities.
- Public awareness program should be launched regularly by aerodrome operator for local public welfare and safety requirement of aircraft.
- By implementing CNS/ATM plan in Nepalese territory a direct international route may be established over Nepalese airspace which will contribute in reducing flying time and also reducing aircraft emissions, thus supporting ICAO Annex-16 for environment protection.
- The organisation should be established nominating officials from concerned authority for reducing the environment pollution and enhancement of safety.
- Regular dissemination of issue of regulations / restrictions regarding environment information should be carried out as per ICAO Annex-15 and the affected organisation or person should be given opportunity for their claim.

REFERENCE

- CAAN Act,2053
- CAAN CAR ,2058
- ICAO Annex-16
- ICAO Documents

HUMAN FACTORS IN AVIATION SAFETY

Mohan Adhikari
Former Acting Director General, CAAN

Safety of civil aviation is the primary objective of the International Civil Aviation Organization (ICAO). The persistent effort of international community has been meaningful in the achievement of considerable progress in increasing safety, and consistent efforts are under way for additional improvements. The international Standards and Recommended Practices (SARPs) set forth in ICAO Annex 13 to the Chicago Convention and related guidance material, has assisted States in the accident investigation and prevention purpose.

Nepal as a Contracting State of ICAO is obliged to maintain a required level of safety through the adherence to international safety standards and recommended industry best practices. The adoption of liberal sky policy by the Government in 1992 was instrumental in breaking the monopoly of the then RNAC. Consequently, number of private operators started their airlines business in a short span of time, resulting significant increment both in the number of aircraft and passengers. However, we are bound to accept the bitter fact that Nepal couldn't establish encouraging safety records since its start and sadly, aircraft accident rates in the immediate past is further discouraging.

Usually accidents require the coming together of a number of enabling factors, each one necessary, but in itself not sufficient to breach system defences. Major equipment failures, or operational personnel errors, are seldom the sole cause of breaches in safety defences. Often these breakdowns are the consequence of human factors including failures in decision-making. The breakdowns may involve active failures at the operational level, or they may involve latent conditions conducive to facilitating a breach of the system's inherent safety defences. It is apparent that most accidents include both active and latent failures.

Human factor is the scientific study of the interaction between people, machines and each other. It refers to environmental, organizational and job factors as well as human and individual characteristics which influence behavior at work in a way which can affect health and safety. A simple way to view human factors is to think mainly about three aspects: the job, the individual and the organization and how they impact people's health and safety-related behavior. Human factors issues can be perceived as difficult to deal with because involved human beings do not behave according to mathematical models.

Irrespective of giant strides in technological advancement, it appears that hundred percent reliance on technology without human involvement is still far remote. While we cannot prevent humans from making errors, our endeavours can certainly reduce the frequency and minimize the consequences. Errors and violations having an immediate adverse effect can be viewed as unsafe acts. These are generally associated with front-line personnel (pilots, engineers, controllers, mechanics, dispatchers etc.). These unsafe acts may penetrate the

various defences put in place to protect the aviation system by the regulatory authorities, the service providers, concerned company management and other people far removed in time and space from the accident.

The unsafe acts may be the result of normal errors, or they may result from deliberate violations of prescribed procedures and practices. It has been recognized that there are many error-producing or violation-producing conditions in the work environment that may affect individual or team behaviour. These unsafe acts are committed in an operational context which includes latent unsafe conditions. A latent condition is the result of an action/inaction or decision made well before an accident or incident, though its consequences may remain dormant for a long time. Individually, these latent conditions may not appear harmful, since they are not perceived as being system deficiencies.

Front-line operational personnel can inherit defects in the system, such as those created by poor equipment or task design, conflicting goals, defective organizations, less prudent management decisions or lack of safety culture. Effective safety management efforts aim to identify and mitigate these latent unsafe conditions on a system-wide basis, rather than by localized efforts to minimize unsafe acts by individuals. Such unsafe acts may only be symptoms of safety problems, not causes.

In aviation, many incidents occur every day which may or may not require reporting by the investigation authority; some come very close to being accidents. Because there is no injury or little damage, these incidents might not be investigated. The need for an investigation by either the investigation authority or the concerned entity must be given due attention. As incidents or even simple occurrences may be harbingers for catastrophic accident, aviation entities must take into consideration that an occurrence or incident investigation can often produce better accident prevention results than can an accident investigation.

According to the ICAO Accident Prevention Manual, accident prevention must aim at identifying all hazards in the system, regardless of their origin. Apparently, if we are to prevent accidents and lessen incidents or occurrences, follow-up action must be taken in response to the hazards identified in the course of accident and incident investigations. By doing so, we can learn more from these experiences and implement new and better measures to prevent unwanted repetitive occurrences. ICAO Annex 13 also places considerable emphasis on such accident/incident prevention measures.

The worldwide casual factor of aircraft accident breakdown is as follows;

Weather-12% Sabotage-9% Total pilot error-50% Maintenance-21% (this also has a big contribution on human error) other human factor-7% others-1% . Thus, worldwide accident data empirically denote that human factor is the number one factor in accident causation. Though perfect analysis is lacking, one fact is certain that human factor share in Nepalese context exceeds the world average. However, it is a pity that due attention has not been paid in our context.

Regardless of the actual percentage, there is little disagreement among government and industry experts over the importance of human factors as a primary element in the causes of accidents and incidents. In spite of this knowledge, and the notion that "to err is human" progress has been slow in adopting a uniform approach to the investigation of human factors in aviation occurrences. When no tangible technical evidence is found to explain the occurrence, investigators and their authorities sometimes find it difficult to deal with human factors issues. The usual trend is when investigators rule out everything except the pilot, the cause becomes pilot factor and Nepal with too little attention on human factors issues has no other choice.

While human performance is cited as prime causal factor in the majority of aircraft accidents and incidents, the investigation of human factors should be an integral part of the entire investigation and its resulting report. It must be well realized that humans do not act alone. They are but one element of a complex system. Often, the human is the last barrier that stops the sequence of events from causing an accident. However, when events combine and interact together to cause a catastrophe, the investigation authority must ensure that all elements of the complex system are investigated to understand not only **what** happened and **when**, but also reveal **how** and **why** the accidents occurred.

It is being realized that except few exceptions, most attempts at error management in the field of aviation have been piecemeal rather than planned, reactive rather than proactive, event-driven rather than principle-driven. They have also largely ignored the substantial developments that have occurred in the behavioural sciences in the understanding of the nature, varieties and causes of human error.

Finally, in view of the growing complexities of aviation, it is axiomatic that investigators must be knowledgeable of and skilled in the application of Human Factors principles and sound data-gathering and analysis techniques. It is also obvious that the expansion of human factors awareness presents the international aviation community with the single most significant opportunity to make aviation both safer and more efficient. Hence, if the accident rate is to be decreased, human factors issues in aviation must be better understood and human factors knowledge more broadly and proactively applied. Nepal with discouraging safety records must pay significant attention in this regard.

Bharatpur Airport

IMPLEMENTING VHF DATA LINK SYSTEM IN TIA

Surya Bahadur Thapa
Director, CAAN Head Office

INTRODUCTION

Tribhuwan International Airport (TIA) is the only International Airport in Nepal and main gateway by air route. More than 85% of the tourists arrive in Nepal by air. Thus TIA is the first destination of tourists in Nepal. For the success of Government Policy to attract more than one million tourists in this country, we have to increase the facilities for passengers, introduce suitable technologies developed in Aviation Industry through identification of new touristic area with full security and facilities and enhance aviation safety and security.

ACARS (AIRCRAFT COMMUNICATION ADDRESSING AND REPORTING SYSTEM)

In an effort to reduce crew workload and improve data integrity, cockpit of the aircraft is provided with the data communication facilities called ACARS (Aircraft Communication Addressing and Reporting System). It is a digital data link system, a complete air and ground system, for transmission of short, relatively simple messages between aircraft and ground stations via radio or satellite based equipment on the place. A person or a system on board may create a message and send it via ACARS to a system or user on the ground, and vice versa, Messages may be sent either automatically or manually. ACARS is currently used by many civilian aircraft and business jets. It can be regarded as "email for airplanes" as the registration of each aircraft is unique and is used as aircraft's address in the system. The majority of ACARS messages are typically only 100 to 200 characters in length.

Prior to the introduction of data link, all communications between the aircraft (i.e., the flight crew) and personnel on the ground (airline bases, ATC controller) used to be performed using voice communication. Such communication used either VHF or HF voice radios, which was further augmented with satellite communication.

Data Link communication between airline control centers and aircraft is extremely important for the efficient operation of the global air transportation systems. The data messages are exchanged between the cockpit of commercial aircraft and the airline offices and the control tower as well.

TYPES OF ACARS MESSAGES

ACARS messages between ground-based organizations and the cockpit may be of three types:

- Air Traffic Control (ATC) messages.
- Aeronautical Operational Control (AOC) messages.
- Airline Administrative Control (AAC) messages.

ATC messages such as ADS, CPDLC and D-ATIS (Meteorological report) type of messages are used to communicate between the aircraft and Air Traffic Control. This system is used to handle these air traffic control messages faster and more accurately than voice communication. ATC messages are used sometimes by aircraft crew to request clearances, and by ground controllers to provide those clearances.

AOC and AAC messages are used to communicate between the aircraft and its base. Various types of messages are possible, and these include fuel consumption, engine performance data, and aircraft position, as well as free text data. So data link communication is generated at every phase of the flight.

Airlines also began adding new messages to support new application (Weather, Winds, Clearances, Connecting flights, etc), and ACARS system became customized to support airlines with unique applications and unique ground computer requirements. This results in each airline having their own unique ACARS application operating on their aircraft.

MESSAGE FLOW MECHANISM

In the aircraft, the ACARS terminal or Management Unit (MU), is located in the cockpit of the aircraft. Other messages can be sent by the pilot by selecting commonly used menu option or by directly typing a free message similar to an e-mail message. Messages are transmitted and received from the aircraft at a radio frequency range of 117.95 - 137MHz.

The Ground station directly receives and transmits messages for the aircraft. The ground station may have several radios installed for transmitting messages simultaneously to aircraft operating on different frequencies.

On the aircraft, the ACARS system is made up of an avionics computer called an ACARS Management Unit (MU) and a Control Display Unit (CDU). The MU is designed to send and receive digital messages from the ground using existing VHF radios.

BENEFIT OF ACARS MESSAGES

The following examples summarize the use of ACARS by aircraft:

- Take off and landing times automatically sent to the airline office by the avionics of the aircraft.
- Weather reports requested by the pilot.
- Pre-departure clearance information sent to the aircraft by air traffic control.
- Engine performance data automatically generated by the aircraft and enable airline to better monitor their engine performance and identify and plan repair and maintenance activities.
- Request for special ground services upon landing.

ACARS DATA LINK COMPONENTS

There are three major components of the ACARS data link system.

- Aircraft equipment.
- Service provider
- Ground processing system

The heart of the data link system on board the aircraft is the ACARS Management Unit (MU). This equipment consists of the airborne end system and a router. End systems are the source of ACARS downlink and the destination for uplinks. Its function is to route a downlink by means of the most efficient air-ground sub-network. One of the typical airborne end systems is the Flight Management System (FMS).

There are currently two primary service providers of ground networks in the world, ARINC and SITA. ARINC operates a worldwide network and has also assisted the CAAC in China, as well as Thailand and South America with the installation of VHV networks. SITA has operated the network in Europe, Middle East and South America and Asia for many years. They have also recently started a network in the USA to compete with ARINC.

The ground end system is the destination for downlinks, and source of uplinks. Generally, ground end systems are either government agencies such as DCA, CAAN, an airline operation headquarters or airline base. CAAN/DCA end systems provide air traffic services messages. Airline and general aviation operations provide information necessary for operating the airline or flight department efficiently.

LIMITATIONS OF ACARS SYSTEMS

As discussed above, data link technology is now the standard in routine communications between flight crews and air traffic service providers. In addition, flight operations applications such as graphical weather descriptions, electronic charts, and engine/aircraft health monitoring programs are commonly used to enhance flight efficiency and safety. Both of these factors require a strong need for far greater digital bandwidth than is provided by Aircraft Communications Addressing and Reporting System (ACARS) technology.

VHF DIGITAL LINK MODE 2 TECHNOLOGY

The need for greater bandwidth in the VHF spectrum introduced VHF Digital Link Mode 2 (VDL Mode 2). Air Traffic Services, electronic flight charts and engine health monitoring programs are some of the advanced implementations geared towards safer, more efficient operations. These critical applications are possible in VDL Mode 2's bid oriented architecture that delivers 10 times the message capacity of the previous character oriented (analog) ACARS system. Today VDL Mode 2 is the new data link standard in aviation industry.

Deploying Remote Ground Station (RGS) for better coverage and supporting VDL Mode 2 in the strategic locations in the vicinity of airports, it is possible to extend the benefits of data link to aircraft operating throughout the world and to provide high quality, seamless, and cost effective worldwide data link facility. It is also possible for the aircraft to fly worldwide and remain connected to high quality data link services by VDL Mode 2 technology.

VDL Mode 2 is Compliant with the ATN SARPs. Its bandwidth is 31.5 kbps (10 times greater than classic ACARS). ICAO recommends 2.5 kbps of bandwidth to communicate between aircraft and airlines. In this technology aircraft establishes a logical connection with a particular VDL station.

RGS (Remote Ground Station) are typically installed on the airport premises so that data link service can be provided to aircraft at the airport, as well as those that are en route.

REMOTE GROUND STATION (RGS) IN TIA

Establishing the RGS in TIA will also enhance the Future Air Navigation System (FANS) operation in Nepal. RGSs are typically installed on the airport premises so that data link service can be provided to aircraft at the airport as well as those that are en-route. Installing air ground Data Link communication supporting VDL mode 2 will work as a basis of the future Data Link communication including ATN network compatibility.

VHF Data Link Mode 2 will work at frequency of 136.975 Mhz. This will provide continuous communication to the aircraft flying in and out of TIA without having the avionics go into the frequency search mode. The VDL Mode 2 system will provide the TIA to transmission of Controller Pilot Data Link Communication (CPDLC), Automatic Dependent Surveillance (ADS) and Digitized Airport Terminal Information System (D-ATIS) messages between the CAAN ATC system located in Kathmandu and aircraft, AAC and AOC with airline offices as well. TIA has installed and operated the D-ATIS system since past 3 years but transmitted the METAR (weather report) in voice mode only due to the lack of data link service providers. With the installation of this data link system, TIA will transmit the Metar in data mode ie Digitized Metar will be transmitted in regular interval to the aircraft by the help of which aircraft will be informed about the weather of the destined airport in computer display of the cockpit.

The service provider delivers the messages between the CAAN ATC system and properly equipped aircraft using VHF, SATCOM and HF data link wherever suitable to increase coverage.

In Asia Pacific region, there are more than 200 Remote Ground Station (RGS) operational with more than 100 customers over 15 countries, including *Australia, Cambodia, Brunei, India, Indonesia, Japan, Korea, Malaysia, Mongolia, New Zealand, Philippines, Russia, Singapore, Taiwan, and Thailand*. Expansion plans are underway to provide greater coverage in this region. In CAAN records, there is no data link services installed in TIA by any service provider. So time has come to install the Data Link System in TIA (RGS and VDL Mode 2) by any appropriate service provider any provide aircraft the facility to enhance safety and security. One of the prime Service Provider, SITA has installed CUTE technology for the check in counter and BRS (Baggage Reconciliation System) process in TIA.

BENEFITS FOR CAAN

The RGS of VHF Data Link Service installed at TIA will increase the coverage for aircraft flying in Kathmandu FIR and bring economic revenue benefits to CAAN. The aircraft using AOC and AAC information messages between Aircraft and Airline bases in the heavy traffic will increase revenue. The ATC messages ie. CPDLC, ADS, D-ATIS messages are free of charge and CAAN will not pay any charges to service provider.

CONCLUSION

With the installation of VHF Data Link, there will be following benefits to the CAAN:

- Coverage of VHF Data Link Service in TIA that will be capable of delivering AOC, AAC, ADS, CPDLC and D-ATIS messages, thereby enabling the implementation of CNS/ATM functionality.
- Improved data link services to the airlines ie, better data link service at lower cost.
- Strengthened regional cooperation and coordination.
- CAAN will get Revenue.
- TIA will be link to Data Link Service of Asia and Pacific Region and increase safety and security.

QUALITY MANAGEMENT SYSTEM IN AIS AND ROLE FOR SAFE OPERATION

Shishil Chitrakar
Director, CAAN Head Office

The 21st century is known as an era of technology-development and the rapid change on Aviation sector is not an exception in this regard. For overall development, every sector must be dependent on correct and concise information. Aviation business runs with multi-dimensional services and Aeronautical information Service is one of services among others. Therefore aviation also cannot escape from latest/ correct/update information.

WHY AERONAUTICAL INFORMATION MATTERS

The Eleventh Air Navigation Conference (AN-Conf/11) held in Montréal in September 2003 endorsed the operational concept and recognized that, in the global air traffic management (ATM) system environment envisioned by the operational concept, aeronautical information service (AIS) would become one of the most valuable and important enabling services. As the global ATM system foreseen in the operational concept was based on a collaborative decision-making environment, the timely availability of high-quality and reliable electronic aeronautical, meteorological, airspace and flow management information would be necessary.

Today, high-quality aeronautical information is often cited in research programmes as a pre-requisite for the development of the many new interoperable tools that future aircraft will carry to improve their effectiveness in navigating safely and efficiently. These new tools will also be used by ATM systems to improve efficiency while maintaining safety. This will result in the provision of more services to more aircraft in the same airspace at the same time.

The AIS is one of the foundation building blocks for the successful transition to a global ATM system. At the core of this building block lies the Quality System that will provide quality and timely aeronautical data and information to the aviation community. International Organization for Standardization (ISO) 9000 series of quality assurance standards provides a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization.

Aeronautical Information Services take all necessary measures to introduce a properly organised quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined. The function stages relate to the functions of AIS as follows,

- Receive and/or originate;
- Collate or assemble;
- Edit;

- Format;
- publish/store; and
- Distribute.

The International Standards provide clear directions towards the needs and requirements for a Quality System within a State's AIS to meet customer needs and expectations, and where continuous improvement is a pattern of organisational behavior and needs to:

- Demonstrate its ability to consistently provide products that meet customer and applicable regulatory requirements; and
- Address customer satisfaction through the effective application of the system, including processes for continual improvement and the prevention of non-conformity.

THE NEED FOR A QUALITY SYSTEM

The importance of aeronautical data and information to the world's aviation community cannot be overstated. Aeronautical data and information provides one of the essential elements and the backbone to enable aircraft operations to take place safely and efficiently throughout the world.

The established quality system shall provide users with the necessary assurance and confidence that the distributed aeronautical information/data satisfy stated requirements for data quality (accuracy, resolution and integrity) and for data traceability by the use of appropriate procedures in every stage of data production or data modification process. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met.

This means that the worldwide aviation community is looking to the AIS's so that they can have a confidence that they are being provided with accurate data and information that meets the required resolution and retains its integrity throughout its life cycle. While this is the principal reason for having a quality system, a Quality System also provides opportunities for:

- Meeting regulatory requirements;
- Performance, coordination and productivity improvements;
- Increased focus on the business objectives and customer expectations;
- Achievement and maintenance of the quality of products and services to meet the customers stated or implied needs;
- Increased customer awareness and satisfaction;
- Confidence that the intended quality is being achieved and maintained;
- Being able to demonstrate the organization's capabilities to customers and potential customers; and
- Expanded market opportunities.

By itself, introduction of a Quality System will not lead to automatic improvements in product or service quality, or an improvement in work practices and processes. What it will do however, is provide the tools and guidance for those working in the AIS field to use a defined and systematic approach to their work and business.

THE INTEGRITY OF AERONAUTICAL DATA

The integrity of aeronautical data shall be maintained throughout the data process from survey/origin to distribution to the next intended user. Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put. Consequently, the following classifications and data integrity levels shall apply:

a) Critical data, integrity level 1×10^{-8}: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

b) Essential data, integrity level 1×10^{-5}: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and

c) Routine data, integrity level 1×10^{-3}: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

RESOURCE MANAGEMENT*/PROVISION OF RESOURCES*

Organisations are required under the International Standards to determine and provide in a timely manner, the resources needed to:

- Implement and improve the processes of the Quality Management System; and
- Address customer satisfaction. In this context, the term resource applies to personnel, facilities and equipment of service providing organization.

INFORMATION MANAGEMENT (IM) AS A CENTRAL COMPONENT

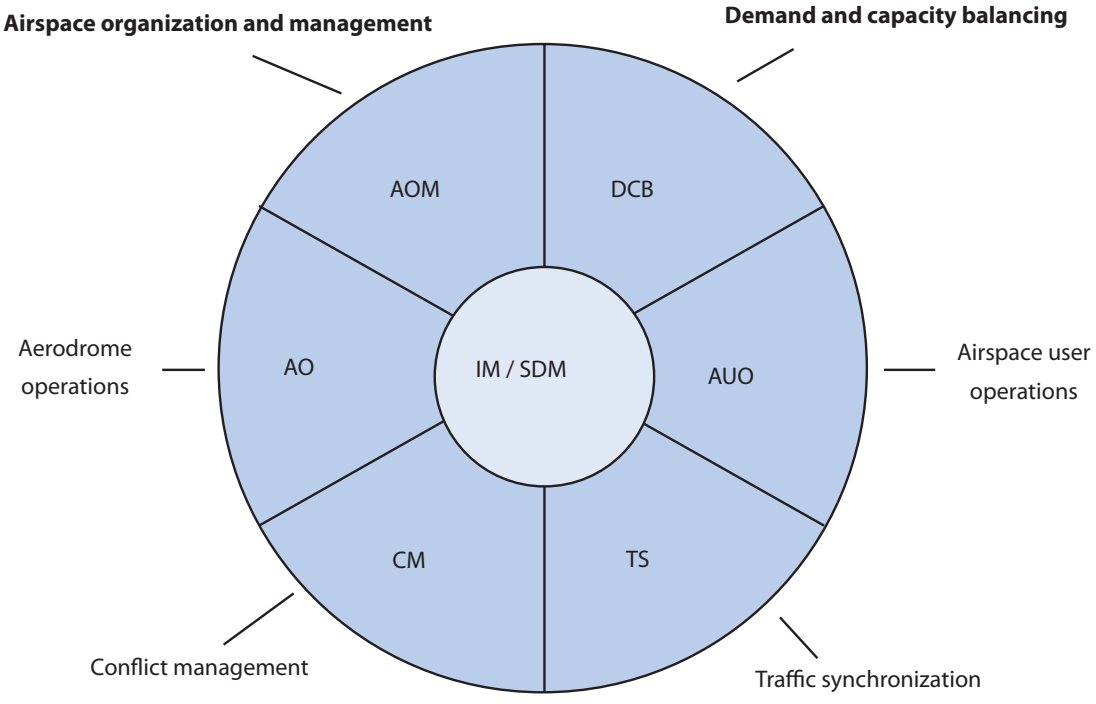
If we are to have an integrated and interoperable ATM system that enables air navigation service providers to safely handle more traffic in the same amount of space during the same amount of time better aeronautical information is essential. Such a system would effectively link the full range of services from airspace design to flight planning, airport operations planning and flight separation assurance while continuing to maintain the safety and security of the travelling public and lessening the environmental impact on the planet and its population. Such a system would allow planners and decision makers to make the right decisions for the development of new tools and techniques based on accurate information available on time and in the right place.

Better aeronautical information is essential if we are to have a system that empowers airspace users by giving them a greater role in shaping the ATM system and by helping them understand their options and make informed decisions while maintaining public safety and minimizing the impact on the environment. Such a system would be focused on users' needs. Corrupt or erroneous aeronautical information has the potential to adversely affect the safety of satellite navigation, just as corrupt or malfunctioning navigation aids adversely affect the safety of ground-based navigation.

These improvements are central to the Global Air Traffic Management Operational Concept and justify by themselves the name change from AIS to AIM that identifies the new focus on all aspects related to proper

information management as opposed to the traditional way of focusing on the provision of standard products to the pilot only. The provision of aeronautical information today is mainly focused on the requirements of pre-flight briefing. The provision of aeronautical information tomorrow will address the requirements of all components of the ATM system for all phases of flight. Seven components of Air Traffic Managements are as follows.

- Airspace organization and management: it includes establishments of airspace structures in order to accommodate the different types of air activity, volume of traffic and differing levels of services.
- Demand and capacity balancing: it will strategically evaluate system-wide traffic flows and aerodrome capabilities to allow airspace users to determine when, where and how they operate, while mitigating conflicting needs for airspace and aerodrome capacity.
- Aerodrome Operations: it is integral part of the ATM system, operator need to provide ground infrastructure, including inter alia, lighting, runways, including exits and precise surfaces guidance to improve safety and maximize aerodrome capacity in all weather conditions.
- Traffic synchronization: It is tactical establishment of a safe, orderly and efficient flow of air traffic.
- Conflict Management: the conflict management consists of three layers namely strategic, pre tactical and tactical conflict. The issues of conflict in ATM community are about risk, hazards, separation, collision avoidance etc. The conflict will exist among the airspace organization and management, demand and capacity balancing, and traffic synchronizations
- Airspace user operations: The accommodation of mixed capabilities and worldwide implementation needs will be addressed to enhance safety and efficiency.
- ATM service delivery management: ATM will operate seamlessly from gate to gate for all phases of flight and across all services providers.



IM /SDM = Information management / ATM service delivery management

CUSTOMER SATISFACTION

The Standards require AIS to monitor information on customer satisfaction and/or dissatisfaction as one of the measurements of the performance of the quality management system. The methodologies for obtaining and using this information must be determined.

This is an important new aspect to the 2000 version of ISO 9001. You are required to monitor your performance as a supplier to your customers. More specifically, you are required to monitor information on satisfaction or dissatisfaction. To do this you will need to find out how satisfied your customers are. Firstly it is important to remember that you may have more than one type of customer. For example, if you are a map or chart manufacturer, you may sell to wholesalers who then sell to retailers who then sell to the general public. In this case you have three types of customer and they all have different requirements. You may be satisfying one group and upsetting another. For your product and/or service to sell successfully you will need to satisfy them all. Another important point is to understand that satisfaction is not the opposite of dissatisfaction. Your customers are entitled to be satisfied and may take good quality of products and/or services for granted. On the other hand, if they are dissatisfied, they may react quite badly or strongly. So satisfaction may produce a neutral response whereas dissatisfaction may produce a strong negative response. There is a third possibility, which is a strong *positive* response. This is sometimes referred to as 'delight', something beyond the normal level of satisfaction.

HUMAN RESOURCES

Staffs who are assigned responsibilities defined in the Quality Management System must be competent on the basis of applicable education, training, skills and experience. People assigned to carry out quality activities are required to be competent to do them, otherwise a quality product or service is less likely to result. The standards require competence to be based on appropriate or applicable education and training and also on skill and experience that the people possess. There is however, no requirement to have all four, only those applicable to the particular task.

Appropriately qualified and experienced staff in sufficient numbers is prerequisites for an AIS organisation to provide safe and timely aeronautical information. The most obvious users of aeronautical information are pilots. Other users of the information represent those engaged in airline operational control and those involved in the provision of ATS. The AIS must be technically oriented in the nature of the services being provided. Given the relevance of aeronautical information to global air traffic, it is important to promote the correct level of technical proficiency within the AIS and that the AIS has an appropriate status in the parent civil or military organisation.

This part of the Quality System requires AIS to have procedures in place for assessing the competence of personnel required by the organisation to check, edit and publish aeronautical information. These procedures should include the levels of training, qualification and experience necessary to achieve expeditious publication of information.

Equally, staff responsible for the collection, collation, checking, coordination and edition information published in the Integrated AIP Package must have a thorough understanding of the content, standards, format and other

user requirements related to the material being published.

Ideally, staff responsible for checking, coordinating and editing aeronautical information should have an extensive background as a pilot or within air traffic services, or have received specialist training in AIS.

For example, staff responsible for the operation of the NOTAM office would be, inter alia, conversant with the standard format, codes and abbreviations for NOTAM;

TRAINING, AWARENESS AND COMPETENCY

This part of the standard requires an organisation to:

- Determine competency needs for personnel performing activities affecting quality;
- Provide training to satisfy those needs;
- Evaluate the effectiveness of the training provided;
- Ensure that its employees are aware of the relevance and importance of their activities and how they contribute to the achievement of quality objectives; and
- Maintain appropriate records of education, experience, training and qualifications.

CONCLUSION

The Global Air Traffic Management Operational Concept defines seven interdependent concept components that will be integrated to form the future ATM system i.e. airspace organization and management, aerodrome operations, demand and capacity balancing, traffic synchronization, conflict management, airspace user operations and ATM service delivery management. The management, utilization and transmission of data and information are vital to the proper functioning of these components. The exchange and management of information used by the different processes and services must ensure the cohesion and linkage between these seven concept components.

ATM community depends extensively on the provisions of timely, relevant, accurate, accredited and quality-assured information to collaborate and make informed decisions; sharing information on a system-wide basis will allow the ATM community to conduct its business and operations in safe and efficient manner. Corrupt or erroneous aeronautical information has the potential to adversely affect the safety of satellite navigation, just as corrupt or malfunctioning navigation aids adversely affect the safety of ground-based navigation. Therefore it is the liability of every person, every unit, and every stake holder to disseminate correct information for safe operations of Aviation business. Thus the quality management system in AIS is highly required for safe operation of Air Transportation.

ASIA PACIFIC ACCIDENT INVESTIGATION GROUP (APAC – AIG)

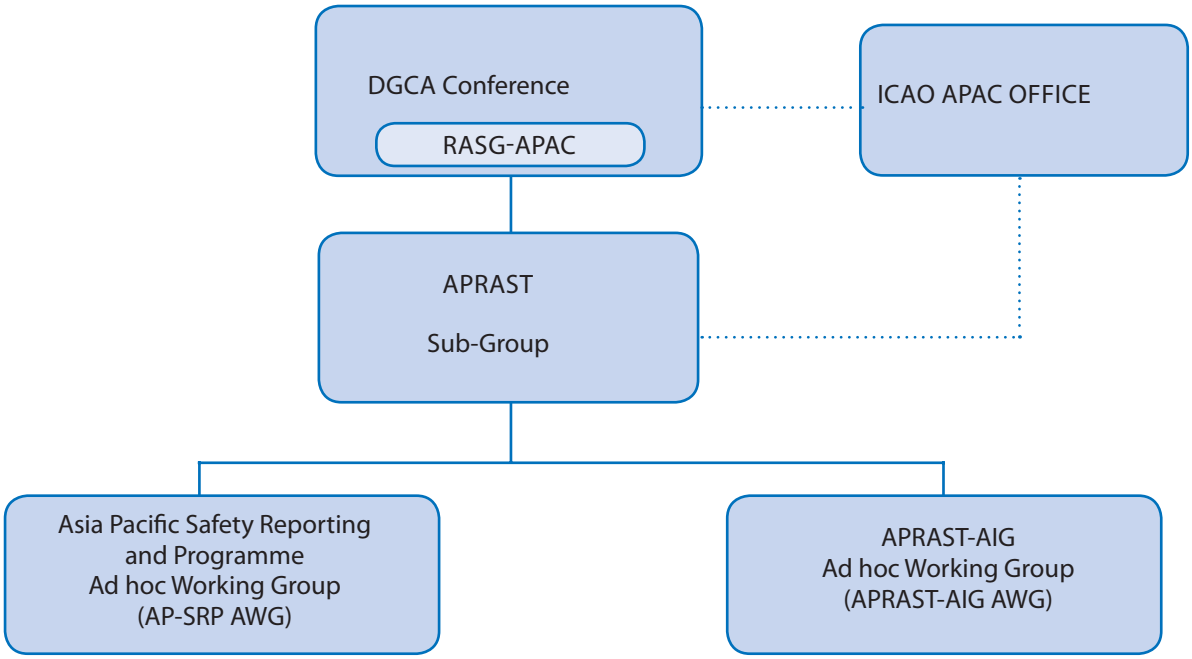
Sudhir Kumar Chaudhary
Dy. Director, CAAN Head Office

The ICAO Global Aviation Safety Plan (GASP), which was endorsed by the 33rd Session of the ICAO Assembly in 2001, stressed the need for a reduction in the rate of fatal accidents in air transport operations. The objective of the Global Aviation Safety Plan provides a common frame of reference for all stakeholders that support a proactive and systematic approach to aviation safety, and helps coordinate and guide the establishment of safety policies and initiatives worldwide. It helps prioritizing and planning safety initiatives and measuring their impact.

Additionally, the GASP encourages States to foster regional and sub-regional safety groups for the purpose of furthering the global safety effort.

Accordingly the Regional Aviation Safety Group – Asia and Pacific Regions (RASG-APAC) was established following the ICAO Council decision in May 2010 and supported by the 47th Conference of the Directors General of Civil Aviation, Asia and Pacific Regions in October 2010.

STRUCTURE FOR THE REGIONAL AVIATION SAFETY GROUP – ASIA PACIFIC (RASG-APAC)



Under the RASG-APAC, an Asia Pacific Regional Aviation Safety Team (APRAST) Sub Group was established and under which two ad – hoc groups were formed, namely; Asia Pacific Regional Aviation Safety Team – Accident Investigation Ad hoc Working Group (APRAST-AIG AWG) and Asia Pacific Safety Reporting and Programme Ad hoc Working Group (AP – SRP AWG).

An APRAST – AIG Ad hoc Working Group was established to review the Global Aviation Safety Plan/Roadmap (GASP/R) and propose recommendations to RASG – APAC to complete implementation through APRAST.

FORMATION OF ASIA PACIFIC ACCIDENT INVESTIGATION GROUP (APAC – AIG)

Inspired from the success operation in Europe – the Group of Experts on Accident Investigation of the European Civil Aviation Conference (ECAC), The 1st Meeting of APRAST – AIG AWG (Bangkok, June 2012) recommended the RASG – APAC through APRAST for the formation of a group of expert on accident/incident investigation with representation from the investigation authorities, industry partners and professional bodies to institutionalize a network for the exchange of views, practices and experiences. Purpose for the formation of group of experts was to serve as a permanent framework in the APAC region for cooperation in the area of aircraft accident/ incident investigation. Such cooperation was to aim at improving the effectiveness and efficiency of the accident investigation systems of the APAC States/Administrations, thereby enhancing aviation safety.

The 2nd Meeting of RASG – APAC (India, October 2012) accepted the recommendation by the APRAST – AIG AWG for the formation of a group of experts on accident/incident investigation. Accordingly, a permanent grouping, known as the Asia Pacific Accident Investigation Group (APAC – AIG) is institutionalized restructuring the APRAST – AIG AWG, which is now dissolved. All APAC States/Administrations are members of the APAC-AIG.

APAC – AIG MODALITIES

The Regional Officer, Flight Safety, ICAO APAC Office will be the Secretary to the APAC – AIG. The Air Accident

Investigation Board of Singapore will provide technical support. Membership of the APAC – AIG will come from participating accident investigating organizations in the Region. Nepal is the Member of APAC – AIG. Others may be invited to participate as appropriate. A Chairperson and Vice Chairperson will be elected from the nominated members from the accident investigation organizations of the participating States.

TERMS OF REFERENCE (TOR) OF APAC – AIG

- To assist States/Administrations in keeping abreast of developments in the area of Accident/incident investigation,
- To enhance the capabilities and professionalism of the accident/incident investigation Bodies,
- To promote the sharing of expertise, experience and information among accident/incident Investigation bodies,
- To develop and strengthen cooperation among the accident/incident investigation bodies.

APAC – AIG WILL ACCOMPLISH THE FOLLOWING:

- Review and/or prepare policies and procedures that can be used in the region to establish a voluntary incident reporting system as envisioned by Global Safety Initiative 3;
- Review and/or prepare policies and procedures that can be used in the region to establish an accident investigation capability as envisioned by Global Safety Initiative 4;
- Identify areas of concern that may be unique to the region or require emphasis within the region, and develop and/or review policies and procedures to address those concerns;
- Work closely with the APRAST, service providers, airlines, manufacturers, industry and labor associations, and other appropriate organizations to ensure that the policies and procedures are developed through a coordinated effort.

1ST MEETING OF ASIA PACIFIC ACCIDENT INVESTIGATION GROUP (18 – 19 SEPTEMBER 2013)

First Meeting of Asia Pacific Accident Investigation Group (APAC – AIG/1) was held in Bali, Indonesia on 18 – 19 September 2013, attended by 53 participants from 15 Member States/Administrations i.e. Australia, Bangladesh, Cambodia, Hong Kong China, Macao China, France, Indonesia, Japan, Mongolia, Myanmar, Nepal, Philippines, Republic of Korea, Singapore, Sri Lanka and 2 International Organization/Industry Partners i.e. Boeing, and IFALPA. 13 observers were present at the APAC-AIG/1 Meeting i.e. Indonesia Air Force, Directorate General of Civil Aviation, Australia Civil Aviation Safety Authority and representatives from the Indonesia aviation industry.

AGENDA OF APAC – AIG/1

- Review of the conclusions of APRAST-AIG AWG/3, APRAST/3 and RASG-APAC/3
- Report on recent accident/incident investigation related developments and activities
- Review of information received from States/Administrations in respect of the Survey on Assistance and Training Needs in the Setting Up of an Independent Accident Investigation System
- Database of APAC accident/incident investigation bodies
- Work Plan

CONCLUSIONS OF THE APAC-AIG/1

The meeting developed the following conclusions:

CONCLUSION APAC-AIG 1/1

APAC AIG recommends to APRAST that RASG-APAC draw the States/ Administrations' attention to the ICAO State Letter 2013/55 dated 19 July 2013 [Ref. AN 6/12-13/55] which proposes a new standard specifying that "States shall establish an accident investigation authority that is independent from State aviation authorities and other entities that could interfere with the conduct or objectivity of an investigation."

CONCLUSION APAC-AIG 1/2

APAC AIG recommends to APRAST that RASG-APAC encourage States/ Administrations' that have not yet established an independent accident investigation authority to do so as soon as possible.

CONCLUSION APAC-AIG 1/3

APAC AIG recommends to APRAST that RASG-APAC let States/ Administrations know that the APAC-AIG can be approached on matters relating to their plan to set up an independent accident investigation authority.

Emphasis by ICAO: The Regional Aviation Safety Groups (RASGs) have been invited to identify activities, including required resources, to support the Annex 19 roll-out plan and the effective and continuing implementation of SMS and SSP provisions. The States, through their RASGs are strongly encouraged to report progress, regarding the implementation of SSP and SMS provisions, which is essential to guide the future development of safety management provisions.

REFERENCE

- Records of Discussion and Conclusions of APRAST –AIG AWG/1,
- Records of Discussion and Conclusions of APAC – AIG/1,
- Records of Discussion and Conclusions of RASG – APAC/2,
- ICAO website etc.

PRINCIPLE OF UNIVERSAL JURISDICTION VIS-À-VIS CIVIL AVIATION LAW

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DEFINITION OF THE PRINCIPLE OF UNIVERSAL JURISDICTION

Even if the general meaning of this principle is known, a definition provides a better understanding of its complexity and limits.

The principle of universal jurisdiction is classically defined as 'a legal principle allowing or requiring a state to bring criminal proceedings in respect of certain crimes irrespective of the location of the crime and the nationality of the perpetrator or the victim'. This principle is said to derogate from the ordinary rules of criminal jurisdiction requiring a territorial or personal link with the crime, the perpetrator or the victim. But the rationale behind it is broader: 'it is based on the notion that certain crimes are so harmful to international interests that states are entitled – and even obliged – to bring proceedings against the perpetrator, regardless of the location of the crime and the nationality of the perpetrator or the victim'. Universal jurisdiction allows for the trial of international crimes, committed by anybody, anywhere in the world. This *derogation* is traditionally justified by two main ideas.

- First, there are some crimes that are so grave that they harm the entire international community.
- Secondly, no safe havens must be available for those who committed them.

Even though these justifications may appear unrealistic, they clearly explain why the international community must intervene by prosecuting and punishing the perpetrators of such crimes. Universal jurisdiction is a matter of concern for everybody.

Under the concept of universal jurisdiction, a state may exercise jurisdiction over crime such as in a matter of *jus cogens* wherever that crime is committed. Under international law, *jus cogens* crimes give rise to obligations *erga omnes*, obligations arising from the "higher" status of the crime and may be punished by any state because the offenders are common enemies of all mankind and all nations have an equal interest in their apprehension and prosecution. This may include the extradition to a state willing and capable of prosecuting fairly and effectively. The purpose is to ensure that:

- the *jus cogens* crime is punished regardless of where the perpetrator may be.
- When exercising universal jurisdiction, neither the nationality of the accused, nor the location of the crime is significant.

EVOLUTION OF THE CONCEPT

Universal jurisdiction can be traced back to the writings of early scholars of note, such as Grotius, and to the prosecution and punishment of the crime of piracy. However, after the Second World War the idea gained ground through the establishment of the International Military Tribunal and the adoption of new conventions containing explicit or implicit clauses on universal jurisdiction. The Geneva Conventions of 1949 are paramount in this regard, providing in unmistakable terms for universal jurisdiction over grave breaches of those Conventions. International crimes were no longer to remain unpunished. The idea that in certain circumstances sovereignty could be limited for such grave crimes was accepted as a general principle. Later on, other international conventions and, to some extent, rules of customary law enlarged the principle's scope of application. This was confirmed by a number of cases, starting with the Eichmann case in 1961, the Demanjuk case in 1985, and more recently the Pinochet case in 1999 and the Butare Four case in 2001, emphasizing that universal jurisdiction could lead to the trial of perpetrators of international crimes. International law empowered and in certain cases mandated states to prosecute crimes that were regarded as harming the whole international community.

Nonetheless, implementation of the general principle remained difficult, since the principle of universal jurisdiction is an issue not only of international but also of national law. States are entitled to grant their own courts universal jurisdiction over certain crimes as a result of a national decision, and not only of a rule or principle of international law. Consequently, the universal jurisdiction principle is not uniformly applied everywhere. While a hard core does exist, the precise scope of universal jurisdiction varies from one country to another, and the notion defies homogeneous presentation. Universal jurisdiction, so having multiple international and national law aspects, can create either an obligation or an ability to prosecute. It is therefore difficult to gain a clear picture of the overall situation.

Universal jurisdiction is rapidly becoming a pillar of international litigation as the subject of constant attack. State and non-state violence against civilians as well as global terrorism seems continuing. The international community and foreign national courts are actively engaging in the expansion of the doctrine in both the criminal and civil context. Human rights abuses widely considered to be subject to universal jurisdiction include genocide, crime against humanity, war crimes and torture. While the principle of universal jurisdiction has long existed for these crimes, however, it is rapidly evolving as a result of significant recent developments.

Universal jurisdiction was discussed recently at the international human rights forums on the challenge of borderless cyber-crime, held in conjunction with the conference for the UN Convention against Transnational Organized Crime in Palemo, Italy. Civil jurisdiction for conduct constituting an international crime has been raised in the context of the draft Hague Conference on Jurisdiction and Foreign Judgments in Civil and Commercial Matters. International Court of Justice is also considering universal jurisdiction issues in some cases of serious violations of international humanitarian law. UN Charter and such other UN Conventions and Declarations on human rights have recognized universal jurisdiction and have suggested rigorous prosecution thereof.

Most scholarly and judicial analysis of universal jurisdiction has been within the context of criminal prosecution. There is less controversy in the criminal context. However, some courts have recently acknowledged that universal criminal jurisdiction necessarily contemplates a significant degree of civil tort recovery as well.

SOURCE OF UNIVERSAL JURISDICTION

To identify the origin of universal jurisdiction, three possible sources can be considered:

- international agreements,
- international customary law and
- national law.

International conventions sometimes impose an obligation to prosecute and punish those who have committed international crimes. This is the case in the Geneva Conventions through the notion of grave breaches of international humanitarian law. The obligation is clearly stated in the conventions and imposes on the contracting state a duty to act, but leaves the state to determine the means to enforce it. This can create some difficulties, as each national system is responsible for fulfilling this twofold obligation of both searching for the criminals concerned and bringing them to trial. It is the concern of a state's ability and structural efficiency required for effective trials and punishments.

Customary international law can also be a source for the recognition of universal jurisdiction when it comes to international crimes. However, it just provides for the principle itself and does not necessarily contain precise directives or guidelines for the implementation of universal jurisdiction. Customary international law can be viewed in two ways. It can be seen as a general obligation to which conventions later give concrete effect through more precise obligations. It can also be seen as an extrapolation of conventional rules so widely accepted that non-party states consent to be bound by the principle as equivalent to a general rule. With regard to universal jurisdiction, this could be the situation of states which refuse to become party to a specific instrument for political reasons, but accept the substance of that principle. Rules of international customary law do provide support for the implementation of universal jurisdiction.

Universal jurisdiction can also be accepted by states as a voluntary commitment, within their municipal framework, to punish some crimes for which no general international obligation to do so exist. Universal jurisdiction then derives from a national commitment to the international community by one state that is, for instance, not party to certain conventions. To recognize universal jurisdiction in this way can create an irregular obligation for some states. This could be the case of states not party to the International Criminal Court (ICC) Statute.

An adequate definition of international crimes and adherence to the International Statute will not be sufficient to ensure the prosecution of those crimes. One of the very first conditions for an efficient prosecution of international crimes is the existence of an efficient judicial system. The constitutional system of a state requires complete independence to the judicial power. Universal jurisdiction may be blurred if viable structures are lacking.

Despite its inherent difficulties, the principle of universal jurisdiction remains widely accepted by states owing to the specific nature of international crimes. This truly universal consideration is one of the main strengths of the principle.

UNIVERSALIZATION OF CIVIL AVIATION LAW

Civil aviation alone could not remain unhurt from such criminal activities. This is how the process of universalization in the aviation legal regime appeared. Unlawful interference against civil aviation is frequently occurring.

Such occurrence of criminal activities in one part of the world may create threat to another part. Therefore they are common to all and threat to all as well. To fight against such crimes, joint effort is must. This requires cooperation among all nations in framing the efficient international aviation security instruments and effective implementation thereof. Now, it has been necessary for all states to adopt international standards as mentioned in these international instruments. It is also reminded a hint of the preamble of the Chicago Convention that the instrument is prepared in view of keeping peace, friendship and cooperation among the peoples of the world for the safe, secure, regular, efficient and economic flight operation. This indicates that civil aviation should be saved and secured from all type of illegal activities and unlawful interferences through the friendship and proper cooperation among nations. To this end, different international aviation security instruments have been signed and national laws also have been framed accordingly. We can cite a trend of unlawful interference in the aviation seen during1993-1997 which is as under:

- Hijackings of Civil Aviation Aircraft
- Bombings/Attempted/Shootings on Civil Aviation Aircraft
- Commandeerings of Civil Aviation Aircraft
- Shootings at In-Flight Aircraft
- Attacks at Airports
- Off-Airport Facility Attacks
- Incidents Involving General Aviation/Charter Aviation

Such activities are imposing challenges to the management of aviation security. To save aviation from being vulnerable to such criminal activities, international community has been striving in framing the sturdy aviation law. Consequently, the process of universalization in the aviation law has been started. International Civil Aviation Organization (ICAO) is at real scene in bringing its member states together in a forum to adopt the suitable aviation security legislation and cooperate each other. Several international air law instruments have been developed in the auspices of the ICAO for securing civil aviation from such unlawful interferences. Some major international air law (AVSEC) instruments are as under.

A. Tokyo Convention 1963 that:

- applies to offences against penal law and acts that affect the in-flight safety of persons and property or jeopardize discipline onboard civilian aircraft,
- authorizes the Pilot In Command to impose reasonable measures including restraint on any person suspected for offences and hand over to the state where the aircraft made landing,
- requires contracting States take custody of offenders and to return control of the aircraft to the lawful commander, and
- ensures the jurisdiction (that of the State of Registry) in which the offence is committed on board an aircraft

B. Hague Convention 1970 that:

- defines offence of unlawful seizure and provides for universal jurisdiction over and arrest and custody of

the suspected offender,

- confers the right of prosecution or extradition of the offender to be done without many restrictions,
- requires Contracting States make hijacking punishable by severe penalties, and
- requires Contracting States assist each other in connection with criminal proceedings brought under the Convention.

C. Montreal Convention 1971 that:

- provides definition of: acts of unlawful interference directed against Int'l civil aviation, aircraft in flight & aircraft in service
- provides the state with the right to establish universal jurisdiction over the offender for the prosecution similar to those as that of Hague Convention
- provides the right to consider the Convention as the legal basis for the extradition
- applies irrespective of whether the aircraft is engaged in Int'l or domestic flight

D. Montreal Protocol 1988 that:

- adds to the definition of offence in the Convention that the offence includes if it endangers or attempts to endanger the person, aircraft and facilities at an Int'l airport and the airport itself or such acts that are likely to endanger airport safety.
- adds something on that the state can establish its universal jurisdiction over the offender in case not extradited or it may establish extra-territorial jurisdiction over such offender.

E. Convention on the Marking of Plastic Explosives 1991 that:

- requires States prohibit and prevent the manufacture of unmarked plastic explosives,
- defines four detection agents,
- requires States prevent the movement of unmarked explosives out of its territory,
- provides for the destruction of certain kinds of existing stocks of plastic explosives.

F. Some Modernized Aviation Security Instruments:

- Beijing Convention (BC) 2010- Convention for the Suppression of Unlawful Acts relating to Int'l Civil Aviation signed at Beijing on 10 September 2010
- Beijing Protocol 2010- Protocol Supplementary to the Convention for the Suppression of Unlawful Seizure of Aircraft, signed at Beijing on 10 September 2010

Int'l Conference on Air Law (Diplomatic Conference on Aviation Security) held under the auspices of ICAO at Beijing, 30 August to 10 September 2010. The Conference met to adopt amendments to the Montreal Convention 1971 as amended by the Protocol of 1988 and to the Hague Convention 1970.

It approved the Text of the Protocol Supplementary to the Hague Convention 1970 with 57 votes against 13 votes. A consolidated text of the Hague Convention as amended by the Protocol Supplementary to the Convention was also adopted at Beijing. The Convention was done at Beijing on 10 September 2010.

- Both the instruments known as the Beijing Convention & Protocol were adopted on September 10, just a day before the ninth anniversary of the 9/11 terror attacks.
- The Convention & Protocol cover extradition and prosecution, hijacking, aircraft being used as weapons and transport of hazardous goods, as well as other areas.
- The Convention & Protocol will be Int'l Law when the legislators of 22 states approve them. 19 states signed the documents at the ICAO Conference in Beijing.
- They will significantly strengthen the existing international counterterrorism legal framework and facilitate the prosecution and extradition of those who seek to commit acts of terror – including the kinds of atrocious attacks that shocked the international community on September 11, 2001.

The upcoming Int'l Air Law Conference to be held from 24 March to 04 April in Montreal for the discussion on the air law draft presented by the ICAO Legal Committee aims at amendment of Tokyo Convention 1963. This first and foremost significant aviation security instrument will be made rigorous by this amendment to universalize the jurisdiction. This will help civil aviation meet the present challenge against such criminal activities.

ICAO Aviation Security and Facilitation Policy (SFP) Section is also in cooperation with UN Agencies like Counter Terrorism Committee working to strengthen the ability of United Nations Member States to prevent terrorist acts both within their borders and across regions.

NEPALESE CONTEXT

Nepal has ratified only the first three among the above international aviation security law instruments. There are some national air law instruments formulated to meet the obligation as the signatory state. They are as under:

- Civil Aviation Act, 2015(1959)
- Civil Aviation Authority Act, 2053 (1996)
- Aviation Security (Management) Rules, 2046

Other relevant National laws-

- Nepal Treaty Act, 1990
- Arms and Ammunitions Act, 1962

Among the above national aviation law instruments, Civil Aviation Act 2015 is the significant aviation security primary law, the Sections (4Ka,9Ka-9Jha,10Ka/Kha,11,12,12Ka,14Ka) thereof are relevant to the aviation security concern basically for defining the aviation crimes, and prosecution and the punishment thereof.

Civil Aviation Authority Act 2053 has only one Section (s. 21) relevant to the management of aviation security. Aviation Security (Management) Rules 2046(1989), Chapters (2, 3 & 4) thereof deal with aviation security management procedures according to which National Aviation Security Committee at the Centre and several airport level aviation security committees have been placed to deal with the unlawful interference activities against civil aviation. Arms and Ammunitions Act 1962, Sections (5,20,23,24) thereof deal with such matters of arms and ammunitions.

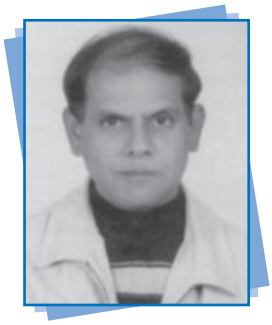
Nepal Treaty Act, 1990 Section 9 confers the authority to the state to adopt the above international air law instruments and promulgate the municipal law incorporating the standards as mentioned in the above international legal instruments.

CONCLUSION

Today, the principle of universal jurisdiction has been of prime concern in the civil aviation nonetheless previously it was necessitated in the abuse of human rights. Because of the modern achievements especially in science and technology, and also the development of globalization have brought easiness in access and coming together availed of opportunities and sometimes created problems as well. In consequence, developmental achievements begain to come up and also give way to criminal activities. This persuaded the international community to come together for fighting against such unlawful interferences. Correspondingly, aviation community also has been prepared for the same. Nepal is also prepared itself in updating the aviation law in line with the international standards. However, it is necessary to ratify the other remaining international instruments and go on framing law accordingly. This will help Nepal to be further apt to the issue of universal jurisdiction which will set the aviation safer and secured.

Pokhara Airport

AVIATION EDUCATION: A CURRICULAR PERSPECTIVE



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ABSTRACT

Informed curriculum for academic aviation education in Nepal is yet to become visible. While emerging trends of and increased advocacy for a comprehensive aviation education is being underscored all over the world, collegiate aviation curriculum formation and delivery to steer aviation development calls for a meso- and macro level intervention to pave way for aviation to be included as discipline of study in the national curriculum framework of Nepal. If not, at least at University level to meet the challenge of generating competent and professional work-force needed by the aviation industry and regulators. This article rationalizes the ripe need for scholarly intervention for aviation education in Nepal. In so doing it considers that research based perspectival study of stakeholders should be done so that it could serve a key framework to the development of engineering and non-engineering aviation curriculum in Nepal before aviation education programmes are initiated. In this light key development trends in training and education are addressed. The proposed roadmap for the transformation of the Civil Aviation Academy (CAA) and its implications are also discussed.

PROBLEMS AND PREMISES

Aviation is overwhelmingly huge training-driven field due to its high-tech performance orientation whose global implications always call for instant responses spatially. It has two functional facets – Flying and Non-Flying. Both the components are objectively structured. Aviation qualifications and competencies ensured through proper education and training do generally characterize both these components. It is the qualifications and competencies upon which identity of aviation personnel is built. Interestingly, in this part of the globe, the effectiveness of application of knowledge and expertise required in respect of technical professionals is not fully justified. This is attributed to the fact that they have entered the aviation field without much knowing of what their career would look like and what they would become, eventually after the qualifications attainment in non-aviation academia. This is truer to the scope of regulators that oversee the entire aviation industry of the country. It has been informed that about 70 % employees are graduates in different disciplines; most of them are adequately trained in-house as well as in renowned international academy. Since 2007 to 2012 about 1121 employees (by head count) have been trained to enhance their competency level that is required to maintain for the given work of different positions in the organization. Civil aviation Authority of Nepal (CAAN) has approved position of 1065 employees, out of which 752 employees are currently working at different airports and offices inside the country. Still there is inadequacy of manpower and the so called expert and qualified manpower have either multiple functional orientations or lesser degree of expert qualifications or learning experiences.

This issue of identification of appropriate educational and training programmes for the development of aviation at par with international standards needs to be resolved across the aviation industry and academic initiatives. Today, the field of aviation has become so complex, multidisciplinary, technology driven, dynamic and essentially international that a competent and qualified workforce is essential to manage and run diverse aviation domains. In this light, the contributory role of university in aviation education is dependent on the informed competencies and qualifications required for aviation industry.

The size and scope of aviation activities in Nepal is ever changing and expanding and new technical and non technical curricula in higher education are also emerging internationally to address the complexities and competency need of this multi-disciplinary, liability prone profession. Higher academics are neither familiar with aviation discipline nor informed about curriculum contents of aviation. Simultaneously, the industry too has not taken any initiative towards collegiate aviation educational initiatives. Importantly, there exist currently no practices of organizational research to identify the generic and specific competencies and qualifications required for aviation operations, nor any collegiate programs in aviation have so far been offered at a University academia. In order to facilitate the aviation regulators and service providers as well as aviation professionals to proactively navigate, explore and harness competencies required by the industry and society, it is necessary to underscore prescriptions of global aviation competence requirements vis-a-vis contextualized perspectives of aviation stakeholders on such needs so that it would determine the set of desired generic- and industry-specific qualifications and competencies to pave way for designing student centered collegiate programmes in the country.

What collegiate aviation qualifications and competencies are required of aviation professionals to meet the qualification demands of today and the challenges of the future? The current world environment demands an efficient and effective aviation curricula for safety of travelling public and protection of national interests. Little research has been done to determine what qualification and competency and corresponding course work is needed within the various components of the aviation industry to meet these demands. It would appear the specific competencies in the form of core skills and training support programs in this field is lacking because of no identification of curriculum contents to meet the aviation demands created by the current environment. Very little data exists upon which to construct meaningful collegiate aviation curricula.

The construction of meaningful educational programme for aviation requires integration of two curricular ideas. They are aviation and education. The general field of aviation is underpinned by personnel who have developed techniques and protocols that are adaptable and useful in a myriad of situations. Aviation stakeholders possess the expertise and information needed to customize aviation knowledge, skills and dispositions to meet the unique demands of the aviation industry. To respond to the education discipline, educators from the domain of academia with years of experience in developing educational curricula can provide a tangible solution needed to develop well-rounded collegiate aviation programmes. In this process, aviation stakeholders' perspectives on qualification needs provide propositions that could offer a rich source of data, thereby provoking design of collegiate aviation education and training programme.

ASSUMPTIONS

It is assumed that the civil aviation worldwide operates in modernistic, scientific-managerial, behavioristic frame. However, this mode of education and training that influences the aviation discipline could be responded to by contextualized perspectives. Moreover, this field could be approached with humanistic point of view by addressing the underlying non-technicality aspects that supplement and complement the positivistic façade of aviation. By taking a holistic approach and obtaining input from carefully chosen stakeholders in the field, vibrant aviation curriculums could be developed. Such curriculums could prepare professional leaders and educators for aviation field through the provision of university based aviation education. As a result, those curricula could attract students for qualifications attainment and then enhance the capability of both States and personnel in creating safe aviation environment in the country.

Career university programmes for aviation industry is explicitly generated by Johnson (1997) who noted the absence of an aviation/aerspace doctoral prgramme in the US. Johnson (1997) coins Aeronology as a new term and defines it as the study of the non-engineering aspects of aviation, aeronautics, and aerospace science and technologies. He connects this definition after realizing the significance of identity. As suggested in an article entitled Aviation Science? Collegiate Aviation? Aeronautics? Aerospace Science? Introducing Aeronology in Resolving Identity Issues , Johnson (1997) stated:

The identity problem creates havoc for educators and students alike. One area affected by identity is student recruitment. Consider a prospective aviation student aspiring to become an airport manager. The student looks at several aviation programs at five institutions and finds the following in the school catalogs: aeronautical technology, aerospace science, aeronautical studies, aviation science, airway science, civil aviation, aviation administration, aviation computer science, and aviation maintenance management. In contrast, a prospective psychology student aspiring to become an industrial psychologist will probably be able to identify a specific industrial psychology program under the auspices of the psychology department.

ACADEMY AND TRANSFORMATION NEED

To coincide the spirit of aviation education, Civil Aviation Academy (CAA) is challenged by the need to cope with growing needs of human capital development towards fulfilling aviation industry needs at national level while keeping pace with global developments taking pace worldwide. Since the early Nineties with the adoption of liberalization policy by the government, the aviation activities including, airline operations and subsequent traffic rise, and safety imperatives of the government and Authority are expanding by leaps and bounds. Aviation Policy 2006 states that the government will, by getting affiliated to Universities and ICAO TRAINAIR programme, make institutional and legal improvements to develop CAA into a professional institution capable to control and oversee the training and educational activities of private sectors. CAA has the vision to become an internationally recognized academy of excellence in the development of quality human resources at national and regional level. However, in view of growing complexities and subsequent challenges for the development of competent human capital to cope with international and national requirements in the field of aviation education, it is inevitable for CAA to undergo transformation from its traditional mode of operation into a competent, standardized national academy.

In realization of the foregoing statements, a transformation model proposed by CAA to establish a National Civil

Aviation Academy has been duly appreciated by the CAAN Board, which has directed a 5 member task-force to materialize the concept. An information paper delineating the roadmap has also been already presented to the 38th ICAO Assembly in which CAA has underscored the support of several stakeholders representing the government, aviation industry, airports and airlines and agencies. It aims to get affiliation to Universities and International Programme institutions. With investment from aviation stakeholders such as Government of Nepal, Civil Aviation Authority of Nepal (CAAN), Nepal Airports and Air Navigation Services Authority, UNDP Aircraft Fund, Nepal Airlines Corporation, private airlines, etc, flight and ground training, academic aviation engineering and technology and management education system could be established.

DEVELOPMENT TRENDS

Several aviation training institutions are undergoing rapid transformation. For example, the civil aviation training center of Indonesia has become the Air Transportation Human Resources Development Centre (ATHRDC) of Indonesia in November 2010. Likewise, in India Rajiv Gandhi National Aviation University Bill, 2013 has been passed by the Parliament for the establishment of National Aviation University to facilitate and promote aviation studies. Korea, Japan and China have already established vibrant aviation universities to fulfill the corporate needs of aviation sector. In Australia, Griffith University conducts an exclusively dedicated Master and doctoral programmes in aviation and is geared to examining competency needs of aviation graduates produced to cater for the aviation industry needs. In United States, aviation has been incorporated right from the elementary schools with a multidisciplinary approach, which involves teaching aviation focused science, mathematics, social science and English language. TRAINAIR Plus programme of ICAO that advocates for competency based education has also realized the role of universities in developing competencies and qualifications required by the aviation industry. Besides, trends that have emerged in the global aviation scenario are rapid pursuit of collegiate engineering and non engineering aviation courses in order to produce competent work force for employment in aviation sector.

Very of late Embry-Riddle Aeronautical University – Asia (ERAU-Asia) has forwarded a concept to establish an International Association of Tertiary Aviation Institutions (IATAI) which could receive official observer status from the International Civil Aviation Organization (ICAO). The concept is set against the ICAO Next Generation of Aviation Professionals (NGAP) initiatives, including the development of more effective communication between sectors of the aviation community and ICAO initiatives. One of these initiatives is the role of aviation education, training and the process of amending ICAO's annexes and Procedures for Air Navigation Services (PANS). Since Annexes 1 and 6 are primarily about training, education and safety, no representatives from aviation tertiary institutions have so far been sought to provide expertise regarding better training systems, excepting professional aviation associations. ICAO has launched its Next Generation of Aviation Professionals (NGAP) initiative to ensure that there is a new professional aviation labor force that is qualified to "operate, manage and maintain the future international air transport system" (ICAO, 2010). To date, much of the initiative has focused on raising awareness among young people about the opportunities that employment in aviation will provide in the future. However, a key issue not so clearly thought about is what the future industry will look like, how young people will need to be educated and trained for the new roles in the industry, and how an efficient, safe and effective regulatory system will need to change in order to support the future professional workforce. To achieve this, universities and aviation institutes around the world need to be included with other international associations in collaborating with ICAO

and national aviation authorities to provide education and training programs with researched outcomes that address the industry's future needs.

However, the issue rather pertains to developing aviation to global standards, and steering aviation with educated faculties. Training by nature is diverse and exclusively concerned with competent skills to meet operational needs. Now the time is ripe to take initiatives for collegiate aviation education so that graduates are prepared to get into aviation jobs. Although the huge skilled manpower developed by CAA with its 5 dozen training courses to meet operational equirements of ANS, Airport fire, security, electrical/mechanical/radio engineering and Nav.Aid maintenance, and other need based safety supportive courses, the workforce hold a mere subservient role. What is most interesting and equally critical about CAAN is that excepting a few engineers, most of the professionals have entered the field without aviation qualifications. In-service training is predominant in the case of Nepalese aviation, Therefore, while training is hailed indispensable, it is more prudent to create a new design thinking based on which CAAN could be equally capacitated to free itself from the absolute subservience. Hence, the role of the Authority and CAA should be made clear while addressing the following overarching concepts of learning, training, education and development.

Learning	Training
The act, process or experience of gaining knowledge or skills. *Can occur through formal and informal means including job aids, FAQs, web applications, etc.*	Instruction and applied exercises for the attainment and retention of KSA, which permits employees to perform their present jobs to standards. *Objective – Learning is for present job (immediate results when performers return to their jobs)*
Development	**Education**
Process of instruction or communication for people to acquire new horizons, technologies or viewpoints. *Objective – Learning is for the growth of the performer, rather than being related to a specific job (results may not be seen for some ?me)*	The act or process of imparting or acquiring knowledge, developing the powers of reasoning and judgment for a specific profession. *Objective – Learning is for future or different jobs. (education can only be completely evaluated when the learners move on to their future jobs or tasks)*

Source: Global TRAINAIR Plus Symposium, Singapore, 25-27 Sept 2012.

NON-ENGINEERING AVIATION EDUCATION IS TEACHABLE

Aviation involves safety imperatives. It operates within a tight technologic-managerial frame. It is more positivistic in nature. However, aviation safety assurance is deeply concerned with humanistic, and subjective treatment as well, because aviation education is a contextualized discipline which should be capable to meet transnational requirements. Increased human factors consideration against aviation occurrences is predominantly surfacing in the limelight of aviation safety. Although engineering education is a focused desire for aviation, foundational courses of non-engineering aviation constitute a very important component as it is more concerned with philosophical and pedagogical needs. State Universities too can be made efficiently well capacitated to provide

aviation supportive higher learning. We need to diversify the rigid aviation frame of curriculum. The main problem with the positivist notion is that it supports one objective truth, one right way, one theory, one unified profession. Positivist and reductionist theoretical underpinnings in the social efficiency theory never serve the diverse needs of a diverse population, as national cultures do impede the safety initiatives. The positivist theory attempts to force everything into a homogeneous blend. One sees no reason for a single curriculum theory underpinning engineering aviation education.

CONCLUSION

Aviation involves use of higher order thinking skills. Training can provide solutions to performance problems. However, we need the praxis of knowledge, skills and dispositions which can only be obtained from University based collegiate education. It is the collegiate aviation that can prepare a new generation of highly skilled workers. Since the public at large does not have an adequate understanding of collegiate aviation, aviation must reach out to young generation. Civil Aviation Authority and Academy need to play a tremendous role to materialize the idea of corporate aviation education to produce graduates for multi-disciplinary aviation positions. Suggestively, foundational non-engineering education can be initiated by collaborating with local universities. However, the foremost approach would be to hear what aviation stakeholders have to say.

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AN ANALYSIS OF TIA PASSENGER SERVICE QUALITY: PAST AND PRESENT

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We were motivated to prepare this article after analyzing the details of passenger-reviews of Tribhuvan International Airport (TIA) services published in CNN Travel Report dated 9th November, 2011. The CNN Travel Report was based on passenger-reviews given in SKYTRAX's Air Travel Rating website. For the reviews, passenger's feedbacks regarding queuing, security procedures, check-in and visa services were taken. Other topics of feedback from the passengers were cleanliness, boarding information and shop facilities. Based on this information, this article is prepared to find out whether the conclusions drawn by CNN report are still valid or not. Thus the objectives of this article are put as follows:

- To cross check whether the adverse comments mentioned in the report are still valid or not,
- If comments are still valid, how the problem could be solved in the short run,
- What additional measures are to be adopted to improve service quality in the long-run?

Tools used for our analysis are (1) categorizing and tabulating the summary of individual passenger comments given in the SKYTRAX website from November, 2009 to November 2013. This population consisted of 11 passengers (excluding 2 comments related to domestic terminal services). And (2) conducting face to face interviews with international departing passengers to collect their comments on different TIA terminal services. Such interviews were taken with 20 passengers and the summary of their feed backs were separately tabulated. In this table one passenger's comment dated 7th November, 2013 which is put in the SKYTRAX website and falls within our interview period is also included.

Keeping in mind that a significant difference may occur in the perceptions of frequent and infrequent travelers; and passengers may hesitate to give negative feed backs in the interviews, we have taken such limitation as granted. With these limitations, we are comparing the present situation of TIA services with the SKYTRAX reviews. Our analysis is limited to International Terminal only.

Type of Comments to come from passenger's experience in an airport can be generally positive or negative. Here in the following table we have put positive and negative comments of the passengers just to build a concept of this subject under discussion. The two categories of comments in the table below are taken from CNN report and SKYTRAX website.

Comments about a loved airport	Comments about a hated airport
"This airport is breathtakingly beautiful, spotless clean, and efficient,""…Smooth check-in, security control and immigration," (Montevideo Carrasco airport, Uruguay)	Terminal buildings are dirtiest and most disorganized. Bathrooms are filthy. Floors are dirty and the seats are not meant for comfort in any way shape or form. Be prepared for sheer pandemonium at all levels.
Security is just doing its job (Zurich Airport, Switzerland)	Seven Security Checks. A true nightmare, all done in the most unfriendly manner.
offers remote check-in and has reinvented just how simple it should be to reach or depart a remote-looking airport (Hong Kong Airport)	Departure was a nightmare upon checking-in Check-in could be vastly improved. TVs not necessarily reflect which airline is boarding.
flawlessly organized and stocked with conveniences (Singapore Airport)	we were not allowed to leave back into the terminal to stretch our legs, instead having to wait in a crowded waiting room served by one atrocious toilet

ANALYSIS OF SKYTRAX CUSTOMER REVIEWS ON KATHMANDU AIRPORT:

The following table is a summary of the Kathmandu Airport passenger-review as given in the SKYTRAX website. We have taken 11 reviews from November, 2009 covering a four year period. For our analysis airport terminal services are divided into five groups viz. Queuing, Security, Cleanliness, Boarding and Flight Information. For detail comments please visit http://www.airlinequality.com/Airports/Airport_forum/ktm.htm

Year	Pax reviews	Queuing	Security	Cleanliness	Boarding Information	Other Facilities
2013	1	-had to queue for 2 hours 20 minutes to get tourist visa	-	-worst	-	-
2012	2	-arrival very fast if you already have a visa but long queues in departures -	-Quick -	-toilets shut for maintenance -toilets cleaner	-Not satisfactory -	-Departure is a nightmare upon checking in -
2011	5	-there is no rhyme or reason to the flow of passengers. Only one booth open for entry visas line - - -long time, queues overflowed onto the pavement	- - -6 checks, 4 total pat-downs - -	-dirty -problem - - -clean	-Insufficient display screens - - - -	-Most disorganized; - - -terrible for departures -limited shopping

2010	2	-arrival was ok, departure was a nightmare, regardless which class you fly you have to queue to get inside	-7 checks, all done in the most unfriendly manner -The final check can be trying	- -	- -	- -C'est la vie
November, 2009	1	-	-several security checks, many stupid questions	- grubby marble floors, rest room flooded and smelled horrible	-	-

As presented in the table above, during arrivals passengers are satisfied except for arrival visa approving services. Sometimes they had to wait for more than two hours and there was only one booth open for entry visa processing. On the departure side, there are many comments for different airport services. Passengers said "queues are long and overflow into the pavement, and there is no rhyme or reason to the flow of passengers and airport is most disorganized".

For the security services some passengers said it was quick. Others said there were up to seven checks and 4 pat downs (frisking). Security checks were done in unfriendly manner. Commenting on the cleanliness aspect, some noted as clean but most others commented as dirty, worst, smelled and horrible. Boarding and information service was not satisfactory. Display screens were insufficient. There was limited shopping facility.

REVIEW FROM RECENT PASSENGER INTERVIEW:

With an objective of getting fresh review of passengers on TIA services, we conducted interviews with international departing passengers. Interviews were taken on five different dates from 26th October to 22nd November, 2013 near the boarding gates. Comments and feed-back of passengers are presented in the following table. For our analysis we have also included one more passenger review of 7th November, which war put in the SKYTRAX website:

Dates	Pax interviewed	Queuing	Security	Cleanliness	Boarding Information	Other Facilities
Oct. 26	2	-good -too long	-good -good	-good -ok	- -	-shops expensive -
2nd Nov	10	-very congested - -need more clearance counters -long time -6/10 -quick - -long - -Visa verification slow moving	-ok - -good -good -10/10 -quick - -ok -strict -ok	-ok -not so clean -very good -good -7/10 -fine - -oddly clean -ok -more dustbins	- -gate no not known - - - -information board had wrong boarding gates -not enough - -limited -ok	- - -staff are polite -simple - - - -very much confusing -not enough coffee shops in gates area -

8th Nov	3	-airline did not accept credit card for excess baggage charge -rush -ok	- -needs improvement -very good	-ok - -clean	-should display the gate no -gate no not mentioned - gate no not mentioned	-cafeteria should have bigger choice - -
7th Nov.	1	- had to queue for 2 hours 20 minutes to get tourist visa	-	-worst	-	-
17th Nov	3	- -	- -as expected -weak	- - -	-very few information board - -Lack of information	- -seems busier airport -not as international
22nd Nov	2	-not bad -	- good middle -ok	--middle -	- -	-coffee price Europe level -

In our interview we got many feed backs and comments relating to check-in, security, cleanliness, boarding information and other facilities. As mentioned in the above table, passengers have almost no comment on arrival side. But taking the comment of 7th November, 2013 given in the SKYTRAX website, which is a recent one, we can say that still there is problem on arrival visa service taking time up to two hours. On the departure side, for queuing some said good, quick, ok and not bad. Other said, "Too long time, visa verification slow moving, need more clearance counters". Still others said "rush and very congested". It means past problems are still hovering over the check-in visa clearance and arrival visa service sector.

On the security services, most passengers said that it was ok and good. Few others commented as weak. It seems there is no such serious problem on security side as reported by CNN. Nevertheless there may be unidentified problems. Commenting on the cleanliness aspect, some passengers said 'clean' and 'good' but others said 'not so clean', 'oddly clean' and 'at middle level'. Some others suggested putting more dust beans. One passenger who gave comment on November 7 in SKYTRAX has put cleanliness in the worst category. Thus the problem of maintaining cleanliness in the international terminal still persists, though in a decreasing trend. In the boarding information service the problem seems to be increasing. Out of 21 respondents only one said it is ok. Nine of them pointed out to a problem. Nine others remained silent. Congestion in the terminal is increasing with the increase of passenger movement. Display screens are sparse. Gate number is not written in the airline boarding card. Aged passengers seem to be in harsh mood due to lack of information.

For other facilities some passengers complained that the coffee-price was at Europe level but there were not enough coffee shops. Others wanted wider choice in the cafeteria. Still others indicated the need of competition in quality and price with more coffee shops. Price list displayed was Rs. 100/- for Nepali Tea and Café Latte Rs. 300/-.

COMPLAINTS ARE HELPFUL TO IMPROVE SERVICE QUALITY:

Complaints are helpful to improve quality of services. In an international airport with a multi-agency service setting, passenger complaints arise in various ways. Even at the airports like Incheon of Korea and Changi of

Singapore, which are awarded with best airports, receive complaints from passengers. (For more information please visit www.airlinequality.com/Airports/Airport_forum/sin.htm and www.airlinequality.com/Airports/Airport_forum/icn.htm). Quality improvement is possible only with complaints and reviews. Therefore, we should not try to defend our weak points.

The Complainant Iceberg:

Here, we have taken 11 reviews of SKYTRAX and 21 of our interviews. In an airport with two million departing passengers, such a small data sample seems to be insufficient to draw a conclusion. But our story is about service quality. Quality generally aims at zero defects at all time. Furthermore, most customers keep silent and do not like to voice out their complaints. Therefore major part of the problem remains unidentified in service sector. Complaint Iceberg model helps us to explain that from the complaints received, only the tip of the 'complaints iceberg' can be seen. Let us look at the following diagrammatic models:

CUSTOMER COMPLAINANT ICEBERG AT BA (BRITISH AIRWAYS)

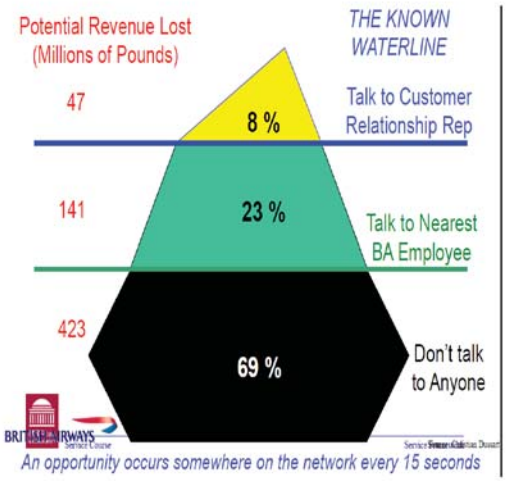

Fig. 1

Fig. 2

Fig. 1 is a real case of British Airways (BA) analyzing its customer complaints and comparing with the iceberg model. Here only 8% of the customers talked about their problem to the customer relationship representative. 23% talked to the Nearest BA employees and 69% did not talk to anyone. Fig. 2 shows that 50 complaint letters means about 1250 experience the same but do not complain. Thus 50 complaints spread over to 12500 negative contact points of the company. In this way about 4 to 8 percent of the problem is identified in the service business. Based on the above complainant Iceberg models, we can say that within five days of our survey period, there were about 250 to 500 complainants (20/8*100=250; 20*25=500) of which we could trace only 20. Additionally, there may be other unidentified problems regarding Trolley, Telephone, Customs, and Transportation (accessibility to and from city). Thus we can assume that our recent survey sample is sufficient to identify service quality problems at TIA.

Our survey interview has revealed that there are still major problems at TIA in Queuing, Cleanliness, and Information service sector. However, problems regarding security procedures seem to be at minimum level. In other facilities like Restaurants and Coffee Shops passengers have a few more complaints. Besides, there may be miscellaneous hidden complaints lying below the surface waterline of the Iceberg. Now the important question is how these problems could have been solved? Let us proceed to discuss further on the problem solving alternatives.

ALTERNATIVES FOR PROBLEM SOLVING:

Short Term Measures:

- Some improvement could be made without much additional resources and manpower. For example, boarding gate information could be easily provided by a staff deputed beside the security police desk near sterile hall. For this, TIA needs three staff costing about Rs. 700 thousand per year. Alternatively, Airlines themselves could assign staff there just for some busy hours of operation. Side by side a big information board probably 100"*150" size could be hung along the information desk side. It may cost about Rs. 500 thousand. Such arrangement could vastly address the passengers' complaint regarding boarding information.
- For cleanliness TIA can form specific groups of cleaners for specific areas. For example separate groups for duty free and sterile areas. Performance of those groups needs to be closely monitored and the best performing group can be rewarded in CAAN anniversary. Reward may be cash and/or appreciation certification. Such an arrangement may cost TIA about Rs. 200 thousand annually.
- A new coffee shop in the newly extended hall area is feasible and necessary. This will address passengers comment as well as generate about Rs. 2 million in revenue. Increased revenue will be more than sufficient to recover the additional cost mentioned above.
- To solve the problem of long queue, departure security checking, a single line could be maintained for all, whether men or women, as is done in the ground floor main entrance. More trained staff should be deputed and existing procedure should be further studied to shorten up so as to solve the problems regarding arrival immigration visa delays and departure immigration waiting time.

Long Term Measures:

• TIA Organization Structure : TIA has no alternative than to aim to be the most preferred airport of the region. For this a concrete long term plan is necessary. TIA organization structure also needs to be adjusted. Customer Service Division and Cleaning and Environment Management Divisions are to be established. IT Department should also be established to manage networks and software. Airport Terminal layout should also be redesigned and refurbished.

• ISO Standards, Quality and Complaints Handling Policy : Modern airports are adopting ISO standards to maintain service quality environment. In India, Delhi, Mumbai, Chennai, Hyderabad and Bangalore, airports have adopted ISO 9001:2008 standards. Other Asian airports like Phnom Penh (Cambodia), Clark (Philippines), Suvarnabhumi

(Thailand) and Bandaranaike (Sri Lanka) have also acquired ISO certification. Similarly, Incheon (Korea), Changi (Singapore), MAHB (Malaysia), Johannesburg (South Africa) and Pristina (Kosovo) have also got ISO Certification. Some of these airports have policy declaration on quality, environment and complaints handling. TIA should also aim to achieve ISO standards and set its policy on quality complaints handling. Following example of airport quality and complaints handling policy is derived here from Pristina Airport of Kosovo:

Prishtina International Airport AdemJashariLimak Kosovo international Airport J.S.C.

QUALITY, ENVIRONMENT AND COMPLAINTS HANDLING POLICY

The Management of LKIA J.S.C. and all its employees are committed to give the best quality service at the terminal and airside operations to its passengers, airlines and related parties. Limak Kosovo International Airport J.S.C `s vision is to be ranked among the most preferred airports in the region. To achieve this goal, we aim to offer:

- Airport services in conformity with our passengers, Airlines and related parties' expectations and preferences,
- The highest standards of modern and fast airport services, Including ground and ramp handling of passenger, baggage, cargo services, food & beverage, car parking services
- The highest security and safety standards As Limak Kosovo International Airport investment development and operation, including ground handling we commit:
- To invest in advanced high-tech infrastructure;
- To implement and maintain a quality management system in order to meet requirements of the ISO 9001:2008, ISO 10 002 and 14 001 standards;
- To take measures concerning environmental consideration;
- To sustain continuous improvement in customer satisfaction and increase efficiency of our quality management system;
- To be respectful to the environment with waste management and energy saving measures, following the environmental rules and laws of republic of Kosova;
- To focus on the expectations and needs of our passengers and airlines by exceeding their expectations and requirements;
- To be customer focused in all our operations and to reach high level of satisfaction in our surveys and feed-backs;

The Management team will periodically review the performance of the Management system and our quality, environmental management and complaints handling objectives.

This quality environment and complaints handling policy is regularly communicated to our employees and reviewed by the Management team for its continuing suitability. In addition this policy is shared with the public.

• Participating in the ACI's ASQ Program:

CAAN is a member of Airport Council International (ACI). ACI has initiated Airport Service Quality (ASQ) program since 2006. More than 275 airports have joined the ASQ program. ASQ's objective is to help airports in their continued efforts to improve the quality of service experienced by their passengers. It is the world's leading airport customer satisfaction benchmarking program. The ASQ programs identify and disseminate best practice from top-performing airports around the world. By joining the ASQ program, airport gains access not just to a wealth of information and advice, but also to a world-wide airport forum discussing various quality issues and solutions. To improve and continually review its service quality level, ACI's ASQ program translates passengers' real-time survey result into data that pinpoint passengers' needs and expectations and tells what is working and what is not. Airport executives use ASQ data to prioritize investment in facilities and services.TIA should participate in the ASQ program to improve its service quality.

CONCLUSION

Our analysis on the CNN report and SKYTRAX customer review together with the recent interview as mentioned above shows that level of passenger service in TIA since 2011 is improving. But the situation is not satisfactory because there are still many problems identified from our recent interview. Many problems still may be below surface of the Iceberg. Our job is to explore more and more and try to improve service quality in TIA.

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- http://travel.cnn.com/explorations/life/10-most-hated-airports-324645;SKYTRAX; airport_forum/ktm; airport_forum/icn; airport_forum/sin; airport_forum/del; aci.aero;
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LP Gas Cannon Bird Scaring Device in Pokhara Airport

AVIATION SAFETY AND SECURITY: THE BLOOD LINE OF AIR TRANSPORTATION

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THE BACKDROP

When you think of aviation, you think of Safety accompanied by Security. And Security and Safety go hand in hand with aviation, be it on ground or in the air; security and safety play a pivotal role in air transportation. No wonder it has been aptly put: Safety on ground is safety in the air, and No search, No fly. Hence, the basic ingredient of safety begins on ground and the vital force of aviation security is to ensure safety on ground along with vigilance and awareness: the prime focus of aviation i.e. Very initial stage of a flight commences from the ground itself where any passenger goes through his/her security formalities before boarding the aircraft. That is why the general public at large should understand as to why so much pain has been taken to thoroughly shuffle the passengers ' baggage's and to ensure that extra caution be maintained to make sure that the passenger goes through the security panels and gazettes provided at any airports.

A GLANCE AT A SHORT HISTORY OF AVIATION SECURITY

The past history of aviation security manifests that those were the days of the golden era in the air transportation business when people flew in the Dakotas (war-horse airplanes), of the then pride of the air transportation which graced the sky; when passengers simply bed adieu to their loved ones, boarded the aircraft and off they flew to their destination; when the pretty air hostesses greeted with their smiles and asked you for your ticket on board the aircraft (as was the case in the Nepalese aviation where the air hostess offered you with few sweets, nuts and cotton to stuff your ears with). But things have drastically changed and security in air transportation means a very deadly and serious business as now anything can happen anywhere as aviation pirates and terrorists are always lurking to hoodwink the aviation security.

The process of security dates back to the 60s and accelerated in the 70s as skyjacking became common and cumulated in the days with the Munich Massacre of 72. The reason being lax airport security between 60s to 70s and it was the golden era for the hijackers that too during the times of 69 when more than 40 attempts were made to hijack the US planes; yet despite that situation, most of the airlines were reluctant to have individual check up for the passengers. Those days no ID cards were required, passengers need not be present physically at the ticket counter at the airport, hand baggage were rarely frisked, and usually suspected passengers were scrutinized. All these styles of security and safety principles drastically gave way to a more refined and thorough check up system of security after the 9/11 incident which brought a transportation chill in the aviation arena which proved the principles of no compromise. Leniency should be taken for granted but strict measures should be adopted in security and safety in the air transportation business in the air or on ground as no airport is devoid of anti-security elements. High caution should always be adopted at all times. These days security has been so tight and tough that passengers may even have to take their shoes off, go through special X-Ray machine, pass through a millimeter wave scanner, and liquids limited to only 3-4 ounces.

ADOPTION OF THE SECURITY AND SAFETY MEASURES AT TIA AT PAR WITH THE ICAO STANDARDS

The legality of the Nepalese aviation began with the incorporation of the aviation security provision in Civil Aviation Act in 1973 which defined the airport restricted areas with its access control accompanied by search of

the passengers and their baggage for other restricted items such as weapons, and guns that can be harmful to the passengers on board the aircraft. Keeping in view that Nepal keeps abreast with the recommendations as led down by ICAO to be adopted by all the contracting states, Nepal established the National Aviation Security Program in 1995 that specifies the rules and responsibilities of every agency involved in airport operations. This is indeed a corner stone in the Nepalese aviation as a major thrust in aviation security.

Similarly it is but a fact that our TIA has also gone a step further in improving the security that too from the on slot of the bombing at Bhairahawa Airport, and along with the hijacking of the Indian Airline outbound from TIA to Delhi which finally got diverted to Kandahar and after massive negotiation with Indian Government the aircraft got back to its destination DELHI, security got even more strengthened. Taking into the present security scenario, it is high time that TIA should deploy at the least (the Bio- metrics, of which we could to the minimum utilize the Irish technology adopted in many airports), techniques for the betterment of both the passengers and TIA itself. This way TIA can boast that it has not lagged behind in complying with the ICAO mandates of security and it could sand tall in the security business (but not to miss understand that TIA in any way does not lag behind in security matters at all but on the contrary it is at par with the prescribed ICAO Standards and Procedures).

THE PRESENT IN VOGUE AVIATION SECURITY

Due to the ongoing threats in air transportation a business, massive changes have been utilized to combat these threats hence the "Behavioral Detection" are being deployed at a greater degree, where the passengers are not only passed through the modern gazettes, but are scrutinized for their behavior they may manifest both at the airport or during the boarding of the aircraft. Hence, providing security and safety to the aircraft and passengers solely by concentrating to detect knives, guns, and explosives may not be the only method but it will be beyond that through the "Behavioral Detection" giving a fuller security. Going further behind, few years back, we had various gazettes to enhance security measures at most of the developed airports such as: the Fiber optic Intrusion Detection Systems that detects the motion, pressure, or vibrations from the intruders .This can be installed on fences, walls, tunnels culverts that can be buried for detection; the Touch Star device is a fingerprint authentication which is a sure shot for the exact person's authentication for a person's identification. Still moving very much into the future of innovative aviation security, countries have developed very sensitive hi-tech that will sniff passengers for dangerous chemicals and vapors at the aircraft doors. Further, finger nail sized video camera along with hidden cameras will also be installed within toilets and other areas so any suspicious conversation can be recorded for security scrutiny. These and many other gazettes will be the daily bred of aviation security for better secured and safe aviation.

CONCLUSION

Even though brains have been ticking, and zillions of dollars are being invested for better, safe and secured air transportation be it domestic or international; yet the most haunting question is : Will the future air transportation be of 100% secured, Both Yes and No. Because, it is ultimately the human factor that plays the entire role be it for security or for ant-security. The full blown human factor deployed plays a pivotal role. Therefore the HR Department needs to be fully and professionally trained, properly utilized (Right man in the Right post and position, as no confusion arises both in activities and decision making), should be self and positively motivated towards his assigned job, should have enough rest hours to avoid the lethargy that may come about due to lack of rest he may have well deserved; should be well footed for his job performed; so that he grinds his nose to his duty and above all is honest, dedicated, and shows no sign of waning when time arises for him to choose between right and wrong activities. Further, he should not fall into the pit of greed. Hence deploying of the highly sophisticated and latest gazettes is not the sole solution for safe, secured and comfortable air transportation but it is the concerned states that have to play the crucial role in utilizing the available manpower to its best so that they do not get strayed. So the future aviation is in our own hands to break it or make it. Let us all play our cards honestly and fairly….

AIR TRAFFIC FLOW MANAGEMENT AND ITS APPLICABILITY IN NEPAL

Suwarn Raj Upadhyay
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When I switch my memory back to 9thMarch 2000, I remember the day when I was in a room with my senior the then Chief ATC our Ex-DG Mr. TR Manandhar in Fukuwoka, Japan. Actually, I was in the classroom of Air Traffic Flow Management Centre building where the Japanese experts briefed us what the ATFM is and how it functions. They showed us the big flat screen (like big LCD monitor) of ATFM system where all the traffic within their FIR were displayed in the monitor. We were told that the centre was managing overall traffic flow within Japanese FIR. It was for the first time I heard the acronym ATFM and its meaning. I was astonished by the development of Japanese Aviation Technology. The technology was beyond the imagination for a country like ours in those days and even today.

After a long gap, I realized that I should write something on this topic. I referred some available literatures, consulted some colleagues, blended my experience therein and then, summarized the concept as below:

INTRODUCTION

ATFM is the acronym of Air Traffic Flow Management. It is an indispensable service tool for the efficiency and effectiveness of the modern Air Traffic Management (ATM) system which also contributes to the safety and cost effectiveness of the system. It is a service established with the intent of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that the ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

ATFM service can be simple or complex depending on the environment and its requirements. Even an appropriately structured and executed simple mode of ATFM service can be as effective as a complex one and can enable Air Navigation Service Providers (ANSPs) successfully provide the necessary services.

ATFM is a collective decision-making process where different stakeholders like airports, ANSPs and airspace users-both Civil and Military coordinate and cooperate with each other and work together to improve the overall performance of the ATM system. Such coordination and cooperation may take place within the jurisdiction of a country's own FIR or can happen even beyond it.

DOC4444 adopted the concept in its 14th edition which was approved on 29 June 2001 and applicable since 1 November 2001. This document emphasizes to implement the ATFM Service in the airspace where traffic demand sometimes or time and again exceeds the defined ATC capacity. The document also stresses on the implementation of this service on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement.

OBJECTIVES OF ATFM

Major objectives of implementation of ATFM are:

- Improve the safety of the ATM system by ensuring the safe delivery of air traffic without any rushes,
- Enhance the flow of air traffic through all phases of flight by balancing the traffic demand and ATC capacity without compromising safety, and
- Promote cooperation among the aviation stakeholders to achieve an efficient flow of air traffic through multiple volumes of airspace in a timely and flexible manner.

BENEFITS OF ATFM

Some of the major benefits of ATFM are :

- Enhancement of ATM operational safety, efficiency and predictability through collaborative decision-making,
- Effective management of capacity of ATM system and air traffic demand through data analysis and planning,
- Reduction in fuel burn thereby reduction in the emissions of greenhouse gases as well as operating costs,
- Effective management and mitigation of effect of system constraints and unforeseen events, and
- Improvement in the quality of air travel.

ATFM MEASURES

ATFM measures are techniques used to manage air traffic demand according to overall system capacity. They are necessary for maintaining the safety and efficiency of the system and therefore, should be discussed collaboratively between ANSPs and airspace users before their implementation. These measures are the control instructions or procedures that may have impact on efficiency of airspace users. Therefore, ATM people should apply the minimum restraining approaches in order to minimize air traffic delays.

Some of the widely used ATFM measures are given below:

- Distance spacing (termed as Miles-in-Trail)
- Time spacing (termed as Minutes-in-Trail)
- Rerouting
- Assigning different arrival or departure fix if standard STARs or SIDs are unusable (termed as Fix balancing)
- Assigning level restrictions (termed as Level Capping)
- Minimum Departure Interval
- Slot swapping
- Ground Delay Programme
- Ground Stop
- Airborne Holding

APPLICABILITY OF ATFM IN NEPAL

ATFM is not a stand-alone concept rather it is a product of collaborative efforts of several stakeholders in aviation business. But looking at the issues of traffic congestion in Kathmandu TMA and capacity of TIA ATCs, this article, in its later part, has focused on the application of ATFM in ATM arena and suggestions thereto.

One of the indispensable components of ATFM is the declared ATC capacity. In Nepal, especially for TIA, some efforts were done in the past to declare the ATC capacity but because of lots of constraints, it could not be materialized. After ICAO audit in 2009, a team was formed to establish the ATC capacity for TIA. With the guidance from COSCAP SA expert, a document was prepared but the document failed to get approval from the authority. Later in 2012, another committee headed by high level CAAN official was formed to finalize this issue, but the committee could not actively function and the result is that the ATC Capacity of TIA ATC has not yet been declared. Since lots of efforts have already been put in this direction, there is still a glimpse of hope that we will have ATC capacity declared for TIA in the way ahead for the formal introduction of ATFM in the Kathmandu TMA in future.

Air Traffic Flow Management has not been implemented in Nepal exactly in the form as conceptualized by ICAO. However, the ATFM technique is knowingly or unknowingly in existence at TIA in traditional mode, in very simple form. For example, traffic flow is controlled by ground delays or ATC hold in the air. Slot management technique is also applied by allowing different slots for departure so as to avoid congestion in the air in a particular sector and the technique is applied right from the stage of clearing the Flight Plan at ATSRO. The concept of Slot management is envisioned in Nepalese Aviation Policy 2063 as well. But so far, we don't have the actual data, mathematical or statistical basis for the application of ATFM techniques as envisioned in ICAO documents.

SUGGESTIONS

Studies have revealed that the average growth of air traffic movement in Asia Pacific (APAC) region will be experienced as much as 5.7% over the next two decades. In terms of Passenger-Kilometers Performed (PKPs), Asia Pacific region is the largest market with 30% of world traffic and the region experiences the 5.5% growth in 2013 and will have growth rate of 6.8% by 2015. As being a part of APAC region, our aviation business has certainly been influenced by the above factor which can be apparent from the paragraph below.

If we analyze the Air Traffic and Passenger Movement data of TIA from 2001 to 2011, average growth of domestic aircraft movement is found to be 4.2% whereas that of international aircraft movement is 11.8%. Similarly, average growth of domestic passenger movement during this period is 7.2% whereas that of international passenger movement is 11.1%. With some exceptions, there are always growing trends in the yearly air traffic and passenger movement data. Ultimately, effect of these trends, if not properly addressed, influence the capacity of Nepalese airspace and airport infrastructures. This will ultimately influence the capacity of Air Traffic Controllers which finally necessitate the need of formal introduction of the Air Traffic Flow Management in ATM system of the country.

Following things need to be taken into consideration for the effective implementation of ATFM concept in Nepal:

- In existing situation, if ATC capacity is degrading in approach, the available technique of solving the issue is to split ATC workload into two sectors. Actually, there is such provision in Kathmandu Approach which is rarely been practiced. If this is practiced, it will certainly help in enhancing air traffic flow management.

- Looking at the growing trend of aviation sector business, it seems that airspace of APAC region will certainly be crowded in future. As being a part of this airspace and as having immense potential of natural tourism, Nepalese airspace will not be an exception, and therefore, we may be required to implement the modality of ATFM as imagined by ICAO. While implementing ATFM, traffic delays may arise in certain airspace or sector which could affect international traffic movement to and from our FIR. So, in order to implement ATFM effectively, a regional or multilateral agreement has to be done especially with neighboring Indian and Chinese FIRs.
- But in present context, the best way to enhance ATFM is the proper scheduling of the air traffic. For this, TIA Flight Operation shall be upgraded for 24- hour operation as per the working policy of three year plan (2067/68-2069/70), and the traffic load shall be distributed accordingly.
- The draft ATC capacity declaration document must be approved as soon as possible and based upon the declared capacity, proper care must be given in airline flight scheduling as well as the departure and arrival slots.
- TIA ATM System is being modernized with the support of Japan and ADB loan, and the TIA modernization plan is continually being implemented. If increasing traffic load in Kathmandu TMA and aerodrome congestion at TIA will necessitate efficient ATFM in future, we should seek advance or digital or automated mode of ATFM system for TIA under the modernization plan or project.
- These days, international apron is being congested now and then. There are nine parking bays and in peak days, around 80 to 85 international movement occurs. This has created significant delays in some peak days. Non-existence of RWY end taxiways and rapid exit taxiways are the added factors for these delays. Such situation can be managed in long-run after the complete execution of TIA Master Plan which should support expanding international apron, increasing international bays and constructing the new Runway End and Rapid Exit Taxiways to enhance the ATFM at TIA.

Sterile Hall, TIA

PROSPECTS OF NON-AERONAUTICAL REVENUE IN CAAN

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INTRODUCTION

No any other means has brought about contraction of time and distance than aviation has. Above all, air transport has brought people and cultures into a direct interface frame. Hence the airport synonymous to air transport undoubtedly serves as the hub of linking nation with the international community. Emerged as a powerful driver of economy in the country, airports have been developed as the fundamental instruments of national as well as regional economic strategy worldwide.

In Nepal due to high cost of road infrastructure development, air transport has always been introduced as the cost-effective and lifeline to enhance the livelihood of deprived people and balanced socio-economic development. However, when remittance and tourist income has captured more than one fourth of national GDP, it appears as the lifeline of national economy as well. The role of the airport becomes more crucial to elevate the local standards of living. The economic and social impact of an airport is often extending far beyond its immediate surroundings. ACI studies conclude that airports support, on average 4,700 direct, indirect and induced jobs per million passengers. Hence the economic growth in Nepal is very much associated with the reliable, sustainable and competent air transport system that would meet the national as well as international air traveler demand.

CAAN, the only regulator of the State overseeing the entire aviation sub-sector of Nepal has a big role to play to contribute to national economy while responding to the globalization pace. However, the question is: would CAAN be able to develop and maintain an internationally competent and global economic friendly airport, given its most of the works and activities being conducted in previous DCA (Department of Civil Aviation) pattern? Airports have been developed and operated mainly to facilitate general public. The operating costs are mostly recovered through the auto generated aeronautical revenue and development cost through government or foreign loan/aids as it was practicing decades ago. This trend is continued. The single International Airport, TIA, is financially supporting to operate almost all other airports and activities of CAAN under state obligation, but its ROI (Return on Investment) is overshadowed.

CHANGING PARADIGM OF AIRPORT INDUSTRY

The airport industry is not same as it was; it has gone through an exceptional transformation that has driven the market towards high level of competition. Since, airport emerges as the part of international community and economy, it requires to maintain various obligations. Therefore, it needs high investment and reasonable

return to compete with other airport in region and world as well. Hence, gradually airport entity shifts from a government owned public enterprises to a public/private owned commercial enterprises. Worldwide many airports remodeled their traditional business form into commercial business form with a view of achieving self-reliance and financial independence. With the same spirit and motive, Civil Aviation Authority of Nepal, CAAN, about 14 years ago, was converted into an autonomous organization from the then DCA. However, it is unable to move in the spirit of an autonomous organization due to various shortcomings in prevailing policy, acts, rules and organizational setup, most importantly the unnecessary external interference. It needs radical changes in policy to institutional setup in the manner that can provide sufficient liberty to increase physical as well as institutional capacity on time and gives freedom to explore sufficient revenue (aeronautical & non-aeronautical both) to finance their investment and operation as well as maintain required level of service, which is acceptable to all airport users, including passengers and airlines operator.

REQUIREMENT OF NON-AERONAUTICAL REVENUE

Under the commercial airport model, airports are no longer considered as a public utility with public service obligation. Instead, they were managed as a commercial enterprise with efforts made to generate revenues from activities, which are not directly related to air traffic, i.e. aeronautical income. Hence it is a shift from focusing only on its core activity of passenger and goods transportation to a more commercialized approach by diversifying airport into various non-aeronautical activities such as expansion of terminals, construction of car parks, hotels, conference facilities and other commercial entities.

This is done with a view to reduce its dependency on airlines, and to differentiate itself from other similar airports in the region as growing competition has been encountered among airports for their facilities and charges. In order to remain competitive in market, neither one can decrease the facilities below specified level of standard nor can increase the aeronautical charges that affect airport business. As per ICAO, revenues from non-aeronautical activities are in fact the principal means by which a number of airports are able to recover their total costs, mainly the losses most of them incur on their air side operations.

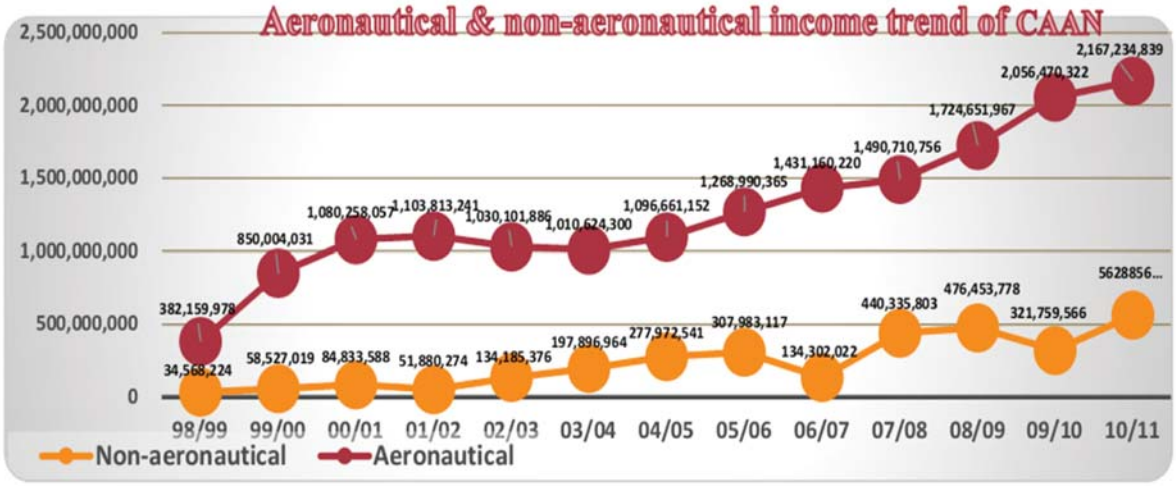
Hence the only option left is the maximization of airport's non-aeronautical revenue by diversifying into appropriate economic activity that is feasible with revenue potential. For this purpose basically an airport can be expanded to a wider market involving the passengers, visitors, airport employees, the local communities and local business as well. It can be achieved through effective airport marketing, airport retailing and timely forecasts of traffic development. The following table shows the different sources of aeronautical income through which an airport generates revenues.

NON-AERONAUTICAL REVENUE IN CAAN

There are various identified areas, in which CAAN has not taken any initiatives to increase possible income. Hence, if the required infrastructure and corresponding arrangement is made in accordance with the type and level of business at TIA and other airports, the revenue of CAAN especially in non-aeronautical side can be increased considerably.

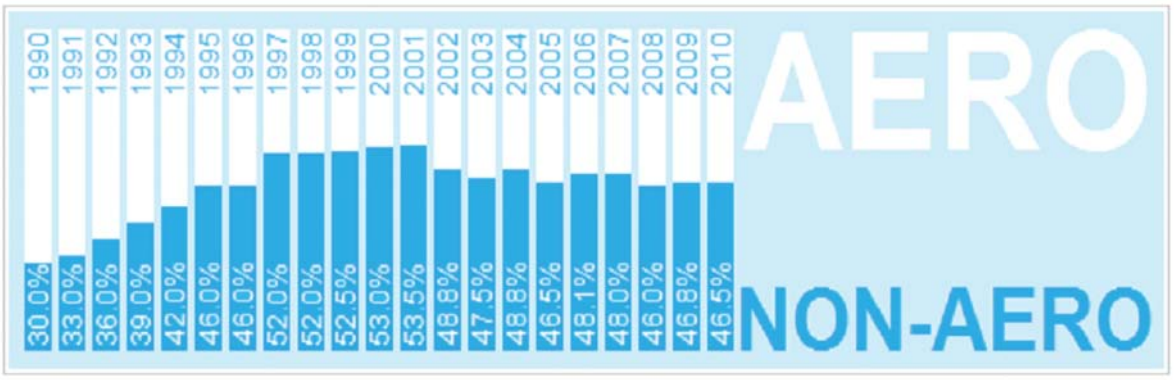
In addition the items or the areas, which are not identified in international perspective but which have high

potential of generating non-aeronautical income in Nepalese context can be explored and identified. The graph below shows the trend of aeronautical and non-aeronautical income in CAAN since 1998 to 2011. At the beginning when, CAAN was established in 1998, the non-aeronautical income was only 8 % (08:92) in total CAAN income, in the year 2005, it increased to 20% (20:80) and in the year 2011 it slightly climbed up to 21 %(21:79).



In average, there is 8 % increment in non-aeronautical income since 1998. However, this increment is very poor to compete with international aviation market where in average, the non-aeronautical and aeronautical income both are sharing almost equally (48:52) to the total income. The graph below shows the growth trend of non-aeronautical income in aviation industry worldwide.

The growth trend of non-aeronautical income in average in international airport



Hence we can say there is good opportunity to increase CAAN income in terms of non-aeronautical revenue i.e. from 20% to 50%. At TIA and the other regional International airport, which are under construction/expansion, this target can be achieved. However, there is big challenge to make it possible in reality as most of the assets of CAAN spread over different domestic airports are almost isolated with aeronautical activities. Among 53 domestic airports, only 33 airports are in operation, and most of them are operated in loss. Normally the basis of non-aeronautical income is also the aeronautical activities, i.e. the movement of aircraft and people that takes place at the particular airport. The level of non-aeronautical income i.e. the expansion of retail business and airport services mainly depend on the ability and willingness of people to pay for an item/service who dwell there. ACI Airport Service Quality (ASQ) retail initiative survey has suggested four things to know, how passengers shop at airport.

- Passengers want more choice, than more service;
- Most passenger don't view the airports as a place to shop
- To increase sales increase footfall in outlets
- Passengers need to be able to find product quickly.

On these ground, in present scenario of some hub airports, like Biratnagar, Pokhara, Bhairahwa, Nepalgunj, etc. it can be said there is some space to move forward, however, for other airports, there is very less chance to increase non-aeronautical income based on aeronautical activities. Hence the only option is to develop the land and property in other form of business that can be most suited for the given locality and surrounding. Moreover there is a vacuum of corporate activities in CAAN to assess and identify the different sources of possible non-aeronautical and aeronautical income and make required business plan and strategy.

HOW CAN NON-AERONAUTICAL REVENUE BE AUGMENTED IN CAAN?

Including all 54 airports and civil aviation offices located at Babarmahal, Sinamangal, and Sanothimi, CAAN has occupied around 1390 hectors land in the country {15500 Ropani/Mountain (7107 Ropani/TIA), 870 Bigha/Tari, 450 Ropani/Valley}, the largest diversified land area that any other organization in the country owns. Some land areas are located at Jomsom, some at Janakpur, some at Babarmahal, Koteshwer, etc. The lands at different places have different value and features. Beyond the aeronautical domain, the land areas at different locations have their own use and importance for CAAN. Ultimately the value of the land rests on the activities that are executed there and the people who dwell at that land. From both perspectives airport is most fertile place, if it is cultivated adequately the yield is obvious.

Hence, in priority, CAAN needs to evaluate and identify the real strength and value of its entire land asset and property in aeronautical and non-aeronautical aspects so that a clear picture of future course of action that CAAN could determine to explore and open the possible business prospects. In this regards, following steps are necessary.

- First of all, CAAN corporate directorate should be de-established from its current sorry state of affairs in a manner that CAAN can stand as a whole in a business aviation organization, where commercial and cost-effectiveness part of each work can be equally footed with the aspects of safety, security and productivity.
- In order to activate corporate and bring efficacy in safety, security and efficiency in work, the qualified personnel from each sectors, i.e. ANS, Aerodrome, Flight safety and Finance shall be deputed to the corporate directorate in CAAN. They should be authorized to plan, design and budget for all the required infrastructure of each sector in long, medium and short term. They should be responsible to monitor, evaluate and analyze the BEP, Cash flow and Cost-benefit of each investment of respective sector in the context of ROI.
- In order to set an adequate and effective business plan and increase possible non-aeronautical income, first we need to know the actual investment of each airport and office. For this, a dedicated team comprising knowledgeable personnel of each field, including, surveyor, computer, administrator should be formed under a qualified expert with advanced degrees on MBA/CA .
- The team should be authorized to identify, classify, and evaluate all the land, installations and property spread over 54 airports and offices on the basis of present market value. And segregate property, where and what is usable, tradable and disposable.
- The team should be capable and responsible to measure the economic performance of each property in

terms of KPAs (Key Performance Area), i.e. Safety, quality of services, productivity and cost-effectiveness.

- The team will be responsible to make an effective plan and project on the basis of given volume and nature of work to be executed for each airport and offices. They should be facilitated with required budget, authority, tools by endorsing through CAAN board or DG whoever will be relevant and effective.
- None of the team members should participate in any other work until the given work is completed as per plan.
- On the basis of KPAs and cost basis, a relevant and effective 'asset management and business plan' software should be developed. Before going to field work all the team members should be educated and trained to perform duty and work in accordance with plan.
- The team will make entry of all the tangible and intangible items of an airport/office in the given software by visiting concerned airport/office on the basis of type, use and unused land, installation and property.
- The software will give the information of actual investment and return of particular airport/office by accounting depreciation/appreciation of each item in terms of expenses and income.
- On the basis of this we will get the clear picture of each property, which one is producing or can produce aeronautical income or on-aeronautical income or both or not any (ideal) at each office.
- At this stage, team will be able to determine the required aeronautical and non-aeronautical activities analyzing exiting property and market scenario i.e. present or predicted economic, social and tourist activities in and around the place. They will assure as to where and what could be done to increase the non-aeronautical income in immediate, medium and long term.
- The aim of this assessment should establish the indicators of cost-effectiveness, safety/security and efficiency to all used resources (land, installation, human) that will ultimately give the overall corporate as well as aeronautical status/performance of an airport .
- On one hand, it helps the airport manager to evaluate and identify the weak and strong section as to where and what to improve; on the other, it will allow examination of the managerial capacity and effectiveness of an airport manager.
- Ownership of a property is one of the most crucial aspects to use it effectively and efficiently for maximum benefit; CAAN needs full liberty to invest its land and property for required business promotion. Hence, initiation should be taken to reduce unnecessary intervention and delay in property use by taking right of property use from government.
- In order to plan and select non-aeronautical activities, set concession fees and rental charges, determine the market value of non-aeronautical income, make required internal administrative arrangements, carry out management contract and promotional activities, guidelines laid down in the ICAO Doc 9567, ACI documents and airport economics can be pursued.
- The present aeronautical and non-aeronautical charging and leasing system, existing policy and act shall be amended in accordance to international charging mechanism. The provision of revision should be done timely on scientific and marketable basis.
- After completing planned work, a knowledgeable and trained focal person at each airport and offices of CAAN should be deputed to develop and manage asset and business under the airport/office manager to produce property outcomes periodically as mentioned below:

- **Immediate term:** The property that can be brought in use to get non-aeronautical income immediately by completing some official formalities without significant investment.
- **Medium term:** the property, which needs some change and investment to bring in required business setup and income, can be generated within 2-3 years.
- **Long term:** The property that needs considerably high investment to bring in required business setup and income can be received within 3-5 years.

HRM AUDIT: TO ENHANCE ORGANIZATIONAL EFFICIENCY

Shyam Kishor Sah
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'Organizations are not mere bricks, mortar, machineries or inventories. It is the people who staff and manage organizations.'

HUMAN RESOURCE MANAGEMENT

Human Resource Management (HRM) is concerned with the people dimension in management. Since every organization is made up of people, acquiring their services, developing their skills, motivating them to higher level of performance and ensuring that they continue to maintain their commitment to the organization is essential to achieve organizational objectives. Thus, HRM refers to a set of programmes, functions and activities designed and carried out to maximize both employees as well as organizational effectiveness.

All major activities in the working life of an employee, early from the time of his/her entry into organization until he/she leaves come under the purview of HRM. Specifically, the activities included under HRM are HR planning, job design and analysis, recruitment and selection, orientation and placement, training and development, performance appraisal and job evaluation, employee and executive remuneration, motivation and communication, welfare, safety and health, industrial relation and the like.

HRM views people as an important source or asset to be used for the benefit of organizations, employees and the society. It has emerged as a distinct philosophy of management and aims at policies that promote mutuality, i.e. mutual goals, mutual respect, mutual rewards and mutual responsibilities. It is believed that policies of mutuality elicit commitment which, in turn yield better economic performance and greater human resource development.

The primary objective of HRM is to ensure the availability of a competent and willing workforce to an organization. Beyond this, there are other objectives too. Specifically, HRM objectives are four fold – societal, organizational, functional and personal.

Societal objectives – to be ethically and socially responsible to the needs and challenges of the society while minimizing the negative impact of such demands upon the organization. The failure of organizations to use their resources for the society's benefit in ethical ways may lead to restrictions and obstructions from the society.

Organizational objectives – HRM department exists to serve the rest of the organization and, hence, responsible for in improving organizational effectiveness.

Functional objectives – to maintain the department's contribution at a level appropriate to fit the organizational requirement.

Personal objectives – to assist employees achieve their personal goals, at least to enhance individual's contribution to the organization. Personal objectives of employees must be met if they are to be maintained, motivated and retained.

HRM can perform effectively with the help of clearly mentioned authority and responsibility as well as HR policy and principle. HR Policy is a statement of intention and commitment of top level management to a general course of action. A policy doesn't spell out the detailed procedure by which it has to be implemented. But, a policy should be stated in terms broad enough for it to be applicable in varying situations. An organization must have set policies, definite procedures and well-defined principles relating to its personnel. These contribute to the effectiveness, continuity and stability of the organization. Moreover,

- Established personnel policy ensures consistent treatment of all personnel throughout the organization. Favoritism and discriminations are, thereby, minimized.
- Continuity of action is assured even through top-management personnel change. Policies serve as a standard of performance and actual results can be compared with the policy.
- Sound policies help build employee motivation and loyalty. This is especially true where the policies reflect established principles of fair play and justice and where they help people grow within the organization.
- Sound policies help resolve intrapersonal, interpersonal and intergroup conflicts. Policies promote stability that creates a climate of security for the employees.

If policy is a guide for managerial decisions and actions, principle is the fundamental truth established by research, investigation and analysis. Principles are universal truths generally applicable to all organizations. Principles guide managers in formulating policies, programmes, procedures and practices.

HRM AUDIT

HRM Audit is a tool for evaluating personnel activities of an organization and helps in finding out how effectively HR functions have been performed for achieving organizational goals. In brief, HR audit is an overall quality control check on HR activities in a company and an evaluation of how these activities support the organization's strategy.

In every organization following issues regarding HRM activities are generally raised:

- Does the organization regularly forecast the demand and supply for employees?
- Do job analyses and design exist for all position in the organization?
- Are all potential sources of recruitment identified and evaluated?
- Are measurable selection criteria developed and used while filling up jobs?
- Do effective training and development programmes exist?
- Is there a performance evaluation system assessing past and potential performance?
- Is the remuneration programme designed to motivate employees?
- Does the organization have high quality of work life?
- Does the HRM practice respond to individual needs and aspirations?

- Does the HRM practice contribute to organizational effectiveness?
- Does management underestimate the capacity of HRM to contribute in organizational effectiveness?

It is necessary to give importance on these questions and HRM audit is highly useful for the purpose. Moreover, benefits of HRM audit can be pointed out as –

- Indentifies the contribution of HRM department to the organization;
- Helps improving the professional image of HRM department;
- Encourages greater responsibility and professionalism among members of HRM;
- Clarifies HRM duties and responsibilities;
- Stimulates uniformity of HR policies and practices;
- Helps finding out critical personnel problems;
- Helps ensuring timely compliance with legal requirements;
- Reducing HR costs through more effective personnel procedures;
- Creation of increased acceptance of the necessary changes in HRM;
- A thorough review of HRM information system.

It is important for HRM to know the department's effectiveness. By auditing, the department identifies problems and attempts to resolve before they become serious. The evaluation process can rapport between the department and operating managers, and it can reveal outdated assumptions that can be changed to meet the department's objectives and future challenges. Systematic assessment instills discipline in the personnel staff and encourages adopting more rigorous assessment of the likely benefits to be achieved. Further, a personnel function must establish credibility with management by justifying its programmes and clearly demonstrating how it contributes in the attainment of organizational goals.

An HR audit must cover the activities of the department and extend beyond, because the peoples' problems are not confined to the HRM department alone. It must evaluate the personnel function, the use of its procedures by the managers and impact of these activities on the employees. Specifically, an HR audit covers the following areas-

- Audit of HRM function – evaluation of HRM function is useful to justify the existence of the department and the expenses incurred on it,
- Audit of managerial compliance – involves audit of managerial compliance of personnel policies, procedures and legal provision,
- Audit of HR climate – HR climate has an impact on employee motivation, morale and job satisfaction,
- Audit of corporate strategy – By assessing company's internal strengths and weaknesses and its external threats and opportunities, the top management set up corporate strategy for gaining competitive advantage.

As a HR audit covers almost all activities of an organization, is essential to enhance organizational efficiency.

STRESS MANAGEMENT AT OFFICE

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Stress has no definition. The very concept of stress varies from person to person. However, one thing is for sure: too much stress can have harmful implications on one's personal as well as professional life. One of the most common places for people to experience stress is their daily workplace. When battling its effects becomes important, learning office stress management techniques can help.

Office stress management techniques can be very important for helping people stay in focus and in control on hard days. While most people would love to say they enjoy their jobs and derive no stress from them whatsoever, this simply is quite often not the case. When stress builds up in the office, releasing it effectively is not only good for the body, but the measure could preserve or even advance a career.

Some of the best office stress management techniques to use in high-pressure situations or even on days when everything just seems to be going wrong include:

Taking a break: This is one of the best office stress management techniques possible. If tension is piling up, taking five minutes break to regroup is always a good idea. Whether a person just sits at his/her desk and closes his/her eyes for a few minutes, visualizes him/her tackling the problems facing them or gets up and walks around, the result can be a calmer feeling and a mind that is more focused on the job at hand.

Thinking positive: After you get off the bed, think about all the things you can be grateful for. Thank god for what you are. Remember, you could be so much more lucky than many people around the world , who even have a hard time just to live. Also, keeping quotes, sayings and other decorators in your workplace which encourage and build confidence give positive influence too.

Drinking some water: Drinking water cools down your body. Moreover, water helps control those hormones in your blood that create anxiety or anger. Water helps control blood pressure. You could even wash your face if it's too bad. After all, it's a good idea to keep a water bottle in your office desk.

Exercise: Some people find that this is among the best office stress management techniques going. Cutting a lunch hour short to walk the stairs or just walk around the building can relieve some of the tension of the day. Plus, it is good for the body and helps get the blood flowing and the brain working.

Learning to prioritize: If you are feeling overwhelmed by everything you have to get done, keep a daily to-do list on your computer and list tasks from most to least urgent. Then, address each project one at a time, and cross it off once it is done. Breaking your workload into individual tasks makes it seem less intimidating.

Keeping posture in check: Often when you're focusing on a stressful project at work, you unconsciously keep your shoulder, back, or neck muscles tensed, leading to pain and fatigue later on. If you catch yourself tensing

your muscles or hunching over your computer, take a deep breath and consciously loosen each muscle in your body.

Keeping photo of loved ones: Keeping photos of your kids or significant other on your desk can be a great morale-booster. If you're feeling especially stressed, look at the pictures and remind yourself of what matters most.

Eating healthy: When the afternoon slump hits, it's so tempting to reach for that chocolate bar or sugary energy drink. But according to Livestrong.com, energy bars and drinks "can cause unwanted side effects such as irritability, anxiety, and withdrawal fatigue." Instead, try snacking on fruits and vegetables that will give you a more natural energy boost. Bananas are particularly great for afternoon snacking. According to Livestrong, they "happen to be low in fiber and are easily digestible, which means their sugar enters your body quickly for a rapid energy boost."

Deep breathing, relaxation techniques: If stressors pile up too high, or a meeting is going out of control, working relaxation techniques into routine before responding can result in the wished performance. Taking a deep breath before answering a complaint call, spending two minutes meditating before facing an angry boss or co-worker or even working muscles to make them relax a bit can also put a person in a better position to release stress and face the day.

Sharing one's problems: Rather than letting stress go over and spill in the wrong place, why not put it in the right place away? Sharing one's problems can reduce stress. One can share it with their trusted ones, close ones, loved ones. But even that is not necessary, one can share it in his/her diary or notebook, or with some inanimate thing such as stone , or even with a god's photo in one's workplace.

Organizing one's desk: How can a neater desk reduce stress? Well, because the source of many types of stress comes from a feeling of being out of control, of being overwhelmed. When your work area looks like a battlefield, you feel the tension growing. And when you cannot find that report you need, your stress level soars even higher. By organizing your files and piles, you get a sense (perhaps mistakenly) that there is some order in all the chaos.

Listening to music: Listening to the music of one choice can soothe the mind and drastically reduce stress. Therefore, it is a good idea to get a headphone (or an earphone)and keep some good music at the office desktop, laptop, mobile phone or even carry a mp3 player.

Smiling: One of the best ways to keep oneself in good mood is to try to feel as if one is already in good mood. Smiling makes one look cheerful on the outside, and if one is cheerful to others, others seem cheerful to him/her. Put on a smile even if you are in the toughest of situations, and the world will seem brighter and better, and it helps reduce stress.

Laughing it off: Laughter is one of the most valuable resources to help you reduce and manage stress. See a funny film or a comedy show. Remember to create time to 'play' and remind yourself to lighten up and not take life so seriously.

It must be always remembered that getting stressed sometimes is a natural part of life. Even people who work in the fields they want and truly enjoy their jobs carry the baggage of stress. What matters, however, is how we manage that period of stress. Just a few minutes here and there to refocus and recharge can make all the difference in the world.

Try these office stress management techniques in your workplace and feel the difference today...

OVERVIEW OF NEW ATS MESSAGE HANDLING SYSTEM (AMHS) INSTALLED AT TRIBHUVAN INTERNATIONAL AIRPORT (TIA), KATHMANDU

Er. Sanjeev Singh Kathayat
Manager, CAAN Head Office

BACKGROUND

With the view to meet the critical requirement of aviation community for exchanging its ground data communications, ICAO has established SARPs (Standards and Recommended Practices) that require all Contracting States to provide and support the Aeronautical Fixed Service (AFS). This service involves exchange of information for aircraft operation such as distress message, flight safety messages, meteorological messages, urgency messages and aeronautical administrative messages.

In order to support AFS and cater to the need of such exchange of aeronautical messages, the Aeronautical Fixed Telecommunication Network (AFTN) has been used for decades. Initially the AFTN infrastructure consisted of slow speed land line teletype links between the major centers which is now subsequently upgraded to high speed digital links.

In view of the critical requirement of aeronautical community for enhancing its ground data communications by means of available up-to-date technology, ICAO has specified that the Aeronautical Telecommunication Network (ATN) may replace the existing networks based on AFTN. The ATN will enable seamless communications between ground uses (e.g. ANSPs, Airlines, etc) and aircraft.

WHAT IS AMHS ?

The AMHS is a natural evolution from AFTN/CIDIN and replaces the telegraphic mode of working with a modern Message Handling system based on international standard. The AMHS, being an ATN application, utilizes the infrastructure of the ATN network, though this is not a prerequisite for the initial deployment of AMHS.

The AMHS is designed according to the International Telecommunication Union's (ITU) X400 messaging framework similar to modern day email message for the use of exchanging messages between the Air Traffic Service users over the ATN.

WHY AMHS ?

The AFTN is an aging technology which is very specialized; it is not based on modern standards, and has no market outside the air traffic control community. This implies that the costs associated with AFTN supply and procurement is overwhelmingly very high. Furthermore, AFTN technology is based on Telex protocols, and is severely limited with regard to messaging functionally and type of information that its messages can carry (i.e. it

can carry text only in either IAS or ITA2 form, and a length of maximum 1800 characters).

AMHS, on the other hand has much higher functions (which includes Security and Directory access facilities), and the message can carry any kind of digital information, including text, graphic, images, files, database, audio and video.

TECHNICAL PROVISIONS

- ICAO Doc 9880: Detailed technical specifications for ATN using ISO/OSI Protocols (Doc. 9880 replaces Doc 9705)
- ICAO Doc 9896: Manual for the ATN using IPS standard and Protocols

EVOLUTION OF AERONAUTICAL FIXED SERVICE AT TIA

The history of Aeronautical Fixed Service at TIA started with the implementation of Morse code (CW) system for the communication link between Kathmandu and Patna, and Banaras of India. This system was later replaced by Radio Teletype (RTT) System based on Baudot Code. In the year 1990 RTT was replaced by computer based semi-automatic message switching system (SMSS), which was operational till 1995 and was subsequently replaced by Automatic Message Switching System. In the year 2000, existing ECIL, Indian AMSS was installed to be Y2K compatible.

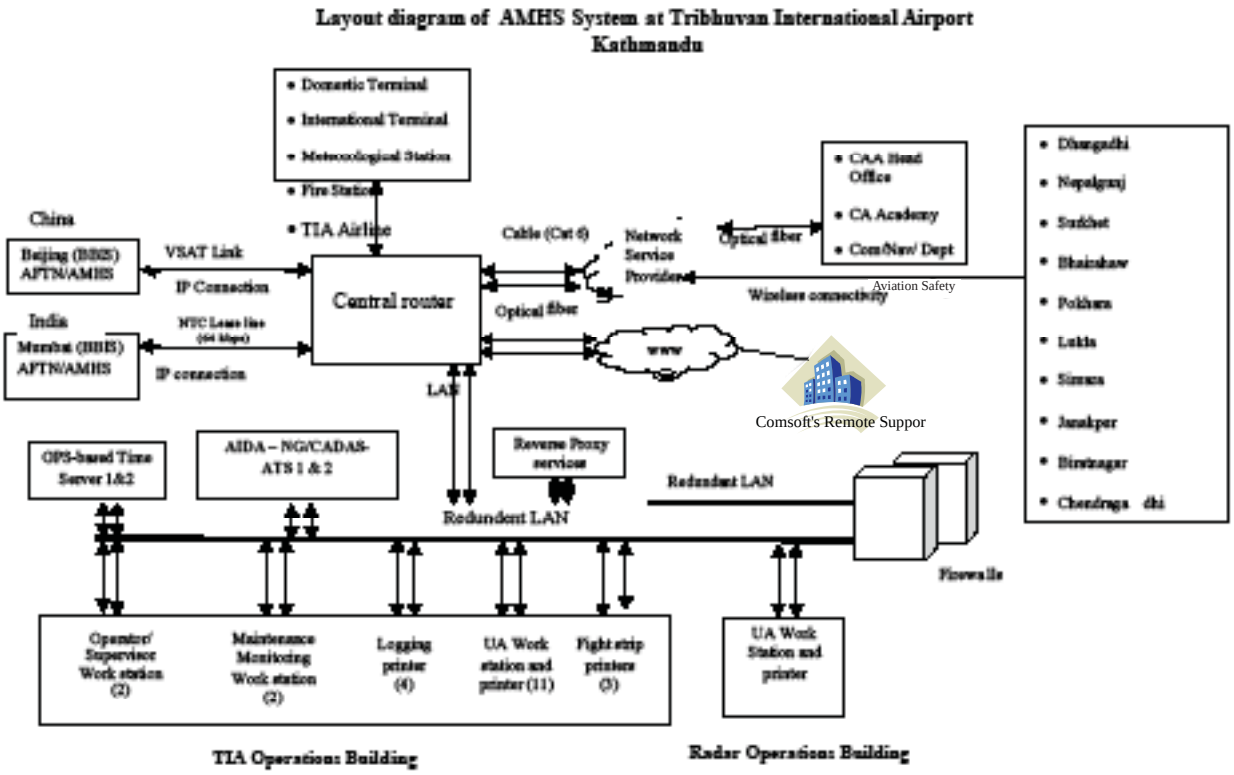
Due to the difficulty in maintaining existing AFTN System which was old, obsolete and also to be in line with ICAO policy in the ICAO policy in the Asia/Pacific region that requires states to implement AMHS as per Asia Pacific ATN Implantation Plan, CAAN recognized the need to replace its existing AFTN (AMSS) system with an ATS Message Handling System (AMSS) at TIA, Kathmandu

AMHS IMPLEMENTATION AT TIA, KATHMANDU

Civil Aviation Authority of Nepal (CAAN) prepared Tender Document with the assistance of Airways International, New Zealand and signed a contract on 14 February 2011 with COMSOFT, Germany for the procurement and implementation of AMHS at TIA, Kathmandu, Nepal. After the installation of AMHS system at TIA, Kathmandu-Mumbai IPS connectivity by AFTN/AMHS was successfully tested on 18th October 2012. Likewise, Kathmandu Beijing IPS connectivity was tested on 1 November, 2012. From 5 November 2012, A New Flight Plan – 2012 has been brought to operation by using the above connectivity.

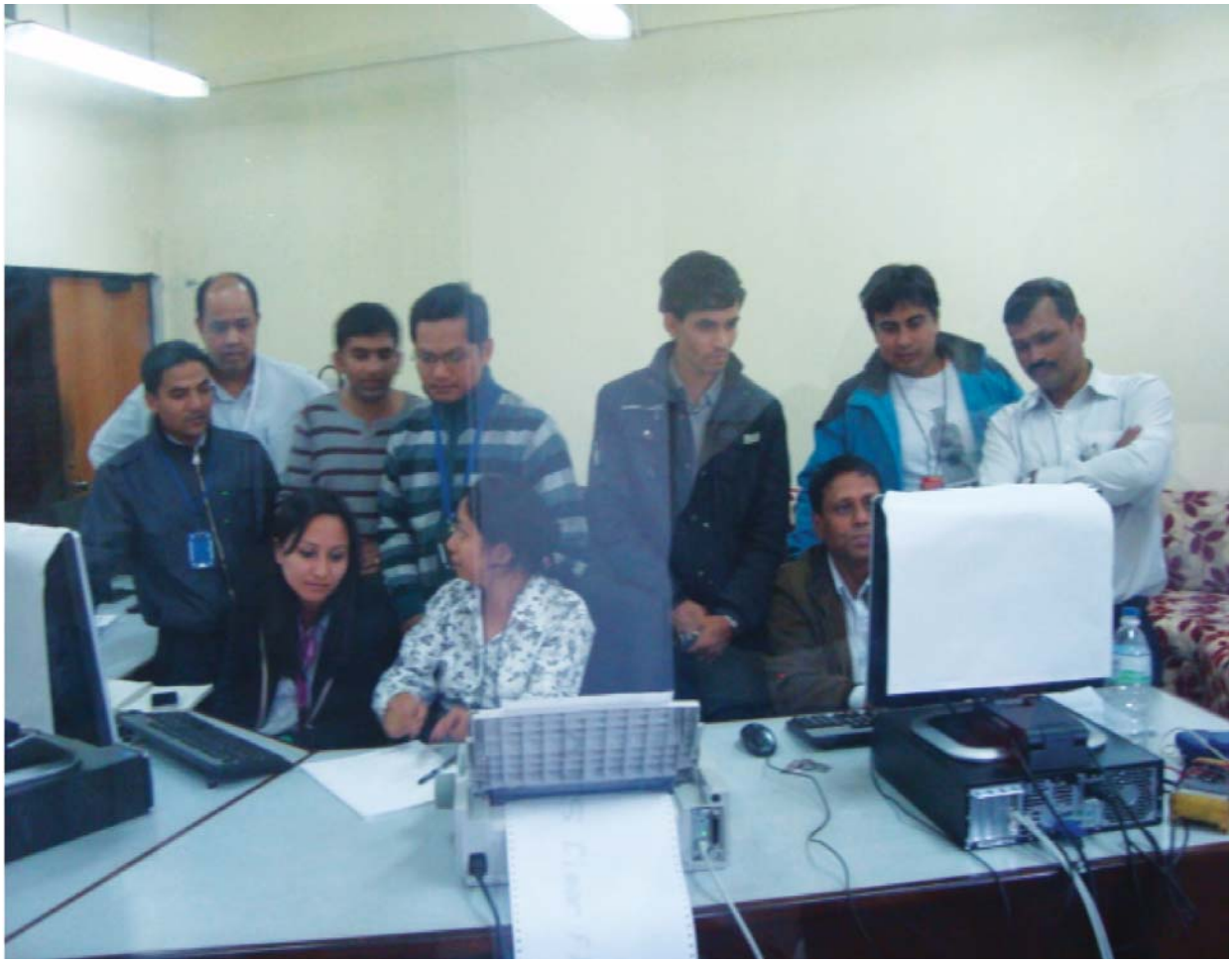
Newly Installed AMHS system in TIA

LAYOUT DIAGRAM OF AMHS SYSTEM AT TIA



FEATURE OF NEW AMHS SYSTEM AT TIA

- The existing AMHS is a hybrid AFTN/AMHS system which supports both AFTN and AMHS connections with its BBIS (Backbone Boundary Intermediate System) Mumbai (India) and Beijing (China).
- ICAO New Flight Plan 2012 compliant.
- Provision of Automatic Flight Strip Generator and Printing.
- Active Flight Data Report can be viewed on line by ATCs.
- Ten main domestic airports will be connected with existing AMHS system and will have inter-airport data communication facilities for the exchange of aeronautical information.
- Improved security of aeronautical messages.
- No restriction on message size.
- ATS Automation will be supported by connecting with ATS sever, Met server, AIS server as required
- Provision of implementation of ATN Directory in future.



New AMHS System testing with Mumbai and Beijing

FUTURE CHALLENGES IN AMHS OPERATION

- The reliable operation of User Agents installed at the remote domestic airports of Nepal will depend on availability of reliable power supply as well as regular technical support.
- Human resource development and/or succession plan for AMHS system administration and maintenance should be formulated and implemented with high priority for the smooth and reliable operation of AMHS at TIA.

REFERENCE

- ICAO Doc. 9880, 9705, 9896
- Comsoft AMHS training Manual
- ICAO and EU websites

COMPETENCE TO BE AN AIR TRAFFIC CONTROLLER

Murari Prasad Paudel
Manager, CAAN Head Office

There are thousands of flights operating safely in the sky at a time. Have you ever thought about the people who work behind the scene to keep those flights safe? They are Air Traffic Controllers or 'controllers' in short. Air traffic control is a specialized job because it needs certain and unique skills and differs from any other job and profession. A set of psychological and physical traits is required for a candidate aspiring to become an air traffic controller. This sensitive profession can afford no space for 'mistakes'. Definitely there are always risks of unwanted mistakes which are a challenge of this job.

In Nepal if you are interested in taking up 'air traffic control' as a profession you must hold a bachelor's degree in any discipline, preferably in science. If you have studied physics and mathematics in higher secondary level it would be better. However, we should not forget the fact that we have a lot of controllers with other than pure-science background who are doing their job well.

If you want to be a controller you must have these skills or abilities:

- Spatial skill
- Visual-motor coordination
- Intellectual skill in understanding concepts, intelligence and reasoning test, intelligence quotient within normal or expected limits according to sex and age
- Skill in remembering both immediate and remote events
- Anxiety - IDARE psychological test
- Teamwork skills
- Tolerance to frustration so that it does not interfere with performance
- Skill in exercising effective personal authority
- Skill in making decisions under pressure with the appropriate thinking process
- Skill in paying attention to details
- Skill in assuming responsibilities
- Willingness to accept criticism
- Respect for authority and the rules
- Skill in performing several tasks simultaneously

- Skill in coping with rapid changes in task assignments
- Inductive reasoning
- Concentration / de-concentration skills
- Resistance to stress
- Emotional stability
- Willingness to anticipate and value possible conflicts. Capacity to foresee possible errors and conflicts
- Resistance to boredom
- Interest in the career
- Feeling of identification with the profession

If you have those qualities you may apply for the training. For this you have to go through selection criteria.

SELECTION CRITERIA

To participate in the selection process, you, as an applicant, must have academic qualification equivalent to that required to enter the university, must be proficient in English language and have knowledge of computer technology. Air traffic control is an activity in which safety and efficiency are essential. Selection criteria must be as demanding as possible in order to attract candidates with the highest potential for facing air traffic controller activities in a satisfactory manner.

Basically in Nepal the possible candidates are selected through written examination followed by oral examination. The characteristics of the air traffic controller profile must be a pre-requisite in the selection process, especially when testing for general knowledge, English language, and medical and psychological condition. After completing these tests, you must be evaluated in a personal interview by a board made up, *inter alia*, of controllers trained in selection methods and procedures and a psychologist trained in or familiar with all aspects of air traffic control.

During the interview, the board should analyze aspects such as motivation, adaptation, flexibility, determination, social skills, hearing capacity, ease of speech, ability, attitude, and adaptability to changing environments. It is important, once the selection process is over, to involve candidates in the traffic control environment through familiarization courses and visits to different units. Selection is a dynamic process and thus must be adjusted as technological changes occur.

MEDICAL REQUIREMENTS

After completion of those selection criteria the selected candidates must meet some medical requirements.

1. Physical requirements : You must have sound and strong physical status at least to meet class three assessment requirements.

2. Psychological requirements : A series of psychological tests should be conducted to specifically evaluate the personality, intelligence, skills, and anxiety of applicants. You must meet all of the characteristics of the air traffic controller profile.

FORMAL TRAINING

If you are medically selected you become eligible to get formal or basic ATS training. The purpose of training air traffic controllers is to ensure that controllers have the knowledge, skills, and experience they need to perform their duties safely and efficiently in order to meet national and international air traffic control standards.

Any training process will benefit from clear objectives. The existence of a definite training period with well-defined stages will help you as students to determine your learning pace and note your progress in each stage. By using the objectives with a logical progression, you will be able to observe your own achievements and thus increase own motivation.

By the end of the training stage, you, the controller should know and understand:

- How an ATC system operates.
- The meaning of all the information presented.
- The tasks to be performed.
- The rules, procedures, and instructions that are applicable.
- The forms and methods of communication within the system.
- How and when to use each item supplied in the workplace.
- Human factor considerations applicable to ATCs.
- The ways in which responsibility for an aircraft is accepted and transferred from one controller to the next.
- The ways in which the work of various controllers is harmonized so that they support rather than obstruct each other.
- What changes could be an indication of a deterioration or failure of the system.
- Aircraft performance characteristics and preferred maneuvers.
- Other factors that affect flights and routes, such as: weather conditions, restricted airspace and noise abatement, etc.
- General knowledge of airport infrastructure and the airspace.
- The importance of reception, transmission, and coordination of information.

Training courses will offer you the benefits of teamwork. Competition helps in the training and contributes to the development of social skills. Individuality in air traffic control does not exist; those unable to work with their peers and who do not tolerate their behavior are not suitable for air traffic control. You must develop a sense of identity with your group and this will increase your motivation.

Air traffic control training can be divided into three main stages, namely: Aerodrome Control, Approach Control, and Area Control. Radar procedures should be included as part of the training when so required.

THE ATC LABORATORY

As trainees, after basic or theoretical knowledge, you must go through the laboratory exercises. In this stage, the basic air traffic control principles, as well as techniques for safely controlling a certain number of aircraft shall be taught. Exercises shall be increasingly intense until the desired level is reached in the simulator room.

The laboratory reinforces your skills and gives you a chance to analyze your behavior, as well as individual decision -making in order to improve teamwork. Furthermore, the laboratory helps the instructor determine which areas need more work. It is in this stage that your weaknesses can be corrected before they become habits.

Any laboratory is safer than an operational experience. For that reason, an intensive training shall be provided, in which mistakes can be made that cannot be tolerated in a real life situation. Don't forget that the basic rules and techniques of controlling are similar all over the world. All annexes, documents and manuals are developed and prescribed by International Civil Aviation Organization (ICAO).

ON-THE-JOB TRAINING

Before you get the certificate and you are appointed for the job you will get on-the-job training. Progressive on-the-job training may include, as initial objectives, the filling out and handling of flight progress strips, proper phraseology, routine skills, etc. Subsequently, basic techniques for aircraft control under conditions of low traffic density and conflict detection would be added, finally getting to more complex traffic situations, expeditious conflict resolution and traffic control. An important factor for trainee controllers is your acceptance into the group by the other controllers.

FAMILIARIZATION FLIGHTS

This familiarization flight is offered during the basic training as well as during the job at any time when required. The purpose of familiarization flights is to give controllers, supervisors, and air traffic services personnel the opportunity to observe at first hand the work of pilots; different types of aircraft and their departure, en-route and arrival procedures, and the work of other ATC units. This means creating an optimum criterion when issuing actual concepts that can improve the service.

After completion of all those steps successfully you are ready to apply for the job.

BE READY FOR TAKEOFF

At the beginning point of Runway, if everything is fine an aircraft says ready for takeoff, she receives final authentic instruction or approval from control tower through these words"…cleared for takeoff". Judge yourself, if you think you can pass through all those processes or you can meet such competence; you are ready to be a controller. How smart you are and how able to perform your task tactfully, it's upto you to decide entering to the most exciting world. You will be proud of yourself that you are responsible to control all activities in the sky and save thousands of lives daily. So friends, you are cleared for takeoff!

REFERENCE

- PROFESSIONAL CAREER FOR AIR TRAFFIC CONTROLLERS GUIDE submitted to ICAO by Grepecas ATC/TF3
- ATS Professional Career Task Force

AVIATION POLICY AND AIR SERVICE AGREEMENTS: NEPALESE AVIATION PERSPECTIVE

Ritcha Sharma
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International Air Services around the world are governed by bilateral and increasingly multilateral Air Service Agreements (ASAs) between governments. Such agreements provide the basis for the airlines of the countries involved to provide international air services for passengers, cargo and mail. Through ASAs, the Government of Nepal has developed and maintained operating environment for its aircraft operating agencies.

Unlike the traditional approach, the ASAs thus pursued by a country are either based on liberal sky policy or open sky policy. Liberal sky policy focuses on bilateral ASAs with some restrictions and government reservations regarding routes, capacity and pricing in international markets. Open sky policy, whereas, is designed to completely eliminate government involvement in such matters. Open sky policy leads to open sky agreements (bilateral or multilateral) between states.

These air service agreements include the items of agreement such as traffic rights, authorized points, capacity, pricing and designation. Other topics related to operative agreements may also be included in such agreement, for instance, code sharing and other issues such as repatriation of earnings, ability to select handling agents at foreign airports and the use of computer reservation systems.

In the past decade, bilateral open sky agreement was widely accepted as the most appropriate framework for liberalization. Developing countries, in particular, used them to exploit opportunities from trade, investment and tourism. But with time the industry has undergone considerable transformation which cannot always be reflected in such agreements. Technological improvements have allowed a great range of services at much lower cost. Studies point out that the bilateral negotiations are often narrowly focused on the benefits to the airlines. The benefits to passengers, shippers, tourism and the wider economy are given less weight, often because they are more difficult to quantify. Recognizing these shortcomings and the potential economic benefits of a more open aviation sector, many governments have moved to deregulate various aspects of aviation. This has included the privatization of airlines and airports, deregulation of domestic markets and liberalization of international ASAs by forming open skies regional groups. Some of such groups are European Union (EU) and Caribbean Community (CARICOM) which have countries under a single umbrella of rules guiding them to pursue air service agreements in accordance to the set policy of such group. Similarly, in 2005, India proposed to SAARC an open skies arrangement with an objective of achieving substantial increment in air connectivity among countries in the region.

Whether to be a part of such regional group or not should be guided by a country's aviation policy which is a guiding principal for the determination of the model to be adopted by a state with regards to the air service agreements. Aviation policies of different states are formulated taking into consideration its capacity, financial strength, geographical location, growth potential and similar factors. Aviation policies of states thus not only reflect different objectives but also differences in the constraints being faced by them. Objectives and constraints are many and varied, and the balance between the different objectives and the strength of different constraints

determines policy preferences.

In general, it is seen that developing countries' policies in international transport tend to be more restrictive than in other service sectors. The aviation policy of Nepal has adopted ' liberal sky policy gradually moving on to the open sky'. It has not, as such, talked about the time frame, and has not elaborated this shift procedure.

Researchers indicate to the fact that for a developing economy and aviation as those in Nepal, the implementation of open sky policy may adversely affect the growth of aviation. Open sky liberates the market wherein the prices are determined based on competition. This may create a situation of reluctance among the smaller operators to take up such a tough competition. They may even call it quits in such condition. The most affected in this scenario would be the national carrier. In Nepal, tapping the benefits offered by the Air Service Agreements still remains a far cry. The National carrier is immersed in various problems like poor management and political interference. Majority of traffic rights granted to the designated carriers of Nepal are underutilized and those granted to foreign carriers are either fully utilized or are sufficiently utilized. Though Nepal has ASAs with 36 countries and the number of seats available from Nepal to those countries exceeds 1 million, only 39% of the seats have been utilized by Nepalese airline operators. This disparity in the usage of traffic rights is on account of various reasons like:

- Our national carrier is not in a position to fly on various sectors due to its financial condition (supported hugely by the ground handling service) and aircraft availability.
- Lack of private operators carrying out international flights.
- Private airline operators, despite their attraction to international flights, being able to operate international flights only for a short period of time and fizzling out.

In Nepal, poor road links, geographically difficult airports and lack of transportation alternatives such as railways infrastructure often constrain the efficient transportation of passengers and goods. As is the fact, air transportation holds both the potential for growth and economic development of the country by fostering trade and foreign investments. However, Nepal's air transport industry has been a smaller player when compared to the global industry.

Some researchers like Frost and Sullivan have pointed out to the fact that the implementations of open skies policies may adversely affect growth of aviation especially in counties with a developing aviation industry. Nepal will have to witness the tough results of open sky policy if she adopts it in present condition of airport infrastructure together with the national carrier. For instance, over capacitation of airports usually occurs if a developing countries lacking infrastructure abruptly adopts this policy. Here TIA with all its constraints has been catering to very dense heterogeneous traffic. The proceedings of the proposed second international airport have come to a standstill. The country itself is going through a cumbersome transition period. With the present scenario of infrastructure and national and private international carriers, foreign carriers will gain much more than the domestic players who will not be able to pace up in order to reap reciprocal benefits from such pacts. Moreover, in such a case most of the profits and producer benefits (including benefits to the workforces of the airlines) accrue to countries other than the home country.

Thus, if well-knit infrastructure can be maintained, Open Sky Policy can trigger economic growth through traffic growth and help in creation of more job opportunity. With the focus of CAAN on infrastructure, capacity development and planned policy, our aviation market is expected to develop significantly in the next few years encouraging this growth momentum. And again, this growth demands a more open and non-restrictive policy. However, Nepal is not yet ready for its shift to an open sky policy or inclusion in any form of open sky regional air service groups. We have still a lot left to utilize from the existing agreements. Ensuring a strong infrastructural foundation and competitive market position with mature players able to utilize all the benefits offered by ASAs is very important in case of Nepal prior to taking up a gradual move to the open skies.

REPLICATING AVIATION IN LIBERIA & UNMIL AVIATION

Umesh Kumar Panthi
Dy. Manager, TIACAO

Far West Africa's beautiful country with lovely people, Liberia is a war ravaged country moving smoothly towards peace, stability & development aided by UN Mission in Liberia (UNMIL), since 2003 and other various UN agencies & international organizations.

UN has involved in this mission since the time of conflict which begun around 1989/1990 in different forms and different mandates. However since 2003, UNMIL came as multidimensional operation mission with almost 15000 military forces, over 1000 police officers, plus the civilian component. Mission is now downsizing & at the stage with 5800 military force with the mandate of enabling the transition of security, promoting human rights, Supporting reconciliation, constitutional reform and decentralization and enhancing support for security sector and rule of law reforms in Liberia.

LIBERIAN AVIATION

Liberia owned its own airline-Air Liberia which ceased its operation in 1990. A little known bureau of Civil Aviation was under Ministry of Commerce, Industry & Transport until 2005 when under decoupled ministry of transport, Liberia Civil Aviation Authority (LCAA) was created to provide for regulation & promotion of civil aviation in Liberia to foster its safe and orderly development as an independent national government authority. Later in line with LCAA but an independent body was established as Liberia Airport Authority (LAA) in 2009 to have managerial & operational control of all government airports (international & domestic) in Liberia to maintain, develop & operate as a service provider with the exception of Air Traffic Services, Fire and Rescue Services, Meteorological Services and Airport Security Services which are jurisdiction of LCAA.

LCAA has the authority to carry out inspection of all the airports in Liberia within the jurisdiction of LAA for monitoring and imposing the ICAO requirements and other national/international compliance. In both the organizations, LCAA & LAA, separate 7 members' board are appointed by the head of state. However, the process/ criteria of appointment are somewhat different. LCAA board members include 1) The Chairman, 2) Designated senior civil servant of the ministry responsible for civil aviation as Vice Chairman, 3) Designated senior civil servant of ministry of finance – member, 4) Three members from private sector each from law, business & aviation – members & 5) Director General as member secretary. Likewise for LAA, 1) Chairman, 2) one representative from ministry of Transport – member, 3) Managing Director of LAA as member secretary, 4) Three members from private sector with aviation background, and 5) one from LCAA as member.

There is one international Airport called Roberts International Airport (RIA) about 50 KM away from capital city

Monrovia which is the gate way for Liberia via Air. But the domestic hub airport which is situated at the down town Monrovia city, named as Spriggs Airfield (SPA) is also catering few cross boarder flights limited to day VFR operations with small & medium sized aircrafts, the biggest fleet being DASH-8. Thus, there are two different managements for airports under LAA in Liberia, one as RIA and the other as Liberia Domestic Airport Agency (LDAA) of which all activities are concentrated at SPA as the main hub of domestic flights. Outside SPA, there is no active presence of LDAA and there are no staffs outside Monrovia but there are few technical staffs as Loaders & Rescue and Fire fighters at 4 domestic airports other than SPA. They are recruited and trained by LDAA but their salary / wedge is paid by UNMIL through LDAA. UNMIL & LDAA as well as UNMIL & RIA have signed two different Memoranda of Understanding for the airport services that RIA and LDAA is providing to UNMIL Aviation in international & domestic airports. Air Traffic Services staffs are under LCAA, but are paid by UNMIL as per the MOU of UNMIL with RIA & LDAA.

Roberts Flight Information Region (Roberts FIR) is the single FIR for three countries which comprises the airspaces of Liberia, Guiney & Sierra Leon. Roberts FIR airspace is managed with categorization of four different classes of Airspaces: Class A (at & above flight level 150), Class C (aerodrome control zones), Class D (terminal control areas) & Class G (outside Class A, Class C & Class D). Roberts FIR's main Aeronautical Information Management office and Roberts Control Area Control Center are situated in RIA.

RIA is the only international airport of the country and more than 90 % of the flights are concentrated to this airport (considering that all international flights operate from RIA and if UNMIL flights are excluded there are no or very limited domestic charter flights). RIA operation dominates the major aviation activities in the country. RIA operates 24 hours and can cater all types of aircraft operations. It has metallic Runway (3400 meters length wise), VOR, DME, NDB, Glide Path etc. navigation aids with Runway & Approach lighting. Outside RIA, as many as five NDBs were installed by UNMIL in the beginning at various domestic Airport locations but only one NDB is operational at present. SPA runway is also metallic with dimension of 1800 X 50 sq. meters but no other navigation aids are available. However, Flight Information Service from ATS tower, Ramp control, Marshaling and Aircraft Refueling services are available. Airport operations are limited to day-VFR-operation however UNMIL is operating night VFR operations for rotary wing aircraft to meet special rescue operations like CASEVAC & MEDEVAC and or military operations with the aid of portable landing lights. There are 7/8 other Airfields for fixed wing operations but none have metallic runway including the one built and operated by a multinational business party operating its Cessna aircraft for its sole purpose. UNMIL is currently operating its biggest fleet in the domestic sector of the country, Dash-7 to other 3 airfields other than RIA & SPA. In addition UNMIL is operating its B190 aircraft to two other destinations in the country.

There are no established national carriers or airlines with scheduled air services. However, there are 1 or 2 companies offering air charter services with Helicopters. All aviation related government functions are carried through LCAA & is the top government agency which implements government's aviation policies and regulations. While RIA management is looking after the only international airport, RIA, LDAA looks after the domestic airports, up gradation, maintenance, day to day operation, and manning of the other Airports but its activities are confined to SPA due to limited resources.

UNMIL AVIATION

UNMIL aviation section, under UNMIL's Integrated Support Services (ISS) division, is responsible to fulfill all of UNMIL's air logistics, rescue & military air operations necessities / demands through its effective and efficient utilization of air assets & aviation manpower with highest safety standards applicable in the industry. When there are more than one aviation standards i.e. country standard or UNMIL standard or ICAO standard, the most restrictive one will apply. Thus UNMIL always try to operate in safest mode of aviation operation however depending upon the nature of military or rescue operation some flexibility will be there to cope with the situation. UNMIL has its main base at SPA but sub base also at RIA and it operates its cross boarder & country specific logistics, rescue and military flights from both airports as per the types of aircraft and air operation requirements. UNMIL has its wide variety of fleets' capability from Boeing 737, Dash 7, and Beach 190 to Mi-26, Mi-8s & Mi-24s. With its vastly experienced aviation experts in aviation planning, operation, management, technical compliance & quality control, swift yet safe, efficient yet reliable UNMIL aviation operation is possible. UNMIL is the major partner supporting all major construction works both at international and domestic airports in Liberia. In addition UNMIL is supporting with many navigational aids, communication equipment and with firefighting equipment and facilities. UNMIL aviation is aided with MOVCON (movement control) which is different section under ISS but works in close liaison with aviation in addition to the UNMIL's military wing UNMIL Force air operation. MOVCON carries out all the works related to Passenger and Cargo booking and passenger and cargo handling in addition it handles sea logistics operations. So the air tasks demand come from both sides to the UNMIL aviation MOVCON & Force air operations, where aviation planning works to best suit the requirements. Safe and efficient execution of air tasks, crews briefing, flight following etc. are the responsibility of Air operation unit. Meteorological unit if required works round the clock disseminating up to date actual and forecast weather of flight origin, enroute and destination. Any air task orders & monthly / quarter yearly flight schedules approval is done only from the top mission administration – Director of Mission Support level.

There are more than 400 helicopter landing sites in the country where at least one or more time Helicopter landing / take off were made. But only about 3 dozens of the Helicopter Landing sites are frequently flown besides there are more than 8 airfields in operation where fixed wing operation is being done. UNMIL's Airfield Management Unit is responsible to maintain an up to date airfield & airfield facilities data readily available to concern at any moment of time so that flying crew can check destination and or alternate airfield / HLS data just before flight. This data management is done through computer based Aviation share drive data source where Airfield / HLS data are orderly maintained in Directories and Indexes. Airfield management unit is responsible for ensuring safe and professional conduct of all ground activities on the UNMIL operated airfields / landing sites and Ramp Activities, monitor the provision of Rescue and fire fighting services, monitor the provision of ATM & Marshalling Services, Fire fighting / fire prevention / crash response and rescue services at Airfields/HLS, Coordination of the Air Liaison Officers' activity in close cooperation with UNMIL Force Air Operations, Monitors the physical state of landing sites and assigned buildings, hangars, offices and equipment, Maintenance and up gradation of airfields/HLS, ensuring that UNMIL operated Airfields / HLSs Directory and indexes are updated in computer data resources centre and publish comprehensive Aeronautical Information Advisory on a daily basis. Thus managing all the airfields / HLS of UNMIL interest all the time in a ready to use condition is a daunting task for UNMIL Aviation and that has been made possible with the deployment of UNMIL Airfield managers to most busy airfields / HLS and assigning them areas of their responsibility for frequent inspections. At those airfield /

HLS places where airfield managers are not deployed due manpower constraints, Military or police officers with aviation background are trained to carry out aviation and MOVCON jobs who are called Air Liaison Officers (ALO) are assigned / deployed.

For the effective oversight of the aviation system, there is an internal audit system which is operated by TCQA (technical compliance and quality assurance unit in aviation). TCQA is responsible for contract management, fleet utility monitoring & calculation, compliance of contract etc. in cooperation with aviation budget unit. Further, to make aviation safer, there is a regional aviation safety office which works in close liaison with UNMIL aviation but in parallel as a watch dog and it reports directly to mission leadership & UN aviation. This is also the body to investigate all the aviation occurrences and advise to improve deficiencies to minimize or mitigate such occurrences in future.

CONCLUSION

Safety, efficiency and reliability are the basic pillars that make civil aviation operations possible anywhere, anytime and every time. Motive of depicting Aviation in Liberia and UNMIL aviation was for letting readers know how aviation is managed in this part to some extent. It is not to depict bad practices as good ones but to present what was observed as an aviation worker. Safety is everyone's responsibility. Therefore it is important to observe things around, to realize what the good practices are and where those can be applied & to know where improvements are needed for a safer and more efficient aviation in an organization.


Beautiful Flying

RELEVANCY OF HUMAN RESOURCE POLICY IN CAAN

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INTRODUCTION

Human Resource includes every person or employee within an organization. In an organization Human resource means "the people that staff and operate an organization"; as contrasted with the financial and material resources of an organization. Human Resources is also the organizational function that deals with people as well as aspects and issues related to people such as acquisition aspect, development and motivation aspect, maintainance aspect, recruitment, compensation, carrer development and training, performance evaluation etc.

Policy deals with the process of making important organizational decisions, including the identification of different alternatives such as programs or spending priorities, and choosing among them on the basis of the impact they will have. So policy is the wayout, layout and or guidelines. or it can be understood as management, financial, and administrative mechanisms arranged to reach explicit goals. A policy is typically described as a principle or rule to guide decisions and achieve rational outcome. The term is not normally used to denote what is actually done, but it is normally referred to as either procedure or protocol to be followed in the future. Policies are generally adopted by the apex board of or senior governance body within an organisation.

Human resource policies are the formal rules and guidelines that the organization put in place from recruitment to retirement process i.e. hire, train, assess, retain longer, reward and retire the members of their workforce. The HR policies are normally referred to as either procedure or protocal to be followed in the future and as guidelines, implementation methods and evaluation techniques relating to recruiting people, training them, performance appraisals, motivating employees, and retaining them for longer period to get optimum working profermence effectiveness. Having policies written is important so that it is clear to all what the policies are and that they are applied consistently and fairly across the organization.

AREA OF HR POLICY

An organization's HR specialist should make sure that they address the following basic human resource issues when putting together their personnel policies for the best HR solutions :

- The organizational structure : form of organization, the HR specialist unit.
- The employment system : i.e. adoption of either post classification or merit system or rank system, and either open career system or closed career system.
- The acquisition : HR planning, Job analysis; job discription, job evaluation, job spceification, recruitment,

selection, posting and transfer.

- The development and motivation : performance evaluation, Performance improvement, trainig, promotion and career development, compansation and non monetary motivation.
- The maintainance : safety, health, conflict and discipline, workdays, holidays, paydays, stress evaluation and Overtime compensation, collective bargaining, management of pressure groups, elimination of grievances, reward and punishment, employee record and termination policy.

NECESSITY OF HR POLICY

It is understood that the most valuable resource of any entities is its employees, as they play a crucial role in accomplishment of the aims and objectives of an organization. Therefore every organization wants to attract, motivate, and retain the most qualified employees and match them to jobs for which they are best suited and retain them for longer period to get best performance. Human resource policy involves visions, rule and guidelines for managing people in an organization. Therefore, the focus of human resource management is to deal with the manpower and all the decisions related to it that can have an impact on the productivity. As the key areas of the HR policy are recruiting people, training them, performance appraisals, motivating employees, retaining them for longer period to get optimum working profermence effectiveness, an organization cannot build the best working professional team without its HR policy. All these concerns can be addressed by having best HR policies.

HR STATUS

Civil Aviation authority of Nepal (CAAN) has been established as an autonomous and corporate body with perpetual succession under the civil aviation authority of Nepal act 1959 in order to make the operation of national and international flights, air communication, air navigation and air transportation services safe, regular, standard and efficient. For this, as its apex human resource, a board of directors comprising of a chairperson and the members as mentioned below has been constituted for the operation, supervision and management of all the functions of the Authority.

BOARD OF DIRECTORS

Chairperson	-	Minister or Minister of State of Tourism and Civil Aviation or a person specified by the Government of Nepal.
Member	-	A representative, Ministry of Tourism and Civil Aviation.
Member	-	A representative, Ministry of Finance.
Member	-	One person nominated by Government of Nepal from among persons belonging to the private sector or association or institution and having special knowledge and experience of the tourism industry.
Member	-	One person nominated by Government of Nepal from among the persons having

special qualifications relating to Civil Aviation.

Member - Two persons nominated by Government of Nepal from among the directors of the institutions operating air service including the private sector engaged in the operation of airlines service.

Member-cum-Secretary - Director General. (As the chief executive officer-CEO)

To carry out the day to day organizational functions guide lined by board of directors as well as other rules and regulations, the human resources engaged with different bureaucratic hierarchy as management and functional level and as permanent staff are as follows;

As of fiscal year 2067/068

Ranks	Permanent Posts	Existing Permanent Staffs	Understaffing	Understaffing Percentage	Remarks
1	155	155	0	0	
2	4	0	4	100	
3	46	32	14	30	
4	85	53	32	38	
5	181	100	81	45	
6	126	84	42	33	
7	182	120	62	34	
8	125	101	24	19	
9	92	75	17	18	
10	41	27	14	34	
11	22	18	4	18	
12	6	4	2	33	
Total	**1065**	**769**	**296**	**28**	

Source: Administration Department, CAAN HO.

And around 800 plus manpower are involved through outsourcing as computer operator, driver, cleaner, announcer, Trolley operator etc. unevenly and inequitably throughout the 52 locations including the head office, CAAN.

EXISTING HR REGULATION AND PROVISION

In CAAN, presently no formal and defined HR policies are promulgated there but to much extent it implies by some guiding rules and regulations such as;

- Civil Aviation Authority of Nepal Act 2053. (1999 A.D.)
- Regulation of employees services terms and conditions and facilities 2056.

- ICAO Annex 1/ AIP Nepal/ FOR/PLR/ATC Manual and other related manuals.
- Civil Aviation Regulation 2058. (preamble 6)
- Civil Aviation Policy 2063. (Section 4.13)
- Prevention of corruption act 2059.
- Public procurement regulation 2064.
- Labor Act 2048. Trade Union Act 2049.
- TADA Regulation of Nepal government.

HR OGANIZATIONS

- Board of Directors.
- Management Committee.
- Recruitment Committee.
- Training Nomination Committee.
- Civil Aviation Academy.
- Personnel Administration Department.
- HR Development Department.

ABNORMALITIES DUE TO LACK OF HR POLICY

There is no formal, defined and complete policy regarding recruiting people, training them, performance appraisals, motivating employees, retain them for longer period to get optimum working profermence effectiveness and so as to derive properly the human resources. CAAN has facing much more abnormalities due to the lack of defined and strictly adhered HR policy. The abnormalities relating to HR can be pointed out as follows:

- No match with the main themes of personnel management; right man in right place in right time.
- Management decisions relating to human resource are impaired by pressure groups but not only impaired, most of the decisions are closest with pressure groups.
- No equity and equality can be maintained on career development within different services and groups of employees.
- The reformation of organizational structure depends on the interest of restructurer without adopting any prescribed form of organization.
- Acute unemployment exists in our society but CAAN has been facing understaffing in some service groups; ATS, Airworthiness, Flight Operations, Legal, CA, Administration, Finance. On the other hand the tendency of recruiting manpower in contract through outsourcing is increasing day by day in undefined, unproductive or useless sectors.
- Management (final decision maker) is always in conflict and under mental pressure on most of the decisions relating to human resource.

- Airports, the main business places of CAAN, cannot provide proper services to the public and somewhere airports are closed due to the lack of technical manpower.
- Nepotism is getting emphasis on recruitment process.
- Highly technical and qualified manpower uses CAAN as platform provider but never as the long lasting employer.
- The development and motivation factors such as performance evaluation, organizational behavior, morale, motivation, team work etc. are losing their meaning.
- No certainty of career development with high performance but may be with catching power centers.
- CAAN's services, performances, social as well as national obligations of safety, regularity, standard and efficiency of air transportation will deteriorate in the long run.

CONCLUSION AND SUGGESSIONS

The valuable resources of any entities are its employees, therefore every organization has to attract, motivate and retain the most qualified employees matching them to best suited job and retaining them long lastingly for getting best profermance. This can be done by having formally well-defined and written best HR policies.

In Civil Aviation authority of Nepal (CAAN),except some guiding rules and regulations, no formally well-defined and written HR policies are promulgated and adhered till now. This has resulted in diminished institutional obligations toward Society as well as nation, Service delivery, and performance effectiveness. The best solution to gain fruitful achievement and to throw away these abnormalities prevailing in human resource management of the institution is to adhere to well-defined and written human resource policies formed by human resource specialist and based on that policy other existing guiding rules, regulations, manuals regarding human resource should be amended and implemented.


Surkhet Airport

AIRPORT CATAGORIZATION

Suneeta Shiwakoti Bhardwaj
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How many fire trucks or fire vehicles does a certain airport have? This is the question that all the airlines and certainly all the pilots should be aware of. What is the RFFS facility at the departure, destination and alternative aerodromes should be the very basic thing that they should have idea about. The minimum RFFS capabilities and equipment is regulated. Depending on what the user aircrafts at the airport are, the number of fire fighting vehicles and the number and quantities of fire extinguishing agents will vary. What is the largest aircraft an airport can handle is a general way of defining an Airport category.

HOW IS AIRPORT CATEGORIZED?

Basically, airport is categorized by determining the overall length and fuselage width of any aircraft that uses the airport. Airport category proportionally depends upon the Level of protection to be provided at an airport, which again is based on the airport category. The level of protection to be provided specifies the minimum requirement of fire stations, communication and alerting service, number of vehicles, response time, minimum discharge rate, and minimum supply and storage of extinguishing agents (water, foam and dry chemical powders or other complementary agents having equivalent fire fighting capability).

ICAO's Airport Service Manual Part 1 says that the level of protection to be provided at an airport should be based on the dimensions of the aeroplanes. The first dimension to take into consideration is the aircraft length and the second is the fuselage width, the reason for this being that short but very wide (fuselage-wise) airplane might carry more fuel and passengers than a short and not so wide aircraft.

Airport categories for rescue and fire fighting are based on the over-all length of the longest aeroplane normally using the airport and its maximum fuselage width as detailed in table 1.

Table.1 also specifies the minimum number of fire vehicles required according to the determined airport category.

Aircraft Category for fire fighting	Aircraft Overall length	Aircraft Maximum Fuselage width	Minimum no of fire vehicle required acc. to category
1	< 9 m	2 m	1
2	9 m ≤ length < 12 m	2 m	1
3	12 m ≤ length < 18 m	3 m	1

4	18 m ≤ length < 24 m	4 m	1
5	24 m ≤ length < 28 m	4 m	1
6	28 m ≤ length < 39 m	5 m	2
7	39 m ≤ length < 49 m	5 m	2
8	49 m ≤ length < 61 m	7 m	3
9	61 m ≤ length < 76 m	7 m	3
10	≥ 76 m	8 m	3

Table. 1.

In the context of Nepal, airports have been categorized for the provision of rescue and fire fighting services on the basis of:

- The biggest type of aircraft operating currently on the specified airports.
- The airport category for rescue and fire fighting should be based on overall length of the longest aeroplanes normally using the airport and their maximum fuselage width.
- The airport category should be determined in accordance to Table 1 by categorizing the aircraft using the airport, first evaluating their overall length and second their fuselage width. If, after selecting the category appropriate to the largest aircraft's overall length, that aircraft's fuselage width is greater than the maximum width in Table 1 for that category, the category for that aircraft is actually one category higher.
- Airports should be categorized by counting the aircraft movement in the busiest consecutive three months of the year as follows:
    - i) When the number of movements of the aircraft in the highest category normally using the airport is 700 or greater in the busiest consecutive there months, then that category should be the airport category.
    - ii) When the number of movements of the aircraft in the higher category normally suing the airport is less than 700 in the busiest consecutive there months, then the airport category may be one less than the highest aircraft category.
    - iii) When there is wide range of difference between the dimensions of the aircraft which are included in reaching 700 movements, the aircraft category may be further reduced to be no lower than two categories below that of the highest aircraft category.

Above mentioned requirements are the basic theories for determining airport category. Prior to the year 2005, the number of aircraft movements was considered and the airport's RFFS category used to be downgraded to one category below if there were not many movements of the largest aircraft during the three busiest consecutive months. Nowadays, during anticipated periods of reduced activity, the level of protection available shall be no less than that needed for the highest category of aeroplane planned to use the aerodrome during that time, irrespective of the number of movements.

Either a take-off or a landing constitutes a movement. Movement of scheduled, non-scheduled and general aviation operations should be counted in determining the airport category. When the assessment of past traffic levels are unavailable, the level of RFFS should be assessed from the best available information.

The level of protection should be equal to the determined category. The level of protection provided by an airport shall be described in terms of the airport RFF category.

According to CAAN, Airport Rescue and Fire Fighting Service Manual, CAAN, 2012 (1st edition.), approved by DGCAAN, the provision of RFFS to the category set out above is a mandatory requirement. However, in case of circumstances like temporary unavailability of a part of the facility due to an in-service mechanical failure of a vehicle or piece of equipment or sudden illness of a member of staff or any unforeseen event or airport emergency exercises (either full scale emergency exercise or partial emergency exercise), immediate action should be taken by the airport management to reinstate facilities. During the temporary depletion, the Category of RFFS shall not be less than the equivalent to two categories below that of RFF category according to the size of aircrafts expecting to use the aerodrome. If any depletion is significant enough to warrant a restriction of aircraft movements then the temporary level of RFFS stated in terms of specific RFF category should be immediately promulgated by NOTAM and radio. Generally, temporary depletion in category of RFFs should not last more than 24 hours at an aerodrome.

RFFS AND ITS CATEGORIZATIONLETION, TGHE

Rescue and Fire fighting Services (RFFS) is referred to as Aircraft Rescue and Fire Fighting (ARFF) or Crash Fire Rescue (CFR) depending upon the global location. In all the cases, these terms refer to the rescue and fire fighting services provided at an aerodrome which are especially dedicated to the support of aircraft operation. RFFS is a special category of fire fighting that involves the response, hazard mitigation, evacuation and possible rescue of passengers and crew of an aircraft involved in an aerodrome ground emergency or potentially off aerodrome as well.

Modern commercial aircraft can have the capacity to carry several hundred passengers and crew. Therefore, due to the mass casualty potential of an aviation emergency, it is critical that emergency response equipment and personnel arrive at the scene within the minimum possible time. The maximum response time from initial notification until the first vehicle is on scene and spraying fire retardant generally ranges from 2 minutes not exceeding 3 minutes to the end of each runway as well as to any other part of the movement area under conditions of good visibility and uncontaminated surfaces. At large aerodromes, this often means that more than one fire station will be necessary. This timely arrival and the firefighters' initial mission to protect the aircraft against all hazards, most critically fire, increases the survivability of the passengers and crew on board. Airport firefighters have advanced training in the application of firefighting foams and other agents used to extinguish burning aviation fuel in and around an aircraft. This helps to provide and maintain a path for the evacuating passengers to exit the fire hazard area.

The International Civil Aviation Organization (ICAO) defines the requirements of aerodrome Rescue and fire fighting Service (RFFS) in the Annex 14, Volume 1 Aerodrome Design and Operations. In accordance with this Annex, it is a requirement for Member States to provide rescue and fire fighting services and equipment at airports under their jurisdiction. ICAO Document 9137-AN/898, Airport Services Manual, Part 1, Rescue and Fire Fighting provided guidance in the implementation of Annex 14 requirements thereby helping to ensure uniform application among the Member States. The Civil Aviation Authority of each State in turn publishes the corresponding regulation and guidance for their operators.

ICAO defines 10 Airport categories and specifies the minimum amount of water, foam and dry chemical powders or other complementary agents having equivalent fire fighting capability and the discharge rates of the crash tenders for each case as shown in Table 1. Although it is recommended to have principal and complementary agents, it is implicitly demanded to have both of them at the airport (in fire trucks). A

monitor and turrets to be on the trucks is also implicitly demanded, as no human can hold on to a hose and nozzle delivering such great high pressure discharge rates. The amounts of water for foam production and the complementary agents such as DCP or CO2 to be provided on the rescue and fire fighting vehicles should be in accordance with the airport category determined.

Although ICAO document is very clear about the minimum number of fire vehicles (trucks) required and minimum amount of extinguishing agents necessary to cope with any type of aircraft emergencies at any airport, it doesn't speak about the number of fire fighters and rescuers in accordance with the RFF category. The number of RFF personnel can vary from one place to another, as it is based on the fire fighting equipments, advancement of the technology, availability of volunteer fire fighting services, provision of providing rescuers separately, provision of Ambulance service under RFFS, etc. But it shall be ensured that the number of Rescue and fire fighting personnel provided at a fire station is based on the availability of equipment and responsibility as well so that all the equipment required as per category shall be well manned.

Table below shows the minimum usable amount of extinguishing agent according the determined airport categories.

Airport category	Foam meeting performance level A		Foam meeting performance level B		Complementary agents		
	Water (ltrs)	Discharge rate foam solution/minute. (ltrs)	Water (Ltrs)	Discharge rate foam solution/ minute (ltrs)	DCP or (kgs)	Halons or (kgs)	Co2 (kgs)
1	350	350	230	230	45	45	90
2	1000	800	670	550	90	90	180
3	1800	1300	1200	900	135	135	270
4	3600	2600	2400	1800	135	135	270
5	8100	4500	5400	3000	180	180	360
6	11800	6000	7900	4000	225	225	450
7	18200	7900	12100	5300	225	225	450
8	27300	10800	18200	7200	450	450	900
9	36400	13500	24300	9000	450	450	900
10	48200	16600	32300	11200	450	450	900

Table.2.

It should also be noted that for the airport categories 1 and 2, water may be replaced by 100 percent of complementary agents and similarly for airport categories 3 to 10, when a foam meeting performance level A is used as primary extinguishing agent then up to 30 percent of the water may be replaced by a complementary agent. Vehicle foam tanks must be full at all the times when the vehicle is in operational service. The quantities of the various extinguishing agents to be provided in the rescue and fire fighting vehicles should be in accordance with the airport category. A reserve foam concentrate and complementary agent should be stored equivalent to 200 percent of the minimum quantities of these agents required as per category and performance level for the replenishment of the fire vehicles at the fire stations.

The following table specifies the categorization of airports of Nepal on the basis of above prerequisites.

S.no	Name of the Airport	Largest aircraft operating	Airport category
1	Tribhuvan International Airport, Kathmandu	B-777	IX
2	Biratnagar Airport	ATR-72	V
3	Simara Airport	Jet Stream	V
4	Gautam Buddha Airport	ATR-72	V
5	Pokhara Airport	ATR-72	V
6	Nepalgunj Airport	ATR-72	V

Table.3.

It must be noted that the RFFS category of an airport can change over time, as air carriers appear and disappear, their fleets change, etc. An airport's ARFF/RFFS category must be published in the AIP.

If a substantially bigger than the A380 aircraft goes into production someday, the categories will be updated and an eleventh category may appear.

If the airport and its approach/departure areas are over the water, swamps or other difficult environments, more vehicles, suitable to those surroundings, should be available. However, this does not eliminate the need for having a minimum number of airport firefighting vehicles or alter in any way the aerodrome's category.

Although there is some disparity among the Member States in the designation used for classifying the RFFS category of a given aerodrome, the basic premise for determining the RFFS requirement for an aerodrome is based on the size of the largest aircraft and the maximum fuselage diameter.

Landing surrouding snow

ROLE OF CIVIL AVIATION AND EVOLUTION OF AIRPORTS IN NEPAL

Jyotshna Shrestha
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Nepal is a land locked country situated between China in the north and India in the south, east and west. Its area is 147,181 sq km. More than 86 % of the area in Nepal is hilly and most of its land is occupied by rocky hills and mountains. Nepal's difficult topographic setting makes transportation a challenging development throughout the nation.

Most parts of the country are under developed due to lack of education and health facilities. In remote area where there is no other means of transport, air transportation plays a very vital role. Without use of air transport, remote areas will be cut off from the point of view of transportation, education, food supply, disaster management, tourism and other basic requirements. In such a country where there is no means of transportation except road ways, air transport is like a boon. After evolution of democracy in 2007 B.S. air transport has developed rapidly. It has connected different parts of the country and has been a key element in the development of modern Nepal.

In the context of aviation development in Nepal, Civil Aviation Authority of Nepal (CAAN) and Nepal Airlines (NAC), previously named as Royal Nepal Airlines (RNAC) have played very important roles.

Department of Civil Aviation began in 1957 as an agency under the Ministry of Work, Communications and Transport. Civil Aviation Authority of Nepal was established on 31st December 1998 in accordance to safe sky policy. It is the autonomous regulatory body that was developed under Civil Aviation Act, 1996. The statutory regulations regarding civil aviation were introduced under the Civil Aviation Act, 1959 (2015 BS). Nepal obtained the membership of International Civil Aviation Organization (ICAO) in 1960. Nepal has achieved significant growth in aviation after adoption of liberal aviation policy in 1992.

The main objectives of CAAN are as follows :

- To make aviation sector safe, regular, standard and efficient.
- To ensure flight safety and sustainability of civil aviation in Nepal.
- To construct, operate and maintain airports.
- To equip the airports with necessary communications and navigational facilities.

The airport began as Gauchar Airport, named after the area of Kathmandu where it was situated. The formal beginning of aviation in Nepal occurred in 1949 with the landing of a four-seater, Beach- craft Bonanza aircraft carrying the Indian ambassador. The first charter flight took place between Gauchar and Calcutta in a Himalayan Aviation Dakota on 20 February 1950.In 1955, airport was established in Gauchar in the memory of the late king

Mahendra's father King Tribhuvan . The airport was again renamed Tribhuvan International Airport in 1964.

The original grass runway was re-laid in concrete in 1957 and extended from 3,750 feet (1,140 m), to 6,600 feet (2,000 m) in 1967. The runway was again extended from 6,600 feet (2,000 m) to 10,000 feet (3,000 m) in 1975.The first jet aircraft to landed at Tribhuvan International Airport was a Lufthansa Boeing 707 which touched down on the 6,600 feet (2,000 m) runway in 1967. Royal Nepal Airlines Corporation, current Nepal Airlines was first airlines which provided service to Nepalese people .

CHRONOLOGY AIRPORT

In 1949 formal beginning of aviation in Nepal with the landing of a 4 seater lone powered vintage Beach-craft Bonanza aircraft of Indian Ambassador Mr. Sarjit Singh Mahathia at Gauchar.

1950: The first charter flight By Himalayan Aviation Dakota from Gauchar to Kolkata.
1955: King Mahendra inaugurated Gauchar Airport and renamed it as Tribhuvan Airport.
1957: Grassy runway transformed into a concrete one.
1957: Department of Civil Aviation founded.
1958: Royal Nepal Airlines started scheduled services domestically and externally.
1959: RNAC fully owned by HMG/Nepal as a public undertaking.
1959: Civil Aviation Act 2015 BS.
1960: Nepal attained ICAO membership.
1964: Tribhuvan Airport renamed as Tribhuvan International Airport.
1967: The 3750 feet long runway extended to 6600 feet.

Nepal Airlines plays very significant role in the aviation industry of Nepal as it is the first airlines to start its operations in Nepal. Nepal airlines was established in 1st July 1958 as Royal Nepal Airlines Corporation with one Douglas DC-3. At the beginning, its services were limited to Simara, Pokhara Biratnagar and Indian cities such as Patna , Calcutta and Delhi. In 1961, **Pilatus Porter STOL** aircraft joined the fleet, and in 1963 12-seater Chinese Fong Shou-2 Harvesters were brought into service, opening up the kingdom's more remote routes. Nepal Airlines operated its first jet operations in 1972 with Boeing 727 aircraft.

AIRPORTS

International Airport : Tribhuvan International Airport is also known as TIA. It is the only international airport in Nepal. It is the landmark of Kathmandu valley. Tribhuvan International Airport (TIA) is situated 5.56 km east of Kathmandu city which is in the heart of the Kathmandu Valley. Government of Nepal has further plans to construct another international airport in Nijgadh of Bara district.

Domestic Airport : The number of domestic airports has increased. But with the increase in the number of domestic airports and domestic airlines increases number of flight operation and thus the challenges of flight safety also increase. The list of the domestic airports in Nepal are as follows :-

- Biratnagar
  - Taplejung
  - Bhojpur
  - Tumlingtar
  - Thamkharka
  - Lamidanda
  - Khanidanda
  - Rumjatar
  - Rajbiraj
- Chandragadi
- Pokhara
  - Manang
  - Jomsom
  - Baglung (Baleba)
- Gautam Buddha
- Nepalgunj
  - Bajura
  - Bajhang
  - Rara
  - Rukum Chaurjhari
  - Rukum Salley
  - Simikot
  - Jumla
  - Sanfebagar
  - Dolpa Juphal
  - Dolpa Masinechaur
- Tenzing Hillari
- Dhangadi
- Surkhet
- Jomsom
- Bharatpur
- Janakpur
- Ramechhap
- Phaplu
- Kageldanda
- Meghauli
- Mahendranagar
- Simara

Airports in Nepal are categorized and operated as follows:

a) International Airport
b) Regional Hub Airport
c) Airport in the area with road transport access
d) Airport in the remote area

Tribhuvan International Airport (TIA), is the country's sole international airport. It is getting some new infrastructure while the existing system is being renovated to increase facilities and enhance passenger processing capacity. The TIA today operates 30 international airlines from major international cities. The domestic airlines operate throughout the country from TIA. There are about 35 domestic airports in Nepal.

CONDITION OF TIA

Civil aviation in Nepal has been going through manifolds of problems. Though TIA is the only door to Nepal via air route; it lacks the standard of what is expected to be an international airport. TIA occupies an area of 10,240m and has 10,000 feet long runway. Apart from the structural advancement, TIA is also bearing poor management and supervision. However, the government has been constantly focusing on the development of TIA.

Some short-term programmes like constructing a golden gate at the entry point, runway maintenance, radar antenna maintenance, sterile hall construction, billboards in different places and helicopter apron construction among other projects are in full swing to enhance TIA's capacity. In 2015, TIA will go in full automation, all manual work will end, and stress related to labour -intensive tasks will be reduced. Reduced stress means greater safety in Nepali skies.

REGIONAL HUB AIRPORT

Biratnagar Airport : (IATA code - BIR , ICAO code - VNVT) Biratnagar Airport serves as the hub of Eastern Development Region. The Airport supports 6 STOL Airports- Taplejung, Bhojpur, Phaplu, Rumjatar ,Lamidanda and Tumlingtar. This airport stands number 1 in terms of passenger movement. CAAN is planning to develop this airport as a regional hub capable to operate medium sized Jet Airplane like Boeing 757. It was operated in

6th July, 1958. Its runway dimension is 1524 x 30 m. Its generally designed for aircraft such as – HS-748, ATR-42, SAAB-340

Pokhara Airport – (IATA code –PKR, ICAO code –VNPK) : It is one of the most popular Airports in Nepal. It is a regional airport serving Pokhara in Nepal. The airport was established in July 4, 1958 AD and is operated by the government (Civil Aviation Authority of Nepal). It offers regular connections to Kathmandu, Jomsom and seasonal connections to Manang District. It is proposed to be developed into Nepal's Regional international airport. Pokhara airport is the main Entrance point for Trekking in Annapurna , Mustang and Dhaulagiri region.

Nepalgunj Airport : (IATA code - KEP , ICAO -VNNG) The airport has been in service since 1961. It is a major domestic hub after TIA in terms of number of airport network, and also second largest airport in Nepal in terms of land area, after Tribhuvan International Airport. This airport also stands number 2 in terms of aircraft and passenger movement. It is one of the busiest airports in the domestic sector of Nepal.

Gautam Buddha Airport : (IATA code - BWA , ICAO -VNBW) It is also known as **Bhairahawa Airport**, It is an airport serving a municipality of the Rupandehi district in the Lumbini zone in Nepal. The airport resides at an elevation of 358 feet (109 m) above mean sea level. It has one runway designated 10/28 with an asphalt surface measuring 1,510 by 34 metres). Bhairahawa is the entrance for Lumbini tour. It is only one direct connection with Kathmandu to visit the world heritage site Lumbini. Many airlines such as, Buddha Air, Yeti Airlines are running their flights to Bhairahawa from Kathmandu.

CONDITION OF REGIONAL AIRPORTS IN NEPAL

The condition of regional airports, however, is even worse. But on bright side, almost all domestic airlines conduct daily flight to the remote hilly airports. Nepal, has been able to establish airports in some of the rural areas despite political instability and geographical challenges . Though the airports do not meet the luxury standard, they still are the one and only available option. The Lukla airport, Jomsom airport, Manang airports are those high altitude air station that gives thrill of flight scare to passenger. Lukla airport which is the gateway to Mt. Everest is one of the most extreme airports in the world.

In domestic sector Nepal Airlines has been serving in different rural areas of the country. It is the only government airlines operating in Nepal. Similarly, the private sector airlines have been contributing the aviation sector of Nepal in big scale and play important role in linking the rural and centered hub together. The increasing number of airlines companies attribute to the fact. However, number of airlines companies that shut down in past few years showcase the difficulty involved in the aviation industry. Many tragic air accidents have occurred in Nepal. The reason can be anything from technical to personal error but the hilly country and climate has in some level added to the challenges.

CONCLUSION

Today the biggest challenge we face in the Nepalese Sky is increasing number of airlines and increase in unhealthy competition among themselves. Along with that there exists a big problem at the parking bay in Tribhuvan International Airport and damages are caused on the runway mostly in the rainy season. One of the ways to decrease pressure on TIA can be constructing alternative runway. Construction of another international airport and increasing well-trained manpower is very essential looking at the increase in air-traffic in Nepal. On the one hand it is good news that people of different nations are visiting Nepal but at the same time it can also raise the question on our credibility if we cannot raise our standards and provide good service to them. These airports are not only the property of Civil Aviation and the government, but of every Nepali citizen. So we all should contribute in raising the standards of these airports by keeping them litter free, helping foreigners in the case they need help and mostly advising government about what are the requirements and expectations of international and domestic airport.