CAAN Souvenir 2010

12th Anniversary

Civil Aviation Authority of Nepal

31 December 2010

KATHMANDU
NEPAL

The Prime Minister

Message

I am pleased to know that the Civil Aviation Authority of Nepal (CAAN) is celebrating its 12th Anniversary with various programs and activities.

A land-locked and topographically constrained country, Nepal, has a crucial role to play in the domain of air transportation for her development. Contrary to the comparatively slow and resource consuming process of road construction, air transportation is the most suitable way to accelerate the pace of economic and infrastructural development. Tourism in our country remains to be one of the major strongholds of the Nepalese economy for decades. It is only with the proper development of safe, secure, reliable and sustainable air transportation system that we can attract large number of tourists and promote tourism industry and transform the socio-economic lanscapes of the country. Therefore, it is considered the matter of an utmost importance that the quality of civil aviation and its services be enhanced and upgraded.

The Government is ever committed to play an exemplary role in enhancing aviation safety and security as well as facilitating air travel. Since Nepal is launching the campaign of Nepal Tourism Year 2011, I would like to appeal to all the stakeholders to forge a collaborative partnership with States at all levels - sub regional, regional and global to make this national campaign a grand success.

The scope of CAAN has thus grown more challenging due to increasing transport activities and national and international obligations to provide standard facilities and quality service. In this context, I believe, CAAN has a big role to play in regulationg and promoting healthy growth of air transport industry while also ensuring increased level of quality services and facilities to benefit the air passengers domestically as well as internationally. I am confident that like in the past, CAAN will remain committed forever to the sustainability of aviation sector. I would like to reiterate that the Government of Nepal is committed to stregthening national policies, laws and other necessary governing institutions in the civil aviation sector with greater flexibility in the days ahead.

I would like to congratulate CAAN on the occassion of its 12th Anniversary and wish it a successful future.

MKNepal

(Madhav Kumar Nepal)

Government of Nepal

Hon'ble Sharat Singha Bhandari
Minister
Tourism & Civil Aviation

Tel : 014211879 (Off.)
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Personal Secretrariat
Singhadurbar, Kathmandu,
Nepal.

Date :

Sub : **Message**

It gives me immense pleasure to know that the 12th Anniversary of the Civil Aivation Authority of Nepal (CAAN) is being observed on 31st December. Personally and on behalf of the Ministry, I would offer my deepest felicitations to CAAN on the occasion.

Nepal occupies a prominent space amongst popular destinations of the world. We are proactively geared toward ensuring safe, secure and reliable air transport system both domestically and internationally.

Air transport has been highly instrumental in helping the connectivity of the country especially the geographically complex and remote regions of Nepal. The role of civil aviation, besides contributing to tourism, has thus been conspicuous in supporting national economy,. Furthermore, we find that the scope of the Authority is getting wider and more challenging with time due to increased aviation activities. Subsequently, the obligation of CAAN to provide standard facilities and services is also increasing. In this regard, the Ministry to Tourism and Civil Aviation is committed to extend its co-operation for the development and expansion of aviation and tourism infrastructures in the country. We would like to invite the aviation parteners, both government and non-government, to co-operate intensively to reiterate the significance of civil aviation. We are dedicated to achieving the goal of safe, secure and sustainable aviation. We are now at the consolidation phase in which we are revising legislation, organization structure and state operating system.

Our plan and preparation to mark the Nepal Tourism Year 2011 is progressing well. It needs the support of every sector and sub-sector in the country. We are determined to improve and expand airport and tourism related facilities to accommodate the growing requirements.

Given the tireless effort of the Government for improvement in the peace process and changing political landscape, it is the right time that Nepalese civil aviation takes a broader, higher and holistic outlook to synergize Nepalese air transport system. I am hopeful that the concerned political parties will come forward in a concerted manner toward engineering the civil aviation and tourism industry in a new milieu for a new Nepal.

Finally, I wish CAAN all the success in its endeavor.

Sharat Singha Bhandari
Minister for Tourism and Civil Aviation

NEPAL TOURISM YEAR 2011
NATURALLY NEPAL
ONCE IS NOT ENOUGH

Government of Nepal

Hon'ble Shathurdhan Prasad Singh
State Minister
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Date :

Message

Sub :

I am pleased to learn that Civil Aviation Authority of Nepal (CAAN) is observing its 12th Anniversary and as part of various activities, it is publishing a special Souvenir magazine.

The instrumental role of air transport cannot be over emphasized in the context of our country where toprgraphical constraint is the main obstacle for development. Therefore, air transport has been and indispensable vehicle to integrate Nepal with the outside world as well as the communities living in the remote areas within the country into the mainstream of national development.

The importance of civil aviation in Nepal can be realized not only in integrating the nation but also in promoting tourism which is one of the most income generating sectors in a naturally rich and beautiful country like Nepal. Since the world aviation is galloping towards modernization and sophistication, only razor sharp reflexes can help maintain the pace of development in this field. This stands as one of the greatest challenges in the field of civil aviation in Nepal. I wish Civil Aviation Authority of Nepal all the best in being able to serve the country by providing safe and efficient aviation services together with keeping pace with the modern world aviation.

I wish CAAN will strive to esclate in technology and facilities and will achieve succuss in providing quality serice to the people remaining within the boundary set by International Civil Aviation Organization and the national legal provisions.

Finally, I would like to congratulate CAAN for its successful completion of 12 years of service and wish it a grand future ahead.

Shatrudhn Prasad Singh
Minister of State for Tourism and Civil Aviation

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Government of Nepal
MINISTRY OF TOURISM & CIVIL AVIATION

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Ref . No

Singhadurbar,
Kathmandu, Nepal

Message

Personally and on behalf of the Ministry of Tourism and Civil Aviation, it is my pleasure, to extend heartfelt congratulations to the Civil Aviation Authority of Nepal (CAAN) on its 12th Anniversary. It is also a matter of delight that the 12th issue of the CAAN Souvenir magazine is being published to mark this day which is very auspicious for the aviation fraternity.

One of the most sought after tourist destinations in the world, Nepal, is vying to offer the best in terms of a varied tourism product and accessibility. Tourism is now well recognized as a means of achieving high economic growth and realizing the social objective of providing a better quality of life. CAAN, undoubtedly, is the most important link in promoting tourism by integrating various countries of the world into the global air transport network. In this context, Nepal Tourism Year 2011 has been set and is aimed to attract at least 1 million tourists that year.

We appreciate the immense contribution made by CAAN for the development and expansion of civil aviation in Nepal. In addition, it is gratifying to see that CAAN is geared towards coping with emerging challenges facing civil aviation sub-sector. We believe the celebration of anniversary is also an opportunity for CAAN to reflect upon its past performance and seek for any possibility of improvement to set improved course of action ahead.

Against the backdrop of considerably increasing air traffic, we believe CAAN has a big role to play in the forthcoming days. We are confident that it will remain committed forever to the sustainability of aviation while being responsive to the demands of time for the adoption of appropriate technology.

I would like to express hearty greetings and best wishes to CAAN on its anniversary. I wish to reiterate that the Government of Nepal will remain committed to strengthening national laws and institutions governing civil aviation with greater flexibility in the days ahead and also to cooperate with CAAN and support it in its efforts to ensure healthy air transportation system in the country. I urge all the stakeholders to cooperate with CAAN in its efforts to discharge the regulatory and service provider functions.

Finally, I wish CAAN all the success in its endeavor.

Kishore Thapa
Secretary
Ministry of Tourism and Civil Aviation

Message from Regional Director ICAO Asia Pacific

I am pleased to note that Civil Aviation Authority of Nepal (CAAN) is celebrating 12th Anniversary of its establishment on 31st December, 2010. On this occasion, I, on behalf of International Civil Aviation Organization, would like to express our best wishes and congratulations to all colleagues of Civil Aviation Authority of Nepal.

Nepal being a Contracting State of ICAO is playing a significant role to foster civil aviation in global as well as in regional level. I am also delighted that Nepal is celebrating Nepal Tourism Year 2011 with an aim to bring one million tourists. I am confident that CAAN would be playing a pivotal role to make this campaign a grand success.

Air transport in Nepal has bigger role to play for better connectivity inside the country as well as with rest part of the world. ICAO is always with country like Nepal to render its support and assistance for safe, secure and sustainable development of civil aviation. I believe Nepalese civil aviation which is embarking upon a new phase of development both on technical and operational fields will keep pace with the changing environments of technological development and service standards to the travelling public in providing safe and secure air transport system.

Finally, I wish CAAN to be more progressive, productive and responsive to the growth and associated challenges of international civil aviation.

Mokhtar A. Awan
ICAO Regional Director
Asia and Pacific Office

CIVIL AVIATION AUTHORITY OF NEPAL

Head Office, Babar Mahal, Kathmandu, Nepal

Commitment

On the verge of Nepal Tourism Year 2011, we are celebrating the 12th anniversary of CAAN with zeal and vigor. On this occasion, it is indeed a pleasure and a privilege to extend our sincere felicitations to all stakeholders representing the organization and the aviation sub-sector as a whole. This occasion is certain to provide the forum needed to exchange views and share the ideas among the government, various organizations, and the industry partners voicing their issues for a safe and secure aviation sector. As CAAN is the sole authority to look after the civil aviation sub sector of the country, we are therefore ever focused to achieve its main objective of safety and are committed to strengthen its role in assuring far reaching connectivity and accessibility. As per the guideline of Aviation Policy 2006, we will continue to encourage the private sectors to extend their services not only in the lucrative sectors but also in the far flung areas and the remote sectors.

Despite significant downturn in global aviation market, Nepal is making headway in domestic as well as international air transport. We have 27 international operators in our list this year and are going to welcome some more international operators in the coming year. The domestic sector also has undergone a sea change with added fleet. The domestic airlines are into international flights slowly expanding their sectors. Out of the two domestic airlines which had obtained international AOCs to expand international air services, Buddha Air has already started operating in international sectors. Abiding by the Aviation Policy 2006, single engine aircraft operation has also gained momentum by the Pilatus aircraft mostly operating in the STOL airports. Compared to last year the traffic this year has shown significant growth. Given the trend, the civil aviation subsector will have made a significant contribution to the national campaign of Nepal Tourism Year 2011 aimed to bring in one million tourists during that year. Carrying out all the activities with the growth of aviation sector and its challenges, we reiterate the fact that CAAN will always remain adhered to ICAO standards and requirements.

And now, preparing to meet the future demands in aviation, we have begun giving shape to our long rooted concentration of second international airport at Nijgarh and the transformation of Gautam Buddha airport and Pokhara airport into regional international airports. As CAAN has multifarious obligations in a high tech, liability prone and internationally influenced field of aviation, it cannot solely meet the emerging needs of infrastructure development and maintenance. Hence, we invite aviation partners, both government and non government, to co-operate intensively in infrastructure development and introduction of modern technology in order to reiterate the significance of civil aviation.

The ever increasing traffic demand had been indicating a need to review the jurisdiction of airspace. We have now new Letter of ATS Agreements with Nepalgunj, Biratnagar and Pokhara. We are also trying for facility expansion and up gradation of airports. Runway Pavement at Tumlingtar airport is going to be completed this fiscal year. Simikot airfield has also undergone up gradation. Similarly, Dhangadhi airport, another hub in the far western segment, has been up graded to cater to the need of far western sector.

We are preparing the State Safety Programme (SSP) and Safety Management Systems (SMS) for Service Provider in the areas of ANS, Aerodrome and operations. The primary aviation legislation and regulation incorporating the ICAO provisions is being reviewed. Likewise, CAAN organization structure is being reviewed under ADB assistance which includes, among other things, the provision of the separation of regulator and service provider function. The AOCR is being prepared incorporating the latest amendments of Annex 6. An assessment has been made by ICAO CNS/ATM experts in order to identify the surveillance and navigation system at TIA so that existing system could be upgraded or replaced with appropriate technology. Runway safety program has been promulgated. For the implementation of PBN, a national task force has been formed and PBN focal point has been designated. Development of PBN implementation road map for 2010-2012 is in progress. In addition, the RNP-AR procedure for TIA is going to be adopted. Efforts are being made for the establishment of Himalayan Routes for long-haul international flights. With the assistance of ICAO, a TRAINAIR project for granting ICAO TRAINAIR PLUS membership to the Civil Aviation Academy of Nepal is being executed.

We believe that a strong adherence to ICAO SARPs in maintaining safe, secure and sustainable aviation and a continued effort in maintaining the physical facilities, equipment and skilled human resources will foster civil aviation sub-sector as a model institution and a pillar of Nepalese economic sector for the holistic development of the country.

Finally, I hope that CAAN will always succeed to indoctrinate safety awareness among the stakeholders of civil aviation with its activities. I would like to congratulate everyone related to aviation and thank you for your keen interest and valuable participation on this auspicious CAAN day.

Ram Prasad Neupane
Director General
Civil Aviation Authority of Nepal

Chief Editor's pen

From the Chief Editor's Desk

At the end of 2010, after twelve glorious years as CAAN, we are enthusiastically celebrating the twelfth anniversary with new opportunities and endeavors to contribute from our own part in achieving the prime goal of CAAN, 'safe, efficient and healthy growth of civil aviation' in Nepal.

It is very important in the aviation field to update knowledge, skills and proficiency by referring to the aviation literatures. An annual publication like this develops the culture of reading and encourages everyone to enrich their knowledge which is the need of the hour in this modern age of technological growth. Such publications offer a variety of ideas from people of different departments of the aviation field. Thus these act as a collection of information, experiences, knowledge and technology going through which can undoubtedly be quite advantageous for all in aviation. The importance of such publications, therefore, is immense. That's why, it is very necessary that such a good source of enhancement of knowledge should also go on improving its quality every year for which specialized manpower and system are required. The demand of the time is a team of expertise in this field so that souvenir can stand itself as a quintessential publication able to set a milestone of its own.

The year 2010 imparted mixed effects to the aviation industry. We experienced both its warmth and its chill. We basked in the success with respect to the number of domestic and international operators and flights and thus the aviation industry as a whole and made a significant contribution to the nation's economy whereas we were unable to count the year as one witnessing no accidents. The year brought in three mishaps within four months engendering thoughts and feelings of qualm and shock among us.

These tragic events indicate that CAAN should adopt state safety programme as a way to safety and focus more on its regulatory role.

As we all know, it is impossible to attain complete perfection in the real world. However, it is equally true that striving for it is what we must be doing. In our attempt to remove the ever present hazards in its various forms, we must identify them first, then analyze, evaluate and control them. Rather than musing sorrowfully at the past misfortunes, we must turn to ourselves and find out how we can optimize every event and weld all of its effects into greater strength. We have to spur ourselves on and stride ahead to greater achievements of the future.

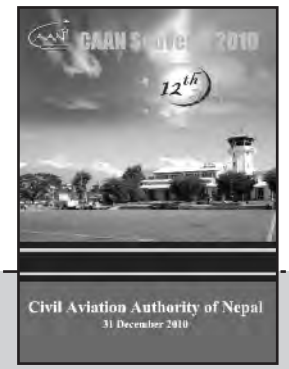
Past is merely a prologue. This twelfth anniversary and the annual publication have provided us the opportunity once more to banish all doubts and worries and try being our highest and our best. A surge of successful achievements and prosperity await us eagerly. Let's keep moving up and be alert to every minute change in this field.

Finally, I take this opportunity to express my sincere gratitude to all of our article contributors and all concerned who helped to make this publication a success.

May there be equal number of take offs and landings !!!!!

.....

Deepak Baral
Chief Editor
CAAN Souvenir 2010



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CONTENTS

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- Editors

Impacts of Liberal Aviation Policy and Growth Trends of Civil Aviation in Nepal

Ram Prasad Neupane*

Nepal has witnessed significant growth in air transport after the adoption of liberal aviation policy in 1992. Subsequent results of tremendous air traffic growth domestically as well as internationally drastically transformed the national scenario of the country. In retrospect, this expansion was also the beginning of several complex challenges that we are now facing in this part of the world. The air transport growth trend can be figured out from the table given below:

Background

In the early 1990s, when rapid expansion was being experienced in avio-tourism sectors of most of the economies of the world, the Government of Nepal too embarked on liberalization by adopting a liberal sky policy in 1992, and then introducing a comprehensive National Civil Aviation Policy in 1993. Upon review of this policy in the light of liberalization trends and forces, especially those brought about by the landmark 5th ICAO Worldwide Air Transport Conference, 2003, a comprehensive Aviation Policy has been brought into effect from 2006. The policy intended to create a conducive and healthy competitive environment and encourage private sector investment in air transport and manage growth, change and emerging environment.

International Movement	1991(pre-liberalization)	1998 (CAAN establishment year)	2009	2010 (Jan-Sep)
Aircraft	7474	8261	15699	13979
Passenger	780933	1044002	2027334	1715949
Freight – (tons).	14269	13863	15749	10719
Domestic Movement-				
Aircraft	11811	34468	76195	55345
Passenger	215957	670076	1377896	1009508
Freight – (tons).	326000	1012680	4387267	2329542
Aircraft fleet	21	64	72	84

The air traffic growth in 2010 is very impressive. The number of international aircraft movements at Tribhuvan International Airport (TIA) is 13979 till September 2010 against 11328 till September 2009 which shows a whopping 23% growth over that in the previous year. The international passenger movement also shows a tremendous growth this year with movement of 1715949 passengers in 2009 (till September) against 1418949 in 2010 (till September). This means TIA handled 21% more international passenger this year than the previous year.

Going through the number of international passengers within one year (from 2008 to 2009), it was 1830630 in the year 2008 whereas it was 2027147 in 2009. Its growth, thus observed, within one year was 11%. The international aircraft movement increased from 2008 to 2009 following the similar trend. It was 14276 in 2008 and 15701 in 2009. TIA thus handled 10% more international traffic in 2009 compared to that in 2008.

Comparing the data to find out the growth in ten years, the number of international passengers in the year 1999 was 1100331 whereas that in 2009 was 1715949, the growth thus being 56%. The international aircraft movement also has almost the same trend of growth from 1999 to 2009. In 1999, the number of international aircraft movement was 8426 but it was 13979 in 2009. The growth in the number of international movements in the span of ten years thus was 66%. This increase in traffic has intensified the necessity of planning for an extension of operation hours at TIA.

The ICAO forecast reveals worldwide traffic to grow at 6.4 percent this year, 4.7 percent in 2011 and 4.9 percent in 2012. Traffic for Asia Pacific Airlines should grow considerable faster than the global aviation with rates 10.8, 7.8 and 7.75 percent for the same period.

In the international sector, there are now 27 air operators flying schedules international services in Nepal against 9 in 1991. The international passenger movement has increased to about 2027147 in 2009 as against about 780933 in 1991. Helicopter flight was not that popular until 1991. Now there are 6 helicopter operators and 10 fixed-wing operators.

In view of rapidly growing traffic, CAAN is concerned with improvement and expansion of Tribhuvan International Airport. Master Plan of the airport has been reviewed under ADB Project Preparatory Technical Assistance (PPTA). Under this assistance we will see door open for upgrading and improvement works as per a 20 year traffic growth trend. However, considering the need to cope with increased traffic we are geared to expand operation hours of TIA. Runway overlay is being accomplished with high priority. We are aware that despite operational constraints, we need to have a Localizer DME approach system for precision at TIA. It will be encouraging for international airlines to utilize TIA in various slots of operations, particularly during night, with increased safety and reliability.

However, TIA is operationally, geographically and technologically constrained. New DVOR/DME installation

and commissioning has been completed, to enhance more efficacy and efficiency, reliability and safety. Studies on the feasibility of RNP-AR approach, ILS approach and LLZ/DME approach at this airport have been vigorously pursued. In order to cope with mounting traffic volume at TIA, and meet future demand, action has been initiated as per the policy to upgrade this airport to the extent of full saturation.

Against the constraints of TIA and enormous potential ahead in terms of tourist flow and airlines operations, action has been initiated towards the construction of a new second international airport in Nijgadh, Bara, the southern plain of the country. With a view to develop the existing Gautam Buddha Airport into a regional International Airport, priority-wise improvement works have been put in process. This will be a Project executed under Asian Development Bank (ADB) -South Asia Subregional Economic Cooperation (SASEC). The materiality will facilitate us to see cross- border flights as well as other international flights. Likewise, action has been initiated for the development of Pokhara New Airport as another regional international airport. These regional airports will serve as direct air link with potential international destinations.

3. Observations and Context

It is incontestable that liberalization in aviation has been a significant factor for the development of air transport world wide. Over 17 years of fast-paced journey of liberalization, CAAN is facing challenges in the domain of airport infrastructure expansion, technological application, human resources development and sustainability of authority and airlines industry and above all safety and regulatory oversight capability. It is worth-mentioning that IATA has also identified five challenges for the successful development of air transport in India (1) enhancing safety, (2) urgent infrastructure improvement, (3) reasonable taxation, (4) commercial freedom and (5) simplifying the business though effective use of technology. It is understandable that similar challenges are being faced by many of the developing countries of the world.

There will not be a lone, straight and smooth path forward in the liberalization of air transport. There may be a co-existence of approaches such as conventional bilateral agreements and "open skies" type bilateral agreements. International strategic alliance between States will be the order of the day in the future. The tie may be in terms of international route utilization and ownership, traffic rights and airline operations, and seat capacity.

In the context of Nepal, the Government and CAAN have granted permission to private sector airlines to operate scheduled international flights in the international sectors. Some of the airlines such as Buddha Air has started flights in some selected sectors. It has been realized that the airlines are required to have flexibilities in the provisions of airline designations. The requirement of substantial ownership is being replaced by permission of principle places of business. However, the effective control will remain unchanged. Whenever the negotiation takes place, such requirement should be reflected in the existing air services agreements. This will facilitate the potential airlines to expand services under the leasing arrangements and the required MOU as stipulated in the Article 83 bis of the Chicago Convention to ensure safety oversight responsibilities by the concerned States.

Moreover, against the backdrop of increased low cost carriers, CAAN has yet to make arrangements for low cost international airline operations. However, a new fee structure of considerable relaxation is being considered in respect of those who may be desirous of taking opportunity to operate, in lean hours, taking into account the traffic concentration during peak hours. In view of the intra-regional sentiments, it is imperative to have a more open, flexible and progressive kind of aviation policy within SAARC member States. For this, the existing bilateral air services model may be reframed in order to make air transport less cumbersome and economically efficient, thereby creating condusive environment for intra-SAARC air services. SAARC Region is the most interactive region for Nepal and since BASA forms a major component of economic regulation, attention and initiative should be focused towards ways of augmenting the bargaining capacity of the weaker economies so that the air travel could be increasingly affordable for the traveling public.

4. Prospects of Air Route Development

Air route development is an important aspect in liberalization to ultimately facilitate in making provisions regarding route designation and utilization during air services. Rising fuel cost, increasing air traffic congestion and increased emissions are the growing concerns of present international air transport. Initiatives taken by ICAO, Asia Pacific Region and IATA in the past to address these problems such as implementation of more efficient route structures in the region including EMARSSH Route, implementation of Reduced Vertical Separation Minima (RVSM), introduction of Air Traffic Flow Management in the Bay of Bengal for the traffic transiting through Kabul FIR are few of the remarkable examples. It is only upon agreement on Nepal's proposal of the Himalaya Routes and Trans-Himalayan Routes by States, IATA, and ICAO, that doors would be opened for bilateral negotiations for the utilization of these routes.

For the past 8 years, Nepal has been focusing on promulgation of international routes across the Himalayas. We should understand the reason for establishing an air corridor across the considerable part of Nepalese airspace. In order to establish Himalayan Route for the optimum utilization of Nepalese airspace. Himalayan 1 from Bangkok to Indek of Pakistan direct via Kolkata and Nepalgunj, Nepal and Himalayan 2 from Kathmandu to Hong Kong direct via Bagdogra and Imphal have been proposed by Nepal since long. We have raised the implementation aspects of Himalayan 2 Route at many international fora, including DGCA Conference, APANPIRG and air route meeting. IATA has appreciated this proposal and assured fullest cooperation in its implementation. These developments will allow the international airlines to over fly Nepalese airspace which means benefit of economy on fuel and distance to the operating international airlines, and a robust revenue to Nepal. Our estimate is that the direct beneficiary airlines will be Air India,

Cathay Pacific, Qatar Airways, Saudi Arabian Airlines, Nepal Airlines, Dragon Air, Yeti Airlines, China Southern, Air Hong Kong among other prospective air carriers.

Coordination with ICAO and relevant countries has been intensified at the Ministry and organizational level. We are also in process of finalizing the Kathmandu-Lhasa B345 Route upto Beijing and Shanghai in the context of the signing of LoA with China on ATS Coordination procedure. The L626 Kathmandu - Mahendra Nagar - Pantanagar - Delhi route has been established and operational siince the implementation of Remote Control Air Ground (RCAG) VHF station at Nepalgunj which was under constant effort to facilitate the the L626 route and provide full VHF communication coverage through Nepal.

The Himalaya 1 Route (ref. to the end of paragraph), supplemented by existing Route L 507 (Bangkok - Kolkata - Nepalgunj)-Indek will not only ease the traffic flow over Delhi but also improve the bottleneck over Afghanistan. Pakistan had formally agreed this route to be promulgated as a bi directional route. In the same way Himalaya 2 Route, if established will be the shortest route from Hong Kong to Kathmandu and vice versa. Distance of existing Kathmandu Hong Kong Route via Bangladesh is 1770 NM whereas the proposed Route is only 1669 NM via Imphal. So it is less by 101 NM. But distance can be further reduced by 35 NM, if direct routing from Kunming to Kathmandu could be materialized. This route if connected to L626 and be extended up to Delhi, ultimately benefit directly to more than a dozen airlines, operating schedule flights to/from Hong Kong to Kathmandu, Delhi and several other destinations to Middle East like Sarjah, Dubai, Riyadh, Doha, Abudhabi etc.

The above proposed routes particularly the Himalayan 2 Route is viable, economically beneficial to the airlines and the States, which will directly support ICAO and the aviation communities for the environment protection with less carbon emission. Therefore, Nepal requires support and cooperation of the Government of India, Government of China and the operating airlines for their implementation.

With strong projected gross domestic product (GDP) growth rates and rising per capita income in China and India and unprecedented air traffic growth in the recent years in the two countries has opened a new prospect of Trans Himalayan Route. Lhasa – Kathmandu – Lucknow (B 345), over flying Mount Everest. From Lhasa this route is further extended to Beijing and Sanghai as B 213. Nepal has proposed this route to be extended to Delhi and beyond as follows:

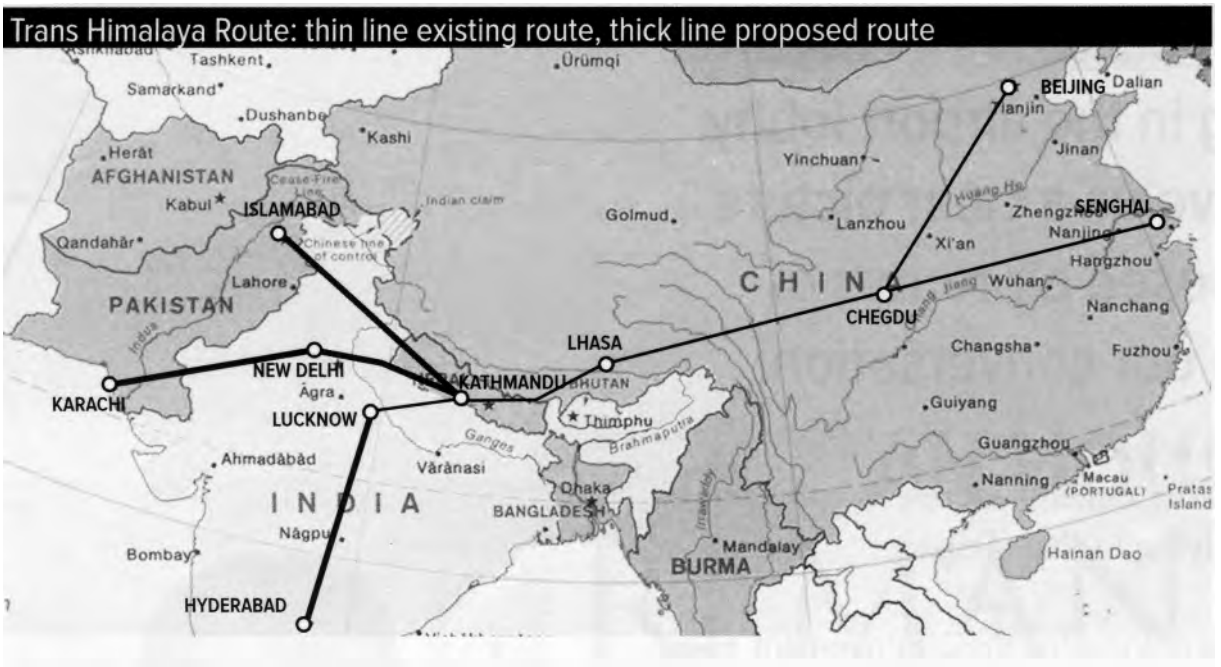
i. Beijing - Chengdu - Lhasa - Kathmandu - Delhi (Two W ay). Or

   Beijing – Lanzhou – Lhasa – Kathmandu – Delhi (two way)

ii. Shanghai - Chengdu - Lhasa - Kathmandu - Delhi (Two Way).

These routes have been identified as the shortest possible routes for the flights to/from mainland China and far east and to Middle East/Europe via Nepal and Indian sub continent. In this regard China has given concurrence for airline operation between Kathmandu and Shanghai/Beijing via Chengdu/Lhasa- Kathmandu (B213 and B345). In concurrence of China, this Trans Himalayan Route can be extended up to Seoul as a direct and shortest route from Delhi and Kathmandu.

Himalaya 1 and 2



Trans Himalaya Route

5. Conclusion

Globalization, liberalization, privatization and consumerism are the drivers of regulatory reform, which should be encouraged without compromising safety standards. Regulators need to actively participate in this process by establishing rules which are non discriminatory, reflect best global practice and take account of local difference and overall national interest.

As envisaged in the Civil Aviation Policy, 2063, The Government of Nepal has encouraged private investment in the construction and operation of infrastructure, The Construction of Second International Airport is being explored under Build, Own, Operate and Transfer (BOOT) Concept. A regulation entitled Airport Infrastructure construction, development, operation and management, 2067 has been introduced under CAAN Act, which encourages private sector involvement with various options and modalities.

The Civil Aviation Authority of Nepal (CAAN) is the sole air navigation service provider with multifarious obligations involving construction, equipment facilitation, operation, maintenance and management of airports, It is responsible for regulation of airlines and safety oversight function. The growth trend with increasing number of heterogeneous aircraft is a matter of concern to the safety and regulatory authority of Nepal. To enable CAAN increasingly proactive in its endeavor and foster healthy growth of air transport without compromising safety, cooperative efforts among policy planners, civil aviation authorities, airline operators and stakeholders at national, regional and global level is indispensable.

The main thrust of Nepal's international air transport policy is to increase global accessibility, optimize utilization of Nepalese air space and maximize economic benefits to the nation by promoting tourism and trade. So, a flexible and liberal approach should be continued to foster healthy and sustained growth of airlines. The new international air route structure should be established to ensure safe, economical, efficient, environment friendly and sustainable air transport. It is high time to formulate comprehensive national air transport policy and also to review pertinent legislation, regulation, policies and practices with respect to the development of air transport under liberalized regime.

***Director General, Civil Aviation Authority of Nepal.**

AIR TRANSPORT

Catalyst for Global Economic Development

Lalit Bikram Shah*

In a report published in June of 2009, OXFORD ECONOMICS suggested that the world's future prosperity may depend on a growing and thriving aviation industry, which currently supports nearly eight percent of the world's economy. According to an Airbus Industry forecast, from 2009 to 2028, some twenty five thousand new passenger and freighter aircraft valued at US$ 3.1 trillion will be delivered posing a challenge to airport and various service providers.

GROWTH

The demand will be driven by emerging economies, evolving airline network, expansion of low cost carries, the increasing number of mega-cities with their traffic growth and the need for more eco-efficient airlines. It is interesting to note that the greatest demand for passenger aircraft will be from airlines in Asia- Pacific and emerging markets. The People's Republic of China and India account for 31 percent of the total, followed by Europe (25 percent) and North America (23 percent). In terms of domestic passenger markets, India at 10 percent and China at 7.9 percent will have the fastest growth over the next 20 years. The largest by volume of traffic will remain the US domestic market.

On a world wide scale, tourism generated US$ 7,067 billion worth of economic activity in 2007 with an expected growth worth US$ 13,232 billion by 2017. Currently, 45 percent pf all tourists worldwide arrive by air.

Talking about Economic Rates of Return from Aviation Investment in Developing Countries, a striking example is the case of KENYA – with an investment of US$ 351 million, the increase in national connectivity has been 59 percent and an Annual Economic Rate of return of 59 percent. Closer to home. Cambodia attained an increase of 46 percent in national connectivity and an annual Economic Rate of Return of 19 percent.

IMPACT ON AIR FARES

It is to be noted that with the tremendous growth in air transport, its inherent benefits that come with increasing competition have led to a significant decline in Air Travel Fares permitting economic development in many sectors. Let us take one example – a London –Sydney flight – in 1945 a trip cost 130 weekly wages equivalent to US$ 94,350;in 1965 a trip cost 22 weekly wages equivalent to US$ 15,970; in 2009 a trip cost simply 2 weekly wages equivalent to comparatively " a paltry'" US$ 1,450. However this decline in air fares should not belie the fact that, currently, costs are on the rise involving several aspects; such as- operational fees, environmental cost , general taxes, increase in oil price and liability protection.

ECONOMIC CRISIS

A look at the time line of worst crisis in air transportation reveals that Oil Crisis generally dominated the period from 1973 to 1980 and from 1981 to1992, except for a break of seven years in between. 1997 brought in the Asian Financial Crisis with the infamous 9\11 event having disastrous effect in the economy from 2001 to 2003 and well beyond. At the end of July 2009, passenger travel was down by 7 percent and freight volumes by 19 percent. Parked Idle fleet was as high as 2.860 airliners comprising a high 13.1 percent of the total fleet. Leaving aside Air Transport industry, the 2008\2009 economic crisis had an equally devastating impact in the Shipping Industry. Container Port Throughput decline was as high minus 27 percent with 9 percent of world shipping fleet having been laid up. Anticipated 2009 looses for all container shipping lines were US$ 10 billion, a comparable figure to the losses incurred by the air Transport Industry during the same period.

POST CRISIS CHALLENGES

The decline has slowed but we still await a positive growth. There are several challenges ranging from finance to safety. Tighter Credit Standards have been put in place and the question that arises is –will finance be available? Another worrying aspect is – will Jet fuel and crude oil surge again in a state of price volatilty? With regard to safety, the regional spread of Accident Rates indicates that in spite of high standards, there are deep pockets of worry with the African, Latin American and East European Regions taking the lead in jet Hull losses per million sectors flown

The longest and deepest recession of the post – war era was ending and a new global expansion began at the end of 2009, although very slowly. The timing and strength of recovery was showing significant regional variations, with Asia leading and Europe and the US beginning to recover. With the stimuli packages having been put in place sustained recovery would depend on a rebound in consumer spending, unemployment, housing prices and business fixed investment in the key economic of the world. The air transport markets have started a slow rebound. The long- term outlook remains strong for the next 20 years with a passenger traffic growth expected to follow the average turned of about 5 percent.

Safety and Security

The number of priority for Aviation Industry as a whole is Safety and Security and is clearly defined in the work of ICAO, in the fact it is carry as an item topping the list of Strategic Objectives in the Business Plan of ICAO. All most all the annexes of ICAO dwell on this aspect in varying degrees. Because it's the number one priority and because of the tremendous collaboration amongst all the stake holders on the global scale under the leadership of ICAO-air travel is and continues to be the safest form of travel that exits. Over the past ten years, there has been a 46 percent decrease in the total number of fatal accident, at a time of significant growth in traffic world wide. This is positive but the reality is that the overall accident rate has remained disturbingly stable over the same time frame. Quick and strong action must be undertaken to develop and implement new strategies to bring down the overall accident rate. Zero accidents and Zero fatalities are the perfect target for the Aviation Industry but very utopian, however, the task is to work more efficiently, collaborate more and share information in order to improve upon the Industry's already enviable record. Given the current state of the Industry, middle income and even lower middle

income economics have great difficulties in finding recourses necessary to safely and securely sustain an expanding and even more demanding sector-even though it's vital to their economics. Every dollar invested by the richer States is of lesser value if at the other end of the flight-similar efforts are not made and this continues to be a major challenge in up keeping high and harmonized standards throughout the world.

It is felt that next and greatest threat to aviation today will not be from within the aircraft, but from a possible airport security incursion. The attempted sabotage of Northwest Airlines Flight 253 on 25 December planned by, what is known as the infamous 'Underwear Bomber' brought home basic realities about aviation security. Dealing effectively with security threats requires a commitment to globally- harmonized measures and procedures. A terrorist will quickly locate the weakest entry point in the security net, be it half a world away from his intended target. The challenge is gigantic proportions- achieving and maintaining an optimum balance between more stringent security measures and processes that facilitate air travel by 2.3 billion passengers per year. ICAO has been working hard to promote closer international cooperation. Ministerial Regional Conferences in various parts of the world have been held to generate global consensus around the development of a uniform, international response to threats to civil aviation.

Environment

It should be noted that the Aviation Industry continues to face hostility at the hands of certain Government and lobbying groups around the world for being perceived as a major polluter. The facts and figures clearly refute these allegations and ICAO with the Aviation Industry are clearly in the lead in having undertaken very proactive measures. Airlines contribute only 2% of global CO2 emissions while 12% remains within the transport sector compared to a very high 74% from road transport in that same sector. The aircraft manufactures have made remarkable achievements- aircraft engines are 70% quieter that they used to be decades back. The A380 and Boeing 787 target less than 3 liters per passenger per 100 km, which is astoundingly comparable to a small car. The Industry is seriously considering working together in achieving a carbon free flight in 50 years.

It must be recognized that the Aviation Industry has made more advancements and greater efficiencies than probably any other industry- certainly in transport, but unfortunately, the Industry is not doing enough to sell its achievements. Civil Aviation Industry continues to be seen as an enticing target that is very visible to the wrath of environmentalists and lobbying groups. At the Global Climate Change talks to last December in Copenhagen, the world Community, not too surprisingly, did not produce the outcome expected. At the same time under the leadership of ICAO and the concerted efforts of all stake holders, aviation could speak to a globally harmonized agreement that to this day remains the first and only agreement created by an industrial sector to address the issue of climate change.

At a High-level meeting on Environment held at ICAO in October 2009. States accounting for 93% of the world's commercial air traffic, together with the Air Transport Industry, set the following objectives:

(a) to reach a global and annual improvement of 2% in fuel efficiency by the year 2050;

(b) to develop a worldwide CO2 standard for aircraft;

(c) to develop a framework for market-based measures in international aviation;

(d) to establish measures aimed at assisting developing States and facilitating access to financial resources, technology transfer and capacity-building;

(e) to develop and establish the worldwide use alternative fuels which would make the aviation industry the first sector to use sustainable alternative fuels on a global scale;

(f) to continue work on the reduction of airport noise annoyance and aviation engine emissions which affect local air quality.

Losing no time, ICAO's Committee on Aviation Environmental Protection in February 2010 recommended a number of concrete steps- a timetable for the development of a CO2 Standard for commercial aircraft with 2013 as the target date. This will be the first global fuel-efficiency standard for any Industry sector. CAEP also proposed NOx (Nitrogen Oxide) Standards 15 percent more stringent than the current levels, applicable to new aircraft engines certified after 31 December 2013. The new threshold will help ensure that the most efficient technology is used in the production of aircraft engines in the near future.

OBSERVATION

Growth in the Aviation Industry brings along tremendous challenges- for the regulators, service providers, trainers, airport and airline operators, in fact for all the stake holders and partners in varying degrees. States have to manage this growth with the highest level of professionalism. If growth is allowed to take its due course with the Civil Aviation Industry falling behind and not being able to manage it, this will inevitably lead to gross inefficiencies and high risk. Growth management calls for a very dynamic and pro-active approach with timely pre-emptive interventions because the Civil Aviation Industry is highly uncompromising and unforgiving. ICAO, States and the Industry partners have done pretty well in ensuring that the Air Transport Industry continues to remain the safest form of transport.

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SIA: Future of Nepalese Civil Aviation

T.R. Manandhar*

Issue of excessive air traffic congestion experienced in Tribhuvan International Airport (TIA) since last few years is a matter of great concern. It is felt that some concrete actions must be initiated urgently. Probable actions may be expansion of TIA infrastructure, 24 hours operation of TIA, diversify the operational base of domestic operators, converting potential domestic airports such as Pokhara and Bhairahawa to international airport.

In course of examining how things are going on, it is apparent that TIA is in a continuous process of expansion. After the completion of on going runway overlay work TIA may go for 24 hours operation. Pokhara and Bhairahawa is in the process of transformation to international airport. However, diversification of the operational base of domestic operators is not being able to implement effectively. In fact, all these process are being very slow in comparison to the rate of air traffic growth. Besides, these solutions are of temporary in nature. It will not fulfill the ultimate requirement to meet the ever growing tourism and civil aviation of the country. Main constraints of TIA is the space limitation. TIA capacity can be significantly enhanced only if an additional runway could be constructed. But because of the space limitation of TIA this is not possible. So the ultimate solution is to develop a Second International Airport.

It must be accepted that now TIA is approaching at saturation level. Even though the airport is operated 24 hours (present operation 18:30 hours), few additional flights can be accommodated. However, as the development and operation of another international airport takes several years, TIA still needs to be optimally utilized till next option is available. Although it is being late to think of the next option, it is a matter of great satisfaction that Nepal Government has taken few serious steps to ensure Second International Airport (SIA) at Nijgadh as their priority project. As a result given below are few major government initiations so far:

- Land requirement and the boundary demarcation for SIA at Nijgadh has been finalized and submitted to government for approval.
- A Negotiation Team has been established to negotiate with the 1316 families who have been identified to have settled in the government land for their resettlement.
- Ministry for Tourism and Civil Aviation has set up a separate unit in the Ministry to deal with SIA.
- Government has granted permission to a South Korean Company – Land Mark Worldwide (LMW) to conduct Detailed Feasibility Study (DFS). This includes detail engineering design of the airport.
- Total duration of the DFS is 10 months and by now LMW is reported to have completed most of their work, including EIA (Environmental Impact Assessment). LMW is preparing to submit the final report of DFS in January 2011. DFS includes development plan of the Airport City along with the SIA.
- Opening of Fast Track which is the complimentary Project of SIA is in progress.
- Korean company LMW was involved in developing Incheon International Airport of South Korea. Incheon International Airport has won the as the best airport under passenger facilitation for the last 5 consecutive years..

There are several issues that are still to be addressed to materialize the SIA. Resettlement of the people and the environmental issues are not so easy but still there are several solutions and options to settle this problem. Major issues are the fast track and TIA 's operational modality after SIA. Fast track connecting Kathmandu and Nijgadh within a shortest possible distance is a complementary project to SIA. They are very closely inter connected. SIA will not be viable unless and until a short and direct access road to the airport from the capital is available. Fast Track Project is under Ministry of Physical Planning where as SIA is under Ministry of Tourism and Civil Aviation. So a very good cooperation and coordination between two ministry is essential. If not it may not fulfill its ultimate target. Second major issue is – once SIA is in operation in what model TIA is to be operated and how to recoup the huge investment that has been already incurred in TIA's infrastructure development .

On November 3, 2010, Rt. Honorable Prime Minister had an aerial inspection of fast track and SIA site. Hon. Minister for Tourism and Civil Aviaion Mr. Sharat Singh Bhandari and Secretary, MOTCA, Mr. Kishore Thapa was also present in the inspection. Before departure to the SIA site, Secretary Mr. Kishore Thapa briefed about the present status of SIA to the Prime Minister. After the completion of the aerial inspection, there was a briefing program in the Budhune Army Barrack in Makawanpur district around 30 km East of Hetauda. Nepal Army made a briefing about the progress and problems in the Fast Track Project. In the program, I had an opportunity to make a brief power point presentation on the need of SIA and its prospects.

Rt. Hon. Prime Minister and Hon. Minister for Tourism and Civil Aviation at Budhune Barrack after aerial inspection of Fast Track and SIA site

After the briefing program, Rt. Honorable Prime Minister in his directives expressed his utmost concern to both projects. PM also emphasized that primary objective of the fast track is in no way to be disturbed and deviated to address the local needs. Honorable Minister for Tourism and Civil Aviation informed the PM that resettlement is not a problem . If needed government may build the multi storey apartment to resettle the affected people. Minister also explained the PM that SIA and the Fast Track is very much interrelated and as such should treat both projects in a single package for its effective implementation.

All those concern for SIA and Fast Track at the national level is the positive indication that the things are moving towards the right direction. However, there are certain things which indicate whether we are really serious about SIA. What I observe is about the lack of commitment and self confidence among us. There are still doubt among the general public and even within the aviation circle whether SIA will really be materialized? But whenever I see the confidence and commitment expressed by our honorable minister regarding this project I hope nothing can resist it now.

SIA is in fact the rival project of CAAN. Once SIA comes into operation CAAN will have to loose major portion of its revenue from TIA. So CAAN should right now start thinking about the alternate source of revenue. Proposed ATS Route Himalaya – 2, if could be established may be one of the major source of revenue. Even being the rival project, CAAN will have to make a vigorous exercise for the successful implementation of SIA. One of this exercise is regarding the need of realignment of present ATS Routes. If India permits inbound traffic for SIA to descend within Indian FIR such realignment may not be necessary, which is a remote possibility. So present route structure may need to be drastically changed, for this also Nepal needs the cooperation from India. There may be no problem for outbound routes but for the inbound routes most probable entry may be from Nepalganj in the West and from Janakpur in the East provided India give consent.

Development of Nijgadh as a Second International Airport will lead Nepal to a new avenues of growth and prosperity. The most potential benefit of the Nijgadh site is its possibility to promote Nepal as an important transit hub of international air transport. Establishment of Himalaya – 2 Route will supplement this possibility. So SIA and Himalaya-2 Route is not only the future of Nepalese civil aviation but also the future of nation as a whole. In spite of all these important facts, no dedicated staffs are assigned so far for this project by the Ministry. Lack of dedicated staffs has seriously affected the credibility of the project.

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Future prospect of Gautam Buddha (Lumbini) Regional International Airport

Rajesh Raj Dali*

Aviation History:

Progress of human beings has always been linked with his ability to travel. Although legends, history and literature demonstrate interest in the possibility of human flight, which did not succeed until 17 December 1903, when Wright brothers introduced the Golden Age for Aviation by flying first airplane made of a frail structure of metal, wood and fabric. The Second World War was a powerful catalyst for the technical development of the aeroplane. At that time, a vast network of passenger and freight carriage was set up. The tremendous growth in aviation became the challenge as well as opportunity for the people of the aviation community. On 7th December 1944 International Civil Aviation Organization came into existence. The Chicago Convention entered in force on 4 April 1947. The Convention accepts the principle that every State has complete and exclusive sovereignty over the airspace above its territory and provides that no scheduled international air service may operate over or into the territory of a Contracting State without its previous consent.

Nepal, whose total area is 1, 47,181 square kilometer (sq km)elongated east west, is situated in between Tibetan Autonomous Region of the People's Republic of China in north and India in west, south and east. Its length is 885 km east-west and its breadth varies from 145-241 km north-south. It has about 3091000 hectors of cultivated agricultural land & total population about 25.887 million. Nepal is a multiracial and multilingual country. There are more than 61 ethnic groups that speak around 70 different languages and dialects. Nepal's economy is mainly agriculture-based and 65.7% population above 10 years involve in agriculture. Rest are involved in service (inside and outside country), business and a few people are diverting to different industries. Ninety percent of the inhabitants live in the rural areas. The country is divided into main three geographical belts running east to west. The Terai (plain) region is a semi tropical area with elevation as low as 70 metres (m) above mean sea level and it covers 17% of total land. The Hilly region in the middle belt rises to an elevation of 4877 m and it covers 68% of total land. Similarly the altitude of the Himalayan region, which covers 15% of total land, ranges between 4,877m.-8,848m. In this region lie eight of the 14 highest peaks in the world which exceed an altitude of 8,000m above mean sea level including Mount Everest. There is nominal surface transportation covering the country. About 53 km is covered by railways, about 42 km is covered by ropeways and about 17609 km by road which include 5222 km black topped,4738 graveled and 7649 fair weather roads. Similarly, 40 of the 75 districts (53.33%) out of which 18 are inaccessible by road are connected by airports. However there are still two districts (Myagdi & Dailekha) directly inaccessible by road as well as airports. As it is inconvenient, unreliable, quite expensive and time consuming to provide road transportation facilities to the people of Nepal, air transportation in the country has automatically climbed high in demand .

On one hand the dimension of its landlocked and mountainous topography has seriously handicapped the national development activities, on the other hand natural beauties, national parks, wild life, very renowned places for pilgrimage, immense cultural heritage of temple, pagoda and monuments, enchanting flora and fauna, rapidly descending rivers for rafting, unique topography for ballooning, hang gliding, paragliding and ecologically rich diversities has made Nepal the main attraction for tourism promotion. As the Nepalese economy is more dependent on tourism and foreign trade, which are the two main sources of foreign currency earnings as well as employment generation, adequate provision of air transport services is required to establish direct air links within the country, neighboring countries and the rest of the world for the promotion of tourism and commodity exports, as both these industries are labour-intensive. Nepalese travel and tourism scenario will set a stage for augmenting regional and international air services for a landlocked country to help the development of these vibrant sectors of national economy. Similarly air transportation has been playing a key role in the development of remote region and alleviation of poverty of people in Nepal.

The history begins in aviation when a pilot landed his glider on the old golf course in 1947 where as the Civil Aviation activities in Nepal started only after 1949 April (2006 BS) when a small four seated single engine Vintage Beach-craft Bonanza aircraft landed at Kathmandu green pastured land (airstrip) known as 'Gaucharan'. The further development and expansion of this Gaucharan has resulted in Nepal's only International Airport – Tribhuvan International Airport (TIA). As aviation is most dynamic in nature, Nepal has been trying to go in line with the ever changing, ever growing and ever developing air transportation sector. With the adoption of Liberal Sky policy, a competitive edge in terms of safety, economy, efficiency and reliability has been generated. The current development in the aviation industry in Nepal has created an atmosphere for excellent opportunities for construction of new airports and upgrading of existing airport to fit the current demand of passenger and operation of aircraft. Further, increase in aircraft fleets and expansion of the airlines will see considerable growth in demand for full facilities and services at the existing airports. So there should be some planning which can upgrade the existing airports up to the standard level seeked by today's demand. The time has come to identify those airports for developing facilities and services as required by the current demand and to attract the operators to use the airports as per the demand of passengers.

There is tremendous growth in passenger movement in domestic as well as international operation of flights. Because of the

demand, lots of people are interested to establish domestic as well as international airlines in Nepal. Similarly the new aviation policy 2063, has also encouraged national and international entrepreneurs to invest in construction or upgrading of airports and in establishing domestic or international airlines. Up till now out of 60 air operator certificate (AOC) issued to domestic operators only 28 airlines have valid AOC and there are only 23 airlines including paragliding operating so far. Similarly, there are 51 fixed wing aircraft and 20 helicopters currently operating, have been registered in Nepal. Regarding international flights, there are 26 international airlines operating in Kathmandu. Throughout Nepal, there are 48 airports including one international airport, 5 main hub airports namely Dhangadhi, Nepalgunj, Gautam Buddha, Pokhara and Biratnagar and 3 more airports in pipeline under construction. But out of 48 airports only 34 airports are currently connected by air services. So it is essential that those airports which are not connected by the air service should be studied and analyzed for the purpose of utilizing it.

Gautam Buddha (Lumbini) Airport :(GBA)

Background

Siddhartha Nagar (Bhairahawa) is the start point of Siddhartha highway. The city is also a gateway to Lumbini and India. The district in general is intersected by two major highways namely East-West highway and Siddhartha highway south-north. The capital Kathmandu is 290 km away from surface transport. The district has well-established two municipalities close and connected with Pokhara and Kathmandu. Total length of road existing within the district is about 270 km including national highway, feeder roads, urban roads and district roads. It is noted that the population served by one kilometer of road in this district is 1956. Likewise, in each 5 square kilometer area there is a kilometer of motorable road. From these remarks, the road transport is good but the foreigners and Indians visiting Bhairahawa intend to return Kathmandu by air. In relation to time value of people traveling through road to Kathmandu, the air-transport seems to be cheaper and better for sick, old, business people and officials. Similarly for foreigners, businessmen, high officials and politicians who cannot afford time traveling by road use air transport.

Gautam Buddha Airport lies in Siddartha Nagar Municipality of Rupandehi District in Lumbini Zone of Western Development Region of Nepal. It is situated only 4 km away from the Rupandehi district headquarters, is only 22 km east of Lumbini, the birthplace of Lord Buddha and at about 22 km south of Butwal which is an important commercial centre of the nation. This airport is considered as a major airport well supported by the influx of domestic as well as foreign tourists. It serves the role of gateway for air passengers coming and going from Lumbini. Lord Gautam Buddha was born in 483 BC at Lumbini, Nepal, attained enlightenment at Bodhgaya, preached his first sermon at Sarnath and realized Nirvana at Kusinagar. Therefore, these four places- are regarded as the most auspicious pilgrim destinations (Chardham) in Buddhism. Buddhism is one of the major religious and philosophical traditions in the world. Buddhism initially spread all over India and Northward through the Great Himalayas into China, Tibet, Korea and Japan. Southward, it reached Sri Lanka, Thailand, Myanmar (Burma), Cambodia, and Vietnam. During the 1900's, it even spread to Europe, United States of America and Australia and the number of Buddhists in the world are estimated over 300 million. Number of foreigners coming to visit this holy place is continuously growing. Tourists, especially from Japan, Thailand, Korea, China, Myanmar, Vietnam, Sri Lanka, Singapore, Malaysia, Taiwan, European countries and USA use this airport to visit Lumbini. Besides, this airport serves as the entry point for the foreigners and Indians coming to Kathmandu via surface route through Sunauli, the border town, which is 5 km from the airport. Places related with Gautam Buddha like Kapilbastu, Kudan, Devdaha and Ramgram are also very close to this airport. Population is rapidly growing in the district due to the availability of infrastructures for development. Other famous tourist places of Nepal such as Pokhara, Jomsom, Bharatpur, Gorkha etc. are also within 15 to 30 minutes air distance from this airport. In the past, it linked Pokhara, Dang, Rolpa, Banglung, Bharatpur and Kathmandu by air. The airport link road is bituminous with two lanes and is connected to the Indian border on one side and Lumbini on the other.

Present Description:

This airport lies at the latitude and longitude of 27°30'20" N and 084°24'30"E.The existing runway orientation is in east-west direction headings 10/28, favorable to the direction of wind flow in this area. The area is flat land with an elevation of 105 m only from the sea level. The airport is currently classified as a Category B airport with 1500m length of bitumen runway. It is equipped with passenger terminal building, all tower facilities, and navigational equipment such as NDB, localizer, VOR/DME and PAPIs to runways. This airport is in operation since the date of first service on 4th July, 1958. A significant growth in domestic traffic (as high as 80%) is the proof of the important role of civil aviation which has indicated that the Short and Long term programmes are very much essential for the appropriate development of Civil aviation sector in Nepal. Therefore, it is very vital to address the urgent need of upgrading the identified existing airports to cope with the current demand. Lumbini is a beautiful place that can attract the Buddhist tourist easily and is potential tourist destination thus making it one of the main sources of foreign currency income in Nepal. This is the one airport which has been identified long before to upgrade it to the international level.

In existing Gautam Buddha Airport, the highest category that has been operated so far is F100 aircraft, but higher than F100 category aircraft could not be operated due to limitation of its runway strength and length. This airport is located near Lumbini, the birth place of Lord Buddha which is the Religious holistic place for all Buddhists around the world. The densely populated country India lies very near from the existing Gautam Buddha Airport. So, Indian tourists (both religious and visiting) will be benefited from this Airport if the airport is upgraded to be used by regional carriers for the direct air link to those Indian cities where most of the Buddhists are

living. Similarly direct flight from other SAARC Countries and South- East Asian countries like Bangkok, Myanmar, Singapore, Japan and Korea etc can be attractive for the people interested in tourism and Buddhism. This airport also could be used as an alternate airport for TIA of Kathmandu as there is no such airport in Nepal where B757 category aircraft can land. So upgrading this Airport to a Regional International Airport will automatically facilitate all Buddhists of the world. Moreover, it will enhance the safety while operating in Nepalese airspace as it will serve as the nearest alternate airport for medium jet type aircraft in case of diversion from TIA. This will give the pilots a confidence while operating to or from TIA that there is another airport well facilitated where they can land in short span of time if they are unable to land at TIA. The peak year for this airport was 2005 AD when the passenger movement was recorded as 128258. The down trends after that year need to be analyzed by the concerned authority for the future development. ADB has shown keen interest in developing this airport and did study the prospect for the future expansion as described below. The cost estimate for the identified work comes about US$ 46.50 millions. So it would be better if the development work should be scheduled in phases so that there will be less possible interruption of operation from the airport. The development of the airport can be divided into two phases. The land acquisition for Construction of new Runway, Taxiway and Apron and other associated works will be done in Phase I and the construction of new Runway, rehabilitation and completion of Terminal Building, Diversion of River, and Fencing etc. will be done in Phase II.

Development Approach:

Regional International Airport in Gautam Buddha Airport will play a key role for the promotion of Pilgrimage tourism and air services to the people of Nepal with environmentally sound development and requiring least disturbances to the nature of the area. TIA is the only international airport & aviation gateway to Nepal catering about 70-80 percent of total tourist inflow, which reflects the image of the country. It has played a dominant role in air transportation and is a responsible agency to provide aeronautical facilities at existing international air-routes and is also a hub for those people who want to go directly to Lumbini. So diversifying the air traffic from TIA to this airport will also help regional carrier to operate considerably cheaper and can save time to those people who want to go Lumbini directly.

The National Planning Commission of Government of Nepal (GoN) in its three years plan has specially pointed its target in the field of civil aviation as follows:

"On the basis of the growing international relations of Nepal, its extraordinary geography, means of access, and growing professionalism, emphasis will be given to the improvement of the communication system in the Tribhuwan International Airport, infrastructure development of second international airport in Nijgadh of Bara, level improvement of International hub airports in Bhairahawa and Pokhara, and improvement and enhancement of other airports, on the basis of priority".

Similarly the working policy is defined as follows:

"Infrastructure development and expansion works will be initiated to develop the Pokhara and Gautam Buddha Airports as regional international hub airports".

With the planning of the policy the GoN in its Budget speech of 2008/2009 has declared the following commitment:

"A necessary preparation will be made to declare 2011 as "Nepal Tourism Year", the objective of which is to widely publicize within and outside the country in order to bring at least 1 million tourists per year in the country."

"The construction of International Airport at Nijgharh, Bara will begin from this fiscal year. Similarly, the construction of Regional Airports at Pokhara and Bhairawa will also be started. I have set aside Rs. 200 million for these projects, which will be constructed on public-private partnership basis. I have proposed Rs.950 million for the aviation sector by substantially increasing the allocation compared to revised estimate of last fiscal year."

With the plan to construct a regional international airport in Lumbini, it is essential that necessary infrastructures and the installation of standard modern technology equipments for providing air traffic services as well as safety standards should be provided in accordance with ICAO guidelines. The new acquired land will be sufficient for the extension and rehabilitation of airport up to 2600m runway length, which will be capable of handling the operation of B-757. But, it is necessary to seek source of fund under various methods of investments as decided by GoN. Various construction and infrastructural development works can be identified in general including new runway parallel to the existing runway, as:

a. Extension of runway length from 1520 m to 2600 m.
b. Widening of Runway (from 30 m to 45m) and Taxiway
c. Existing pavement strengthening of runway, taxiway and apron.
d. Drainage improvement
e. Diversion / crossing of Ghaghar Khola.
f. Diversion of irrigational channel and road due to runway expansion
g. Expansion of RFFS building and fuel farm
h. Water supply improvement
i. Apron expansion (300x152.5m)
j. Rehabilitation and Expansion of Terminal building
k. Construction of Operation /Airlines / Cargo Buildings and Car parking area.
l. Navigational Facilities
m. Runway and Taxiway Lights
n. Construction of Hangars and Maintenance Yards.
o. Construction of Perimeter and Improvement of Access Roads.
p. Construction of Security Fencing works

Qualitative development of airports and its operation & maintenance of safety standards with the recommended international standards is necessary to cope with the increasing traffic size and performance of the aircraft. The main objective of this development is to provide standard, safe, smooth, secured and reliable air transportation system in the existing Gautam Buddha Airport as a Regional International Airport to cater the modest type aircraft like B-757 and make available alternate airport in Nepal besides TIA. Similarly policy should be developed so that the aircraft can be used for traveling to and from Kathmandu, Pokhara, Nepalgunj, Dhangadhi, Biratnagar and some remote parts of Western region of Nepal. This will help the regional balancing of the air transport facilities as well as develop people activities outside Kathmandu valley for reducing unnecessary requirement to come to Kathmandu.

Future Prospect:

The Asia-Pacific region is expected to represent over 50% of the world's total international tourism traffic data by 2010. Nepal, the birthplace of Lord Gautam Buddha may receive its appropriate share of passengers, if there is timely and proper planning to attract and facilitate them. The outbound travel from Asia-Pacific (excluding South Asia) was estimated to be over 90 million to different countries of the world, out of which 67 million is within the Asia-Pacific itself. The Asia Pacific region is dominated by a majority of Buddhist Countries or have a predominantly Buddhist influence like China, Japan, South Korea, Taiwan, Thailand, Myanmar, Cambodia, Vietnam, Sri Lanka, Hong Kong, Singapore and India. Under these encouraging circumstances the time now has come for the concerned authority to plan on promoting potential religious tourism in Nepal with the joint effort of different Non Government Organizations (NGO) working with the same objectives of Lumbini Development.

Since a number of years, there were discussions and demands among the politicians and decision makers for construction of an international airport at Lumbuni, but for a country like Nepal, the construction of such mega projects like international /regional airport with such a long-term perspective need very big amount of financial requirement. So, a phase-wise programme for the development of regional or international airport at Lumbini might be the only possible option from the techno-economic point of view. Existing Gautam Buddha airport can be extended a few hundred meters towards east and upto Tinau River in the west with a view to upgrade so that it could function as the regional airport for small and medium size jet aircraft. The additional acquisition of the land in both the sides along the runway has already facilitate for extension\upgrading programme with additional instruments and necessary equipments to provide a safe landing of medium sized jet aircraft coming from India, Bangladesh, Pakistan, Sri Lanka, Bhutan, Myanmar, and Thailand. Such an extension /upgrading would also facilitate chartered flights from various countries on the basis of making the intermediate stop-over in any international airport within and outside Nepal.

Due to geographical situation of this GBA, the consideration of the airspace requirement and utilization also are equally important factors to be studied. The airspace planning and management need and cooperation of the neighbouring state to accommodate the international flights. The standard Letter of Agreement (LoA) designed as per ICAO will give a complete solution for the arrival and departure of all international flight in this GBA .This can be achieved by professional approach. The designing of the proper air route will safe guard all agencies requirement.

A detailed feasibility survey on the business plan is essential to workout the exact costs of civil work and other costs for navigational aid and other equipment facilities required for the regional airport. The upgraded/extended airport of Gautam Buddha will permit its functioning as the Regional Airport serving the neighboring countries. It will also permit chartered flights coming from various distant countries. Such programmed can be implemented within the mid-term business plan by creating conducive atmosphere for national as well as international investors as required. Neither the country, nor the international funding agencies can take a risk to invest a large-scale project, which is not viable from business and financial viewpoint. Only viable projects can be started with a view to get reasonable financial return from the project. However, a phase-wise approach could be implemented during the first phase of the Lumbini airport development programme. Once the traffic with more cargo values will be generated, it could be attractive for the international investors to invest money on BOOT concept for a new international airport elsewhere. Thus the existing airport may be evaluated for an extension/upgrading to regional international airport to accommodate medium jet type aircraft for more tourists visiting Lumbini in future.

- The existing airport can be extended up to 3.5 km in length and 1.5 km in breadth on the basis of acquiring the land from east as well as from west.
- Upgraded/extended airport of Gautam Buddha will permit it to function as the Regional International Airport for flights from neighboring countries and it will also permit for the chartered flights coming from various countries. The project can be implemented within few years by mobilizing national as well as international funds as required.

So far the national policies on the air transport sector of Nepal need to be reviewed so as to develop a sound national working environment in involving the private sector in various modalities. Although there are various concepts of investment policy such as MOT (Maintain-Operate-Transfer), BOO (Build – Operate – Own), BOT (Build-Operate-Transfer), the concept of BOOT (Build-Operate – Own – Transfer) can be more potential, in as much as it allows the private sector to construct, operate, own for some time, and eventually transfer the ownership. Improvement, development or construction of airports or other infrastructures will be performed by both the government and private through public private partnership (PPP) or through indigenous and/or foreign investors by way of building owning, operating and transferring (BOOT) process. Such investors should be given necessary facilities and encouragement including the facility of land acquisition and other aspects of incentives and motivations.

A separate study on the privatization of airports has to be conducted on the socio-economic and legal aspects of Nepal. Both the national and international investors should get the guarantee for their investments from the nation. The existing legal framework and the financial regulations need to be reviewed to offer security to investors in air transport in Nepal. Thus, a short-term and long-term air transport policy has to be defined so that both the national and the international investors might take interest in the construction of domestic, regional, and international airports in Nepal.

The new Aviation Policy 2063 has stated in its policy regarding foreign investment are as follows:

1. Categorization and Operation of Airports

The airports will be categorized and operated as follows:

(a) International Airport;

(b) Regional Hub Airport;

(c) Airport in the area with road transport access;

(d) Airport in remote area.

2. Keeping in view the long-term development of air transportion of the country, a new international airport with the state-of-art facilities will be built and developed with the participation of the Government of Nepal and the private sector with a view to developing Nepal as a transit hub in the Asia and Pacific Region.

3. Airports will be gradually upgraded keeping in view the geographical location, density of population, regional balance, tourism promotion, proximity with another airport, and potentiality of cost effectiveness.

4. Necessary infrastructures will be prepared to develop Biratnagar, Pokhara, Bhairahawa, Nepalgunj and Dhangadhi Airports as regional hub airports and expand air services with adjoining countries. Air services will be operated in remote areas, taking these airports as the operation base.

5. A slot system will be so developed as to be ancillary to make a balance between the increase in airport use time and the air traffic distribution, by making necessary arrangements for flight support equipment at airports.

6. The upgrading and modernization of airports will be gradually carried out, by making a plan of the development of airports.

Regional International Airport is likely to change the socio-economic scenario not only in the project vicinity, but also in the country as a whole. Several sectors will be directly or indirectly affected by the construction of regional international airport. The main sectors are tourism, agriculture, export/import, services, employment, education, and health, etc. It is generally recognized that infrastructure alone will not induce economic growth, rather its absence will constraint growth areas with development potential.

Conclusion:

Keeping in the view of the importance of the area, existence of only one airport in the zone, the international fame of the place as the birthplace of Lord Buddha, have been strong reasons due to which building an international airport in this place has become very necessary. For this South Asia tourism infrastructure development project (SATIDP) has planned to upgrade this airport with the following financial plan:

a) ADB Grant	12.75 mil	27.40 %
b) ADB loan	12.75 mil	27.40 %
c) OFID	15.00 mil	32.22 %
d) GoN	6.00 mil	12.90 %

CAAN has formed project management and implementation unit (PMIU) on Nov 23rd 2009 and public notice of land acquisition of 146 bighas has been published on May 11 2010. Similarly by Sept 3rd 2010 GoN and CAAN has completed subsidiary financing agreement with ADB and OFID for implementation of this project. Thus to start constructing this airport to a level of international standard, this project should consider the following points for further benefit to the country through aviation sector.

1. Regional balance
2. Direct access to the Buddhist of the world
3. Tourism Promotion by direct access to famous place.
4. Contribution to the National economy
5. Serves as alternate Airport of TIA
6. Enhance flight safety by building confidence to the international flyer
7. Economical diversify from Kathmandu
8. Attract more flight from Buddhist countries
9. Generation of more economic activities
10. Ultimate benefits to the people of New Nepal
11. Additional utilisation of Nepalese Airport and airspace to International operator.

Reference:

(A) ICAO Report

(B) Three year plan of NPC

(C) Budget Speech of GoN 2008/2009

(D) The Aviation Policy, 2006

(E) CAAN Report

(F) ADB Report

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Fluctuations of Inbound Tourism in Nepal: Causes and its Impact: An Overview

Ram Chandra Bhattarai, Ph.D*

Background

Nepal has for the most part of its modern history (1846-1951) been closed to the outside world due to its relative inaccessibility, malaria –infected Terai region and the isolationist policy of the Rana rulers who were suspicious of foreigners. It has been estimated that between 1981and 1925, only 153 foreigners were granted permission to visit Nepal (Aditya and Shrestha, 1998).

It is only in the early 1950s that Nepal can be said to have opened its doors to tourists, particularly mountaineers. The historic ascent of Annapurna 1 by French climbers Maurice Herzog and Luis Lachenal in 1950 (Herzog, 1952), followed three years later by the ascent of Mt. Everest, highest mountain the world, by Hillary and Tenzing in 1953 (Hunt, 1953) put the Nepal Himalaya squarely on the global mountaineering map and set the tone for international tourism to Nepal.

Government of Nepal acknowledged for the first time in its First Plan (1956-1961) that tourism had a role to play in the development of the country. As a result, a national Tourism Development Board was setup in 1957. According available estimates, a total of 2056 tourists visited Nepal in 1958 (Satyal, 2000). The Department of Tourism was established under the Ministry of Industry and Commerce in 1959. However, it was only in the three Year Second Plan (1962-1965) that a provision was included for fostering tourism as an industry with emphasis on increasing accommodation, aviation facilities and tourist reception services, after which tourist traffic increased significantly.

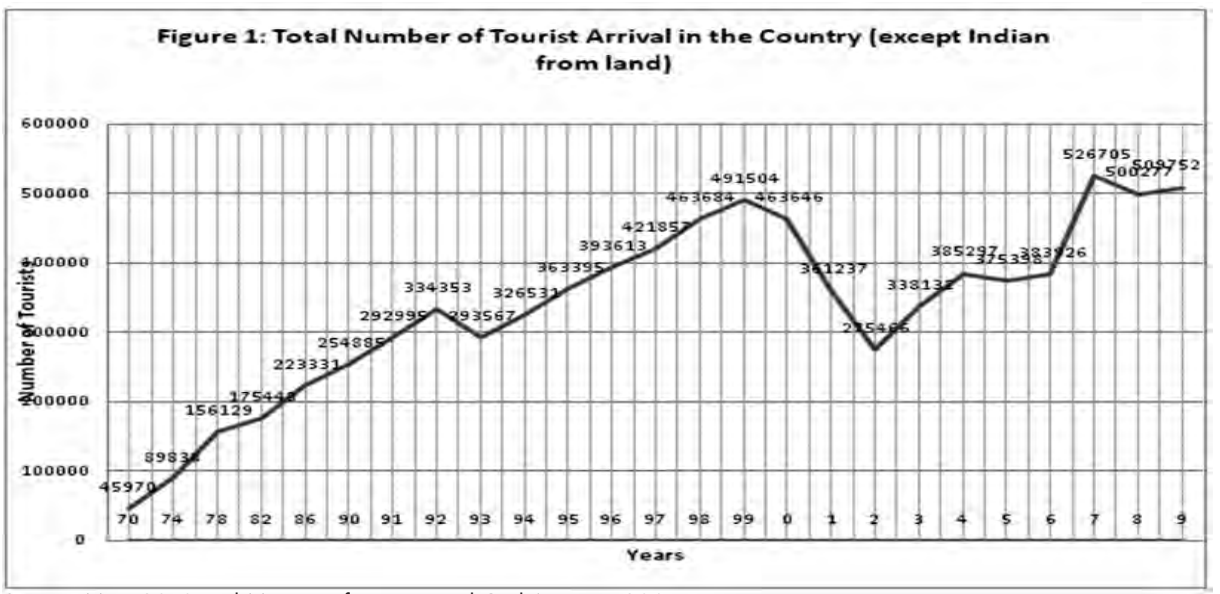
In 1972, the government went a step ahead by approving a 'Nepal Tourism Master Plan' – a road map for tourism development for the next ten years. In line with the Master Plan, a full fledged Ministry of Tourism was established in 1977 and the Department of Tourism found a natural home in this ministry. Marketing strategy for Tourism in Nepal was developed for the period 1977-1981. In 1984, the Master Plan was updated and extended for two years. It was during the eighth plan (1992-1997) period in 1995 that a Tourism Policy –first of its kind- was adopted and a high level Tourism Council formed under the chairmanship of Prime Minister. The overall objective of the Tourism Policy 1995 was to promote Nepal as a premier destination by utilizing its resources and making it a vehicle for national development. It emphasized strongly the role of private sector in the overall development of tourism in the country. It was during this period that the liberal sky policy was adopted under the National Civil Aviation Policy, whereby private sector was encouraged to operate air services, both domestic and international.

In 1996, the Government of Nepal decided to observe ' Visit Nepal Year 1998' Jointly with private sector to promote tourism development on a sustainable basis and reposition Nepal in the international market. In 1999, Nepal Tourism Board was conceived as a public private partnership initiative with a mandate to do just that.

Trend of Tourists Arrivals in Nepal

As foundation of the tourism sector ware being laid down from early 1950's to the 1990's as discussed above, the number of tourists visiting Nepal was increasing rapidly (Figure-1).

Figure 1: Total Number of Tourist Arrival in the Country (except Indian from land)



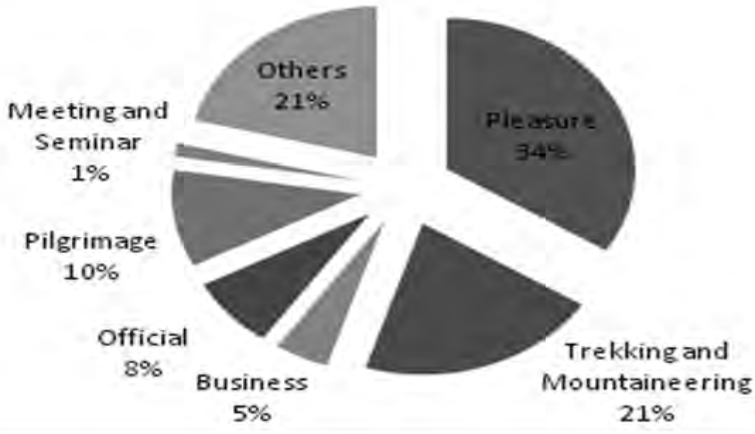
Source: MoF, 2010 and Ministry of Tourism and Civil Aviation, 2007

In 1962, when Nepal first started to keep records of data related to tourism, there were only 6,179 tourist arrivals in the country. This figure rose to 509752 in 2009, registering a growth of nearly 8250 percent in the 47 year period, despite suffering two major slumps: one between 1992 and 1993 and the other between 1999 and 2002.

Economic Contributions from Tourism Sector

The total foreign currency earnings from the tourism sector is about NRs. 27960 million in 2008/09. This amount is 40 % of total value of merchandise exports, 6.5 % of total foreign exchange earnings and nearly 3 % of the GDP (MoF, 2010). The historical data on foreign exchange earnings from tourism shows that the share of tourism is declining due to the increasing share of remittance income. However, in terms of GDP its share is in between 1.4 to 4.1 during past 35 years (MoF, 2010).

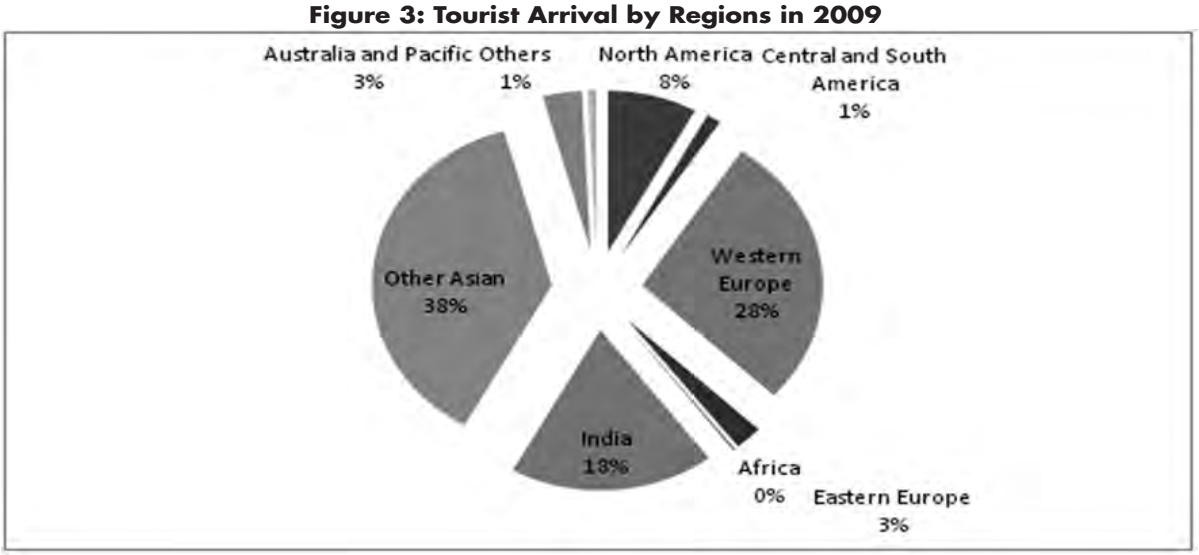
Chart 2: Number of Tourists by Purpose of Visit in 2009



Source: MoF, 2010

If we see the purpose of tourists for visiting the country nearly one third are for pleasure, 21 % are for the purpose of trekking and mountaineering, 10 percent are for pilgrimage 8 percent for official, 5 % for business 1 % for meeting and seminar and 21 % for other purposes (figure 2).

Figure 3: Tourist Arrival by Regions in 2009



Source: MoF, 2010

Among the total tourists the share of Asia is highest. Nearly 56 % tourists come from Asia. In terms of single nation tourists from India is highest. The share of Indian tourists is 18.4 % and the share of African tourists is very low i.e. 0.2 % (Figure 3).

Overall tourist arrivals declined from 1999 to 2002 and recovered in two phases from 2003 to 2004 and 2006 to 2008. The decline was caused by the deteriorating image of Nepal as a safe destination, owing to the then internal conflict due to Maoiest insurgency and regional and international incidents such as September 11 terrorist attacks, war in Afganisthan (Haslett, 2001) were some factors.

The recovery on the other hand was caused partly by the

intrinsic resilience of the tourism sector (its ability to bounce back quickly) added by a slew of measures put in place by the government and Nepal Tourism Board in cooperation with private sector (Adhikari, 2005 and Asia Tribune, 2004). The signing of the Comprehensive Peace Agreement and the eventual joining of the government by the CPN-Maoists opened the way for international tour operators and Western embassies to put Nepal back on their list of safe destinations.

The economic performance of the tourism sector for the most part mirrored the decline and recovery trends of inbound tourism between 1998 and 2008. Similarly gross foreign exchange earnings closely followed the overall tourist arrivals numbers during 1998-2009. Looking the past trend Nepal Government's goal of attracting 1 Million visitors by the coming year 2011 needs more efforts from the side of the government and private sector.

Conclusion and Recommendations

The declining and recovery phases associated with inbound tourism to Nepal in the last decade has underscored that news or travel authorities related to crimes, diseases, wars, political unrest, hazards and disasters can have serious impact on the number of tourist arrivals in Nepal. Therefore it is important to manage a crisis, whenever or whatever it occurs in the following way.

- Initiate confidence or image building measures following a crisis quickly in several fronts-with travel trade, the media, embassies, tour operators etc. Press trips to change public perceptions to build confidence; transparency in communications; formation of crisis action cell and meeting on travel advisories are important measures. As a means of counteract the existing negative streams of news, it is important to give out accurate and balanced information with frequent updates through trusted mediums and outlets.
- The government should insist that the embassies discuss beforehand the content of travel advisories with the authorities of Nepal including Nepal Tourism Board, or at the very least follow the guidelines stipulated in the Global Code of Ethic for Tourism (UNWTO, 2001). This is especially important for Nepal because of their generalizing effect, and also because they tended not to change with time and did not paint the full picture. So there needs to be struck a balance between the embassies' right to inform their citizens about security situations and the host country's tourism development imperatives.
- Familiarization trips offer one way to correct an image problem by bringing journalists and international tour operators to see for themselves true situation of Nepal following a crisis period. As the saying goes, "seeing is believing!".
- Promoting domestic tourism during a time of crisis through information dissemination of safe travel options, discount price schemes etc. A country with robust domestic tourism is better able to weather difficult crisis situations.
- Organize special events such as International Mountain Biking Competition, Everest Marathon, and International Mountain Film Festival etc.
- Schemes and programs aimed at boosting inbound tourism in the lean months (January-February and May-June-July-August) need to be designed and implemented to remove the seasonality of tourism.
- As nearly 80 % of the tourists arrive in Nepal by air, it is very important to focus on the civil aviation sector. Nepal needs to invest in infrastructure development, especially in regional airports, short-take-off –and-landing strips and helicopter services. It needs to revive and revitalize Nepal Airlines Corporation by removing politics from the business of flying the national carriers on long haul strategic routes such as Western Europe.
- As Nepal is located between two fastest growing economies in the world (India and China), it needs to position itself strategically to benefit from their growths. Thus needs to lobbying with China government to extend the railway line from Lahsa to Kathmandu while at the same time lobbying with the Indian Government for similar connectivity.
- The government, with collaboration with stake holders, must commit to maintaining peace and security in the country. It needs to focus on main political agenda i.e writing of the constitution within a specified time period. While it may take some time for the dust to settle-i.e. for bandas or political/civil unrest to end given that the country is in transition- the government should, take all precautions and measures to see to it that the situation does not get out of hand or blow up, damaging Nepal's image as a safe and secure destination in the regional and international markets.
- Nepal needs to reclassify types of tourists possible here based on the typologies of the tourists visiting Nepal, and develop tourism products and services for each of these types of tourism to cater to each typology of tourists.

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Performance Based Navigation (PBN) Planning and Implementation

Kamal P. Rimal*

Introduction

Performance-Based Navigation (PBN) is defined as Area Navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace. It provides a way forward in addressing present and future aviation system capacity, efficiency, environmental and safety issues. PBN is ICAO's effort and objective to redefine the regional differences of various Area Navigation (RNAV) and Required Navigation Performance (RNP) specifications into a globally harmonized set of PBN applications. The RNAV and RNP components of PBN provide a foundation for evolutionary developments of aviation system such as Single European Sky ATM Research Programme (SESAR) and Next Generation Air Transportation System (NextGen).

SESAR is a programme launched by EUROCONTROL in 2004 to modernize ATM to cope up with the growing demand of air travel. The objectives of SESAR are to eliminate the fragmented approach to ATM, transform ATM system, and synchronize the plan and actions of different partners and resources. In the past, many initiatives aiming at improving the ATM system were undertaken in the European region but full benefits in most cases were not achieved mainly due to commitment from stakeholders. SESAR's core objectives are to develop ATM technology needed to manage increasing demands with reduced costs and minimum environmental impact. Its development phase is between 2008 and 2013 with deployment phase from 2014 to 2020.

The NextGen Implementation Plan of the Federal Aviation Administration of the United States contains firm, fully-funded commitments to new operational capabilities, new airport infrastructure, and improvements to safety, security, and environmental performance. It is a wide ranging transformation of the entire national air transportation system in the United States to meet future demands and avoid gridlock in the sky and at airports. It moves away from ground-based surveillance and navigation to new and more dynamic satellite-based systems and procedures, and introduces new technological innovations in areas such as weather forecast, digital communications and networking. When fully implemented, NextGen will safely allow more aircraft to fly more closely together on more direct routes, reducing delays, and providing unprecedented benefits for the environment and the economy through reductions in carbon emissions, fuel consumption and noise. Its implementation is aimed for 2025.

The Challenges

The global aviation community is facing significant challenges. As demand for air transportation services increases, States are faced with finding solutions to safely increase capacity, efficiency, and access, e.g. to terrain challenged airports. These constraints are largely a result of reliance upon conventional ground-based navigation aids (e.g., VOR, NDB, ILS), which limit routes and procedures beyond their coverage. These ground-based systems have served the aviation community well since inception; however, they do not permit the flexibility available with PBN to meet the present and future challenges. ICAO has therefore adopted PBN to address these challenges. Through the application of Area Navigation (RNAV) and Required Navigation Performance (RNP) specifications, PBN provides the means for flexible routes and terminal procedures. The illustrations depict the constraints associated with conventional, ground-based sensor specific routes, procedures and the flexibilityÊand benefits of performance-based, non-sensor specific navigation (both RNAV and RNP).

PBN will help the global aviation community to reduce aviation congestion, conserve fuel, protect the environment, reduce the impact of aircraft noise and maintain reliable, all-weather operations, even at the most challenging airports. It provides operators with greater flexibility and better operating returns while increasing the safety of regional and national airspace systems.

Benefits of PBN

The PBN will provide the following benefits.

- **Environmental Benefits**

o Reduces emissions by saving fuel. It is expected that 3.15 kg of CO2 emissions will be eliminated, every 1 kg of fuel savings will be achieved through shorter and vertically optimized PBN flight paths. IATA estimates that globally, shorter PBN routes could cut CO2 emissions by 13 million tones per year. Additionally, PBN provides a mechanism for optimized profile descents that allow aircraft to descend from high altitudes to the airport at minimum thrust settings.

o Reduces noise pollution. Consistent, precise paths can be routed to avoid noise sensitive areas. Noise levels can often be reduced through use of optimized profile descents, which allow lower, quieter thrust levels.

- **Improve Safety**

o Reduces the risk of Controlled Flight In to Terrain (CFIT) accidents by providing a very precise lateral and vertical flight path.

o Provides consistent, predictable and stabilized approaches. Aircraft arrive at the runway aligned with the centerline, in the same configuration and at the same speed every time.

o Reduces diversions caused by adverse weather conditions, enabling aircraft to reliably access airports with lower visibility restrictions.

- **Improve Operating Returns**

o Reduces fuel waste through shorter flight tracks, optimized

profile descents and fewer diversions. Enables more direct and closely spaced parallel tracks en route for increased fuel efficiency and reduced flight time variance. More efficient departure operations enable fuel savings from decreased taxi and ground waiting lines.

- Creates new market opportunities by providing safe access to terrain and weather challenged destinations. PBN also provides a path for airline growth as emission caps are implemented around the world.
- Provides a degree of precision approach capability without the investment required for expensive infrastructure.
- Improves customer satisfaction and customer loyalty by allowing airlines to more consistently access airports serviced at higher on-time rates.

● Increase Airspace Capacity

Increases traffic capacity through more efficient routes and smoother flows. Reduces airspace conflicts between adjacent airports and prohibited or special use airspace.

PBN provides the global framework of harmonized modern navigation requirements, which did not exist previously or existed on a regional basis only, and also provides the platform to implement and benefit from existing and future area navigation technologies. It includes two key "building blocks": area navigation (RNAV) and required navigation performance (RNP), the application of which encompasses all phases of flight from en-route to approach. PBN enhances safety by providing improved flight guidance to pilots. It enables operational improvements including shortened routes, continuous climb and descent operations and enhanced approach procedures, all of which reduce fuel consumption thereby reducing aviation's environmental impact and improving safety.

Regional Planning and Implementation Initiatives

The ICAO coordinated effort for "rolling out" PBN contains three main elements which form an integral package: improving awareness and education; coordination and facilitation of Implementation and strengthening implementation of Standards and Recommended Practices (SARPs) and guidance material.

Planning

Based on Eleventh Air Navigation Conference recommendation, ICAO Assembly in its 36th Session adopted a Resolution (A 36/23) that States and all the Planning and Implementation Regional Groups (PIRGs) complete a PBN implementation plan by 2009 to achieve implementation of RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones and implement approach procedures with vertical guidance (APV) (Baro-VNAV and or augmented GNSS) for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with the defined intermediate milestones. ICAO Assembly, in its 37th Session reviewed the status of global PBN implementation and through its Resolution A37/11 revised the requirement of completion of State PBN implementation plan and included LNAV only minima in the approach procedures.

To assist in implementation efforts, ICAO Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) has established a PBN Task Force. The Task Force has developed Regional PBN Plan. All States were expected to have completed development of their National PBN Implementation Plans based on the Regional Plan by the end of 2009 but due to resource and expertise constraints, only 21 States in the region have been able to complete this requirement in time. To assist States, educational tools were offered by ICAO in the form of airspace workshops, approach procedure with vertical guidance (APV) design courses and PBN implementation seminars. The PBN Task Force has held seven meetings until September 2010 and has been encouraging States to develop their National PBN Implementation Plan and also to provide status report to the Regional Office in a format adopted by APANPIRG.

The 47th Conference of the Directors General of Civil Aviation, Asia and Pacific Regions held in Macao, China from 25 to 29 October 2010 noted the lack of completion of States' PBN Implementation Plan in the Asia and Pacific Regions. In keeping with the ICAO Assembly Resolution A37/11 the Conference, in its Action Item 47/4, urged States/Administrations that are yet to develop their plans, to complete a State PBN implementation plan as a matter of urgency to achieve the timelines and intermediate milestones.

ICAO has updated regulatory and guidance materials to include PBN provisions. ICAO Standards and Recommended Practices and Procedures (SARPS) provide the necessary legal framework under the Convention and the referenced manuals provide support to States and stakeholders in the PBN implementation process.

States have also been assisted through the Cooperative Development of Operational Safety and Continuing Airworthiness Programmes (COSCAPs) in order to provide them guidance on air operator airworthiness and operational approvals for all navigation specifications contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

Conclusion

Progress in the development of National Implementation Plan is slow. It is very important that States should complete the development of National Implementation Plans and ensure compliance with the dates indicated in the PBN Implementation Plan. This will be a significant step toward a global performance-based air navigation system for the future.

As a result of ICAO efforts, States started implementation of PBN however, in many States shortage of resources and expertise precludes optimum implementation of the programme. Therefore, strong ICAO leadership would be essential to maintain implementation momentum.

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TIA Capacity Constraints and Nepal Tourism Year 2011

Sanjiv Gautam*

Owing to its being the only international airport of the country, Tribhuvan International Airport (TIA) is the sole gateway for foreign international operators to fly to Nepal with their scheduled passenger and charter flights. While signs of restoration of considerable peace and stability in Nepal are showing up after more than a decade long internal conflict, there has been substantial increase in business activities in the diverse economic sectors. Tourism, as the mainstay of Nepalese economy, is indeed not an exception. As a major second contributor in foreign currency earning by State after remittance, tourism industry in Nepal is also a significant employment generator with tremendous, perennial growth potentiality. Due to its dynamism and available products within the country, the Government of Nepal has launched various campaigns in periodic manner to promote tourism in Nepal. Nepal Tourism Year 2011 (NTY 2011) has been launched in the similar vein.

Constraints and Campaign

NTY 2011 will definitely put heavy demand on quality airport operations. It is ironic to notice that flights are delayed at the airport (on the ground as well as in the air) due to obligations of controllers to stick to the prescribed international standards and procedures while providing their services without compromising safety. For a few years traffic delays have been a common phenomenon at other airports too, besides TIA, which are due to other contributing factors such as weather, runway layout, procedures, etc. Travelling public is also concerned about safe and prompt journey to their destination.

While domestic and international flights are increasing significantly at TIA, the NTY 2011 campaign, targeted to introduce at least 1 million tourists to the country, will obviously result in excessive delays at the airport, until a tangible solution is sought. To address the problem, responsible policy makers and executives hold the view that the only panacea to get rid of congestion at the airport can be the extension of operational hours of TIA. Even the Minister and Secretary in different forums of seminar and meetings have expressed their commitment to making the TIA open for round-the-clock operation to make NTY 2011 a grand success.

The traffic scenario at TIA comprises both domestic and international movements of which domestic traffic share around 80 percent of the total. Domestic flights normally operate from sunrise to sunset; most of the delay occurring between the early morning and midday are caused by domestic movement and instrument procedures. However, delay rarely occurs during the rest of the prescribed operational hours. Therefore it is necessary to consider different variables and evaluate them before a rational decision is made. It has been my effort to find an appropriate answer to the big question:

Do we really need a round the clock operation at TIA based on the recorded data, future traffic demand, available capacity (in terms of runway, apron and terminal), level of safety and other necessary variable?

The solution will not only affect the decision maker, aerodrome operator, aircraft operators, ANS service provider, traveling public but also more importantly the general public of Kathmandu valley.

Capacity constraint is the major problem for most of the airports worldwide, which is related with the traffic demand, traffic management, infrastructure development and service provision and there are numbers of variables that can enhance the capacity and selection of the most suitable one is an arduous challenge for service providers. Despite the best efforts of airport operators to expand capacity to meet the demand and eliminate created capacity constraints, the phenomena of traffic peaking may reduce the effect of such efforts. Traffic peaking airports result in severe negative, economic repercussions, such as passenger and aircraft delays, under utilization of available resources at an airport, etc.

Some facts and figure

- During the operation hour of 18.5 hours a day (0600-0030) there is a movement of 80% domestic flight and 20% international flights approximately.
- Domestic flights concentrate mostly during daytime
- Maximum of 32 international flights per day are operated
- Total int'l parking stand- 9
- During arrival and departure, 2 million passengers are processed annually (showing increasing trend)
- Total aircraft movement, international, has reached 15700 in the year 2009.

Basically, capacity can be measured in terms of runway, apron and terminal. Therefore, the notion of considering "Passenger Processing capacity of TIA" as a single variable, which stands at 930 passengers per hour departure- arrival, should be given a second thought. Precisely, capacity in terms of runway and apron must also be accounted for.

What is our position?

If we calculate the airport capacity in terms of runway, which is directly related with the airspace capacity, we have to base our capacity measurement on runway configuration, prevailing weather condition, ATC procedures (SIDs and STARs), type of fleet, flight rules, available CNS facilities, etc. ATC capacity study based on DORATASK (Directorate of Operation Research and Analysis) and MBB method with reference to Air Traffic Service Planning manual ICAO Doc. 9624 says that ATC can handle the given capacity if all the operational components function as per assumed standards. Applying the given methods and assuming the operational components functions normal, Air Traffic Control capacity at TIA, using the single runway for both arrival and departure in instrument meteorological condition with 12 flights per hour and in visual meteorological condition with 30 flights per hour can be handled by applying set standards and procedures without jeopardizing safety level. Using both runway for arrival and departure in IFR Condition 8 flights per hour and in VFR condition 25 flights per hour can be accommodated without compromise safety. Actual data (Domestic and international) randomly selected indicates that aircraft handling by ATC is more than their capacity during several hours of a day. Calculated capacity can be further reduced if available facilities and other relevant resources are degraded. Based on given data ATCs are handling more traffic than their capacity resulting in aircraft delay on ground and on the air.

If our capacity is measured in terms of Terminal, we are in a safe position. Terminal building capacity based on providing 24 sq m space per passenger hour, admits that the current international terminal is able to handle 1350 PHP with adequate level of service. Based on the given analysis, if scheduling and slot management can be performed efficiently with appropriate traffic distribution, the International Terminal Building will be able to handle about seven million passengers annually. Similarly if we calculate our capacity in terms of Apron we can find out that total of 81 aircraft can be accommodated in a day if total ground time is 2 hours per aircraft, i.e., 29,565 annually. Historical data reveals that average ground time for the aircraft is about one hour and fifteen minutes. (Excluding ATC delay) and operational experience shows that self ground handling is more efficient than commercial ground handling which is solely performed by Nepal Airlines.

Nepal Tourism Year 2011

Government of Nepal has announced national Champaign "Nepal Tourism Year 2011" to promote domestic tourism for the sustainability of the industry and aims at telling the world that peace is restored in Nepal. With the announcement of NTY, it is anticipated that at least one million international visitors will visit Nepal in 2011. Historical data reveals that 70% international visitors enter Nepal by air and around 400,000 tourists visited Nepal by air in the year 2009. If we are able to achieve our goal some 300,000 tourists will travel Nepal by air, which means our airport has to manage additional 600,000 passenger movement at TIA in 2011. Asia Pacific traffic forecast is about 8% and based on that estimate total passenger forecast will be 2.8 million which demand 2000 additional flight i.e. Maximum 6 flights a day. Based on the industries norm of providing 10000 to 13000 sq m of space per million passengers, the current ITB capacity can be taken to be between 2.5 to 3.2 MPPA. Similarly, as per the analysis of the processing capacity of the existing ITB facilities and space utilization, the existing ITB could be enhanced to serve the forecast passenger demand up to 2015 at an acceptable Level Of Services (LOS). Based on the given condition of parking capacity of TIA with achieved NTY target, we need to handle additional 6 flight per day in year 2011 i. e. 38 flights per day (32 plus 6), which is well below the parking capacity of 81 aircraft per day.

Why round the clock operation?

Before implementing any plan and programme, it is necessary to evaluate the different factors affecting the plan and

programme and we have to foresee the reason behind our decision and its future impact. Basic variables for the extension of operation hour we believe are, if traffic demand exceeds capacity, there is no room to exploit existing capacity using all available resources. But sometimes such decision can be made if stakeholders demand to adjust their flight, there is political and management commitment to make the decision successful. Interestingly, the underlying fact is that an additional 5.5 hours a day to the existing operational hours can solve all the (mis?)management problem of the chaotic airport.

Other Factors considerable for expansion

Basically, there are numbers of variables which need to be evaluated before the extension of operation hour of an airport is done. Such factors are level of safety, demand justification, cost-benefit analysis, social responsibilities etc. Regarding TIA, this airport is certified by CAA Nepal as Certified Aerodrome as per the provision of ICAO annex 14. Manual of aerodrome standards of Nepal clearly stipulates that certified aerodrome needs to implement safety management system, having acceptable level of safety achieved. With ICAO findings during Universal Safety Oversight Audit of Civil Aviation System of Nepal, there are numbers of areas where we are not able to achieve the level of standards. For example, the availability and reliability of CNS equipment at TIA is not acceptable as per ICAO standards. Availability of required number of qualified manpower in aerodrome operation and ANS operation is lacking, For the granting and maintenance of the aerodrome certificate Safety Management System, surface movement guidance system shall be implemented which is yet to be materialized. Besides, it is widely accepted that safety assessment shall be conducted to implement any changes that affect safety.

Given data considering NTY 2011 and traffic forecast do not substantiate demand and we have still to consider the most important factor– cost benefit analysis, and public concern before our plan of extension of operation hour is executed. Despite our best efforts, secure, affordable and regular airport-city transportation system, safe, secure and high quality airport facilities are yet to be in place. Most importantly, the basic need of people and their right to enjoy a sound sleep are not being addressed. Democratic government is responsible to provide basic needs (to sleep) of people and there is strenuous opposition to aircraft noise by the public during night time throughout the world. This affects the scheduling of aircraft operation, especially during the deep night. It is worthwhile to note that in consideration of the notion of public welfare, night-time operational restriction is commonly imposed at many airports in Europe, USA, Australia, Japan, etc.

There are a lot of grievances voiced by the tourism related entrepreneurs regarding non-cooperation of CAA Nepal to make NTY 11 a grand success. CAA Nepal, as a government agency and responsible for the provision safe and standard airport operation is accountable for smooth flow of passenger services at the airport in accordance with the ICAO annex 9 facilitation standards. As most of the international visitors enter and exit via Tribhuvan International Airport, services rendered to the passengers during arrival and departure play a significant role to reflect the country images. CAA Nepal in general and airport management in particular need to focus just two things towards elimination of capacity problem: a multiple number of variables should be considered, and there must be safe, expeditious and hassle-free movement of visitors.

Peaking and Pick-ups

TIA is witnessing traffic peak during day time for around 5 to 7 hours a day which generates severe economic penalties such as under utilization of costly airport facilities and services with significant traffic delays and passenger chaos during such period. Significant improvement can be obtained by redistributing traffic through effective coordination and cooperation among the parties involved i.e. air operators, aerodrome operators and regulatory authority. Besides aerodrome operator at TIA must take immediate action to ease the situation considering the following objective items;

- Acceptable technical and operational mechanism should be developed to improve airport and airspace capacity.
- Provide sufficient signage wherever needed.
- The means of increasing capacity must be exploited wherever possible.
- Minimize retail shopping to provide adequate maneuvering space to passengers.
- Provide adequate and standard passenger processing facilities.
- Look at the route cause of congestion and resolve problem with the consultation of concern parties.
- Slot allocation is of fundamental importance of airport operators and congestion pricing and slot management can be the best solution to enhance capacity.
- Some form of demand management would be primary consequence of unresolved constraint at TIA resulting in traffic peaking.
- Declare hourly, daily, monthly and yearly airport capacity in terms of runway, terminal and apron to analyze the need for up-gradation.

Reference

ICAO Annex 9,Facilitation
Manual of Aerodrome standard Nepal
ICAO ATS planning Manuals
Report of ICAO USOAP Audit
Policies and recommended Practices handbook 2009, ACI

***Director, ATM**
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Skilled Human Touch in Aviation

Birendra Kumar Singh*

Dare to believe it, but it is a fact that human error is by far the most pervasive cause of accidents and incidents in technologically complex systems especially in air transportation. Data have revealed that 65% of all jet accidents have been attributed to human error that too for the approach and landing phase of flight accounts for 4% of the total flight exposure time and 49% of all accidents human error is cited for 80% in one form or another. Flying crew, therefore, need to be well trained so as to tackle any problem that may arise either in the sky or on ground there by providing safe and efficient flght. Ofcoure, this can be achieved only through efficient and effective as well as timely and updated training which can again be gotten thru simulator training for the cock-pit crew. But by all means, aviation is not only the crew members on board an aircraft (I.e. pilots, co-pilots, airhostess or say flight engineer) –but includes each and every person including flight dispatcher, ATC, ground staff– security, staff behind the counter who checks your airline ticket, to the loaders–all of these are the human facilitators who can either make or break the journey to your destination.

Therefore, what needs to be fully understood is that "human touch" or the "human resources" is of vital importance in the aviation arena and no one can be considered as the key and the sole entity or the overall figure but by all means no one is of less importance. When air transportation is in play, over all safety and security as well as eco friendliness plays strong and affluent role and that too it starts from the ground. Each and everyone should be fully aware that he/she plays a pivotal role in making a safe, secured, reliable and successful flight. For this, training plays a ground breaking role. This training is so essential that it cannot be over emphasized enough to harp again and again that YES training is the key for success in aviation in any part of the globe. That is why ICAO has repeatedly stated that "Tomorrow's Aviation a World of Opportunity for Skilled Aviation Personnel."However, lack of aviation personnel is one of the major issues that will increasingly affect the global air transportation of the future.

ICAO has embarked on a series of reforms in the management of human resources aiming to assist the organization in addressing the challenges it faces in terms of attracting, retaining and maintaining a competent, mobile and diverse workforce in order to promote fairness, equity, integrity, efficiency, effectiveness, transparency and ethic throughout the organization. This requires an immense investment in staff and is of prime importance so that they remain in touch with the current development in the field of their workforce. Timely training program should get injected at improving the technical and managerial skill and the competences of the staff. Modernization of the staff through the use of new technologies with a view to increase the efficiency, effectiveness and competency is of paramount importance. Presently, the human resource development stresses that integration of human factor and resource management principle into an organization's culture is a wise course of action.

Flight safety is the major objective of ICAO and it has long been known that some three out of four accidents result from less than optimum human performance, including that any advancement in the human resource development thru effective training can have a significant influence on the improvement of flight safety. Hence, this was recognized by the ICAO Assembly which in 1986 adopted the Resolution A26-9 on Flight Safety and Human Factors and as a follow up to the Assembly Resolution, the Air Navigation Commission formulated the objective of the task as:"To improve safety in aviation by making states more aware; and responsive, to the importance of human factors materials and measures developed on the basis of experience in states. Human factors concern with people in working; and living enviournments, about their relationship with equipment procedures; and involves the overall performance of human beings within the aviation system and training seekers to optimize people l.e.performance often integrated within the framework of "Human System" for enhancing safety and security coupled with efficiency and eco-friendliness envious in the field of air transpiration." ICAO too has charted out its Strategic Objectives for 2005-2010 as: Safety –Enhanced globalaviaion security, environmenatal protection –minimized adverse effect of global aviation on aenvironment, Efficiency-Enhanced efficiency of aviation operations, Continutiy of aviation opaeatoions, Rule of law-Strengthen law governing international civil aviation.

It is important to recognize that all concerned with the operation and administration matters of the aviation system must understand that no matter how determined the human factor is there to prevent an incident, human error will creep into the working arena to create an impact resulting in an immense human loss or a mere incident as human beings cannot perform perfectly at all times .That is why in order to achieve better performance, aviation has always linked up for a better design,training,education,services,motivtion with the objective of providing a safer, secured swifter air transportation . Hence, skilled manpower is the call of the day in today's aviation which is developed through intensive training and effective motivation. Presently there has been a massive wave of retirement from the current workforce and the growth of the industry is not in tandem and consistent with the current training making the present aviation service lose most of its lustre and ultimately leading the popularity of civil aviation towards wane. Safer sky is only achieved through investing for the production of highly skilled, efficient effective, and highly self motivated manpower which again is the outcome of high technology and well equipped training centre that has the confluence of well trained instructors who have logged years of experiences in their respective fields in the arena of aviation.

At this backdrop, globally speaking, Civil Aviation Policy states that institution and legal reform should be made to have training and educational activities operated in as much

as possible to strengthen and accommodate well equipped manpower to propel air transportation. Taking this into consideration, Civil Aviation Policy of Nepal states that institution and legal form will be made to have training institute of CAAN affiliated with universities and Train Air Program of ICAO and develop the institute as professional capable of carrying out quality control and oversight of training and educational activities operated by private sector. The native and foreign investors are encouraged to operate trainings so that the requirement of human resources will be fulfilled in the field of air services. Glancing back at the report of the ICAO USOAP/2000 of CAAN, we can recall that it clearly mentioned about how the low inspector remuneration continues to hamper CAAN's ability to attract,recruit,retain and train appropriately qualified inspectors. Because CAAn's inspectors ratios in comparison to the numbers of aircraft is far below for the inspectors to perform their assigned duties and has been far below the acceptance level, and further operation inspectors fly for hire with local airlines which not only create a shortage off inspector availability at CAAN but creates a conflict of interest with a the airline they regulate .For rectify this ICAO has recommended $ points for HRD as: Quantify the problem, Bring ICAO's SARPs in tandem with the modern technologies, Identify activities that support partners in the community that they can play and Provide a platform for the aviation community to come together for a common strategy. But, sadly in the present context, Nepal does not have the required and sufficient skilled, trained and highly self motivated civil aviation staff to fully perform the assigned duties and on top of that because of the lack of sufficient budget the capability to produce the required manpower has often taken its toll. Often the lack of staff has been overburdened as they have to shoulder their responsibilities strecheing into long hours of duties that can hamper their working capabilities. Of course, it is hoped that these suggestions by the year 2010 should have already been rectified and CAAN should be forging ahead to welcome with open arms the 2011 as it is just round the corner. So, serious thoughts should be given for a safe,secured,sustainable and efficient Nepalese sky which CAAN as the leader in the Nepalese Aviation must now ponder and Say it Out Loudly that YES CAAN does have the adequate skilled, efficient, tremendeously motivated personnel who when time arises can grind their nose against the grill if not it is high time that CAAN must stand up and do something for the future aviation so that it can stand on its own feet having a sound technology accompanied by full human recourses capable of dishing out the required amount of duties assigned on respective shoulders. That is why as the punch line goes: You want a safe, Secured Sky Invest Wisely on HRD.....

***Former Joint Secretary, Ministry of Tourism and Civil Avaition**

Challenges of Air Accident Investigation

Rajan Pokhrel*

Civil aviation, by nature of operation, is a field of international character. An aircraft is designed in a state, manufactured in another state with major parts manufactured in different other states, type certification in another state, owner and operator may be in other different states with area of operation in multiple international destinations reflects the complexities of air transport operation. So, Article 37 of the Convention on International Civil Aviation requires each contracting State to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, and organisation in relation to aircraft, personnel, airways and auxiliary services. Accordingly, ICAO adopted international standards and recommended practices and procedures dealing with different matters concerned with the safety, regularity and efficiency of air navigation as the Annexes to the Convention on International Civil Aviation. It is therefore the purpose of the Chicago Convention that signatory states are obliged to comply with standards, recommendations and directives issued by ICAO, as long as they do not contradict their own laws. Contracting states are obliged to incorporate the provisions made on ICAO Annexes to their national regulation and comply it. Article 38 of the Convention states that Contracting States are required to notify the Organisation of any differences between their national regulations and practices and the International Standards contained in the Annexes and any amendments thereto.

Accident Investigation an International obligation

Amongst other requirements, the Chicago Convention requires the signatory states to carry out investigations into those air accidents that take place within their own territory. Article 26 of the Convention on International Civil Aviation imposes an obligation on the state in which accident occurs to institute an inquiry into the circumstances of the accident in accordance, in so far as its laws permit, with the procedure recommended by the ICAO. Annex 13 to the Convention is the primary source of regulation based on which contracting states should formulate their own national regulation. Annex 13 protects the right of the countries in which the aircraft in question was designed, built, approved or registered to participate in the accident investigation. Manual of Aircraft Accident and Incident Investigation (DOC 9756) issued under Annex 13 provides guidance material for the organisation, conduct and control of an investigation. Guidance on Assistance to Aircraft Accident Victims and their Families (ICAO Circular 285) provides guidelines for the establishment of legislation, regulations, and programmes by contracting states to support the victims of aircraft accidents and their families. The sole objective of the investigation of an accident or incident is the prevention of accident and incident; it is not the purpose of this activity to apportion blame or liability. Neither the investigation report prepared under the provision of Annex 13 should be presented before judiciary for other investigations purposes.

Independence of Investigating Body

In the beginning, aircraft accident investigations were carried out by the regulatory authority itself. Since a regulatory authority is responsible for the certification and safety oversight function it could be involved in the actual root cause of an air accident in terms of its failure to implement appropriate regulations or by failing in its oversight obligations. Therefore, a separation of interest during investigation process is realized. In the 1950s, the ICAO therefore recommended that air accidents be investigated by independent bodies. Now there are well established accident investigation agencies with all required facilities and resources in many developed countries e.g., NTSB in USA, TSB in Canada, BEA in France, AAIB in United Kingdom, Australia and Singapore etc.

In many developing countries, accident investigation is still carried out by Civil Aviation Authorities (CAA). If CAA is also the accident investigation agency, the functional difference should be there as a regulator and investigator. However, the incident investigation is the responsibility of Civil Aviation Authorities. Investigation of incident should also be carried out by airline operator. The difference between an accident and incident lies down in the outcome. So an in-depth investigation of incident by independent investigating mechanism within the organisation is essential to identify the failure and take corrective measures to prevent recurrence of such incident. The ICAO has made inclusion about the possibility to delegate investigations accident to regional accident investigation organisations in Annex 13. This provision could be beneficial to develop regional cooperation in the field of air accident investigation and ensure in place the more independent mechanism for accident investigation.

Composition of Investigation Team

Where there is not an independent permanent body, accident investigation is conducted by an investigation team or commission formed after the aircraft accident. Such team or commission is constituted on ad-hoc basis. In this kind of investigation, experts are hired from CAA and airline industry. Accident Investigation Team normally constitutes professionals from Flight Operations, Airworthiness and Aircraft Maintenance. Normally, a three member team is an ideal composition for an aircraft accident investigation task. If the accident is of complex nature (related to large transport aircraft and involvement of many parties), investigation team can be larger but focus should be given on constitution of different technical groups under investigation team. The Team is lead by Pilot, Maintenance Engineer or Aviation Professional with adequate knowledge of aircraft performance, procedures with training and experience of aircraft accident Investigations. Accident Investigation is a pure technical investigation prepared to enhance safety rather than blaming on any organisation or person.

In countries with very small aviation activities, it may not be practicable to establish a permanent investigation organisation. Also, it would be very difficult to find independent experts in the market, as; they are either affiliated to CAA or industry. When experts are hired from CAA and Industry, the potential conflict of interest between their role as an investigator and an employee of their respective organization may arise. In such a situation, team should be formed with persons not directly involved in the oversight function from CAA, and persons not any linkage with concerned airline operator. Sometimes, experts from military wing may be involved in investigation team. When military experts are used, it should be ensured that they have adequate knowledge about the functioning of civil aviation system and investigation procedure as laid down by Annex 13 and related documents. Investigators should always bear in mind that the objective of technical investigation is to enhance safety rather to apportion blame or find guilty.

Relationship between Investigating agency and CAA

Aircraft Accident Investigating Agency should be a separate organisation from Civil Aviation Authority. However, in developing countries of small aviation activities, there is the practice of accident investigation being carried out by CAA itself. If CAA itself is the investigating body, there should be the clear functional difference in the organisation set up between the regulatory and investigating responsibility. The responsibility to safeguard civil aviation system in a state lies on CAA. Even if the Investigation Agency is an Independent body, the role of CAA is always very significant in aircraft accident investigation. It can play the advisory role to the investigating agency during accident investigation process. Investigation should not be carried out in isolation and as a secret mission. Regular discussion, idea sharing and advice of different stakeholder are required so that maximum information could be gathered and a more appropriate and realistic investigation report could be prepared.

Parliament of European Union (EU) recently approved a new law intending to ensure the independence of air accident investigations throughout the Europe. By the provision of this law Europe's new accident investigation system will be structured as a network of national agencies that can share resources. (EASA) is the regulatory body of EU and will have access to the safety occurrence reports produced by Member States, may be invited to advice in accident investigations. The EASA can participate in the investigation as the representative of the state of aircraft design, as the state of certificator. The EASA has the responsibility to oversee the application of safety recommendations. In USA, NTSB is a independent federal body to investigate the transport related accident, and many parties can participate in air accident investigation. Federal Aviation Administration (Regulatory body) participates in the investigation as a party by law. NTSB and FAA have undergone a Memorandum of Understanding that clearly laid down the role and responsibility of these two s on the matter related to aircraft accident investigation.

Criminalization of air accident Investigation

The trend to bring criminal prosecutions in the event of commercial aircraft accidents is a growing in many parts of globe today. The reason behind the increasing number of criminal prosecution might be the failure in the part of regulatory and safety organisations to respond to the public expectations for corrective action after an accident. The potential target groups of criminal investigation are mostly pilots, controllers, maintenance personnel, technical investigators and people from CAA responsible for safety oversight function. Aviation communities are showing grave concern over the growing criminalization of air accidents in some European countries. They think that the criminalization of air accidents has the potential to cripple their ability to learn from incidents and accidents. In France, Italy, Switzerland and Greece, there exists two tier system of accident investigation i.e. technical and judicial. In USA, only the cases of suspected criminal activity are investigated by other agencies and NTSB may participate to assist such investigation. Australia, Great Britain, the United States, and several other countries have systems in which the technical investigation takes precedence, unless criminal activity is indicated or proven.

The criminal investigation is different from technical or safety investigation carried out under the provision of Annex 13. Para 5.4.1 of Annex 13 states that any investigation conducted in accordance with the provisions of this Annex shall be separated from any judicial or administrative proceedings to apportion blame or liability. Annex 13 suggests that separation can be achieved by the investigation being conducted by State accident investigation authority experts, and any judicial or administrative proceedings being conducted by other appropriate experts. A State should ensure that any investigations conducted under the provisions of Annex 13 have unrestricted access to all evidential material without delay and are not impeded by administrative or judicial investigations or proceedings. ICAO make concerns that information contained in the records and obtained from interview during the investigation process could be utilized inappropriately for subsequent disciplinary, civil, administrative and criminal proceedings. If such information is distributed, it may, in the future, no longer be openly disclosed to investigators. Lack of access to such information would impede the investigation process and seriously affect flight safety. So a new Attachment E to the Annex 13 has been introduced, which make provisions for the legal guidance for the protection of information from safety data collection and processing systems.

Investigation Report

Aircraft accident investigation report is not prepared to blame any organisation or person, nor is its purpose to find guilty and punish him. The main purpose of accident investigation is to enhance safety. The final report of accident investigation incorporates factual information of the accident, analysis of the relevant events, identifying safety deficiencies, determining causes and suggesting safety recommendations. According to the provision made on 6.3 of Annex 13, the State conducting the investigation is required to send a copy of the draft Final

Report to the State that instituted the investigation, the State of Registry, the State of the Operator, the State of Design, the State of Manufacture and any State that participated in the investigation, inviting their significant and substantiated comments on the report as soon as possible.

The result of investigation, including the conclusion, should be correct and fair, and the safety recommendations contained thereto should be fully enough to prevent recurrence of similar aircraft accidents. So, before finalizing the report, it should be consulted with CAA, airline operator and manufacture for their comments. Recommendations should be logical and implemental; otherwise it will remain as recommendations only. Investigation body is not an enforcement agency, so recommendations should be implemented through CAA. It is the purpose of investigating an accident that the safety recommendations should be seriously considered and implemented by all concerned parties. When there is the existence of disagreement on the draft Final Report between the concerned parties, the comments from the other parties are appended in the final report. But this practice, in some cases, may raise the question on the quality of the accident investigation report. This can give opportunity to other parties that the conclusions and/or intended safety recommendations are not reasonable and not acceptable in the interest of safety. Sometimes, disagreement may be the outcome of non-technical matters, including political reason or interests of the concerned parties.

Conclusion

Accident investigation has played a very vital role in identifying technical defects that need to be corrected, operational procedures that need to be revised and human factors issues that need to be addressed. Accident investigation is a very sensitive, difficult, time consuming and challenging job. Involvement of a number of parties after an air accident makes the investigation process more complex. Proper handling of victim families and provide necessary assistance aftermath of an accident is emerging as a new challenge before investigating agency. The growing trend of parallel criminal investigation in many developed countries is posing threat before the aviation community in the world. The regulator, operator and manufacturer are the key players of a state aviation system. Their role is considered very crucial for the success of accident investigation. It is the responsibility of regulatory and safety organisations to build faith among society by responding to public expectations for corrective action after an accident. The result of aircraft accident investigation should be correct, fair and able to maintain the confidence of the aviation industry and public that accidents and incidents are thoroughly investigated. Every effort should be made to release the final report by eliminating the differences between the parties involved in investigation, but this should be not in the cost of truth, facts and impartiality of the investigation result. New initiative towards the investigation of accident through regional basis can pave the way for standard, harmonized and cost effective investigation of air accident in future.

References:

- Convention on International Civil Aviation (Doc 7300/9)
- Annex 13 to the Convention on International Civil Aviation (10th Edition, 2010)
- Manual of Aircraft Accident and Incident Investigation (Doc 9756)
- Guidance on Assistance to Aircraft Accident Victims and their Families (Circ 285)

***Deputy Director, CAAN**

SAFETY MANAGEMENT SYSTEM (SMS): An effective approach to manage safety

Pratap Babu Tiwari*

Evolution of safety management

"An accident is the 'tip of the iceberg' the 'what you can see'. More of the iceberg is visible and there are clues but then nothing is done. It is what happens beforehand that is crucial in the prevention of accidents and serious incidents. That is the hidden part below the waters surface. The unknown latent risks that are yet to be discovered..."Steve Hull, Senior Air Safety Investigator (Flywise Issue 169)

Traditional systems for the management of safety are set in motion only after some triggering event, such as an accident, incident or reportable event, discloses a safety concern. For this reason, such approaches may be considered outcome-driven and reactive. Safety improvement measures introduced usually address the identified safety concern exclusively. The 'what', 'who', 'when' and 'how' were often identified but not the 'why'. As such, the organizational and environmental contexts in which errors were made were often neglected, and measures adopted therefore often addressed only symptoms. Furthermore, lines of accountability for safety monitoring and safety responses may not always be clearly defined, and if they are, safety accountability generally stops at the middle management level.

Today, Safety Management Systems aim to enhance the organizational approach to managing a safe and successful aviation operation. The study of accident causation today focuses on organizational processes, latent conditions, workplace conditions, adequacy of defenses as well as active failures. Safety management systems are based on the fact that there will always be hazards and risks, so proactive management is needed to identify and control these threats to safety, before they lead to mishaps. Today's managed approach to safety and to SMS has given greater emphasis not only on proactive but also to predictive system to manage safety and also requires a change in the way that people think on safety, a collective perception, that may be referred to as safety culture. The management of safety today conveys the notion that the management of safety is a business process that must be considered at the same level and along the same lines as any other business process.

Therefore, a definition of safety must be provided to grasp the fundamental concepts of SMS. Safety can be defined as the state in which the risk to harm to persons or damage to property is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and risk management.

The salient features of Safety Management System (SMS)

It is systematic, proactive and explicit

Safety Management System (SMS) is a systematic, explicit and proactive process for managing safety that integrates operations and technical systems with financial and human resource management to achieve safe operations with as low as reasonably practicable risk.

An SMS is systematic in that safety management activities are carried out in accordance with a pre-determined plan, and applied in a consistent manner throughout the organization. It is proactive by taking an approach that emphasizes prevention, through hazards identification and risk control and mitigation measures, before events that affect safety occur. It is also explicit, in that all safety management activities are documented, visible and performed as an essential component of management activities.

It is a performance-based approach

Compliance with ICAO Standards and Recommended Practices (SARPs) has been a cornerstone of international civil aviation safety. However, a rapidly expanding industry and resource limitations within oversight authorities make it increasingly difficult to efficiently and effectively sustain a prescriptive approach to the management of safety based upon regulatory compliance exclusively. It is essential to complement the regulatory approach to the management of safety with a performance-based approach, which includes: 1.agreement between oversight authorities and operators/services providers on the safety performance to be expected from the operators/services providers, 2. agreement between oversight authorities and operators/services providers on safety requirements necessary to achieve safety indicators and targets and oversight authorities and 3. Oversight authority verifies achievement of the agreed safety performance or its lack thereof, and operators/services propose corrective measures for observed deviations.

It is an integrated approach to manage safety

Currently, certain elements may exist but they are not integrated, the quality assurance, accountability structures and the reporting culture need to be developed. It integrates operations and technical systems with financial and human resource management to achieve safe operations with as low as reasonably practicable risk.

It is a top-down approach

Safety cannot be achieved by simply introducing rules or directives concerning the procedures to be followed by operational employees; it encompasses most of the activities of the organization. For this reason, safety management must start from senior management, and the effects on safety must be examined at all levels of the organization. So, SMS is top down driven system, which means safety management must start from senior management and that the Accountable Manager of the organization is responsible for the implementation and continuing compliance of the SMS. Without the wholehearted support of the Accountable

Manager an SMS will not be effective. More precisely, a senior management commitment to an effective formal Safety Management System is must and equally, every level of management must be given safety accountability. The contribution of the staff at and below supervisor level must be emphasized.

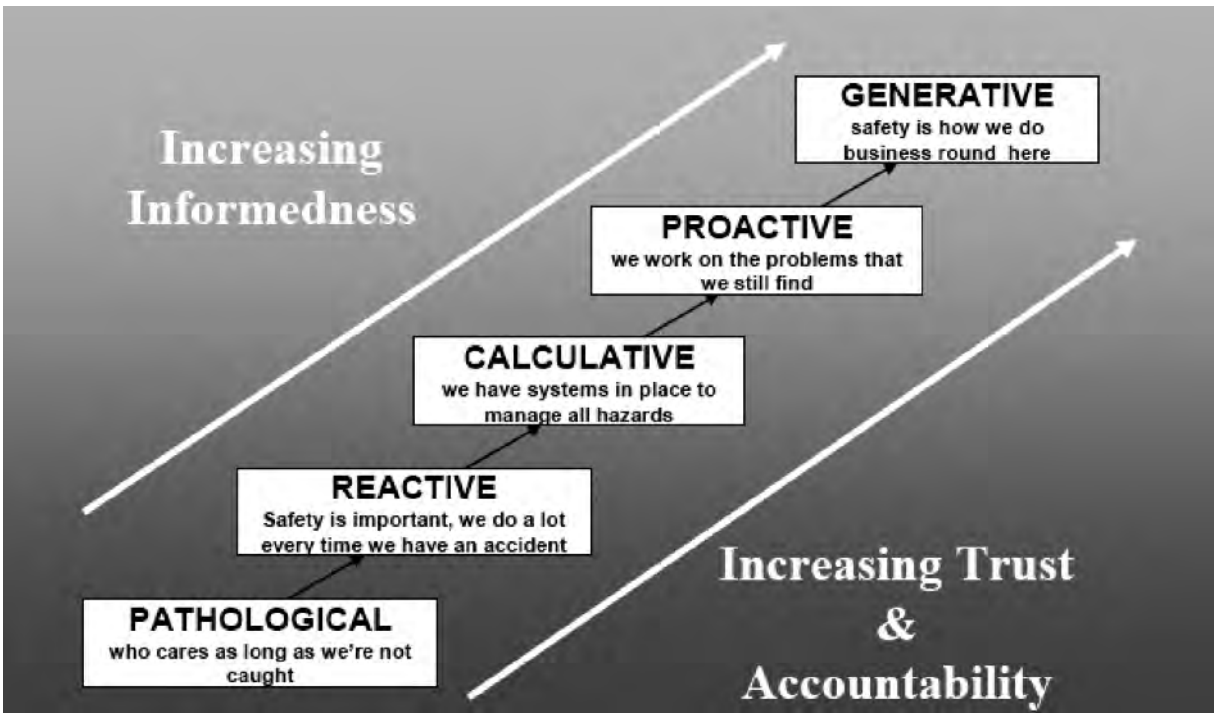
It is based on proven procedure and techniques

SMS uses proven procedures and techniques to identify and analyze hazards, and their associated risks, inherent to the operation. The hazards are then eliminated, if possible. If not, the associated risks are managed to a level as low as reasonably practicable by reducing the likelihood of an occurrence or the severity outcome of an occurrence, should one happen. Tracking of the risk mitigation efforts is done to analyze system effectiveness. Concurrent with these efforts, new emerging hazards, and/or hazards initially overlooked, are identified for attention. These efforts are all conducted within a structured framework of safety targets, policies, procedures, and departmental/personnel accountabilities.

The Fundamental requirement of safety management

Success in a company's safety performance will be greatly strengthened by the existence of a positive safety culture. Safety culture in an organization can be described as the way in which it conducts its business and particularly in the way it manages safety. It emanates from the communicated principles of top management and results in all staff exhibiting a safety ethos which transcends departmental boundaries.

Evolution of Safety Culture:



ICAO Requirement on Safety Management System (SMS)

Safety Management System (SMS) have recently been developed and implemented by airlines, airports, manufacturers, civil aviation authorities, and air traffic control units worldwide.

The International Civil Aviation Organization (ICAO) has introduced SMS as a part of its requirements in the field of Annexes 1, 6, 8,11,13 and 14. The requirements impose upon States the responsibility to establish a safety programme and, as part of such programme, require that air operators, approved maintenance organizations, air traffic services providers and certified aerodrome operators implement a safety management system acceptable to the State and as a minimum, such SMS shall:

a) identify safety hazards;

b) ensure the implementation of remedial action necessary to maintain agreed safety performance;

c) provide for continuous monitoring and regular assessment of the safety performance; and

d) aim at continuous improvement of the overall performance of the safety management system.

CAAN SMS Requirements

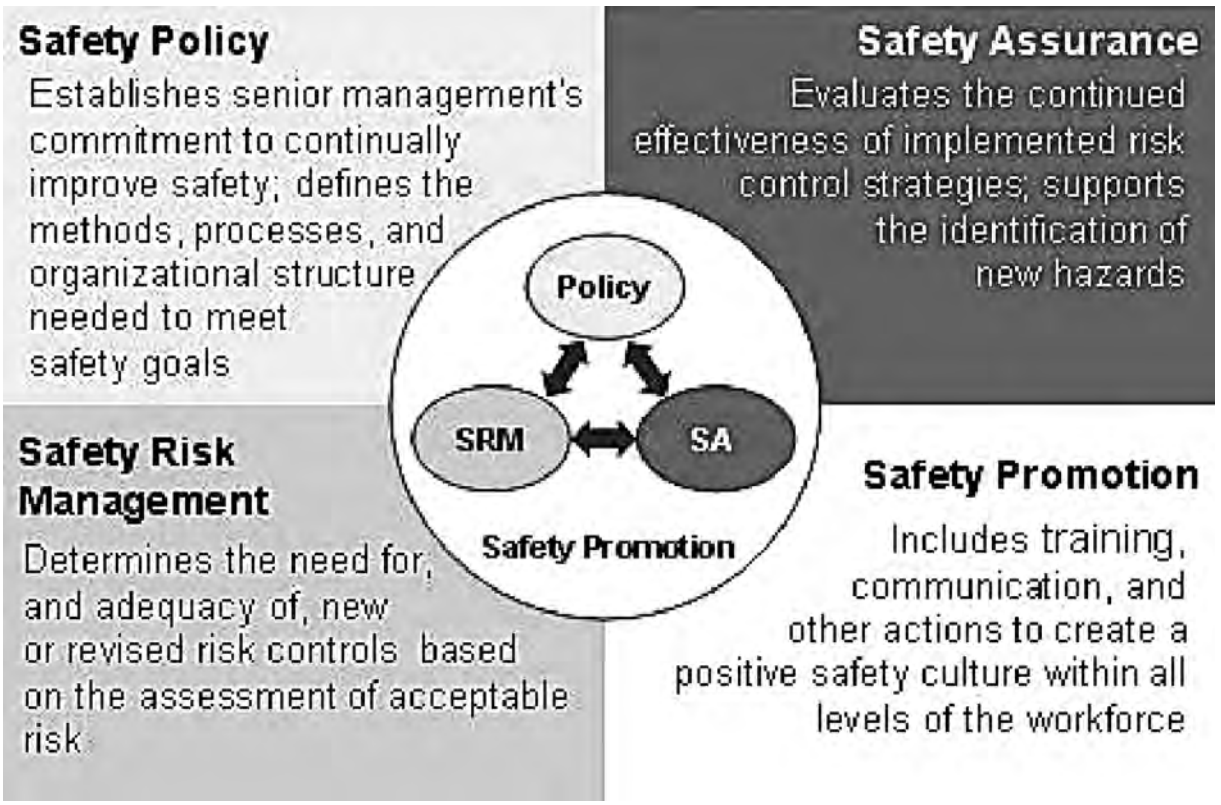
Recently Civil Aviation Authority of Nepal (CAAN) has enacted "Safety Management System Requirement, 2010". With this requirement, service provider (ATS provider, air operator, aerodrome operator..) involved in civil aviation safety have to implement the requirement set forth in it. Some salient features of this requirement include:

- a safety policy on which the system is based;
- a process for setting safety objectives, goals and performance indicators;

- clearly defined lines of safety accountability throughout the organization, including a direct accountability for safety on the part of the Accountable Manager
- a process for identifying hazards to aviation safety and for evaluating and managing the associated risks;
- a process for ensuring that personnel are trained and competent to perform their duties;
- a procedure to document all SMS components, procedures and activities including their relevant integration;
- a process for conducting periodic reviews or audits of the safety management system.

It also requires that the responsibility of the Service Provider shall be to establish, maintain and adhere to a safety management system (SMS) that is appropriate to the size, nature and complexity of the operations authorized to be conducted under its operations certificate and the safety hazards and risks related to the operations.

The Four SMS Components



Building a successful SMS:

A successful safety management system is a systematic, explicit and comprehensive process for managing safety risks. As with all management systems, it involves goal-setting, planning, documentation, and the measuring of performance against the goals. Any successful safety management system is woven into the fabric of an organisation. It becomes part of that organisation's culture, and of the way people go about their work.

The hallmarks of an effective safety system are:

- People feel encouraged to voice safety concerns and to report events resulting from human error without fear of retribution.
- When such concerns are reported they are analysed and appropriate action is taken.
- People are encouraged to develop and apply their own skills and knowledge to enhance organisational safety.
- There is never the complacent view that the safety system has achieved its goals and needs no further modification.
- Staff are regularly updated by management on safety issues.
- Management acknowledges all safety concerns and suggestions, and safety reports are fed back to staff so that everyone learns the lessons.
- Management practices what it preaches regarding safety, including the allocation of sufficient resources and the prioritization of safety ahead of cost.
- Management gives timely, relevant and clear feedback on decisions, even if the decision is to do nothing.
- If no action is contemplated, that decision is explained.

When you can say "yes" to all those hallmarks, you have in place an effective safety system.

Implementation of SMS -

SMS implementation requires organisations to conduct a Gap analysis of their system(s) to determine which components and elements of a safety management system are currently in place and which components or elements must be added or modified to meet regulatory requirement.

Full implementation of SMS varies on the size of the organization. For example, it may take several years for a large organization to fully implement a SMS. The main challenge lies in bringing about the necessary changes in organisation safety culture. This could take several years, and in a sense may never be complete, since preserving the organisation culture is an ongoing task that forms an essential element of a SMS.

Ccomplex SMS are likely to be inappropriate for small operator. Smaller organizations may not have sufficient resources to employ a full-time safety manager. Such organizations should tailor their SMS to suit the size, nature and complexity of the operation and must have genuine commitment from upper level management to allocate both personnel and financial resources to the critical functions of safety management (Referred from Transport Canada guidance document).

For the effective implementation of SMS, Senior management commitment is essential which must be seen by their behaviour and actions to support SMS. Establishment of a common understanding of Safety including training, development of safety culture amongst the stakeholders, development of confidence in the „non-punitive" reporting system, improve communication regarding safety issues, improve data analysis methodology and their classification of risk, development of / interface with stakeholder's SMS, establishment of appropriate performance indicator and targets are some challenges lies ahead for the effective implementation of Safety Management System. To support its various activities prioritization of resources towards safety concerns that hold the greatest risk potential, and towards activities likely to produce the biggest return on resources invested need to give due consideration. As SMS is a performance based approach, a separate division is deemed necessary to oversee the implementation of SMS requirement by service providers. For this a separate SMS division has been proposed in the organization structure under CAAN Regulatory umbrella.

Conclusion

Safety management must be seen as an integral strategic aspect of business management, recognising the high priorities attached by the company to safety. It is also true that safety is not the first priority for aviation organizations because no aviation organization has ever been created to deliver only safety. Effective safety management is just one of many organizational processes that allow a company to deliver its services and generate profits. The cost of even one serious aviation safety event can be staggering. A high profile accident has the potential to end the very existence of the company. Resources intelligently allocated to an SMS can ensure the survival of the organization and continued operation of the firm.

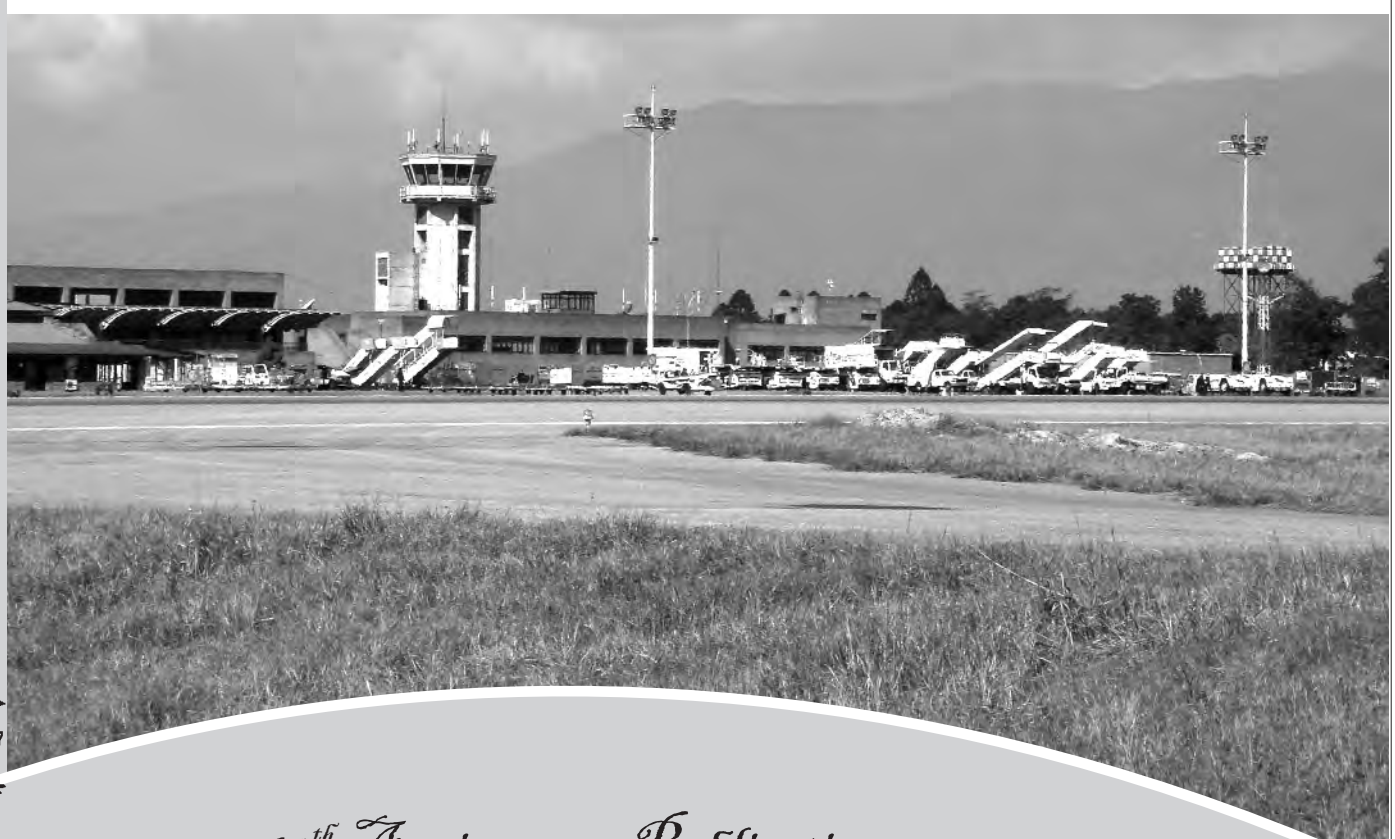
To improve on existing levels of aviation safety in the light of the continuing growth of the industry, additional measures are needed. One such measure is to encourage individual operators/service provider to introduce their own Safety Management System. Such a system is as important to business survival as a financial management system and the implementation of a Safety Management System should lead to achievement of one of civil aviation's key business goals: enhanced safety performance aiming at best practice and moving beyond mere compliance with regulatory requirements.

References:

ICAO DOC. 9859

Trasport Canada Publication, SMS for small aviation organization, Steve Hull , Flywise Issue 169

***Deputy Director, CAAN**



Aeronautical Information for safe operation of Air transportation

Shishil chitrakar*

AIS: An aeronautical information service shall ensure that aeronautical information/data necessary for the safety; regularity or efficiency of air navigation is made available in a form suitable for the operational requirements of:

a) Those involved in flight operations, including flight crew, flight planning and flight simulators: and

b) The air traffic services unit responsible for flight information services and services responsible for pre- flight information.

AERONAUTICAL INFORMATION PUBLICATION (AIP):

AIP is intended to satisfy International requirements for the exchange of aeronautical information of a lasting character essential to air navigation. AIP constitutes the basic information source for permanent information and long duration temporary changes.

Amendments and checklists:

The AIP must me amended or re-issued at such regular intervals as necessary to ensure the information contained in the AIP is completed and up to date. An AIP, which is not up to date, can jeopardize the safety of air navigation.

Assignment of responsibility for origination of raw data:

The State's aviation authority should assign to its technical branches at headquarters the responsibility of originating the raw data required to be promulgated by the aeronautical information service (AIS) in the Aeronautical Information Publication (AIP), AIP Supplements, NOTAM or Aeronautical information Circulars (AIC). Accordingly, the technical branches should ensure that they have speedy and reliable lines of communication with AIS. On receipt of raw data it is the responsibility of AIS to check, record and edit the data in order to promulgate the information in a standard format. RAW data will include both basic and ephemeral information and should be submitted to AIS on the aeronautical promulgation advices form.

Basic Information:

Basic information usually covers the more permanent or static material for inclusion in the AIP and such should preferably be authorized by the policy branches at headquarters level in order to ensure uniform format and compliances with present or future policy. All basic information should be supplied well in advance to AIS, to permit ample time for processing and promulgation, thus affording reasonable notice to operators.

Ephemeral Information:

Ephemeral information may be originated by the technical headquarters branches or sections for example when temporary changes are made in basic information, when special short-term procedure or in the case of certain navigation warnings, etc.

Responsibility of AIS:

The collection and distribution of aeronautical information for use by all types of aircraft operations is the responsibility of the AIS of a State, as specified in an Annex 15 to the Convention on International Civil Aviation.

Needs of Operator:

The operator on any type of a/c, be it a small private or large transport, must have available a variety of information concerning the air navigation facilities and services which may be expected to be used. For example, the operator must know the regulation concerning entry into and transit of the airspace of each country in which operations will be carried out; and must know what aerodromes, heliports, navigation aids, meteorological services, communication services and air traffic services are available and the procedure and regulation associated with them.

Responsibility of PIC:

The responsibility of the pilot in command to become familiar with all appropriate information is stated in chapter 2 of annex 2 to the Convention on International Civil Aviation. – ---- ------ . Certain specific types of information must be carried on board an aircraft, and no flight may be commenced unless there is reasonable assurance that the facilities and services required on the flight are available and operational.

Area of Publication of NOTAM:

NOTAM shall be originated and issued concerning the following information:

a) Establishment, closure or significant changes in operation of aerodrome(s) or runways;

b) Establishment, withdrawal and significant changes in operation of aeronautical services (AGA, AIS, ATS, COM, MET, SAR, etc.);

c) Establishment or withdrawal of electronic and other aids to air navigation and aerodromes. This includes; interruption or return to operation, change of frequencies, change in notified hours or service, change of identification, change of orientation (directional aids), change of location, power increase or decrease amounting to 50 per cent or more, change in broadcast schedules or contents, or irregularity or unreliability of operation of any electronic aid to air navigation, and air-ground communication services;

d) Establishment, withdrawal or significant changes made to visual aids;

e) Interruption of or return to operation of major components of aerodrome lighting systems; f) establishment, withdrawal or significant changes made to procedures for air navigation services;

g) Occurrence or correction of major defects or impediments in the maneuvering area; h) changes to and limitations on availability of fuel, oil and oxygen;

I) Major changes to search and rescue facilities and services available;

j) Establishment, withdrawal or return to operation of hazard beacons marking Obstacles to air navigation;

k) Changes in regulations requiring immediate action, e.g., prohibited areas for SAR action;

l) Presence of hazards which affect air navigation (including obstacle, Military exercises, displays, races and major parachuting events outside promulgated sites);

m) Erecting or removal of, or changes to, obstacle to air navigation in the takeoff/ climb, missed approach, approach areas and runway strip;

n) Establishment or discontinuance (including activation or deactivation)

Each NOTAM shall be as brief as possible and so complied that its meaning is clear without the need to refer to another document. Each NOTAM shall deal with only one subject and condition of the subject.

NOTAM Distribution:

A NOTAM should be distributed whenever information's is of direct operational significances to address who cannot otherwise be given at least seven days prior notification .TO the extent practicable, NOTAM should be distributed via AFS.

Duration of NOTAM:

Although not directly specified in Annex 15, NOTAM should not remain in force more than three months. If the circumstances notified exceed three months, then a new or replacement NOTAM should be issued, particularly in those cases where a condition is only expected to last for further period of one to two months .It should also be noted that any changes of long duration (three months or longer) are published in AIP Supplement.

Notification of unservicelibility :

NOTAM notifying unserviciceability of aids to air navigation, facilities or communication services should given an estimate of the period of unserviceability or the time which restoration of services is expected .

Value of NOTAM:

The basic purpose of any NOTAM is the dissemination of information in advance of the event to which it relates, except in the case of unservicebilities which cannot be foreseen. Thus to realize its purpose the NOTAM must be received by the addresses in sufficient time for any required action to be taken. The value of a NOTAM lies in its "news content" and its residual historical value is therefore minimal.

Coordination between aeronautical information services and aerodrome authorities:

To ensure that aeronautical information services units obtain information to enable them to provide up to date pre flight information and to meet the need for in flight information, arrangements shall be made between aeronautical services and aerodromes authorities responsible for aerodrome services to report to the responsible aeronautical information services unit with a minimum delay:

a) Information on aerodrome conditions

b) The operational status of associated facilities, services and navigation aids within their area of responsibility.

c) Any other information considered to be of operational significance.

Pre Flight Information:

At Any aerodrome/helipad normally used for international air operator, aeronautical information essential for the safety, regularity and efficiency of air navigation and relative to the route stages originating at the aerodrome/heliport shall be made available to flight operations personnel, including flight crews and services responsible for pre-flight information.

POST Flight information:

The purpose of post flight information is to ensure that any inadequacy. Observed by an operator into the course of operation, of facilities essential to the safety of those operations is reported to the authority responsible for them without undue delay. Annex 6 part 1, chapter 4, 4.1.2 and part iii chapter 2, 2.21 places the responsibility for reporting such inadequacies on the operator.------ States to ensure that arrangements are made at aerodromes/helipad to receive this information and to make it available to the AIS " for such distribution as the circumstances necessitate". ----------

Information to be notified by AIRAC (Aeronautical Information Regulated and Control):

The establishment, withdrawal of, and premeditated significant changes (including operational trials) to:

Limits (horizontal and vertical), regulations and procedures applicable to:

a) Flight information regions;

b) Control areas;

c) Control zones;

d) Advisory areas;

e) ATS routes;

f) Permanent danger prohibited and restricted areas (including type and periods of activity when known) and ADIZ;

g) Permanent areas or routes or portions thereof where the possibility of interception exists.

h) Positions, frequencies, call signs, known irregularities and maintenance periods of radio navigation aids and communication facilities.

I) Holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures.

J) Meteorological facilities (including broadcasts) and procedures.

K) Runways and stop ways.

L) The establishment and withdrawal of, and premeditated significant changes to

i) Position, height and lighting of navigational obstacles.

ii) Taxiways and aprons.

iii) Hours of service: aerodromes, facilities and services.

iv) Customs, immigration and health services.

v) Temporary danger prohibited and restricted areas and navigational hazards, military exercises and mass movements of aircraft.

vi) Temporary areas or routes or portions thereof where the possibility of interception exists.

AIC (Aeronautical Information circular):

An AIC is originated whenever it is desirable to promulgate:

a) A long-term forecast of any major change in legislation, regulations, procedures or facilities;

b) Information of a purely explanatory or advisory nature liable to affect flight safety;

c) Information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters.

This shall include:

1) Forecasts of important changes in the air navigation procedures, services and facilities provided;
2) Forecasts of implementation of new navigational systems;
3) Significant information arising from aircraft accident/incident investigation which has a bearing on flight safety;
4) Information on regulations relating to the safeguarding of international civil aviation against acts of unlawful interference;
5) Advice on medical matters of special interest to pilots;
6) Warnings to pilots concerning the avoidance of physical hazards;
7) Effect of certain weather phenomena on aircraft operations;
8) Information on new hazards affecting aircraft handling techniques;
9) Regulations relating to the carriage of restricted articles by air;
10) Reference to the requirements of, and publication of changes in, national legislation;
11) Aircrew licensing arrangements;
12) Training of aviation personnel;
13) Application of, or exemption from, requirements in national legislation;
14) Advice on the use and maintenance of specific types of equipment;
15) Actual or planned availability of new or revised editions of aeronautical charts;
16) Carriage of radio equipment;
17) Explanatory information relating to noise abatement;
18) Selected airworthiness directives;
19) Changes in NOTAM series or distribution, new editions of AIP or major changes in their contents, coverage or format;

Quality Management:

Coordinates activities to direct and control an organization with regard to quality (ISO 9000).

Quality:

The degree to which a set of inherent characteristics fulfillments (ISO 9000*) The term "quality" can be used with adjectives such as poor, good or excellent.

Role of the AIS and the Globalization of CNS/ATM:

Clearly the role of 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.

Information, information and information:

The importance of information/ data is essential in every field of business. The Civil Aviation sector runs with multiple discipline and entity. The Information/ data are only not sufficient but correct information/ data is required. The correct information/ data of different entity of Civil Aviation are highly required and it should be easily available and easily understandable to all for smooth and safe operation of Air Transportation.

In this regard I would like to cite one quotation of Buddhism (in Pali language).

Ekam dhammam atitassa

Musavadisa jantuno

Vitinnaparalokass

Natthi papam akariyam

Meaning:

There is no evil that cannot be done by the liar, who has transgressed the one law (of truthfulness) and who is indifferent to a world beyond.

Conclusion:

The Aviation business is developing very fast and Qualitative information through skilled manpower is essential for safe operation of air transportation. Since safety is every body's concern, data/information updating and correctly using information for air transportation is necessary for every person, and sections involving in aviation business. The importance of information/data is essential for safe operation of Air Transportation. And ultimately it leads to the development of country through growth of tourism industry and safe Air Transportations. Every person, entity should consider safe operation of air transportation through qualitative information system at real time for safe the life and property. The Integrated effort of every person/entity should be focused deeply on updating of data/information and implementing them for safe operation of Air Transportation.

REF : AIS Manual

: Annex 14

CAR 15

DOC8126 AIS Manual

Manual of the Quality Management System for Aeronautical information Management

The Dhammapada, pali text & translation, By NARADA THERA

***Dy. Director, TIACAO**

Performance Based Navigation : The Next Generation Navigation :

Mahesh Kumar Basnet*

Introduction

Everybody in the aviation arena should be familiar with the word PBN. Performance Based Navigation (PBN) is a framework for defining performance requirements in "Navigation Specifications". PBN framework can be applied to an air traffic route, instrument procedure, or defined airspace. PBN provides a basis for the design and implementation of automated flight paths as well as for airspace design and obstacle clearance. The two main components of PBN framework are Area Navigation (RNAV) and Required Navigation Performance (RNP). Once the required performance level is established, the aircraft's own capability determines whether it can safely achieve the specified performance and qualify for the operation. PBN is applicable to all airspace environments. Since safety is the first concern, PBN increases capability while enhancing safety. While RNAV operation determines point-to-point navigation without going to Nav Aid to Nav Aid, RNP was initially developed to address the problems of terrain and weather challenged airports. Therefore RNPs efficiency and operational benefits are valuable to all airports. So, PBN with both RNAV and RNP is good for the environment and addresses CFIT providing stabilized approach, more efficient use of airspace. Hence, PBN is a green approach with fuel / time-sharing.

In the above context the 36th ICAO Assembly Resolution, PBN global goals is very relevant

Whereas a primary objective of ICAO is that of ensuring the safe and efficient performance of the global Air Navigation System;

Whereas the Eleventh Air Navigation Conference recommended that ICAO, as a matter of urgency, address and progress the issues associated with the introduction of area navigation (RNAV) and required navigation performance (RNP);

Whereas the Eleventh Air Navigation Conference recommended that ICAO develop RNAV procedures supported by GNSS for both fixed and rotary wing aircraft, enabling lower operating minima in obstacle rich or otherwise constrained environments;

1. Urges all States to implement RNAV and RNP air traffic services (ATS) routes and approach procedures in accordance with the ICAO PBN concept laid down in the Performance Based Navigation Manual (Doc 9613);

2. Resolves that: States and planning and implementation regional groups (PIRGs) complete a PBN implementation plan to achieve:

3. Implementation of RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones; and

4. Urges that States include in their PBN implementation plan provisions for implementation of approach procedures with vertical guidance (APV) to all runway ends serving aircraft with a maximum certificated take-off mass of 5700 kg or more, according to established timelines and intermediate milestones.

5. Requests the Planning and Implementation Regional Groups (PIRG) to include in their work programme the review of status of implementation of PBN by States according to the defined implementation plans and report to ICAO any deficiencies that may occur.

ICAO is endorsing global implementation of PBN concept in order to provide a seamless environment and standard flight crew procedures. ICAO aims to provide safe, secure, efficient and economical air transport throughout the world. Interestingly aircraft's navigation capability has outstripped the services provided by ATM System. Aircraft are equipped with more capable avionics where as the ATM System is still lagging behind. In Nepal's case, also the airlines have purchased old aircraft with no new and advanced avionics. On the other hand airspace capacity is restricted with more & more aircraft and high controller workload augmented by difficult terrain. In this context more autonomous operation of the aircraft utilizing its inbuilt system reduces controller workload and unlocks the airspace capacity within the ATM System. Which can be applied in Nepal also. It is surprising that Nepal Airlines two B757 aircraft have no GNSS avionics in their System, which is a core element under PBN concept. Hence, it is not surprising that Nepal airlines is facing difficulty in flying on PBN specified SIDs, STARs and routes in other parts of the world.

In Nepal significant numbers of aircraft which fly on domestic sector, general aviation (GA) aircraft) have GNSS (GPS) but not IFR approved. While the GPS systems fitted to these aircraft, in general terms, may be capable of supporting RNP 0.3 operations, with TSO C129 class a1, the actual aircraft installations has not been assessed. Al though CAAN has specified to all airlines to install GNSS with TSO C129 Standard in Flight Operation Requirement (FOR), and also mentioned in AIP, the actual equipment status may be in the range from modern fully integrated digital systems to very basic flight instruments. In other countries, these GPS systems are approved for Terminal and Approach operations, which are nominally RNP 1 and RNP 0.3 operations. In our case GPS IFR approvals has not yet been done due to certification issues, pilots and controllers training, navigation data integrity and other requirement issues.

Since GNSS approval and implementation of NPAs is the first step to implement PBN, a PBN transition / implementation problem is how to determine a PBN capability for GPS IFR aircraft without recertifying each aircraft. First CAAN should approve GNSS for IFR than recertify for PBN. While recertification is an option, CAAN has short of the resources

to do this. Therefore, there is a need for guidance material to be developed by ICAO and training to inspectors for the assessment of GPS IFR aircraft installations to enable a nominal PBN capability to be determined in the first instance without the cost and overhead of having the complete GPS IFR installation recertified for PBN. Then GPS IFR approved aircraft need to be integrated into PBN environment without causing undue cost to operators.

Another issue for GNSS operation is human factors. RNAV operations by GNSS has significant safety issues regarding the human factors of RNAV systems designs, RNAV systems installations in aircraft, and flight crew conducting RNAV operations.

The Cranfield University report has identified a number of human factors issues that need to be considered for the conduct of safe RNAV operations. There is a high error rates for crews carrying out missed approach on RNAV operations. These shortcomings stem from lack of understanding of systems and their operating modes, training effectiveness and learning styles, and other human factors in the cockpit. Oversight of operators RNAV operations needs to rest with a single entity to ensure that there is an overall approach to RNAV approvals rather than the compartmentalized practice.

Aircraft installation deficiencies have significant adverse impact on crew performance. The report shows that it is not feasible to carry out RNAV operations using conventional aids. So dual RNAV systems fully integrated into the flight instruments and autopilot is required to carry out the RNAV operations. Charting issues were identified as being a major source of significant human factors concerns for crews. The Cranfield report concludes that charts need to be pilot oriented and to provide information in a manner that is directly usable by the crew and enhances situational awareness Therefore, operators emphasize all pilots involved in RNAV operations to apply these Human Factor issues,

PBN Implementation status in Nepal

Civil Aviation Authority of Nepal (CAAN) has formed a National PBN Task Force headed by Deputy Director General of CAAN and members from various disciplines including airlines pilots and PBN Focal Point has been designated to coordinate and follow up the PBN Implementation.

GNSS based approach and departure procedure has been designed for nine (9) airports including Tribhuvan International Airport and some of them validated. A few GNSS Approaches will be implemented in this fiscal year under PBN specification. The CAAN has initiated review of some GNSS/RNAV approach and departure procedures in line with PBN concept with LNAV criteria for some airports and developing RNAV/RNP SIDs and STARs.

CAAN has recently sent two (2) persons for basic PAN/OPS and two (2) persons for PBN Procedure Design Course organized in Beijing, China under ICAO/FPP Programme. Draft PBN implementation plan with implementation time frame 2010-2012(Near Term) has been produced. Detail PBN Implementation Plan is under preparation by National PBN Task Force. Required Navigation Performance – Authorization Required (RNP-AR) procedure for TIA is under development with the assistance of QUOVADIS, a sister organization of Airbus Company.

Conclusion

Lack of adoption of GNSS due to Regulation and Operational Approval, Aircraft Certification, Pilot and Controller Training etc has hindered the progress of PBN implementation. Operators capability in terms of aircraft avionics, pilots capability and human factor issues are other factors that are to be considered. The best CAAN do now is that national PBN Task force should gear up by taking in all the stake holders and come up with the solid foundation for the next generation navigation: the PBN.

***Deputy Director, CAAN**

Airport City and Aerotropolis Approach for SIA Development

Shaligram Poudyal *

Changing Characteristics of the Airport Business:

In the 19th and 20th century, railroads and highways were the basis of a nation's industrial development. In this 21st century, amid the forces of globalization and internationalization, airports are emerging as the new linchpins in the movement and exchange of people, products and ideas, and creators of high value-added. A nation's economic competitiveness today is increasingly determined by the competitiveness of its airports.

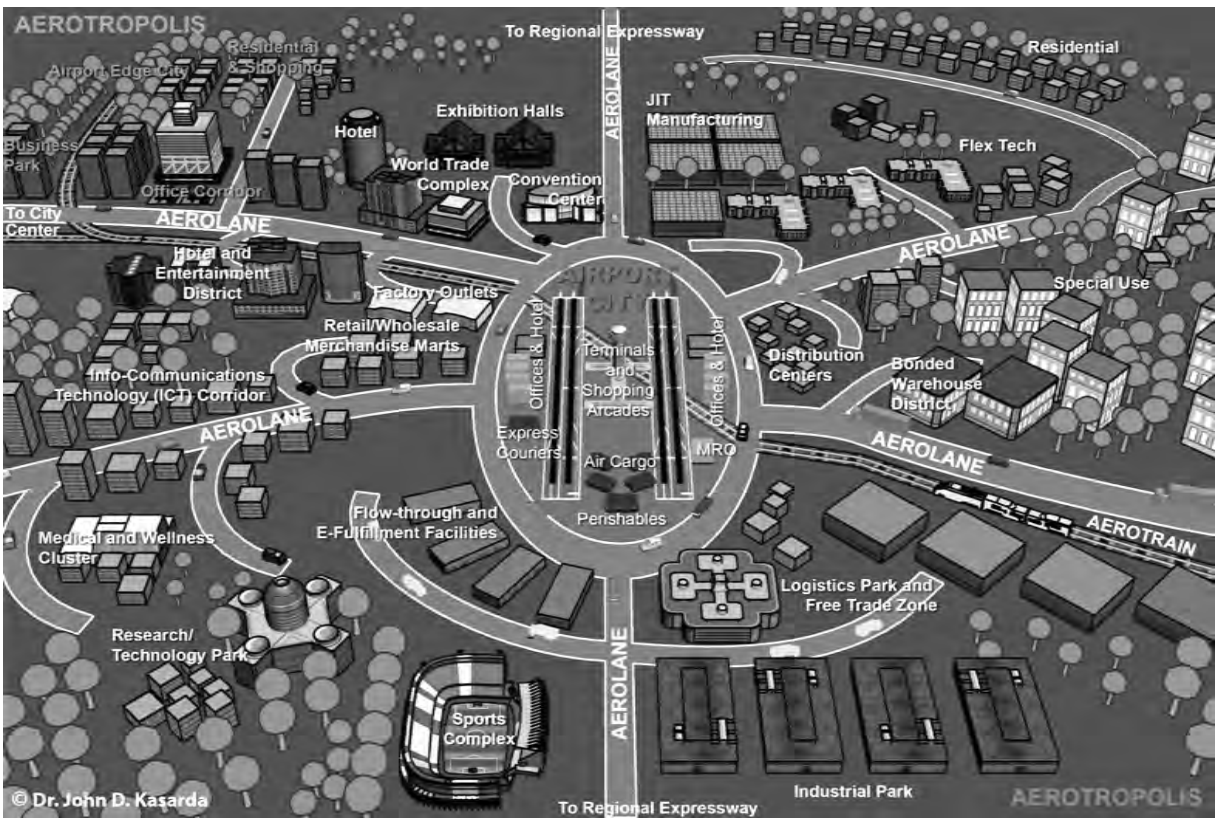
Airports are capital intensive projects. Billions of dollars of investment is necessary to develop airport facilities. In the case of existing airports, facility expansion is required to address the growth in traffic. Technology advancement is also demanding bigger facilities (such as a 4000 meter runway and wider parking bay for A-380 Aircraft). Modern international airports are virtually a large business ventures. In the airport business return on investment is not much attractive. It generally takes more than ten years to turnaround the capital investment. Thus airports are concerned to safeguard their investment looking for the long term financial sustainability.

There is regional and global competition among international airports. They want to reduce aeronautical charges to attract more and more flights. By this tendency, the proportion of aeronautical revenue is decreasing. To compensate the deficit, airports are focusing to increase the share of non-aeronautical revenues. Non-aeronautical revenue comes from commercial facilities. Successful airports are getting more than two third of revenue through commercial facilities. In this process airports are exploring for new business models. They want to be innovative. They are inventing new playing fields to expand their business. The concept of Airport City and Aerotropolis has emerged from this background.

Concept of Aerotropolis:

The concept of "Aerotropolis" envisions an airport and airport city at the center and a greater airport related activity centered city, linked to, and generating synergy effects with shopping, relaxation, tourism, entertainment, convention and other facilities located in area surrounding the airport. As a national economic growth engines, airports must generate demand and position themselves for heightened competition. Through airport city and aerotropolis airports like to place themselves as the core engine of national development. Aerotropolis concept brings important industry, trade, business and commercial activities within the airport area. With airport city and aerotropolis airport are not only the place of departure but also an important destination to visit, stay and to doing businesses. A model of Aerotropolis as given by Professor Dr. John D. Kasarda is illustrated below:

A Model of Aerotropolis



As given in the above model in the center there are Airport Terminal Buildings and Shopping Arcades, Air Cargo Facilities, Offices, Hotels and Parking Facilities. This core area is called Airport City. In the outer side in one block, there is Medical Cluster, Technology Park and Sports Complex. In another block, there is Industrial Park, and Free Trade Zone. Distribution Centres, Bonded Warehouses and area of special use is also there in the surroundings. Manufacturing, Flex Tech and Residential Area are also allocated. On the other side there are Business Parks, Office Corridor, Hotels, World Trade Complexes and Convention Center. There are ICT Corridor, Merchandise Marts, Entertainment Districts and Factory Outlets. This whole area combined is called Aerotropolis. In the facility side, there are roads, expressways and train connections to airport, airport city and aerotropolis from around multi-directions. In such a way Aerotropolis is a compact metropolis fully dedicated to produce and distribute goods and services in a well-planned setting.

What the World is doing on Airport City and Aerotropolis?

The concept of Airport city began to emerge from the 1990's. Many of the airports have already adopted this concept. Incheon airport of Korea has acquired a vast area of land to build 'Air City'. They are integrating airport and seaport. In 2009 there has been 164 billion dollor of trade through Incheon airport representing 24% of Korea's total trade. They are planning to invest about 30 billion pound in Air City development. Hong Kong airport has developed airport city naming as 'Sky City'. Aerotropolis concept is yet new. It is coming from this very decade. Airports such as Memphis, Atalanta, Houston, and Detroit of the USA are adopting aerotropolis concept. Dubai's Al Maktoum International Airport has a vast plan to develop aerotropolis. In india, Durgapore Airport will develop aerotropolis within a 9.0 square kilometer area partnering with Singapore's Changi. In Delhi airport GMR the airport operator has got land from airports Authority of India for aerotropolis development.

Why Airport City and Aerotropolis in SIA?

As mentioned above, the concept of airport city and aerotropolis has been essential for airport's long term financial sustainability. The site of Second International Airport (SIA) is going to be developed from the very green field status. Billions of dollar investment in SIA development has to be financially sustainable. Investment should produce reasonable return on capital. Since projected traffic is not so high, we must choose a business model to sustain in future. For sustainability, we should follow suit as other successful world airport operators are doing. It is probable that SIA will be developed under BOOT modality. Private investors want to minimize the risk of loss. They want attractive return on investment. With availability of sufficient land, private airport developers would favor to take airport city and Aerotropolis concept in SIA.

Nijgadh and its vicinity area are appropriate to aerotropolis development. Birgunj is a trading gateway of Nepal. There is modern dry port facility. Birjung-Pathlaiya is being developed as an industrial corridor. In Hetaunda (about 40 km) there is already an industrial zone. Royal Chitwan national park a touristic destination of Nepal is reachable within two hour drive. All these conditions are favourable for aerotropolis development in Nijgadh. Moreover, SIA can be an air cargo hub to serve the transit trade between India-China via Tibet-Nepal. Furthermore, the feasibility for Airport City and Aerotropolis development in SIA can be understood from the following points:

1. The SIA Site and Available Land:

Nijgadh is in the mid development region of Nepal. It is adjacent to the East West Highway. Birgunj-Pathlaiya industrial corridor is near by the site. There is a multi-model dry port in Birgunj. With a fast track connection, SIA would be within one and half hour reach from Kathmandu (72 km) and 20 minutes reach from Birgunj(25 km).

Modern international airport especially in the context of developing airport city and aerotropolis, requires a vast land area. There is plenty of government land available around the SIA site. It is estimated that SIA would require about 8000 hectares of land (80 square km). Most of the land of the site area is forest which is government owned. Private land acquisition will be minimum (within 100 hectares).

2. Air Transport Feasibility:

TIA has limitation of facility expansion for future air traffic and passenger growth. There is no feasibility of parallel runway. Instrument landing system is not feasible. Due to proximity of hills in the north side, missed approach is not easy for large aircrafts. Approach air space is already in congestion resulting in-sky queuing and holding. All this situation is demanding the construction of a second international airport in Nepal.

At present, where there are two million international passengers in TIA, it may be said that SIA is not yet feasible in Nepal. But the concept of modern international airport development is to be taken differently. Even with a few million passengers, SIA can be feasible integrated with the concept of airport city/aerotropolis.

2.1 Traffic Forecast:

Actual international passenger traffic of TIA in 2009 was 2.03 million. Recently Asian Development Bank (ADB) has given traffic projection of TIA in its Technical Assistance Report. This is a GDP based projection at 95% confidence level. Taking data of this projection, by 2028 SIA will get 3.17 million. We assume that SIA will be completed by 2018 and TIA will also continue international operation even after SIA operation goes on. On this basis the tentative passenger share between TIA and SIA would be seen as follows:

Passenger Traffic Projection at TIA Based on GDP (Regression Analysis) and Distribution of Passengers Between SIA and TIA

year	International Passenger Forecast by ADB for TIA (Projection based on GDP)**			In the Most Likely Case			
	Minimum	Maximum	Most Likely	Share of SIA	%	Share of TIA	%
2013	2.53 million	3.01 million	2.77 million		100%	2.77 million	100%
2018	3.26 million	4.03 million	3.65 million	0.75 million	21%	2.9* million	79%
2023	4.16 million	5.29 million	4.73 million	1.83 million	39%	2.9 million	61%
2028	5.27 million	6.86 million	6.07 million	3.17 million	52%	2.9 million	48%

*Under the ADB Loan assistance TIA facilities are going to be added to serve for 2.9 million passengers per annum

**Civil Aviation Airport Project ADB PPTA: NEP 38349-01, Final report Volume-1, Airport Planning and Engineering, 2009, appendix A page 36

This traffic projection shows that after 18 years from now i.e in in 2028 passenger traffic for TIA will be in the range of 5.3 to 6.9 million. Assuming that TIA facility will not be expanded beyond 2.9 million passenger capacity, passenger share of SIA by 2028 will be about 3.17 million. In such a low passenger flow SIA should be developed with innovative and sustainable business model such as airport city and aerotropolis.

(Note that there is also a chance of GDP growth to go higher than expected along with the political conflict resolution. But in that case also total international passenger may not exceed 10 million by 2028)

2.2 Fast Track Link to Kathmandu and Birgunj:

Most of the international airports are situated around 30 kilometer distance from the main city or state capital. A few others are little bit far (Narita Airport at 57 Km, Kualalumpur airport at 50km and the Incheon airport at 70km) distance. In Nepal due to hilly region there is no appropriate location available within 30/40 kilometer distance Kathmandu. Nijgadh is apparently in far distance. But with a fast track facility, Kathmandu will be within 72 kilometer, reducing travel time to one and half hour drive. In case the fast track is not constructed, SIA will not be feasible in any way. Therefore a four-lane fast track completed before the completion of SIA will enhance its feasibility. It is also desirable that the fast track be extended up to the dry port in Birgunj. If we talk only about fast trak,it is a most required infrastructure for Kathmendu- Birgunj road connectivity. It means fast track is feasible even without SIA project.

Other Consideration in the Context of SIA

Project Financing Arrangements

Billions of dollars is required for airport construction and development. Government fund is limited. CAAN is also not in a position to accumulate such a huge amount. Therefore, possibility of using local technology and resources should be explored. Structures design should be flexible to allow annexing or extension as per the growth of traffic. Maximum possible space should be allocated to non-aeronautical revenue generation purpose such as retail shop, duty free area and shopping mall.

Fund arrangement from government resource is almost impossible. But, if we plan right from now a certain percentage

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Fund arrangement from government resource is almost impossible. But, if we plan right from now a certain percentage of funds can be accumulated. For example, one of the funding resources would be the revenue generated from the sale of tree logs of the forest land under SIA development area. Secondly, Airport Development Fee-ADF (say, $15 and $3 per departing international and domestic passengers respectively) may be charged in TIA. Estimated annual collection of ADF would be about $ 20 million. Out of this 60% (or about $ 12 million annually) should be deposited in "SIA Development Fund". This fund should be commercially managed to earn interest as well. In a seven years period this fund with interest may reach up to $100 million.

Implementation & Institutional Arrangement:

Presently, CAAN is the statutory right to regulate airspace, to operate airports and to provide air traffic services throughout Nepal. Nevertheless, for SIA development project, government must play crucial role. It is also desirable that a separate subsidiary company under CAAN be established for project implementation. After project completion, the operational responsibility be given to a separate fully autonomous SIA Company

To Sum up:

The development of SIA should be taken as a primary necessity of economic development of Nepal. As the passenger availability for SIA is not so attractive, SIA should be developed for long term financial sustainability with the Airport City and 'Aerotropolis' business model. Kathmandu-Nijgadh-Birgunj fast track/ express way will be the pre-requisite for SIA development. By some technicality, airports are to be located in a considerable distance from the main city or capital. Thus most of the new international airports have an inherent challenge to develop from hinterland to a business hub and an air city. Feasibility study, master plan and development of SIA should be guided from this principle.

Professor Dr. Kasarda saya "The true challenge is planning to get the Aerotropolis(or airport city) right.Ê If there is not appropriate planning, airport-area development will be spontaneous, haphazard, and economically inefficient and ultimately unsustainable.Ê The aerotropolis model brings together airport planning, urban and regional planning, and business-site planning, to create a new urban form that is highly competitive, attractive, and sustainable." Let this quotation be our guideline to airport, airport city and aerotropolis development in Nijgadh.

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2 Kasarda Aerotropolis Expansion Theory, , Accessed on 9/27,2010

3 Evolutionchapter1.pdf, , Accessed on 7/12 ,2010

4 TIA Flight Moovement Data for 2009 As per the records of TIACAO, Flight Permission Sectin

5 Second-international-airport, , Accessed on 30/09, 2010

***Deputy Director, CAAN**

Low Cost Airlines Glimpse

Govinda Poudyal*

Many low cost airlines in the world are developing different business models changing their strategy triggered by stagnating traffic volumes and rising fuel price in order to increase revenues through higher passenger load factors and improved revenue income.

Some of the important changes adopted by low cost airlines to attain business profit and success are as follows. The principal philosophy of low cost airlines is to achieve the lowest cost per available seat mile.

01. High utilization of aircraft and seat numbers to increase aircraft productivity.
02. Achieve high rates of crew productivity using optimum services of the crew member remaining within the legal frame work.
03. Using simplified fare structure and revenue management philosophy for the purpose of reducing the expenses.
04. Selection of secondary airports for its operations and avoiding night stops out of the base as much as possible to reduce the crew allowance, aircraft landing/parking charges and the maintenance cost by outsourcing maintenance of the aircraft.
05. Arranging refueling of the aircraft where the fuel cost is cheap.
06. Using E-Tickets and single sales channel to reduce ticket and agency cost.
07. Arranging general distribution system within the airlines.
08. Reducing cost from administrative, reservation, ticketing system and in flight catering items etc.
09. Limiting the type of aircraft in operations and opting for narrow body crafts like B.320.

The main problems being faced by the low cost airlines resulting in low yields are as follows.

01. Steady rise of the aviation fuel cost all over the world.
02. Steady rise of the user charges of secondary airports and also increased labor cost.
03. Global recession is one of the important factors to reduce the number of passenger traffic requiring even to cut the number of flight(s).

Few examples of successful low cost airlines are as follows.

An example is set by JetBlue low cost New York based carrier, which celebrated its first decade of schedule service in last February. As per "Air Traffic World" it has grown into the 7th largest US passenger airline, offering 650 daily departures to 61 cities in the US, Latin America and Caribbean.

Operational performance of JetBlue generally has been near the top of the industry and it has received awards for being highest in customer satisfaction etc.

It has been profitable in six of its ten years, including in 2009 on with aggregate industries where in loss due to worldwide receation.

As published in its fact file JetBlue fleet expected Airbus A32O type 116 and Embraer EMB 190 type 45 as of December 2010. Both the types are narrow body aircrafts. JetBlue has overtaken American Delta Airlines and US Airways to become the largest carrier at Boston by seat share. JetBlue is starting to plan connectivity internationally at JFK signing codes sharing agreement with Lufthansa and Interline partner Airlines with South African Airways etc.

JetBlue has set record of no lay off policy. All licensed employees have individual work contract but the carrier is 100% nonunion which are expected non-controversial in official business. The number of crew members with JetBlue is 12750.

The low cost carriers are growing in Asia and Pacific region rapidly. It is predicted that the Low Cost Carrier will hold 20% of the market by 2012.

Thai International Airways and Singapore based Tiger Airways teamed up to create Thai Tiger Airways. Similarly Malaysian Airlines plans to equip its peneng-bsaed low cost subsidiary "Firefly" being operated by Boeing 737-400 and 800 aircrafts.

The proposed South East Asia open sky agreement, which comes into effect by 2015, allows unlimited flights to all 10 ASEAN members, which is expected to grow low cost airlines within the region very quickly.

Air Arabia, the first and largest low cost carrier is one of the fast growing Airlines of Middle East and North Africa operating 23 Airbus A320 aircrafts in high profit. The company has an existing order with for 44 Airbus A320 aircrafts. Air Arabia was awarded by Airbus for its operational efficiency and new world breaking record.

* **Senior Manager, Yeti Airlines**

Airport Third Party liability insurance

Narayan Prasad Giri*

By definition insurance is the business that saves from risks or contingencies. Insurer, the insurance company, insures or saves others (insured, the second party) from their risks in consideration of the premium paid to that company. Here, insurer is the first party who collects premium for bearing the risk of the insured and the insured is the second party who pays the premium. The business can save the insured and the third party may be beneficiary out of the insurance policy, for the insured insures its liability to save oneself from any contingencies. Third party does not need premium to be paid to the insurers because insured pays the same, for the compensation is paid to the third party only because the insured causes damage or prejudices others. Third party comes at scene here, for third party is prejudiced by the insured; it may be property damage or injury or loss to the third party. Third party comes here only because of liability to be borne by the operation of law or by the negligent acts of the second party. Insurance involving third party falls under liability insurance.

Insurance is necessary to save one's property, life or liability from any peril. Airport is owned or operated by someone. Whoever owns or operates the airport has to insure its property in order to save from such uncertainties and its liability in order to save oneself from such perils which may cause the second party pay the compensation for loss or damage corresponding to the damage or loss sustained by the third party. The owner or operator of the airport who has not insured its property or facilities at the airport may bear the loss or damage to one's property or may endure bodily injury. The type of insurance is called 'airport owner or operator property insurance'. If such entity or person has not insured one's liability created because of operation of such airport may require pay oneself the compensation for the loss or damage made to the prejudiced party (third party), there will be no one (insurer) to pay for such loss or damage. Insurer may compensate such loss or damage made to third party if such liability is insured purchasing a policy from the insurer. The type of insurance is called 'airport third party liability insurance'. Airport property insurance so saves from loss or damage of own airport property, whereas the airport liability insurance saves oneself from peril coming out of such liability.

Therefore, both the insurance-airport property insurance and airport liability insurance need to be purchased. Though the airport insurance may involve property, employee and liability insurance, airport liability insurance keeps much importance above all the above ones, for it has legal obligation of higher priority.

As focus of this article is on the airport third party liability insurance, it is so desirable to go with some elaboration about the same. Though some of the above description highlights on the airport third party liability insurance, the following para with definitions will help to understand about the third party, liability insurance or third party insurance, aviation insurance including airport insurance and some more about the airport third party liability insurance, and so helps to understand the significance of such insurance.

"Third party is someone who may be indirectly involved but is not a principle party to an agreement, contract, deal, lawsuit or transaction."[1]

"Liability cover purchased by an insured (the first party) from an insurer (the second party) for protection against the claims of another (the third) party. The first party is responsible for its own damages or losses whether caused by itself or the third party". [2]

"Liability insurance pays on behalf of the insured for certain types of injury to others."

"Insurance for what the policyholder is legally obligated to pay because of bodily injury or property damage caused to another person."

"Insurance coverage that offers protection against claims alleging that a property owner's negligence or inappropriate action resulted in bodily injury or property damage to another party."

"Insurance protecting the insured against financial loss arising out of legal liability imposed upon him/her in connection with bodily injuries (or death) suffered, or alleged to have suffered, by persons of the public, or damage caused to property other than property owned by or in the custody of the insured as a result of the maintenance of the premises, or the business operations of the insured."[3]

"The aviation insurance industry is not just for owners of private and commercial planes. Aviation facilities need to carry insurance to protect their aviation properties, including premises, hangars, and other products. Future pilots who want to learn how to fly and aviation instructors need to purchase the right form of flight school insurance."[4]

"The work done by airport employees is considered to involve the greatest level of professional responsibility. Even smallest errors by airport personnel can result in enormous casualties

[1] http://www.businessdictionary.com/definition/third-party.html
[2]http://www.businessdictionary.com/definition/third-party-insurance.html#ixzz0zNnwfnWV
[3]http://wiki.answers.com/Q/What_is_liability_insurance&src=ansTT
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[5]http://www.ingos.ru/en/corporate/avia_space/airport_owner/printable.php?print=1
[6]http://www.answers.com/topic/airport-liability-coverage
[7]http://www.ingos.ru/en/corporate/avia_space/airport_owner/printable.php?print=1

and material losses. Therefore it is important for airport owners to insure not only their property but also third-party liability."[5]

"Insurance for owners and operators of private, municipal, or commercial airports, as well as fixed-base operators, against claims resulting from injuries to members of the general public or physical damage to the property of members of the general public, provided that these individuals are on the premises of the airport or its related facilities. The policy may include any or all of the following coverages: (1) (2) (3) and (4) contractual. The policy can be tailored to meet the particular requirements of the insured."[6]

Part of a business liability policy that covers an insured for bodily injury or property damage liability to members of the public while they are on his premises. This coverage is available in basic business policies that include Commercial General Liability Insurance (CGL); ; Owners; Landlords; and Tenants Liability Policy; .

Insurance objects:

- The Insured's liability as an airport owners and/or airport structures that may include:
- airport terminal, airfield and other infrastructure;
- fuelling station;
- air traffic control center.

Insurance risks:

- liability for causing material damage to third parties;
- liability for causing damage to life and health of third parties.

Insurance period:

- Period specified in the insurance policy – normally one year.

The cost of insurance is influenced by:

- number of takeoff and landing operations;
- types of aircraft based at the airport;
- passenger and freight flow volumes;
- structures comprising the airport;
- security measures;
- work conditions of air traffic control center.

Exclusions:

- Standard: military risks; risks related to nuclear explosion effects and radiation hazard.
- Specific: liability to the Insured's personnel; liability for property owned or temporarily possessed by the Insured;

liability for injuries to persons and property resulting from construction, demolition, dismantling or reconstruction of buildings and runways by the Insured or sub-contractors unless such activities have been agreed on with the Insurer.[7]

Now, we have also insured our airports with third party coverage. Before the last insurance policy purchased for airport liability, we had insured our airport purchasing the insurance policy with the Nepal Beema Sansthan but now it is done with the Everest Insurance Company. Previously, TIA alone was insured with such third party coverage but now we have insured other airports for such coverage. Sums insured on CSL- Combined Single Limit (Bodily Injury/Property Damage) for TIA is USD 200,000,000 each occurrence and in the aggregate in respect of products legal liability only.

HUB Airport's Combined Single Limit is USD 10,000,000 each occurrence and STOL Airport's Combined Single Limit is USD 5,000,000. Personal injury is limited to USD 25,000,000 any one offence and in the aggregate within overall Combined Single Limit. Legal costs and expenses are payable in addition to the above limits.

However, we have a lot of questions raised, for we have no sufficient insurance coverage of third party.

It can be summarized here that the airport third party liability insurance is of great importance. We need to implement it.

***Manager, CAAN**

INVESTMENT IN AIRPORT INFRASTRUCTURE DEVELOPMENT: A MISSING PART

Ashok Kumar Subedi*

Changing market conditions, global airline competition and increasing pressure on cost and revenue have significantly changed the international aviation business. This has led to greater competition among airports as well. Airport competition is intensifying due to the following trends: ongoing concentration in the airline industry (global mergers and alliances), new airline business models (low cost carriers), differentiated hub strategies (the trend towards multi-hubbing), increasing overlap of catchment areas supported by fast track links to the major cities, and the development of multinational airport companies. Airports worldwide have invested more than 150 billion USD in the past five years in capital infrastructure to address these issues. This includes development of brown field as well as green field airports.

In Nepalese context (rather worldwide concept), air transport is now accepted as a fundamental pillar of our global society, as indispensable to our daily lives as medicine and telecommunications, and essential for social progress and economic prosperity. Now, it is no more a luxury means of transport but a necessity. It plays a vital role in facilitating economic growth, particularly in developing countries.

In Nepal, our past experience tells that we just need some square meter of plain land and traditional orders from political authority to build an airport. A mere compact runway strip of few hundred meter, mobile ATS service (carrying the VHF and HF set in a 'doko' followed by ATS personnel and provide service from open sky), and we are almost ready for flight operation. Airports in Nepal are ubiquitous but the service is most awful and some airfields are already abandoned. We will install runway lights where there are no IFR flights; we will extend and pave the runway where only couple of flights are operated per day. These realities contradict the modern concept of aviation.

Investment in Airport Infrastructure Development: -

Point to remember: -

Government view (as stated on Government policy on aviation), "There has been encouraging development in the fields of civil aviation in the past few years. Air service at the present time is not limited to domestic flights. There are extreme possibilities for cross border and inter-city flights. In this regard, some of the existing airfields will be improved and extended, making the take-off and landing of large jet aircrafts possible. Some other airports will be modernized and renovated as required and will be provided with communication facilities, aerial navigation instruments and buildings."

Major on-going activities for Airport Infrastructure Development in Nepal: -

It is a reality that current capacity at the only international airport (Kathmandu) is substantially insufficient to meet the present passenger and cargo demand. Despite the current economic crisis, CAAN needs to finance and build much needed infrastructure to cope with the expected passenger and cargo traffic demand of coming years. Unless capacity can keep pace with this traffic growth, passengers, airports and airlines across the country will suffer from congestion, delays and service reductions. Because airport infrastructure involves extremely long lead time in terms of planning, financing and construction, it is necessary to invest timely to meet the future needs of airlines and passengers.

In most cases, airlines are not paying the full cost of the airport infrastructure they use. They benefit from an under-recovery of capital costs at the expense of the airport operators. There is a growing trend of compensation losses from aeronautical revenue, since airports are often not able to achieve adequate cost recovery through aeronautical charges due to market conditions. This situation also applies to most of the Nepalese airports, which for years has shown insufficient outcomes from airport charges but cannot be closed because of our social obligation.

In our case, in line with the Government/ CAAN policy, there are plenty of projects in the pipeline as brown field and green field projects. Improvement of TIA, pavement of Simikot airport, construction of new Pokhara airport, improvement of Bhairahawa airport to international standard, Installation of runway lights at Dhangadhi and Simara, installation of two new DVOR/DMEs, PAPIs are some of the major cases. As these projects require huge amount of money, outsourcing was sought and we were able to receive as well. In this article, a missing part in these projects (especially Bhairahawa and Pokhara) is highlighted.

Key issues for the development of airport:

There are copious parameters to be considered for the construction and development of an airport. One major issue shall be the suitability of the aerodrome in terms of flyability. Due to ever increasing air traffic growth, the airports should be flyable in limited weather conditions also; otherwise the huge investment could not be justified. Prime contributing factors for the selection of airfield side in Nepal are: topography and the proximity of national border. Both factors are not under our control, so the only option is to avoid it. And if these issues are ignored, our airports are hardly sellable and we can never ever recover the cost.

Brown field project, Bhairahawa: -

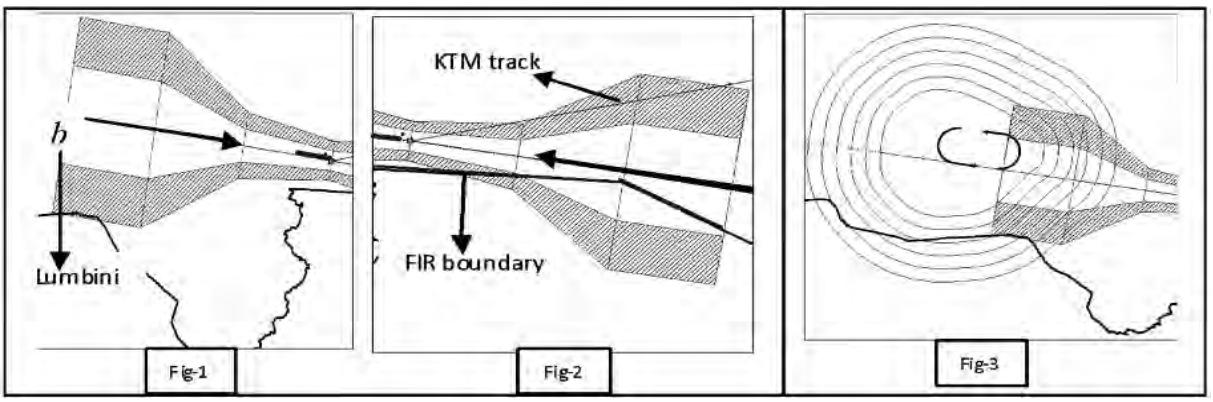
Excerpts from ADB report: -

The Bhairahawa airport shall be upgraded to category "E" as per ICAO guidelines so as to provide facilities for operating as a regional international airport. The infrastructure

improvement to meet airport category E will involve construction of a new runway 2600 meters long and 45 meters in width parallel to the existing runway, spaced at a distance of 182.5 meters, and the conversion of the existing runway to a parallel taxiway. For this purpose, CAAN has acquired 70% of the land and is in the process of acquiring the remaining land. The total cost of upgrading this airport is estimated to be around US $37.45 million.

In the report, the installation of landing aids (VORDME, ILS) has been mentioned, but the issues of Instrument flight procedures are not mentioned. For the full utilization of upgraded cat 4'E' airport, and to make it of international standards, we must need flyable and comfortable instrument flight procedures. This article explains these issues, which should have been considered beforehand.

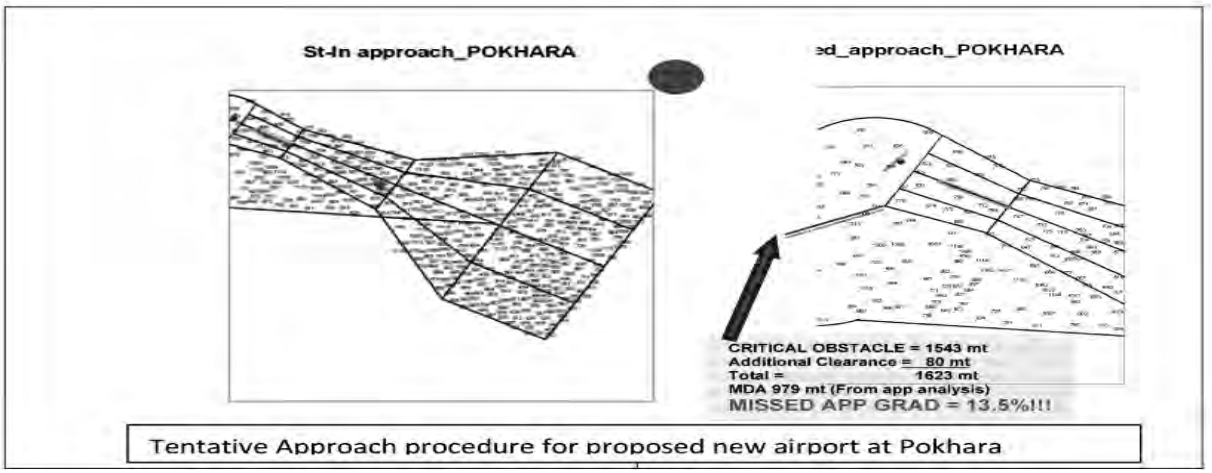
A preliminary study of 'Instrument Approach Procedure' for the Bhairahawa airport indicates that it will be complicated. The proposed runway towards further south of existing will again be worrying factor. Approach from east extensively penetrates Indian FIR (from holding to final segment) and approach from west overflies world heritage site 'Lumbini'. Indian authority had already denied for the consideration of overlapping area in designing the procedures. So, our effort for developing this airport as a regional international airport could face dire grievances.



Approach procedure from east (Kathmandu track) shall be very limited and complicated due close proximity to Indian FIR (Fig.-2) Approach from west might create problem for Lumbini site (Fig.-1) (a site being dedicated and developed for peace and meditation). Even towards Lumbini side, secondary part of the holding area lies outside Kathmnandu FIR (Fig.-3).

Green field project at Pokhara: -

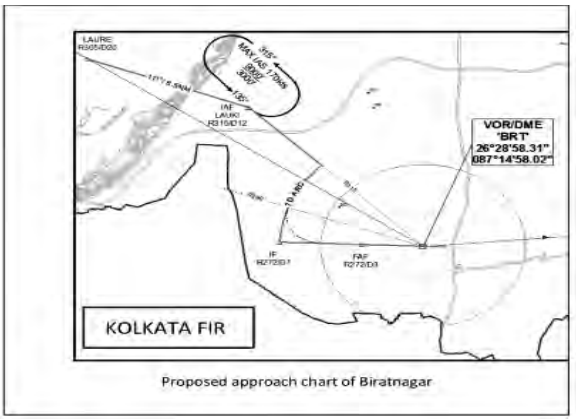
Around three decades back, land was acquired for the construction of new airport at Pokhara. Even VORDME was installed near the proposed airfield, which was useless and later on dismantled. Now, some preliminary work being done and detailed project report has been prepared. This airport has also been proposed for a Cat 4'E'. Outsourcing has been sought for the project, which is yet to be finalized. As the Pokhara area is surrounded by high hills, designing of IFR procedures shall always be challenging. We could not design such procedures at the current airport because of this factor and it is operational as a VFR airport. But, the new site seems comfortable in terms of the procedure because of the east west orientation of the strip and with bigger area. But, if looked minutely, approach procedure seems comfortable; the real challenge is the missed approach procedure. From the preliminary study, missed approach procedure requires an 11.5% gradient which is rarely accepted. Even if we make IFR procedures, it will be one way approach thus resulting in the traffic conflict and airspace congestion. So, we must be very careful before investing huge amount of money and these issues should be addressed immediately. Designing of departure procedures are again seems critical. Till now, this part seems neglected again.



The approach procedure seems comfortable, but missed approach could be the issue with extremely high gradient

Learning from past mistake: -

Biratnagar case (Airport Relocation): When the old airport of Biratnagar, which was very close to the Indian FIR, was relocated at the present place, the prime factor of suitability for IFP was a hideous omitted part. Had this fact been considered and the airport side was chosen accordingly (towards Itahari, or Pakali), we would have made a far more comfortable procedure. Now, we are suffering for the shortsighted vision of our predecessor. If we again repeat the same mistake and chose the airfield without analyzing every tits and bits, new generation shall face the same problem and put blame on us.



Proposed approach chart of Biratnagar

Designing of Approach procedure for Biratnagar is extremely complicated due proximity to Indian FIR

Conclusion: -

While airports are not labor intensive, their operations involve a very high proportion of fixed costs. Therefore, building new airport infrastructure creates a disproportionately high share of costs of capital being implemented as incremental costs, which are very difficult to recover. And if huge capital is invested without proper assessment of all factors, the recovery is a mere dream. It is wastage of taxpayer's money. If comfortable and flyable IFR procedures cannot be designed, any investment in the airport shall be justified in terms of its usability.

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GBAS : The New Generation Precision Approach System

Er. Sanjeev Singh Kathayat*

For the effective use of limited airspace and to avoid the air traffic congestion, International Civil Aviation Organization (ICAO) recommends implementation of Global Navigation Satellite System (GNSS), since it can provide more accurate positions and time data to aircraft. An approach to implement GNSS is Ground Based Augmentation System (GBAS) which broadcasts integrity data of GPS and correction data to aircrafts. GPS is already providing improved services to Civil Aviation users. The foreseen contribution of GPS to aviation promises to be revolutionary. GPS/GBAS augmentation can be used for precision approach system. GBAS is a satellite-based precision approach and landing system. It augments GPS signals to provide aircraft with very precise positioning guidance, both horizontal and vertical, which is especially critical during the approach and landing phase of flight. This allows for a safer, more efficient descent and landing.

Conventional navigational aids like VHF Omni Directional Radiator (VOR), Distance Measuring Equipment (DME) and Tactical Air Navigation (TACAN) and Instrument Landing system which are currently in use are more than 50 years old technology. Instrument landing systems (ILS) fundamentally depend on an even older innovation. In March 1964, the first automatic ILS landing took place at the UK's Bedford Airport, and this landing system remained as state-of-the-art for the next half century. All that, however, may be about to change with the first GPS-powered landing of an Airbus A380 – Qantas flagship Nancy-Bird Walton – at Sydney in January 2009.

Ground-Based Augmentation System:

GBAS is recognized by ICAO as a replacement for current Instrument Landing System (ILS). It is a critical component of next-generation of air traffic management infrastructure and will help to reduce fuel burn, aircraft noise and airport delays. GBAS can also provide safety and cost benefits to airlines, airports and air navigation service providers.

Ground-based augmentation system (GBAS) is a system that supports augmentation through the use of terrestrial radio messages. Ground based augmentation systems are commonly composed of one or more accurately surveyed ground stations, which take measurements concerning the GNSS, and one or more radio transmitters, which transmit the information directly to the end user. It is the Next generation navigational technology that supports precision approach using Global Position System (GPS) satellite data and transmits digital guidance signal to aircraft system. Generally, GBAS networks are considered localized, supporting receivers within 20km, and transmitting in the very high frequency (VHF) bands.

The GBAS is an all-weather aircraft landing system based on real-time differential correction of the GPS signal. Local reference receivers located around the airport send data to a central location at the airport. This data is used to formulate a correction message, which is then transmitted to users via a VHF data link. A receiver on an aircraft uses this information to correct GPS signals, which then provides a standard ILS -style display to use while flying a precision approach.

The Ground Based Augmentation System (GBAS) is designed to correct some of the errors inherent to GPS. One problem is the lack of a real-time, rapid-response monitoring system. Category I equipment will normally alert the user of the problem within ten seconds of detecting a problem. GPS has no such rapid-warning system. For example, if a satellite develops a clock problem, there is no way to rapidly warn the user not to use that satellite. Another problem is positional accuracy. Sources of error such as satellite clock drift or ionospheric delays can introduce several meters of error in an aircraft's position. These errors must be corrected in real time for a precision approach where there is little or no visibility.

The GBAS ground station is installed at an airport and consists of:

- four reference receivers which collect navigation data from Global Positioning System (GPS)
- a processor which provides corrections for GPS errors, GBAS-specific information as well as final approach path points
- a VHF data broadcast unit to transmit digital data to aircraft.

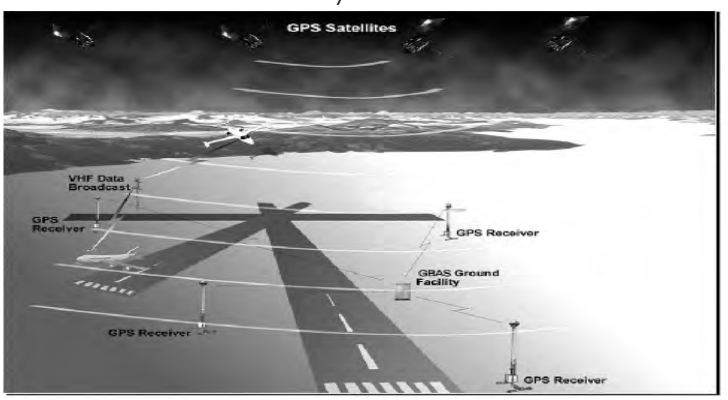

Fig.1. GBAS Operating Principle (Photo courtesy: Air Services Australia)

Benefits of GBAS System:

One of the primary benefits of GBAS is that a single installation at a major airport can be used for multiple precision approaches within the local area. For example, if 4 runways end each with a separate ILS, all 4 ILS facilities can be replaced with a single GBAS system. This represents a significant cost savings in maintenance and upkeep of the existing ILS equipment.

Another benefit is the potential for approaches that are not straight- in. Aircraft equipped with GBAS technology can utilize curved or complex approaches such that they could be flown on to avoid obstacles or to decrease noise levels in areas surrounding an airport. GBAS shares in some of the same threats as all RF based landing systems; that being unintentional jamming, signal derogation due to multipath causing loss of accuracy or signal fading.

The GBAS Precision Approaches is one of the investment programs that provide solution to "Increase Flexibility and the Terminal Environment" in the Next-Gen Implementation Plan.

The FAA plans to replace legacy navigation systems with satellite based navigation technology. The FAA has determined that GBAS is the only cost effective alternative to the existing Instrument Landing Systems (ILS) by providing terminal, non-precision, and CAT I/II/III precision approach capabilities in the NAS. Some of these existing ILS systems will be phased out over time as GBAS are installed. A number of ILS facilities are expected to remain operational, to continue to provide precision approach service as a backup in the event of unavailability of GBAS services.

Honeywell's SmartPath:

Next-Gen SmartPath System Provides Safer, More Precise Aircraft Navigation. March 17, 2009 Qantas Airlines has received approval by the Australian Civil Aviation Safety Authority (CASA) to use the Honeywell SmartPath Ground-Based Augmentation System (GBAS) at Sydney International Airport for satellite-based Landings on their A380 aircraft. The Honeywell SmartPath GBAS is the next-generation navigation technology that supports precision approach and landings using Global Positioning System (GPS) satellite data and transmits digital guidance signals to aircraft systems.

Airservices Australia, with whom Honeywell has worked on SmartPath GBAS in a coordinated effort, has been actively engaged in the use of GBAS technology since 1999 and has been operating the Honeywell SmartPath GBAS ground station in Sydney since November 2006. Qantas had previously been approved to fly GBAS approaches with their Boeing 737 fleet, recording more than 1,600 GBAS landings in Sydney to date with precision guidance provided by Honeywell's SmartPath GBAS. A GBAS landing on the A380 was first demonstrated during the Airbus A380 test flight in Sydney in June 2007. Honeywell provides the Flight Management System and 11 other products and systems for the Airbus A380.

Fig.1. Qantas Airbus taking off from London Heathrow in January 2009, this aircraft was the first Airbus to make a GPS-powered Landing in Sydney Airport .

Currently, aircraft use Instrument Landing System (ILS) technology, an older technology with technical limitations that impact flight path flexibility and airport throughput. ILS is also susceptible to signal interference by weather and obstacles, including large aircraft like the A380. This can result in significant disruptions to airport traffic and cause delays. Replacing ILS with GBAS has been identified in the FAA's NextGen and Eurocontrol's SESAR programs as critical enablers for improving air traffic capacity.

The improved safety from the accuracy and stability of the approach provided by Honeywell's SmartPath GBAS versus the older ILS technology is one of the major benefits to pilots. A single GBAS can support landing operations on multiple runways simultaneously, eliminating the need for multiple ILS systems at airports with more than one runway. This new system will reduce acquisition and maintenance cost while providing aircraft operators and airports with safer and more efficient operations.

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2. ICAO Annexes and other Documents.

***Manager, CAAN**

Meaningful Investment: An Assessment of CAAN

Sachit Bhakta Pokharel*

Aviation seems glamorous sector in business environment. There are a mixture of players who directly and indirectly have an effect on each other's business such as airports, airlines and ultimately the passengers. Without any of these players aviation business cannot function. Apart from these players there are various factors which affect aviation business i.e, government, procedures, international environment, climate, technology etc.

operated by Civil Aviation Authority of Nepal (CAAN). Civil Aviation Authority of Nepal (CAAN) was established as an autonomous organisation in 1998. The concept of being an independent organisation was an attractive decision for the employees and stakeholders. However, it has not been an easy ride. During the one decade of its journey, CAAN has been continually forced to invest in some unplanned or non recovery sectors. Most of the airports have failed to give returns of its massive investment. Small airport's gross earning is about ten percent of their annual operating expenditure. Hence, major airports have to share their earning to sustain small airports. Government expects a share on investment even in restoration, reinstatement and replacement of destroyed airports and infrastructures during the decade long insurgency.

Studies of investments show that in every organisation there is specific risk inherent in each investment.ÊThe amount of unsystematic risk can be reduced through appropriate diversification.ÊBut the case of CAAN is different than stated in investment studies because risk is obvious while investing in non performing airports. Most of the activities that have exposed the organisation to risk were performed because of no enough risk assessment done at the planning stage. Commencement of regional international flights from domestic hub airports, getting ready to operate closed airports, expansion and strengthening of airports for specific fleet operation, and construction of new airports have been some examples which have posed risks to the business of CAAN.

Regional International Flights

Management often tries to operate regional international flights on demand of tourism entrepreneurs, local users, political parties, business groups and airlines. There have been some unrealistic investments carried out in the past, such as trying to operate regional international flights from Biratnagar airport, Gautam Buddha airport and recently Buddha Air trying to connect Indian city Lukhnow from Pokhara airport. These attempts of international flights did not work and had to be stopped after a certain period of time. We can see abandoned terminal buildings and equipment in some airports. Operation of the international flight from the airport is not an easy job. A series of additional procedures are required such as additional security systems and personnel, immigration facilities, custom clearance etc. It is only possible by developing infrastructure and skilled human resource. CAAN has lost millions from its capital to fulfil such type of unrealistic endeavour.

Operation of Closed Airports:

Many airports were constructed during the 70-90's in the country. In that period, most of the districts and major cities were not in the national road network. Airport was the only means of transport. After some decades, most of the airports or nearby cities have been linked into the national road grid and numbers of flight naturally decreased. As a result, number of flights has been reduced from Dang, Chaurjhari, Rolpa, Ramechhap, Jiri, Sanfebagar, Dhorpatan, Balewa, Rajbiraj, Mahendranagar, Tikapur, Darchula, Syangboche, Langtang, Palungtar airports. Consequently some of the airports in the country were either closed or have nominal flights. Airlines cannot commence a flight without getting a return of the cost on particular flight operation. Air transportation is more expensive than other transport system and in Nepal most of the people fall below the poverty line. They are not in the position to use such facilities unless in urgency. Those who can offer this service, either they are above the poverty line, corporate users or tourists.

Currently, there has been an attempt to re-start scheduled flights in some of the airports after the long shutdown of operation. This has proved to be very expensive for CAAN as the operations had to be stopped after a very short time, though the investment was big. In some of these airports not a single flight has occurred after the investment in airport improvement and in some of the airports few flights were operated in a long span of time.

Construction of New Airport:

Construction of a new airport is expensive and only just by building an airport does not mean flight operation can be performed. Regular flight is equally important to operate an airport and two way simultaneous passenger flows is necessary for airlines to initiate routine schedule flights. Only one part cannot carry out air transportation service in any particular airport. According to the airport policy, these are things to be considered when building any airport. However, disregarding the airport policy, building of Simichaur (Gulmi), Ilam, Sitaleswara (Iamjung), Gaighat(Udaypur), khijichandeshori (Okhaldhunga) airports are in the priority.

Expansion and Strengthening of Airports:

Expansion and strengthening of existing airport is equally expensive than building a new one. Development and additional strengthening only for limited number of flights gives negative impact to the airport. This type of practice is frequently adopted in this sector. Operators are using different aircrafts than as agreed upon. Hence, longer and stronger runways, bigger departure/arrival and other facilities are urgently required. Similarly, human resource has not been strengthened and trained appropriately. History of aviation in Nepal shows that most of the airlines drop new venture

after commencing few flights. Hit and trial of private sector business have been continuously affecting CAAN. In the name of airport development, some of the disparity on planning has also affected the huge investment with no return, for example space in terminal Building at Jomsom airport, where most of the rooms allocated for different purposes are not yet used. Rescue and Fire Fighting Building and security watch tower at Bharatpur airport, multiple drainage systems at Janakpur airport etc are other examples.

Initially, expansion of one of the airports was initiated by the business community. It was supposed to have been a tripartite investment with concurrence of the Government, Business Community and CAAN at the rate of 50-25-25 ratios respectively. Government has been providing funds to continue the expansion work to the CAAN in the form of share investment and CAAN also continues investing on expansion work. However business community handed over small amount less than committed. Expected air transport movement is still not achieved and most of the improvement work still needs to be done.

True Objectives of Aviation Policy 2063:

If we truly follow the objective of Aviation Policy 2063, for new airport construction, we cannot find the place to build a new airport except in high mountains. The distance between the proposed airport and the nearest airport must be generally 20 nautical miles in mountainous and hilly areas and must be at least 40 nautical miles in Terai and inner Terai area. CAAN should ensure this is followed as per the policy on construction of new airports.

Conclusion:

Construction of new airport should be done following the objectives of Aviation Policy 2063 and be constructed only after assessing the return on investment. Ad hoc and temporary decisions on reopening of airport, initiation of regional international flights, expansion-strengthening of infrastructure should be closely examined and then decisions should be made appropriately. Reward and punishment system should be implemented for proper management not to repeat past mistakes. Non-performing airports should be handed over to the government and side by side private sector should be encouraged to operate airports. In simple words, the business administration and strategies are strongly required to run the autonomous business oriented organisation like CAAN. Increasing facilities and services into the performing airport definitely returns the investment rather than non performing airports. CAAN only cannot carry out the operation of the airports but it has to be a shared responsibility of Airport-Operator-User. CAAN should learn lessons from past and give serious consideration to its investment endeavours.

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Modern Approach to Air Traffic Surveillance System

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The two major air accidents which occurred in 1992 near the Kathmandu valley drew the attention for the immediate improvement of navigational and surveillance facilities at TIA. In 1993, the Government of Japan was requested to extend cooperation in the aviation sector of Nepal in order to improve air navigational safety. A study team through JICA was made available to conduct a detail study of TIA. The job progressed after the JICA Expert submitted its report to improve the airport facilities and proposed a TIA Modernization Project.

I) field work started in June 1995. The installation work had been completed in 1996. The newly installed Radar (ASR/SSR) at TIA had been brought into test operation after completion of commissioning flight calibration by FAA. The system was handed over to then Department of Civil Aviation in August 1997 and brought into full operation as a terminal radar facility for the air traffic approach service in 1998.

Maintenance of the Operational Facilities

After a long wait and overdue schedule of radar antenna overhauling CAAN has been successful to complete the job on its own expenses in April 2010. The regular maintenance of overall radar system ensures the smooth operation and running life of the system.

However, due to various reasons the job could not be performed in time.

After all, for this project, eight service engineers from Toshiba and NEC were involved. The TIA Maintenance engineers had participated in the job actively to support them. It was a great experience and opportunity for the local technical personnel to be involved in this overhauling work to learn from the manufacturer engineers. The work was completed in April 2010. The parts of the antenna system – Antenna Bearing, Rotary Joint, Drive motors, APG units, have all been replaced.

Toshiba Engineers and TIA technical personnel engaged inAntenna Overhaul work

New Technology in Air Surveillance System

Multilateration (MLAT)

Applications of Multilateration (MLAT) are Airport Surface, Terminal Area, Wide Area (WAM), Precision Runway Monitoring, Height Monitoring Unit, etc. It is an attractive new surveillance technique for Air Traffic Control service. This multilateration network employs a multiple small remote sensor surrounding the area that receives transponder reply signals from the aircraft, as secondary radar does, and forwards the received signals with precise timing information to a Multilateration server. At the server, time-difference-of-arrival (TDOA) technique is used to determine aircraft position and identification. This data is then transmitted to air traffic control for the use of Monitoring movement of Airplanes, Vehicles etc in an Airport Surface. It can work as Airport Surface Detecton Equipment (ASDE) which works on the principle of primary radar. It provides surveillance separation services, if it is employed as Wide Area Multilateration (WAM). Secondary Surveillance Radar (SSR) uses same frequency all over the world. Multilateration (MLAT) also utilizes the same frequency as SSRs do. Hence, the same transponder of an aircraft can be used for both SSR and MLAT. Multilateration has been adopted globally. China, Austria, United States of America, Australia, Canada, North Sea, New Zeland, and India etc. are deploying multilateration systems.

Modern Surveillance system: ADS-B

Automated Dependent Surveillance Broadcast (ADS-B) equipped aircraft determines its own position and periodically broadcasts its position and other relevant information to

ground stations as well as other aircrafts with ADS-B equipment. Position data is usually derived from aÊ (GNSS). ADS-B provides accurate information and frequent updates of data to airspace users and controllers. Its accuracy is found consistently superior to radar for ranges greater than 5 NM from sensor. ADS-B is under CNS/ATM plan of ICAO.

While ADS-B transmissions contain position data and can be received directly by other aircrafts, WAM surveillance data is processed by the ground system and typically provided only to an ATS facility. However it is possible in an ADS-B implementation for the radar- or WAM-derived positions of non-ADS-B equipped aircraft to be rebroadcast to ADS-B equipped aircraft via a Traffic Information Service Broadcast (TIS-B) service.

Improved Surveillance Radar: MSSR

Monopulse secondary surveillance radar (MSSR) is an improved version of the conventional SSR. Garbling and the False Replies Unsynchronized with the Interrogation Transmissions or simply FRUIT are the problems resulted in loss of the aircraft position producing inaccuracies. Both of these problems have been minimized in MSSR. Its direction accuracy is three times better than conventional SSR and reduced Garbling and FRUIT by 90%.

The use of MSSR can reduce separation minima in en-route air traffic service from 10NM (19 km) to 5NM (9.3 km) and in Approach Radar from 5 NM to 3 NM.

MSSR with Mode-S can send message to an aircraft along with receiving it. Between an aircraft and ground station Selective Addressing can be set up as to establish a data link between aircraft and controller. The word Selective provided its first letter 'S' for this new way of contact or mode, becoming thus theÊMode-S. Since there is only one reply at a time to be processed by the MSSR and no other to confuse it, garbling and FRUIT is further reduced, hence accuracy is further added.

Following are the information that can be down and/or up-linked between controller and aircraft using Mode-S which is well impressive:

- any clearance to the aircraft
- any request by the pilot
- all cockpit data appear in front the controller without having to ask
- all non-control data as ATIS , METAR, Route-info, SLOTS etc. can be directly received by the pilot also without having to ask
- many aircraft parameters can be fed to the tracking system and help the accuracy and speed of position calculations

Redundancy

Without provision of surveillance system, it would be very difficult for an air traffic controller to manage traffic at the busy airport. In order to provide an uninterrupted service, installation of next radar is required which will be a great financial burden for CAAN. If Multilation is installed, it works as redundancy for existing conventional surveillance system. Since, it employs multiple sensors, the system itself has redundancy. Even if any one of the sensors is out of service, the other sensors work to forward the received signals to the Multilateration Server as usual. As an added redundancy, WAM would be able to provide air traffic data to the control tower even in the event of outage of ADS-B. Besides this, the ADS-B position reports can be validated with the simultaneous multilateration on those ADS-B transmissions. This assists not only in the transition stage of ADS-B, but also in the long term, where issues of legal liability on ADS-B data are still being discussed globally.

Study at TIA

[1] Possibility of installation of Radar on hill top had been studied earlier. The studied site locations are: Phulchoki, Nagarjun and Nagarkot. Recently, engineers from NEC & AERO-TECHNICA and CAAN officials along with ICAO & JICA Experts had visited Bhattedanda and Phulchoki station. [Study visit to Bhattedanda was organised by CAAN on 5th Oct. 2010].

[2] Feasibility of MLAT Surface System and WAM is under study by ERA/SPA in Tribhuvan International Airport.

[3] HELIOS had studied on ADS-B Feasibility in Nepal

[4] ODA officials from Japan visited TIA on Nov. 2010 to study present condition of airport facilities. On this very occasion, Director General of CAAN had informed about the existing Radar and nav/com system under JICA Phase 1 & Phase 1.5 projects and its present needs for TIA.

Conclusion

It might not be easy to manage the airspace above Kathmandu TMA without Radar System due to growing air traffic. So, TI Airport needs a good coverage Radar System with uninterrupted service. Due to limitation of existing Radar System, TIA is providing Radar Monitoring Service only and Radar Vectoring (Provision of navigational guidance toaircraft in the form of specifics, based on the use of) service is not available. If we could install an MSSR with Mode-S on a hill top, the coverage of Radar would be extended up to more than 200 NM and Radar Vectoring service could be established as well.

Accuracy of SSR is degraded whereas accuracy of ADS-B and WAM is better than this. Where installation of radar on top of a mountain is impractical, a solution could be WAM. The beauty of WAM is that it needs no additional equipment in the aircraft. It can use the same transponder equipped for SSR. No Blind Cones, no Slant corrections, no rotating parts, Mode S Squitter Processing, ADS-B processing etc. are the other good features of WAM whereas these features are not available in conventional SSR. Besides this, coverage can be increased afterwards by adding more sensors in different locations.

Proper maintenance and smooth operation of sophisticated systems like nav-aids and surveillance equipments need highly trained and skilled technical man power; and the management has a responsibility to maintain the spirit of technical personnel being involved in the field works.

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Business Planning : An Overview

Chandrakant Pandit*

Concept

Simply stating, planning is the future road map of an organization. An organization, which runs on business principles, must be guided by its business planning. The planning which is outlined by using existing and available resources and information including vision, mission, strategy, objectives, goals or targets with income generating action plan of the organization is called business planning. It is expressed in term of long term planning or investment decision with budgeting for acquiring organization's future benefits over the years to come. The Term business planning or corporate planning was used in the 1960s, but now it has widely and popularly been referred to as strategic planning or strategic management. As a formal and structured approach, business planning or corporate planning or strategic planning can be instrumental in achieving strategic corporate goals and objectives either for any service oriented public organization or for any profit oriented business organization.

Business planning focuses on efficiently and effectively achieving optimal performance from all business oriented divisions or units of organization with actionable information provided to executive management to foster accountability and business growth. Most effective and actionable plans are developed by gathering various information with addressing organization's goals and objectives usually by the team of executives or senior management or by the management experts. Various statistical data including budget formulation and performance management is used in connection with analysis and forecasting for business planning.

The business plan and budget must be co-joint to each other and accordingly the framework of business strategy should be developed for short term and long term business plan. The project to be carried out during the specified period should be indentified within the limitation of budgetary framework.

The process of drawing up detailed action plans to achieve an organization's goals and objectives, taking into account the resources of the organization and the environment within which it operates, are minutely scrutinized for coping with the organization's future requirements. So business planning represents a formal, structured approach to achieving objectives and to implementing the corporate strategy for the long term benefit of the organization.

An effective business planning mainly includes the following aspects of the organization:

- Forecasting the strategic vision of the organization.
- Laying out the communication Tools of the organization.
- Setting short term and long term planning by involving to all levels of management staff.
- Finding the sources of funds for phase wise investment.
- Managing the various resources of the organization
- Preparing budget for sound implementation of such planned projects.
- Forecasting and reviewing projects as per the need of the organization
- Enhancing all employees for its effective implementation
- Finding the basis for rational decision making process.

The organization may either be small or big in size, but business planning is the first and foremost as well as essential step or tool for gradual development of the organization. So it should be judged highly by the top level management. It may be simplified by enriching special format and may also be sub-classified as per the requirement of the particular directorate, departments, divisions and various grassroots offices as well.

The business planning may have several purposes. It encourages the management team to focus on why they are in business or in commercial activities and what it takes to succeed. It is the vehicle which describes product or service or technology to others and why they will buy it.Ê It also provides the guidelines to management on how an organization will managerially and technologically be managed. Similarly it describes the financial plans of the organization and also convinces investors to invest huge amount of fund in the organization.

It serves as a guideline for allocating resources in a coordinated way. It handles unforeseen complications, helps make appropriate business decisions and provides specific and organized information about the organization how investors will be rewarded. It specifies ends and means of implementing actions. Business planning strategically defines the existing state and desired state of the organization. So, an appropriate business planning is a crucial part of the organization.

Now-a-days, business planning is interchangeably used as strategic planning, but its literal meaning is slightly different. Strategic planning is an organization's process of defining its strategy, or direction, and making decisions on allocating its resources to achieve its final goal, including its financial resources or capital and human resources or people in a long term perspective. Various business analysis techniques can be used in strategic planning, including SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) and PEST analysis (Political, Economic, Social, and Technological analysis) or STEER analysis involving Socio-cultural, Technological, Economic, Ecological, and Regulatory factors. Generally strategic planning adopts the following process in its initial formulation stage.

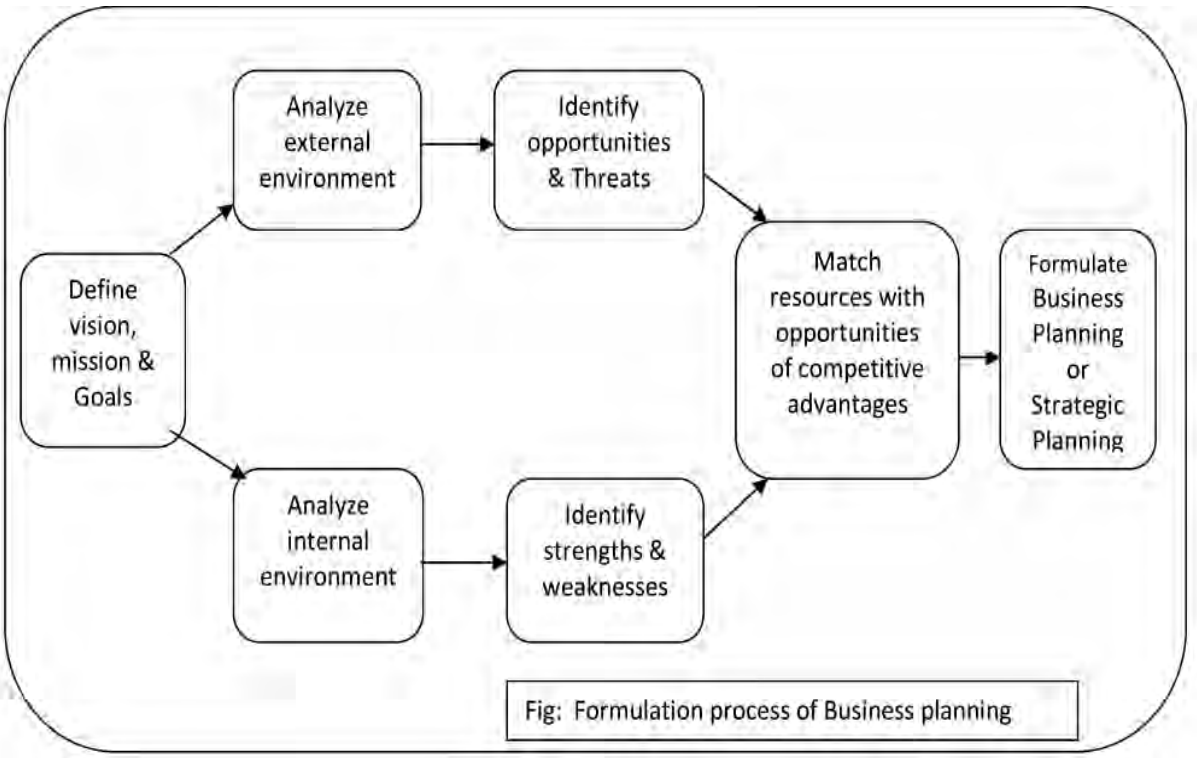

Fig: Formulation process of Business planning

A good business planning may address many issues such as innovation assessment, market research, competitive analysis, business model, financial projections and management team.

Business planning may be focused externally or internally as stated above. Externally focused plans target goals that are important to external financial stakeholders. They typically have detailed information about the organization or team attempting to reach the goals. For profit earning entity, external stakeholders include investors and customers. External stakeholders of non-profit making entity include donors and the clients of the non-profit services. For government agencies, external stakeholders include tax-payers, higher-level government agencies, and international lending bodies such as Asian Development Bank, World Bank etc.

Internally focused business plans target intermediate goals required to reach the external goals. They may cover the development of a new product, a new service, a new information technology system, a restructuring of financing methods or a reengineering of the organization structure. An internal business planning is often developed in conjunction with a balanced scorecard. This allows success of the plan to be measured using non-financial measures. Business planning identifies and targets internal goals, but provides only general guidance on how they will be fulfilled which are called strategic planning.

Conclusion

To sum up, business planning is one of the most crucial decision-making tools. It represents all aspects of business planning process; declaring vision, mission, values and strategy alongside sub-plans to cover marketing, finance, operation, regulation, human resources, infrastructure and legal plan. Business planning draws wide range of knowledge from many different disciplines such as finance, human resource management, economics, law, corporate, engineering, intellectuals, stakeholders, regulators, service providers, operation and marketing management etc for its preparation. A good business planning can help to make a good business credible, understandable, and attractive for enhancing or fostering commercial activities of the organization. A business planning is a macro planning aspect of all disciplinary plans. It covers wide field. This article is just a theory based pictorial aspect of business planning.

"A business without a plan is like a car without a steering."

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Women as Air Traffic Controllers

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1940s is the first decade women entered air traffic controlling. The field was predominantly male and the women traveled a difficult road to reach today's state of presence in this area. Not necessarily air traffic controlling only, the male dominance was abundant in every other field during that time but the case was more severe in a technical and unique field like air traffic controlling.

Till today, air traffic controlling remains an intriguingly strange topic for common people. The air traffic controllers should really equip themselves with explaining and convincing skills before tackling a question as regards to what they do. People's perception about this topic varies widely, ranging from understanding it as traffic police to counting it as a profession for aspiring air hostesses. They find this job an unusual one and jump straightaway to the conclusion that no matter what the air traffic controllers should do, this profession is a complete misfit for women.

Perhaps this kind of belief shapes up after being known to the facts that air traffic controlling is a highly stressful job where one needs to do technical works remaining close to communication and computer equipments and should work in odd hour shifts. Moreover, the work air traffic controllers do each day is often regarded as 'behind the scenes' because the public is unable to directly watch the controllers at work. Owing to these facts, it is not surprising that this common belief sets up in people's mind frame before they are aware of its other subtler traits. In fact, the career field of air traffic controller is characterized by its heavy reliance upon and interaction with technical equipment, multi tasking, the necessity for concentration and paying attention to details, good memory, intelligence, decisiveness, teamwork skills, emotional stability with tolerance to stress, spatial awareness etc.

In this scenario, it seems very natural that people feel this field is not suitable for women and there are many theories which revolve around this topic. Some traditional scientists and theorists believe that a female presence in a technological field is negative, either because they believe women are biologically ill-equipped for such a career or because they believe women require surrendering their feminity in order to attain career success and advancement. On the contrary, modern researches have actually excavated the facts which do not quite match the aforementioned statements. In our society, there are many conventional ideas scattered all around advocating the stereotypes about women, mainly their inability to handle stress and their being prone to anxiety disorders. But the study about how brain mechanisms of learning and perceiving differ between sexes leads us to conclusions very different than these conventional ones.

Considering the characteristics inherent in a good air traffic controller, let's try to analyze how good women are regarding these characteristics.

It is known worldwide that women are natural communicators. They have the brain organization to stand out excellent on communicating skills. Magnetic Resonance Imaging (MRI) brain scans clearly show why women have greater capacity of communicating and evaluating people and circumstances. Studies suggest that women have between fourteen and sixteen areas of the brain to evaluate the behavior of others as well as unexpected situations versus a man's four to six such areas.

Similarly, paying attention to details is another trait which women are quite good at. In general case also women are found to consider every detail whenever they are meeting new people, or conversing with others. These facts imply that women can be good not only in regular traffic controlling, but also handling emergency situations like radio communication failure or unlawful interference. Furthermore, the combination of both the traits communication skills and paying attention to details render women excellent co-coordinators during air traffic controlling. Besides being way ahead in communicating skills, women have advantage regarding the clarity of their voice as well. Their voice is considered easier to understand because of being an octave or two higher than a male voice.

Multitasking is another requisite for air traffic controlling. Studies prove that the female brain is organized for multitasking. An average woman can juggle between two to four unrelated topics at the same time. She can watch a television programme while talking on the telephone, plus listen to the second conversation behind her, while drinking a cup of coffee. This proves that, a woman air traffic controller can give instructions to the pilots, make plans considering the traffic situation & pattern, listen to the coordinator while he co-ordinates with other units and also pay attention to the traffic in surface movement control frequency (in case of controlling at tower).

Next quality an air traffic controller should possess is the ability to deal with stress. According to the researchers from Hebrew University of Jerusalem, women have the edge in dealing with stressful conditions and can endure the otherwise exhausting stress of being responsible for the safety of several aircraft and their passengers.

Women can be awesome in team work. They have the skill of binding diverse people together into a single team as they have been doing so since ages by working as a binding force in keeping family and friendly bonds tightly woven. Moreover, women have proved that instant decision making is also their forte. Research has proved that good decision making group has more women in it.

Thus researches and studies have supplied us with evidence enough to prove that traditional beliefs about women not identifying with technological area like air traffic controlling are completely wrong. On the contrary, women possess the innate qualities that make them excellent air traffic controllers.

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Extinguishing Agents and their use in different fires

Narayan Bahadur Rawat*

Various types of extinguishing agents have been introduced in the fire service according to the classification of fire. In the practices of International Civil Aviation Organization, a fire fighting work should accomplish within the time bound of determined aspect using these extinguishing agents. So, every fire fighters and general people must be familiar with different types of fire in his daily life for protection and inspection.

Class 'a' Fire

Class A fires evolve from ordinary combustible materials such as wood, cloth, paper, rubber and many plastics. Water can be used as an extinguishing agent to cooling or quench the burning materials below the ignition temperature.

Class 'B' fire

Class B fires evolve from liquids and liquefied solids such as gasoline, oil, lacquer, paint, mineral spirits and alcohol etc. The smothering and blanketing effect of oxygen exclusion is most effective for extinguishment and also helps reduce the production of additional vapors. Foam is a best extinguishing agents for class B fires in the aviation liquid fuel fires and other liquid fuel fires.

Class 'c' Fire

Class C fires evolve from gases or liquefied gases in the form of a liquid spillage and gas leak. For extinguishing such fires, the action required is to reduce and shut off the supply of gas. These fires can also be extinguished by cutting off the flames using dry chemical powders and other agents such as water spray etc.

Class 'D' Fire

Class D fires evolve from combustible metals such as magnesium, titanium, aluminum zirconium, sodium and potassium etc. One of the characteristics of such fires is that they burn with very high temperatures. Water should not be used because it is very dangerous for such type of fire. Dry chemical and CO2 are also hazardous if applied to most metal fires. Powder graphite, limestone and dry sand are normally suitable for these types of fire.

'Electrical' fire

Electrical fires are not treated as a class of their own but Electrical Fires evolve from energized electrical equipments such as household appliances, computers, transformers, over heated transmission lines etc. These fires can sometimes be controlled by non-conducting extinguishing agents such as halon, dry chemical and carbon dioxide. The fastest extinguishing method is to de-energize high-voltage circuits and then fight the fire appropriately depending upon the fuel involved.

Class 'K' Fire

Class K fires evolve from vegetable oils, animal oils or fats in cooking appliances, specially denoted by commercial kitchens, restaurants and cafeterias etc. Due to the high temperature attained by the fuel, normally extinguishing agents such as water, foam, dry chemical foam are ineffective as there is always a chance of reigniting. The extinguishing agent for such fires is wet chemical, which extinguishes it by emulsifying the oil, making it non-flammable, and also partly cooling the fuel.

We have seen earlier that the processes that take place in most combustion reactions are quite similar; however, while the actual combustion zones or flames are comparable, it is not possible to use the same extinguishing agent for each type of fire. The burning material can be in different forms, such as solid, liquid or gas due to which common extinguishing agent is not possible. The reactions, both physical and chemical, of the burning material to the various fire fighting agents are very great. In some situations, the use of an extinguishing agent can be effective and the same extinguishing agent may be ineffective in other types of fire.

Therefore, keeping the above factors in mind, it must be clear that the various extinguishing actions and extinguishing agents are effective only in certain situations. In fact, the use of the wrong extinguishing action of agents can in some cases be dangerous. Another important fact to be taken into consideration that the persons attempting to put out a fire using portable appliances are the first responders because the people on the spot, who may be semi-trained or even untrained in the use of such appliances.

The extinguishing agents are classified into two categories as per ICAO guidelines such as principal extinguishing agents and complementary extinguishing agents. The principal extinguishing agents are introduced as a permanent control of the fires and complementary extinguishing agents are introduced as a transient control of fire. Both principal and complementary extinguishing agents are described in detail and the various types of foam have taken as a permanent control in the fire service. So foam is the mass of bubbles filled with air of Carbon di -oxide like gases. The principle method of fire extinction is cooling i.e. reducing the temperature of burning material below its ignition point so that ignition does not continue. Another method uses foams. Foams are basically introduced into two types 1) Chemical foam and 2) Mechanical foam.

Chemical Foam

In 1877, British scientist was introduced of chemical foam in the foaming history and first successful use of chemical foam by Russia in 1904. Chemical foam is produced by the interaction of two chemicals when mixed with waters. These chemicals are Sodium Bicarbonate and aluminum Sulphate and used in the hand extinguishers of 9 liters capacity. Chemical foam is not normally used in the fire service but it is frequently used by fixed installations such as the protection

of apartment, housing, buildings, hospitals, industries, aircrafts, etc. Chemical foam, in which the bubbles are filled with carbon dioxide gas, is produced by the reaction of solution of sodium bicarbonate and aluminum sulfate in the presence of a foam stabilizer. This type of foam is no longer widely applicable in the fire fighting operation in the practices just for transient control of incipient fires.

Mechanical Foam

In 1920, protein foam concentrate was first produced along with equipments designed for the production and delivery of this mechanical foam. Mechanical foam produced by introducing a foam compound in water and then aerating the resultant mixture. Mechanical foam, in which the bubbles are filled with air, is classified into the following categories which are based upon concentration percentages, expansion rates and chemical composition. Mechanical foam extinguishes the fires as a permanent control by flowing over the surface of the flammable liquid.

1) Protein Foam
2) Fluoroprotin Foam
3) Aqueous Film Forming Foam
4) Film Forming fluoroprotein Foam
5) Synthetic Foam

Protein Foam (PF)

Protein foam is manufactured by the alkaline or acid hydrolysis of either vegetable (soybean or peanut meal) or animal proteins (feather meal, blood, hoof, bone and horn meal or fish scales. In the past, protein foam concentrates have been widely used by industries, the fire service, the armed forces and aviation authority throughout the world. Protein foam concentrates are inexpensive and usually manufactured for use at :- 3% or 6% concentration, typical expansion:- 7:1 to 9:1, typical drainage time (25%):- 7 to 10 minutes. Versions are available that can be mixed with sea water and fresh water. They are only intended for the production of low expansion finished foams. It has good resistance to burn-back, keeps well when correctly stored and will not corrode equipments provided. The equipments is washed out thoroughly with clean water.

Aqueous Film Forming Foam (AFFF)

Aqueous Film Forming Foam concentrates are solutions of fluorocarbon surface active agents. AFFF foam concentrates are usually available for use at: - 1% 3% 6% concentrations, typical expansion:- 1 to 11:1, typical drainage time (25%) :- 4 to 6 minutes and versions are available for use with fresh water, salt water and brackish water. They are primarily intended for the production of low expansion foams although they can also be used to produce medium expansions. Aqueous Film Forming Foam concentrates are not recommended for the production of high expansion foam. AFF is widely accepted for crash rescue fire fighting or aircraft rescue and fire fighting uses and on less volatile fuels such as kerosene and diesel oil. AFFF foam concentrate is not particularly corrosive and contains no special corrosion inhibitors.

Fluoroprotien (FP)

Fluoroprotien foam concentrates basically consist of protein foam concentrates with the addition of fluorinates surface active agents. FP foam concentrates are usually available for use at:- 3% or 6% concentrations, typical expansion :- 7:1 to 10:1, typical drainage time (25%) :- 7 to 10 minute and versions are available for use with sea and fresh water. FP foam concentrates are primarily intended for the production of low expansion foams although they have also provided effective when used to produce medium expansion foam. They are not recommended for the production of high expansion foam. FP foam is used widespread in the fire service, the petro-chemical industries and armed forces throughout the world. It is more expensive than protein foam concentrate.

Film Forming Fluoroprotien (FFFP)

FFFP foam concentrates are based on FP foam concentrates with the addition of film-forming fluorinated surface active agents. Under certain conditions this combination of chemicals can, as well as producing a foam blanket, allow a very thin vapor sealing film of foam solution to spread over the surface of some liquid hydrocarbons. FFFP foam concentrates are usually available for use at :- 3% to 6% concentrations. They are primarily intended for the production of low expansion foam although they can also be used to produce medium expansion foam. FFFP foam is not recommended for the production of high expansion foam and this foam are not more expensive than P and FP foam concentrates.

Synthetic Detergents (SYNDENT) Foam

Synthetic foam concentrates were developed from early synthetic detergent and are based on a mixture of hydrocarbon surface active agents. Synthetic foam concentrates can be used to produce low, medium, and high expansion foams. They can also be used on class A fires and class B fires synthetic foam concentrates are usually manufactured for use at 1% to 3% concentrations and versions are available for use with sea and fresh water. This type of foam can be more effective on hydrocarbon fuels, particularly those with lower boiling points and more susceptible than protein foam to breakdown by hot fuel layers and radiant heat. It is important to achieve gently surface application when it will give quick control. They are of similar cost to protein foam and fluoroprotien foams concentrates.

Carbon-dioxide (CO_2) Extinguishing Agents

Carbon-dioxide is colorless, non-flammable, and odorless gas under normal conditions. When subjected to high pressure at a temperature less than 31.1 degree Celsius, the gas liquids. Carbon-dioxide has been used for many years to extinguish flammable liquids fires and fire involving live electrical equipments. Consequently it is widely employed as an extinguishing media in fixed installations and also in portable hand extinguishers with liquefied gas. Carbon-dioxide extinguishers are carried on some fire brigade appliances but more often found as part of the fire fighting equipments in commercial and industries premises. Portable Carbon-dioxide extinguishers are often installed in kitchens in hotels

and large restaurants and fishing frying establishments. The precaution should be taken when handling them as with any other compressed gas cylinders.

Advantages of Carbon-dioxide

- It is extremely rapid in action and its action is independent of atmospheric temperature.
- Being an inert gas it quickly disperses, leaving no trace behind.
- No chemical action under normal conditions and no damage to machineries or articles.
- It is non-conductor of electricity.

Disadvantages of Carbon-dioxide

- The total weight of the extinguishers in comparison with the weight of the discharges is considerable.
- There is no visible check up on the contents.
- Cylinders must be sent away for recharging.

Dry Chemical Powder (DCP) Extinguishing agents

Dry Chemical Powders for firefighting falls into three groups

1) Powders for use against class B fire:-

Powders intended for use on flammable liquid class B fires are usually on sodium bicarbonate. Powders extinguish class B fires by interfering with the chemical chain reactions in the flames.

2) General purpose powder for class A and B fires :-

Powders dealing with carbonaceous class A fires as well as class B fires known as general purpose powders are based on ammonium phosphates. Class A fires involve two distinct parts of the flames and the smoldering or glowing combustion of the solid material. Class B powder will extinguish the flames in class A fires but will not inhibit the smoldering combustion

3) Powders for use against class D fires :-

These powders normally used for extinguishing agents are inadequate when dealing with metal fires such as magnesium, aluminum, titanium etc. One powder is a combination of turnery eutectic chloride (TEC) which has proved effective for uranium, plutonium, and magnesium alloy.

The action of dry chemical powder is heat absorbents and smothering for controlling the incipient fires. These powders under fire condition form crusts surrounding the burning material so excluding air and reduce heat and temperatures.

Advantages of DCP

1) Water repellent
2) Non toxic and Non corrosive
3) Very swift in action as quickly knockdown the fire flames.
4) Non conductor to electricity
5) Free flowing
6) Refilling is quick and simple

Disadvantages of DCP

1) Flash back can occur in some cases and thus it is not full proof.
2) No cooling effective, so unsuitable for class A fires
3) Create poor visibility when discharge in bulk or indoors.
4) Requires cleanliness when used on fine machineries etc.

Different Types of Fire Extinguishing Agents

A multipurpose DCP (ABC class fire)

Dry Chemical (BC class fire)

Carbon- dioxide (BC class fire)

Foam type (AB class fire)

Halons (Halogens)

1011 CBM (chloro-bromo-methane), 1211 BCF (Bromo-chloro-Difluoromethene), 1301 BTM (Bromo-Tri-Fluoromethane) are the most popular vaporizing liquid extinguishing agents which are stored in liquid form and released in such a way as to vaporize rapidly in a fire zone in a similar way to carbon dioxide. Their extinguishing capacity depends generally on their influence on the chemical reactions involved in the propagation of flame. 1301 BTM is better for fixed installations, computer system, tanks, aircraft engines, where other than fixed installation 1211 BCF is better.

Advantages of Halon

- Does not leave any residue, therefore, best for aircraft engines fires, landing gears fires and fires in electrical equipments.
- Non- conductor of electricity

Disadvantages of Halon

- It is toxic and corrosive under certain circumstances.
- Irritant to throat and eyes therefore nobody should stay for a long period in the area where it has been used.

Due to OZONE depletion and Global Warming Potential (GWP), the production of halons ceased on 31 December 1993 as agreed upon by the parties to the Montreal Protocol.

Water

Water is an excellent fire extinguisher, since both figures are high. This fact, combined with its availability in large quantities, make it by far the most useful fire extinguisher for general purposes.

As explained above, water is the best commonly used extinguisher media employed in fire fighting and that it could be applied either by means of buckets, extinguishers, and hand pumps or mechanically operated pumps. In almost all cases it is in the form of jet of varying size and force. But now, the use of water in the form of spray and for is increasing day by day since it has many advantages over the straight jet, fog and spray will be helpful in understanding their values for firefighting purposes.

Advantages of Water

- All water absorbs heat from the fire.
- It has got best cooling effect
- It falls very gently on the burning surface and will give best cooling effect.
- Water for firefighting is in form of steam, in which, it produces more of a smothering or blanketing effect.
- Water is cheap extinguishing media than other for firefighting purpose.

Now, Civil aviation Authority of Nepal have various types of modern rescue & firefighting vehicles with different fire extinguishing agents (foam, water, DCP, CO2) for extinction aircraft accident/incident fires. These types of firefighting and rescue operation service have been provided in Nepalgung Airport, Gautam Buddha Airport, Pokhara Airport, Simara Airport and biratnagar Airport. In fiscal Year 2067/68 B.S., CAAN has purchased a new modern firefighting vehicle in which carrying capacities are as follows :-

- Water Tank Capacity 12,500 liters
- Foam Tank Capacity 1500 liters
- Monitor Range Capacity 80 meters

Conclusion

Civil Aviation Authority of Nepal (CAAN) has been launching a firefighting & rescue operation service as per International Civil Aviation Organization (ICAO) guidelines. These services should further be improved by increasing the trained manpower, physical infrastructure and modifying the organization structure. Due to financial problem, which can be a strong obstruction, CAAN management might not have given importance to these aspects in the aviation service. Traffic movement has been increasing day by day. That's why fire and rescue service should be up-to-date according with ICAO standard for better protection of aircraft and other facilities.

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त्रिभुवन अन्तर्राष्ट्रिय विमानस्थलको हवाई उडान, यात्रु तथा मालसामान तथ्याङ्क सम्बन्धि विवेचना

राज बहादुर महर्जन*

नेपालको एक मात्र अन्तर्राष्ट्रिय विमानस्थल त्रिभुवन अन्तर्राष्ट्रिय विमानस्थलमा यहाँबाट कति वायुयानको उडान, यात्रुको आगमन-प्रस्थान हुन्छ साथै कति सामान (कार्गो) आयात निर्यात हुन्छ भन्ने धेरैको चासोको विषय हुन सक्छ । यसैले यहाँ त्रिभुवन अन्तर्राष्ट्रिय विमानस्थलको सन् २००० देखि २००९ सम्म दश बर्षको वायुयान (हवाई) उडान, यात्रु तथा कार्गोको तुलनात्मक आंकडा प्रस्तुत गरिएको छ ।

सन् १९९३ देखि नेपाल सरकारले खुला आकाश नीति अपनाएदेखि उडान संख्या, यात्रु तथा कार्गोमा उल्लेखनिय बृद्धि हुँदै आईरहेको देखिन्छ तर यसैसाथको चार्टहरूमा देखाए जस्तै बिचका बर्षहरूमा यी तथ्यांङ्क ऋणात्मक अर्थात ओरालो लागेका पनि छ । यसैले त्रिभुवन अन्तर्राष्ट्रिय विमानस्थलका Movement (हवाई उडान,यात्रु तथा कार्गो) बढ्नु र घट्नुका केही संभावित कारणहरू निम्नानुसार रहेका देखिन्छ ।

Movement (हवाई उडान,यात्रु तथा कार्गो) बढ्नाका कारणहरू

(१) खुला आकाश नीति, सरकार तथा नेपाल नागरिक उड्डयन प्राधिकरणद्वारा वायुसेवाहरूलाई विभिन्न छुट एवं सहुलियत प्रदान
(२) निजी वायुसेवाहरूको सहज प्रवेश,
(३) मानिसहरूको क्रयशक्ति अर्थात आर्थिक स्तरमा वृद्धि,
(४) विदेशी लगानी तथा पार्टनरसिपमा सहजता,
(५) विमानस्थलको भौतिक, प्राबिधिक तथा सुविधामा वृद्धि,
(६) सडक यातायातको जोखिम,
(७) नेपाल प्रति पर्यटकको आकर्षण,
(८) नेपाल सरकारको वैदेशिक रोजगारको नीति तथा नेपालीहरूको वैदेशिक रोजगारमा आकर्षण,
(९) अन्तर्राष्ट्रिय वायुसेवाहरूको लागि नेपाल राम्रो गन्तव्यको बजार हुनु,
(१०) अन्तर्राष्ट्रिय वायुसेवाहरू बीचको प्रतिस्पर्धा र ठूला वायुयानहरूको संचालन आदि ।

Movement (हवाई उडान,यात्रु तथा कार्गो) घट्नाका कारणहरू

(१) निजी वायुसेवाहरू खुल्दै, बन्द हुनु,
(२) बेला बेलाको बन्द, हड्ताल एवं द्वन्द (राजनैतिक कारण),
(३) वायुसेवाको भाडामा वृद्धि हुनु एवं जनताको क्रयशक्ति घट्नु,
(४) साना वायुयानको स्थानमा ठूलो वायुयानको प्रयोग हुनु, जसबाट उडान संख्या घट्ने हुन्छ,
(५) आन्तरिक विमानस्थलहरूमा सडक यातायात पुग्नु,
(६) धेरै दिन मौसम प्रतिकुल हुनु,
(७) भौतिक पूर्वाधारको कमि हुदै आउनु र यसको क्रमिक रूपमा बृद्धि गर्दै लान नसक्नु,
(८) सडक यातायातमा पनि आरमदायी र सस्तो भाडादरका बाहनहरूको प्रयोगमा बृद्धि हुनु,
(९) चाहेको बेलामा भन्नासाथ हवाई टिकट उपलब्ध नहुनु,
(१०) आर्थिक अभाव तथा स्थान अभावले गर्दा नयाँ नयाँ प्रबिधि ल्याउन नसक्नु आदि ।

हवाई उडान, यात्रु , कार्गो तथा मेल सम्बन्धि पूर्वानुमान (Trend Forecast)

Aviation मा Movement भन्नाले हवाई उडान, यात्रु आवगमन, मालसामान (कार्गो) आयात - निर्यात तथा Mail Movement भन्ने बुझिन्छ भन्ने माथि पनि प्रस्तुत भईसकेको छ । अब यस सम्बन्धि केही पूर्वानुमान (Trend Forecast) यहाँ उल्लेख गरिन्छ ।

(१) हवाई उडानका पूर्वानुमान (Trend forecast on Flight movement)

बढ्दो विश्व व्यापारीकरण, व्यक्तिगत व्यस्तता, समयको महत्व, आर्थिकस्तरको बृद्धि, निजी वायुसेवाहरूको संलग्नता, प्रबिधिको विकास तथा न्यून दुर्घटना, पर्यटन क्षेत्रको विकास तथा पर्यटकको बृद्धि आदि कारणहरूले गर्दा हवाई उडान संचालनमा लगातार बृद्धि भईरहेको छ । त्रिभुवन अन्तर्राष्ट्रिय विमानस्थलको भौतिक पूर्वाधार बढ्दो हवाई उडान आवागमनको लागि अपर्याप्त भैसकेको छ तापनि हवाई उडान संचालनमा कुनै कमि आएको छैन र अन्तर्राष्ट्रिय तथा आन्तरिक वायु सेवाहरू, वायुयानहरू थपिने क्रम जारी नै छ र यो क्रमले निरन्तरता पाई रहने देखिन्छ ।

10 YEARS (INTERNATIONAL & DOMESTIC) FLIGHT MOVEMENT

YEAR	Flight Movement	Increase/Decrease than last year +/-	% Change	Remarks
2000	64103	-107	-0.2	1999 Mov = 64210
2001	63159	-944	-1.5	Decrease
2002	54825	-8334	-13.2	Decrease
2003	60648	5823	10.6	Increase
2004	75533	14885	24.5	Increase
2005	80379	4846	6.4	Increase
2006	72348	-8031	-10.0	Decrease
2007	77342	4994	6.9	Increase
2008	83562	6220	8.0	Increase
2009	91884	8322	10.0	Increase

(२) यात्रु आवागमनको पूर्वानुमान (Trend forecast on Passenger movement)

Global village को अवधारणा अन्तर्गत विश्व साँघुरिदै गई रहेको छ । व्यापार, वाणिज्य, रोजगार, अध्ययन तथा पर्यटनको विकाससँगै विश्वभरीका मानिसहरूको विभिन्न देशहरूमा आवत जावत भै रहेको छ । यसैसँग नेपालको एक मात्र अन्तर्राष्ट्रिय त्रिभुवन विमानस्थलमा पनि क्रमिक रूपमा यात्रुहरूको आवागमनमा बृद्धि भै रहेको छ र अझ बृद्धि हुँदै जाने आंकलन गर्न सकिन्छ ।

10 YEARS (INTERNATIONAL+DOMESTIC) PASSENGER MOVEMENT

YEAR	Passenger Movement	Increase/Decrease than last year +/-	% Change	Remarks
2000	1914349	-79310	-4.0	1999/1993659
2001	1849766	-64583	-3.4	Decrease
2002	1600309	-249457	-13.5	Decrease
2003	1748082	147773	9.2	Increase
2004	2016850	268768	15.4	Increase
2005	2362885	346035	17.2	Increase
2006	2265758	-97127	-4.1	Decrease
2007	2543482	277724	12.3	Increase
2008	2867216	323734	12.7	Increase
2009	3405015	537799	18.8	Increase

(३) मालसामान आयात निर्यातको पूर्वानुमान (Trend forecast on Cargo movement)

विश्व व्यापारीकरणको कारणले गर्दा र नेपाल विश्व व्यापार संघको सदस्य देश भएको नाताले अन्तर्राष्ट्रिय व्यापारमा बृद्धि हुँदै जानु स्वाभाविकै हो । सडक मार्फतको ढुवानी एकदम ढिला हुने र समुद्री मार्ग टाढा भएको हुनाले व्यापारीहरू हवाई ढुवानी तर्फ आकर्षित भई रहेका छन् । यसैले त्रिभुवन अन्तर्राष्ट्रिय विमानस्थलबाट आन्तरिक तर्फ दुर्गम क्षेत्रतिर र अन्तर्राष्ट्रिय तर्फ सबै स्थानको मालसमान ढुवानी बृद्धि हुँदै जाने अपेक्षा गर्न सकिन्छ ।

10 YEARS (INTERNATIONAL + DOMESTIC) CARGO MOVEMENT

YEAR	Total Cargo in tons	Increase/Decrease than last year +/-	% Change	Remarks
2000	19481	3807	24.3	1999/15674 ton
2001	15478	-4003	-20.5	Decrease
2002	15399	-79	-0.5	Decrease
2003	18707	3308	21.5	Increase
2004	15119	-3588	-19.2	Decrease
2005	16125	1006	6.7	Increase
2006	16414	289	1.8	Increase
2007	17808	1394	8.5	Increase
2008	18690	882	5.0	Increase
2009	19734	1044	5.6	Increase

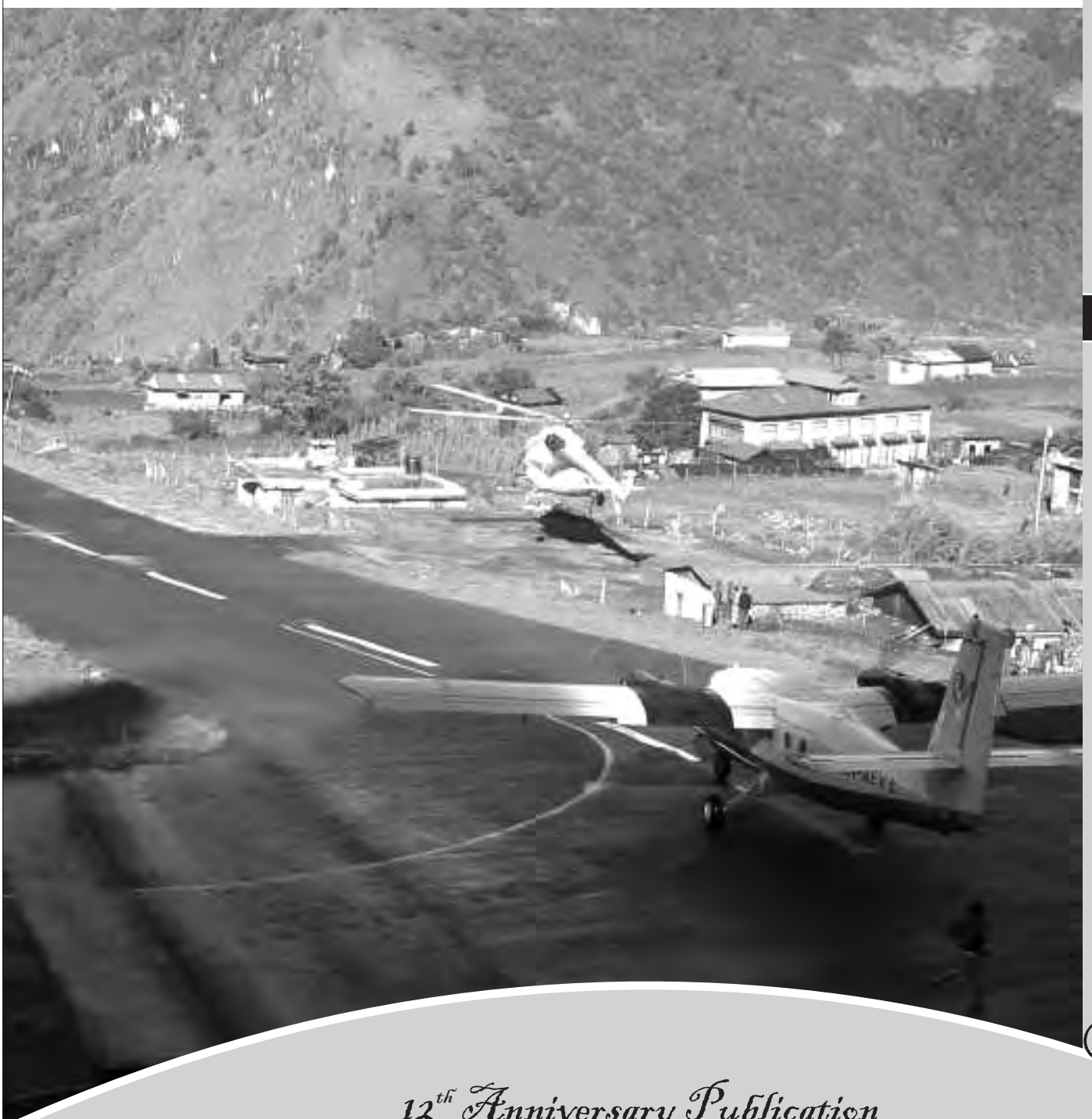
(४) चिठ्ठी-पत्र ढुवानी पूर्वानुमान (Trend forecast on Mail movement)

चिठ्ठी-पत्र, पार्सल, डकुमेन्टको ढुवानीमा उतार चढाव देखिए तापनि यसको भविष्य खस्किदै जाने देखिन्छ । बढ्दो दुर संचारको विकास, फ्याक्स, ईन्टरनेट वा संचारको संजाल, नयाँ नयाँ प्रबिधिको विकास र यसको प्रयोगकर्ताको निरन्तर बृद्धिसँगै अत्यावश्यक कागजी प्रति (Hard copy) नै पठाउनु पर्ने बाहेक अन्य प्रकारको मेल क्रमिक रूपमा घट्दै जाने संभावना देखिन्छ ।

10 YEARS (INTERNATIONAL + DOMESTIC) MAIL MOVEMENT

YEAR	Total Mail in kgs	Increase/Decrease than last year +/-	% Change	Remarks
2000	386482	53482	16.06	1999/333000Ê
2001	389812	3330	0.87	Increase
2002	426919	37107	9.52	Increase
2003	433183	6264	1.47	Increase
2004	367607	-65576	-15.14	Decrease
2005	478988	111381	30.30	Increase
2006	385187	-93801	-19.59	Decrease
2007	250816	-134371	-34.89	Decrease
2008	264567	13751	5.49	Increase
2009	403700	139133	52.59	Increase

*प्रबन्धक, त्रि.अ.बि.ना.उ.का.



आर्थिक उदारीकरण - सन्दर्भ, हवाई नीति २०६३

सुनिल मूल*

अर्थतन्त्रलाई सरकारी नियन्त्रण अथवा स्वतन्त्र निर्देशनवाट मुक्त गर्नुका साथै निजी क्षेत्रलाई प्रवर्द्धन गर्नु नै उदारीकरण हो । विसौं शताव्दिमा साधन र श्रोत सिमित भएको अवस्थामा के उत्पादन गर्ने र कसरी उत्पादन गर्ने भन्ने समस्याको समाधान गर्नका लागी (क) केन्द्र निर्देशित आदेशात्मक अर्थतन्त्र (ख) निजी उद्यममा आधारित वजार अर्थतन्त्रको दुई आर्थिक पद्धति प्रयोग गरिएका थिए । शताव्दिको अन्त्यमा आदेशात्मक अर्थतन्त्रले आर्थिक विकासलाई दिगो वनाउन र सम्मुन्नती हासिल गर्न विफल हुन पुग्यो, परिणामस्वरूप सरकार उदारीकरणको वाटो हिड्न वाध्य भयो । उदारीकरण वजार सुधारका लागी सबै लाभहरू प्राप्त गर्ने, उद्यमहरू तथा परिवारहरूलाई उत्पादन निर्णयहरू विकेन्द्रित गर्ने र अभिकर्तालाई स्वतन्त्र व्यापार गर्न, माग र पूर्तिका शक्तिहरू अनुरूप प्रतिक्रिया गर्ने, प्रेरित गर्ने र सूचना प्रदान गर्नु हो ।

आर्थिक उदारीकरण वर्तमान परिवेशमा कुनै नौलो विषय रहेन । १९औं शताव्दिको उत्तरार्ध तथा र २०औं शताव्दिको शुरूआतमा यसले व्यापकता पाउँदै गएको हो । आर्थिक उदारीकरणको शुरूवात सन् ७०को दशकमा वेलायतवाट भएको हो । ब्रिटिश प्रधानमन्त्री मार्गरेट थ्याचर र अमेरिकी राष्ट्रपति रोनाल्ड रेगनले विश्वमा आर्थिक उदारीकरणलाई राजनीतिक नेतृत्व प्रदान गरेका थिए । त्यतिखेर ब्रेटेनउडको स्थिर विनिमय दरको असफलता र पूंजिवादिहरूको नाफामा आएको ह्रासको कारण नै आर्थिक उदारिकरणको जन्म हुन प्रेरित भएको मानिन्छ । मूलतः मुनाफाको कारणले गर्दा आर्थिक उदारीकरणले विश्वमा व्यापकता पाउँदै गयो । विकसित राष्ट्रवाट शुरू भएको आर्थिक उदारीकरण विकासशील राष्ट्रहरूको निम्ति संजिवनी सावित हुन सक्ने भएतापनि विकसित देशहरूको दाँजोमा विकाससिल देशहरूमा आर्थिक उदारीकरण कत्तिको सफल हुन पुग्यो त रू विचारणीय रहेको छ ।

आर्थिक उदारीकरणले सरकारको भूमिकालाई कम गरी निजी क्षेत्रको क्रियाकलापलाई प्रोत्साहित गर्ने मान्यता राख्दछ । यसले आयात प्रतिस्थापन नभै निर्यातमूखि आर्थिक नीति अवलम्वन मा जोड दिन्छ । वस्तु तथा सेवाहरूको आयात निर्यात सहज ढंगवाट हुनु पर्दछ । सरकार नियन्त्रित अर्थ व्यवस्था भन्दा खुला उदार र वजार अर्थ व्यवस्थामा श्रोत र साधनको वांडफांड यर्थाथपरक भई उत्पादन वढ्छ भन्ने मान्यतामा नै आर्थिक उदारीकरणको नीति अडिएको हुन्छ । खास अर्थमा सरकार पनि एक सार्वजनिक संस्था हो । यसलाई हाक्ने मानीस अकुशल र निजी स्वार्थमा लाग्नाले सरकारले सहि मानेमा साधनहरूको कुशल वांडफांड गर्न सक्तैन । यर्थाथमा आर्थिक उदारीकरणको सफलताको लागी सानो र कानूनी रूपमा प्रभावकारी सरकारको खाँचो रहन्छ । सानो सरकारको अर्थ सरकारको आकार घटाउनु हो अर्थात सार्वजनिक व्यय घटाउनु हो । अनुत्पादक खर्चहरू घटाउने देखि लिएर सार्वजनिक संस्थाहरू निजीकरण गरेर सार्वजनिक क्षेत्रको आकार घटाउन सकिने र निजीकरण गर्दा संस्थानहरूलाई जाने सरकारी योगदान घटन गई सरकारको आय वढाउन सकिने हुन्छ । आर्थिक उदारीकरणको महत्वपूर्ण पक्ष नै व्यवसायीक स्वतन्त्रता भएकोले समग्र अर्थतन्त्रमा निजी क्षेत्रको पहुँच बढाउनु हो । यस्कालागि निजी क्षेत्रलाई व्यवसायिक रूपमा प्रर्वद्धन गराउने र ऐन कानूनलाई परिमार्जन गर्दै जानु पर्ने हुन्छ ।

विकासशील देशहरूमा सक्षम सरकारको अभाव नै आर्थिक उदारीकरणको असफलताको प्रमुख कारण वन्न पुगेको पाईन्छ । यस कुराको पुष्टि नेपालको उदाहरणले पनि गरेको छ ।

नेपालमा सन् ८० को मध्य देखि आर्थिक उदारीकरणको प्रादुर्भाव भएता पनि मुलुकमा प्रजातन्त्रको पुनर्स्थापना पश्चात मात्र यसले गति लिएको मान्न सकिन्छ । हाम्रो देशमा आर्थिक उदारीकरण नीतिले देशका सबै तह तप्कामा वहु आयामिक प्रभाव पारेको छ । अर्थतन्त्रमा सामयिक सुधार एवम् परिवर्तनका लागी विभिन्न क्षेत्रमा रहेको सरकारको उपस्थितिलाई घटाई आर्थिक उदारीकरण गर्ने नीति अनुरूप सरकारले सन् ९० पछि २४ सार्वजनिक संस्थानहरूलाई निजीकरण गर्यो । विदेशी लगानीलाई प्रोत्साहित गर्न उदार वजारमुखी औद्योगिक एवं व्यापार नीतिहरू लागु गरियो । भन्सारका दरहरूमा परिवर्तन देखि आयात निर्यातका अनुदानहरूमा समेत हेरफेर गरियो । यसवाट वित्तिय क्षेत्रको साथसाथै विविध क्षेत्रमा आमूल परिवर्तन भएतापनी समग्र अर्थतन्त्रमा अपेक्षित योगदान भने पुग्न सकेन । यस्तो हुनुको कारणमा राजनैतिक अस्थिरता, भ्रष्टाचार, कमिशन तन्त्रको खेलवाट संस्थानहरू ग्रस्त हुनु आदि पर्दछन् । नेपालको कमजोर शासन प्रणाली, व्याप्त गरिवी र वेजरोगारीका कारण आर्थिक उदारीकरणबाट आशा गरे अनुरूप आर्थिक सफलता हासिल गर्न सकिएको छैन । करीव एक दशक लामो आन्तरिक द्वन्दको कारण देशमा विकासका कार्यक्रमहरू लामो समय सम्म ठप्प प्राय हुन पुगे । हालको शान्ति सम्झौताले स्थिती केहि सहजताको वातावरणतर्फ उन्मुख हुन पुगेको छ । यस सहजताको वातावरणलाई स्थायी तुल्याई आर्थिक अभिवृद्धि कार्यक्रमहरूलाई क्रियाशिल तुल्याईनु आजको पहिलो आवश्यकता हो ।

नेपालको आर्थिक विकासमा जलश्रोत र पर्यटन मूख्य आधार स्तम्भ हुन सक्ने कुरा नीति निर्माताहरूबाट पटक पटक सुन्नमा आएको पाइन्छ । हाम्रो देशमा पर्यटक आगमनको इतिहास पुरानो रहि आएतापनि पर्यटन क्षेत्रले संगठीत उद्योगको रूपमा अझै विकास नगरिसकेको अवस्था छ । यसले अर्थतन्त्रमा के कति योगदान पुऱ्याउन सक्दछ भन्ने उचित लेखाजोखा समेत भएको थिएन । यसैलाई दृष्टिगत गरी सरकारले वि.सं. २०५२ मा पर्यटन नीति जारी गरेको हो । पर्यटन नीतिले मुलुकको पर्यटन क्रियाकलापलाई एक संगठीत उद्योगको रूपमा विकास गरी पर्यटन प्रवर्द्धनको माध्यमबाट स्थानीयस्तरसम्म विकासको प्रतिफल पुऱ्याउने लक्ष्य लिएको छ । नेपालको पर्यटन प्रवर्द्धनमा हवाई यातायातको महत्वपूर्ण योगदान रहि आएको छ । नेपालमा हवाई यातायातको इतिहास त्यति पुरानो रहेको छैन । हवाई यातायातको क्षेत्रमा वायुसेवा संचालन तथा सो को लागि आवश्यक पर्ने विमानस्थल लगायतका पूर्वाधार विकासको काम नेपाल सरकार अन्तर्गत नै हुँदै आएको थियो । नेपाल वायुसेवा निगम सरकारी स्वामित्वयुक्त आन्तरिक एवम् वाह्य हवाई सेवा संचालनको लागि एकाधिकार प्राप्त सरकारी संस्थानको रूपमा रहेको थियो । त्यस्तै विमानस्थल संचालन तथा पूर्वाधार विकासको काम हवाई विभागबाट हुँदै आएको थियो ।

सरकारले सन् १९९२ मा हवाई यातायातको क्षेत्रमा समेत उदार नीति अवलम्बन गर्‌यो । यसबाट आन्तरिक हवाई सेवामा निजी क्षेत्रका लागि ढोका खुला भयो । परिणामस्वरूप आन्तरिक हवाई यातायात संचालनका लागि धेरै निजी वायुसेवा कम्पनीहरू अस्तित्वमा आए । हवाई यातायात सेवामा निजी क्षेत्रको सहभागितालाई संस्थागत गराउने उद्धेश्यले राष्ट्रिय हवाई नीति २०५० जारी भयो । यसबाट आन्तरिक हवाई सेवाको क्षेत्रमा राष्ट्रले ठूलै फड्को मारेको देखिन्छ । विश्वमा हवाई यातायातको क्षेत्रमा देखा परेको नविनतम विकासक्रम तथा आन्तरिक आवश्यकता समेतको दृष्टिले यस नीतिलाई पहिलो पटक वि.सं.२०५३ मा परिमार्जन गरियो । यस संशोधनले उडान सुरक्षा तथा हवाई सुरक्षाको सुनिश्चितता एवं अन्तर्राष्ट्रिय मापडण्ड अनुरूप हवाई सेवा संचालनमा जोड दिएको थियो । परिवर्तित हवाई नीतिले राष्ट्रिय ध्वजाबाहक नेपाल वायुसेवा निगमको हवाई सेवा स्तर गुणस्तरीय एवम् प्रतिस्पर्धी बनाउन निगमलाई आन्तरिक एवम् वाह्य गरी दुई भागमा विभाजन गर्ने नीति लिएको थियो । त्यस्तै नागरिक उड्डयनको प्रभावकारी नियमन तथा विमानस्थल लगायतका पूर्वाधारको विकासका लागि हवाई विभागलाई एक स्वायत्त नेपाल नागरिक उड्डयन प्राधिकरणमा परिणत गर्ने उद्देश्य लिईएको थियो । जस अनुसार सन् १९९८ मा हवाई विभाग एक स्वायत्त नेपाल नागरिक उड्डयन प्राधिकरणमा परिणत भइसकेको छ ।

नेपालको भौगोलिक स्वरूपका कारण हवाई सेवा नै एउटा यस्तो भरपर्दो यातायातको माध्यम हो जस्ले आन्तरिक एवं वाह्य क्षेत्र सँग सरल, किफायति, कम समयवाट आरामदायी सुविधा उपलब्ध गराउन सक्दछ । यहि तथ्यलाई आत्मसात गर्दै हवाई यातायातको सन्तुलित विकास द्वारा पर्यटन, उद्योग समेतको क्षेत्रमा योगदान पुऱ्याउने अपेक्षा स्वरूप सरकारले नयाँ हवाई नीति २०६३ लागु गरेको छ । प्रस्तुत नीतिले हवाई सेवालाई सुरक्षित, भरपर्दो, स्तरिय, सुलभ सर्वसाधारणको पहुँचयोग्य, दिगो एवं प्रभावकारी तुल्याउँदै उदार आकास नीतिको अवधारणामा नीजि क्षेत्रको समेत सहभागिता अभिवृद्धि गरि हवाई यातायात प्रणालीको विकास गर्ने लक्ष्य लिईएको छ । विद्यमान हवाई नीतिमा ६ वटा नीतिगत उद्धेश्य, १७ वटा नीति र १२ वटा कार्यनीति समाविष्ट रहेका छन् । नयाँ हवाई नीतिका नीतिगत उद्धेश्य यस प्रकार रहेका छन् :

- मुलुकको उड्डयन उद्योगलाई विश्व उड्डयन उद्योगको समकक्षमा स्थापित हुने गरि विकास गर्ने ।
- हवाई उडान सुरक्षा तथा हवाई सुरक्षाको उच्चतम स्तर कायम गर्ने ।
- वायुसेवा संचालन विमानस्थल निर्माण संचालन र व्यवस्थापन तथा हवाई यातायातसंग सम्वन्धित सेवा र सुविधाहरूको विकास, विस्तार तथा संचालनमा स्वदेशी तथा विदेशी निजी लगानीकर्तालाई आर्कर्षित र प्रोत्साहित गरि स्वच्छ एवं प्रतिस्पर्धात्मक हवाई सेवाको विकास गर्ने ।
- मुलुकको हवाई सेवाका आवश्यकता परिपूर्ति गर्न अत्याधुनिक सुविधायुक्त अन्तर्राष्ट्रिय विमानस्थल सहित अन्य उपयुक्त किसिमका विमानस्थलहरूको निर्माण तथा विकास गर्ने ।
- नागरिक उड्डयन क्षेत्रमा दक्ष तथा व्यवसायिक जनशक्तिको आवश्यकता परिपूर्ति गर्न नागरिक उड्डयन सँग सम्वन्धित प्रशिक्षण संस्थाको संस्थागत विकास तथा सुदृढीकरण गर्ने ।
- नागरिक उड्डयनलाई मुलुकको भरपर्दो सेवा उद्योग तथा हवाई मनोरञ्जन र साहसिक यात्राको उपयुक्त माध्यमको रूपमा विकास गर्ने ।

जारी नीतिमा नेपाल नागरिक उड्डयन प्राधिकरणलाई नागरिक उड्डयन क्षेत्रको नियमन, नियन्त्रण एवं विस्तारका कार्यहरू प्रभावकारी रूपले संचालन गर्न एउटा सक्षम नागरिक उड्डयन नियमनकारी निकाय एवं व्यवसायिक संस्थाको रूपमा सुदृढ गर्दै लगिने उल्लेख रहेको छ । मुलुकमा सक्षम, प्रतिस्पर्धी एवम् गुणस्तरीय हवाई सेवाको विकासका लागि नयाँ हवाई नीतिले आवश्यक व्यवस्था गरेको छ । वायुसेवा संचालनमा विदेशी लगानीलाई समेत प्रोत्साहन दिने नीति लिइएको छ । दुर्गम क्षेत्रमा हवाई सेवाको पहुँच बढाउन निजी वायुसेवालाई आकर्षित गर्ने उद्देश्यले दुर्गम क्षेत्र हवाई सेवा कोषको प्रभावकारी संचालन गरिने व्यवस्था हवाई नीतिले गरेको छ । नयाँ हवाई नीतिले विमानस्थलको निर्माण, संचालन तथा विमानस्थलसँग सम्बन्धित पूर्वाधार विकासमा निजी क्षेत्रको सहभागिता गराउने सम्बन्धमा आवश्यक व्यवस्था गरेको छ । प्राधिकरणबाट संचालित विमानस्थलहरूको संचालन तथा व्यवस्थापन स्थानीय निकाय वा नेपाल सरकारले निर्धारण गरेको मापडण्ड पुरा गर्ने संस्थालाई करारमा दिन सक्ने व्यवस्था समेत कार्यनीतिमा शमावेस रहेको छ । हवाई नीतिमा मुलुकको दुरगामी हवाई यातायात विकासलाई दृष्टिगत गरी नेपाललाई एसिया तथा प्रशान्त क्षेत्रकै ट्रान्जिट हवको रूपमा विकास गर्ने अभिप्रायले नेपाल सरकार र निजी क्षेत्रको सहभागितामा आधुनिक सुविधायुक्त नयाँ अन्तर्राष्ट्रिय विमानस्थलको निर्माण तथा विकास गर्ने उल्लेख गरिएको छ । त्यस्तै विराटनगर, पोखरा, भैरहवा, नेपालगंज र धनगढी विमानस्थलहरूलाई क्षेत्रीय हव विमानस्थलहरूको रूपमा विकास गरी निकटवर्ती मुलुकहरूमा हवाई सेवा विस्तार गर्न आवश्यक पूर्वाधार तयार गरिने समेत हवाई नीतिमा उल्लेख रहेको छ ।

नेपालमा हाल २२ वटा निजी विमान कम्पनिहरू आन्तरिक हवाई सेवा प्रदान गर्ने कार्यमा संलग्न रहेका छन् । आन्तरिक हवाई क्षेत्रमा निजी क्षेत्रको प्रवेशले हवाई यातायात प्रतिस्पर्धी एवम् गुणस्तरीय हुन पुगेको छ । विगतमा नेपाल वायुसेवा मात्र आन्तरिक हवाई सेवामा संलग्न रहँदा पर्याप्त हवाई उडानको अभावमा देशका कतिपय विमानस्थलहरू बन्द हुन पुगेको थिए भने दुर्गम स्थानमा सर्वसाधारणका लागि हवाई सेवा पहुँच बाहिर थियो । निजी विमान कम्पनीहरूको सेवा प्रवेशले त्यस्ता बन्द अवस्थामा रहेको कतिपय विमानस्थलहरू अहिले व्यस्त विमानस्थलमा परिणत हुन पुगेका छन् । विशेष गरी यातायातको वैकल्पिक व्यवस्था भएका सुगम स्थानमा अवस्थित विमानस्थलहरूमा हवाई सेवा अत्यन्त प्रतिस्पर्धी हुन गई यसको प्रत्यक्ष फाइदा हवाई यात्रुलाई हुन पुगेको छ । तथापी वैकल्पिक यातायातको पहुँच नभएका दुर्गम स्थानमा हवाई सेवा सर्वसाधारणको लागि अत्यन्तै महँगो साबित भएको छ । निजी वायुसेवाहरूलाई दुर्गम क्षेत्रमा उडानका लागि प्रोत्साहन गर्न दुर्गम क्षेत्र हवाई सेवा कोषको व्यवस्था हवाई नीतिमा भएता पनि यो संचालनमा आउन सकेको देखिंदैन । आन्तरिक हवाई यातायातको साथ साथै यस अवधिमा प्याराग्लाइडिङ्ग, ह्याङ्ग्लाइडिङ्ग, माइक्रोलाइट जस्ता मनोरन्जनात्मक उड्डयन क्रियाकलापहरूले पनि नेपालमा प्रवेश पाएको देखिन्छ । विशेष गरी देशको पर्यटकीय नगरी पोखरामा पर्यटनलाई प्रवर्द्धन गर्न यस्ता मनोरन्जनात्मक उड्डयन गतिविधिको महत्वपूर्ण योगदान रहेको पाइन्छ ।

नयाँ हवाई नीतिले नेपालमा अन्तर्राष्ट्रिय वायुसेवा संचालनमा निजी क्षेत्रको अलावा बैदेशिक लगानीलाई समेत प्रोत्साहन गरेको छ । यस अवधिमा केही स्वदेशी वायुसेवा कम्पनीहरूले अन्तर्राष्ट्रिय उडान संचालनमा सक्रियता नदेखाएका होइनन् । तर उनीहरूको अन्तर्राष्ट्रिय उडान तर्फको यात्रा अत्यन्तै अल्प अवधिको रह्यो । यस दौरान नेपालमा नयाँ वाह्य हवाई सेवा कम्पनीहरूको सेवा प्रारम्भ तथा विद्यमान हवाई सेवा कम्पनीहरूको सेवा विस्तार उल्लेख्य रूपमा भएको पाइन्छ । अन्तर्राष्ट्रिय हवाई सेवा तर्फ यस अवधिमा प्राप्त उपलब्धिलाई देहायको तालिकाले स्पष्ट गर्दछ ।

अन्तर्राष्ट्रिय हवाई यातायात गतिविधि (सन् २००३-२००९)

बर्ष	वायुयान	यात्रु	कार्गो
२००३	७५०८	१०००१०१	१५५८५१२१
२००४	९०६२	११४०६६०	१२८०१६५६
२००५	१२१६९	१२५१९६२	१३१५११२१
२००६	११०५७	१३८३०४१	१३११०८१९
२००७	११८९९	१६२७०५३	१३८८३८६६
२००८	१४२७६	१८३०६३०	१३११०८१९
२००९	१५७०१	२०२७१४७	-
जम्मा	८१६७२	९२३४०००	८१६४३४०२

प्रस्तुत तालिकाले अन्तर्राष्ट्रिय उडान तर्फ वायुयान तथा यात्रु आवागमनमा हरेक वर्ष बृद्धि भइरहेको देखाउँदछ । मुलुकमा वायुयान तथा हवाई यात्रु आवागमनमा उल्लेख्य बढोत्तरी भएता पनि यसबाट राष्ट्रले चाहे जस्तो प्रतिफल प्राप्त गर्न सकेको छैन । राष्ट्रिय ध्वजाबाहक नेपाल वायुसेवा वायुयान विहिन अवस्थातिर बढिरहेको यथार्थताको सन्दर्भमा वाह्य हवाई सेवामा विदेशी वायुसेवा कम्पनीहरूको एकाधिकार हुने स्थिती देखा परिरहेको छ । अन्तर्राष्ट्रिय हवाई सेवामा देखा परेको बढ्दो बजारको फाइदा विदेशी कम्पनीहरूले यथेष्ट लिइरहेको देखिन्छ । जवसम्म नेपाल आउने हवाई यात्रु र नेपालवाट जाने हवाई यात्रुलाई नेपाली वायुसेवाको अधिकतम उपभोग गराउन सकिंदैन तवसम्म नेपालले अन्तर्राष्ट्रिय हवाई सेवा क्षेत्रबाट प्राप्त गर्नुपर्ने आय अंश प्राप्त गर्न सक्दैन । नेपाली वायुसेवाहरूको अन्तर्राष्ट्रिय हवाई यातायात गतिविधिहरूमा अपर्याप्त पहुँचका कारण प्राप्त हवाई सिट क्षमता समेत अत्यन्तै न्यून उपभोग भई रहेको छ । नेपालले अन्तर्राष्ट्रिय हवाई उडान तर्फ आफ्नो सेवा विस्तार वढाउन सक्ने हो भने हाल अन्तर्राष्ट्रिय सेवामा उपभोग भइरहेको हवाई सिटको कम्तिमा आधा अंश नेपाली वायुसेवाहरूले उपयोग गर्न सक्ने भई नेपालले तत्सम्वन्धि आय अभिवृद्धि गर्न सक्ने हुन्छ । यसको लागी राष्ट्रिय ध्वजा वाहक तथा निजी क्षेत्र समेतको प्रयास अत्यावश्यक हुन आउंछ ।

सन् २००९ मा नेपालमा अन्तर्राष्ट्रिय उडानमा संलग्न वायुसेवाहरूको उडान स्थिती देहायको तालिकामा प्रस्तुत गरिएको छ ।

सन् २००९ मा अन्तर्राष्ट्रिय उडान अनुमति प्राप्त वायुसेवाहरूको विवरण संख्या

	यात्रु संख्या			
वायुसेवा	आवागमन	वर्हिगमन	चाटर्ड उडान संख्या	कुल उडान संख्या
एअर अरेविया	५८१६४	७३२२२		४९३
वहराईन एअर	११९६६	२०९११		१६२
विमान वंगलादेश एअरलाईन्स	३६५६०	२४१६७	१२	३७१
एअर चाईना	१३०१२	१६६०८	१६	१८५
चाईना ईष्टर्न एअरलाईन्स	२६६८	२४६५		४०
चाईना साउथरेन एअरलाईन्स	१०७३५	१११२४		१२०
रोयल भुटान ड्रुक एअर	१०४५९	११४०९	२	३२२
इतिहाड एअरवेज	३६०६१	४१९२०		२०८
फ्लाई दुवई	६०५	१२१७		१०
जि एम जि एअर वंगलादेश	२४९००	१२१७७	१	६२०
गल्फ एअर	११६९००	१२१६२७	१	१४२
ड्रागन एअर	२२२०७	२५४५१		१९५
ईण्डियन एअरलाईन्स	९९८०६	९९९६४		१०९६
जेट एअरवेज	७८२८७	८९५६२	१	७०३
जेट लाईट एअरवेज	५०६६६	५६६०५	१	३६५
कोरियन एअर	१५९७९	१७१२०		१०४
पाकिस्तान ईन्टरनेशनल एअरलाईन्स	२८८६५	२९२९६	४	२१४

कटार एअरवेज	१३१३२३	११९८९१	६	६९८
आर्के फ्लाई	१४४८	१२१२		१३
नेपाल एअरलाईन्स	११००५३	१२७६९८	५	९७५
सिल्क एअर	२४३२४	२८०४८	२	२२५
थाई एअरवेज ईन्टरनेशनल	९२७८०	९३६८६		४३३
अन्य	६८२५	७१७४	१५२	१५२
जम्मा :	९८४५९३	१०४२५५४	२०३	७८४६

माथी प्रस्तुत तालिकामा देखाईए अनुसार अन्तर्राष्ट्रिय हवाई सेवा तर्फ सन् २००९ को जम्मा वायुयान आवागमन संख्या १५७०१ मध्ये नेपाल वायुसेवा निगमको कुल वायुयान आवागमन संख्या १९५० देखिन्छ जुन कुल बार्षिक अन्तर्राष्ट्रिय उडानको ८.०१ प्रतिशत अंश मात्र हुन आउँदछ । त्यस्तै सन् २००९ को यात्रु आवागमन तर्फ कुल यात्रु २०२७१४७ संख्या देखिएकोमा नेपाल वायुसेवा निगमको सो बर्षको कुल यात्रु आवागमन संख्या २३७७५१ कायम भई कुल अन्तर्राष्ट्रिय यात्रु तर्फ ८.५२ प्रतिशत मात्र अंश रहेको पाईन्छ । सिद्धान्ततः द्विपक्षीय हवाई सेवा सम्झौता मार्फत विदेशी वायुसेवा कम्पनीहरूले जति सिट उपभोग गर्न पाएका हुन्छन् नेपालले पनि त्यत्तिकै संख्यामा हवाई सिट उपभोग गर्न सक्नुपर्दछ । यस मापदण्ड अनुरूप नेपाली वायुसेवा कम्पनीहरूले आफ्नो उडान संचालन गर्न सक्यो भने मात्र हवाई सेवा स्वस्थ्य एवम् प्रतिस्पर्धी हुन गई नेपाली नागरिकले त्यसबाट अधिकतमा लाभ हासिल गर्न सक्दछन् ।

त्यस्तै विमानस्थल सेवा सुविधा तर्फ खासगरि यात्रु चाप हरेक वर्ष वढ्दै गईरहेको सन्दर्भमा त्यसलाई धान्न सक्ने गरी देशको एक मात्र अन्तर्राष्ट्रिय विमानस्थलले तदनुरूप विकास र विस्तार भने गर्न सकिरहेको देखिंदैन । अन्तर्राष्ट्रिय वायुसेवा संचालनमा देखिएको वढ्दो चाप सँग विमानस्थलमा भौतिक पूर्वाधारहरू सुधार तर्फ प्रगती हुन नसकेको अवस्था विद्यमान छ । राष्ट्रिय हवाई नीतिले एसिया प्रशान्त क्षेत्रकै ट्रान्जिट हव हुने गरी मुलुकमा एक सुविधा सम्पन्न दोश्रो अन्तर्राष्ट्रिय विमानस्थल निर्माण गर्ने अत्यन्त महत्वाकांक्षी नीति लिएको देखिएता पनि यस तर्फ खासै केही प्रगति हुन सकेको देखिंदैन । हाल आन्तरिक उडान तर्फ क्षेत्रीय विमानस्थलको रूपमा गणना गरिएका नेपालगंज, विराटनगर, भैरहवा, पोखराबाट क्षेत्रीय अन्तर्राष्ट्रिय उडान गर्ने नीति हवाई नीतिमा उल्लेख भएको छ तर यस दिशामा पनि कुनै किसिमको उपलब्धि हासिल भएको देखिंदैन । आन्तरिक विमानस्थलहरूको विकास एवम् संचालनमा निजी क्षेत्रको सहभागीता गराउने सम्बन्धमा हवाई नीतिमा व्यवस्था गरिएता पनि यसले मूर्त रूप लिन सकेको छैन । हवाई नीतिमा समावेश गरिएका कतिपय व्यवस्थाहरूको कार्यान्वयनका लागि मौजुदा नागरिक उड्डयनसँग सम्बन्धित ऐन, नियमहरूमा आवश्यक संशोधन गर्नुपर्ने वा नयाँ कानूनी व्यवस्था गर्नुपर्ने हुन्छ तर यस दिशामा समेत हालसम्म कुनै प्रगति हुन सकेको देखिंदैन । हवाई नीतिले आन्तरिक हवाई सेवा उद्योगको विकासको लागि प्रोत्साहन दिइने नीति लिएको छ तर त्यसको कार्यान्वयन पक्षमा पनि कुनै ठोस व्यवस्था हुन सकेको देखिंदैन ।

विश्व व्यापीकरणको अहिलेको अवस्थामा आर्थिक उदारीकरण मुख्य आर्थिक नीतिको रूपमा रहेको पाईन्छ । विश्वमा प्राय सवैजसो देशहरूले आत्मसात गरेको उदारीकरणको सन्दर्भमा नेपालले पनि यो नीति आत्मसात गर्दै आएको छ । तसर्थ विश्वको बदलिंदो परिस्थिति, हवाई सेवाको क्षेत्रमा हासिल अभुतपूर्व उपलब्धि तथा नविनतम विकास सँगै नेपालले पनि अन्तर्राष्ट्रिय मूल्य मान्यतामा आधारित भई मुलुकको नागरिक उड्डयन क्षेत्रमा समसामयिक सुधार तर्फ अग्रसर हुनु आवश्यक हुन्छ । नेपालमा आर्थिक उदारीकरण सँगै लागू गरिएको हवाई नीतिबाट हवाई सेवा उद्योगको विकासमा महत्वपूर्ण योगदान पुग्न गएकोमा दुईमत हुन सक्ने अवस्था छैन । तर हवाई नीतिले लिएको सुरक्षित, प्रतिस्पर्धी एवम् गुणस्तरीय हवाई सेवा, सोको उचित नियमन गर्न सक्ने नियमक निकाय एवम् हवाई यातायातका लागि आवश्यक विमानस्थल लगायतका भौतिक पूर्वाधार विकासमा लक्षित उपलब्धि भने हासिल भइसकेको छैन । नेपालको सन्दर्भमा हवाई सेवा पर्यटन प्रवर्द्धनको समेत एक वाहकको रूपमा रहेको छ जसले दिर्घकालिन रूपमा मुलुकको दिगो विकासमा ठूलो टेवा पुऱ्याउन सक्दछ । यस तथ्यलाई दृष्टिगत गरी राष्ट्रिय हवाई नीतिले लिएका लक्षहरू हासिल गर्ने दिशामा नेपाल सरकार तथा नागरिक उड्डयनसँग सम्बद्ध सम्पूर्ण संघ संस्थाहरूको गम्भिर ध्यानाकर्षण हुन आवश्यक देखिन्छ ।

सन्दर्भ सामाग्रीहरू

हवाई नीति २०६३

Nepal Tourism Statistics 2009

Civil Aviation Report 2008

सार्वजनिक अर्थशास्त्र : डा. श्याम जोशी

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