INFORMATION, COMMUNICATIONS AND TRANSPORT SECTORS IN BHUTAN: A SPECIAL REPORT

Ministry of Information & Communications
Royal Government of Bhutan

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Ministry of Information & Communications
Royal Government of Bhutan
Thimphu: Bhutan

FOREWORD

*O*ver the last few years, developments in information, communications and transport networks and services have brought dramatic changes to our society. When I joined the erstwhile Ministry of Communications in 1995 as the Deputy Minister, Internet and mobile phones were a distant dream for Bhutan. Coaster buses were few then and civil aviation was not a priority agenda. Now, Internet access, mobile phones, wireless networks and satellite systems have opened up new ways of communicating, finding information, being entertained, and doing business. A number of safer and comfortable passenger transport vehicles have been deployed and routes increased making in-country travel for the public more reliable. Our businessmen, government officials as well as ordinary citizens can now fly to Bangkok and other destinations within the region on a regular basis. This has also led to a significant increase in the number of tourists visiting Bhutan over the last couple of years.

The pace of change in the information, communications and transport sectors shows no sign of slowing as is evident from this report. In particular, the report looks at the contribution that such networks have made to our national economy and society in the last five years; it reviews ongoing programs and projects, proposes plans, programs and projects for the Tenth Plan, and suggests the way forward for the next decade.
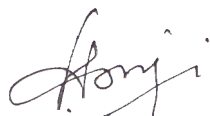
It is hard to make predictions about new technologies with any certainty, and we must thus be prepared for fresh developments and unexpected changes. However, based on the best current knowledge, this report predicts a paradigm shift in the information, communication and transport networks and hence in the provision of associated services over the next decade. We are preparing to expand existing information, communications and transport

infrastructures and build new ones. The need for effective regulation of these sectors would continue to increase but regulators should identify areas where the regulatory burden could be lifted. While regulators must ensure that competition develops wherever possible, they need to protect the interests of consumers through fair and proportionate regulation where competition does not develop.

This document is being published as a special report to inform the people of Bhutan on the developments that have taken place and will take place in the information, communications and transport sectors. Among others, it clearly sets out the most significant challenges that Bhutan faces in these sectors, and highlights opportunities to overcome these challenges. I hope that it will be a useful reference particularly for the new elected Government in 2008, and look forward to receiving views on how best we can together establish and ensure vibrant and competitive markets for the information, communications and transport sectors in Bhutan.

I would like to dedicate this report to the Bhutanese people and others with whom I have worked and sailed through my life in the service of the *Tsa-Wa-Sum.*

TASHI DELEK!

Leki Dorji
Minister
Ministry of Information & Communications
29 June 2007

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EXECUTIVE SUMMARY

*O*ver the last two decades, developments in information, communications and transport networks and services have brought dramatic changes to our society. These sectors continue to fuel Bhutan's socio-economic growth and will become even more vital in light of the impending political changes taking place in the country. Inspired by His Majesty the Fourth King's vision of maximizing Gross National Happiness, Bhutan has always placed her people at the centre of its development efforts. As an active member of the global fraternity, Bhutan has also integrated the SAARC Development Goals and UN Millennium Development Goals as part of its national development targets.

The ICT sector has come a long way since the first telephone network in Bhutan was established in 1963. Fixed-line teledensity has increased from 2.8% in 2002 to 5.3% in 2006 and mobile teledensity, as of December 2006, has reached 12.3%. Computing and networking is gradually becoming a part and parcel of our everyday life. Competition has been introduced in the ICT market with a view to rationalize tariffs and offer more choices for Bhutanese consumers and the public at large. All stakeholders, including the Government and industry, now recognize the important role that ICT plays in enhancing good democratic governance.

The media sector also saw some significant changes in its market structure and institutional set up. Two private newspapers have been licensed and 49% of Kuensel shares divested to the public. Two private FM radio stations are on-air including Kuzu FM 90. The local music and film industry is becoming more competitive, innovative and indigenous. BBS, as the national public service broadcaster, provides both radio and television services across the Kingdom. Its FM radio service covers all 20 Dzongkhags. Currently, 44 towns in Bhutan can watch BBS TV directly. The Department of Information & Media has been established to coordinate and enable the smooth development of the media sector.

The Bhutan InfoComm & Media Authority has been de-linked from the Ministry of Information & Communications making it autonomous in the delivery of its regulatory mandate as per the provisions of the Bhutan Information, Communications and Media Act 2006. Pertinent Rules and Regulations are being put in place to facilitate accelerated development of the ICT and media markets and improve delivery of services.

As part of its modernization program, Bhutan Post has launched several new products and innovative services. Despite the downturn in postal businesses worldwide, Bhutan Post continues to move ahead headstrong in the delivery of postal services to every nook and corner of Bhutan through its well-established national network of post offices. Bhutan Post also provides public transport services in Thimphu.

Privatization of passenger transport services began in 1985 on a pilot basis and was achieved fully by October 1991. The Road Safety & Transport Authority was established in January 1997 pursuant to the Road Safety and Transport Act. In addition to its traditional function of monitoring and regulating passenger transport services, other mandates include promoting road safety, traffic and transport management, regulation of taxis and other commercial vehicles, and development of transport infrastructure and facilities. Increase in the number of vehicles in the country has been dramatic during the last one decade, particularly in the larger towns of Thimphu, Phuentsholing, Samdrupjongkhar and Gelephu. The number of vehicles has increased by 145% between 1997 and 2006.

The Department of Civil Aviation, established in January 1986, is responsible for providing air traffic services; operation and maintenance of airports; and, setting and monitoring safety standards for safe and efficient operation of air services. The department has undergone major transformation over the years, evolving from being a small agency to a multifaceted and professionally responsible organization. The Civil Aviation Act 2000, the Bhutan Air Navigation Regulations, and other international Requirements provide the legal and regulatory framework for safety and security of air transport operations in Bhutan.

Drukair is the only airline at present. Operation of international air services is governed by the rights and privileges agreed in the Bilateral Air Service Agreements. Bhutan has such bilateral arrangements with Bangladesh, India, Myanmar, Nepal and Thailand. The total number of Drukair passengers, including 3rd, 4th and 5th freedom traffic, increased from 63,194 in 2004 to 115,694 in 2006 following the procurement of two Airbus A319 aircrafts and increased traffic rights obtained through bilateral negotiations.

The information, communications and transport sectors face daunting challenges posed by limited skilled and trained human resources, inadequate infrastructures and facilities, lack of R&D policy, small domestic market, capital-intensive nature of investments, increasing number of vehicles and territorial mindsets, among others. However, opportunities abound in the form of recognition of these sectors as integral to enhancing good governance, leapfrogging developmental stages, increasing public awareness, active participation in regional and global trade, growing private sector interest to participate in these markets etc.

Private sector participation in the information, communications and transport markets has become prominent in the last five years and will continue to grow in the Tenth Plan as the Government gradually withdraws from service provisioning, as appropriate, to focus on policy and regulatory roles and responsibilities. Public-private partnership has also been successfully implemented and more such collaborations will continue in the near future.

PART 1   INTRODUCTION

1.1   BACKGROUND

$\mathcal{B}$hutan started planned development in 1961, and since then it has followed a unique development path. A series of five-year plans provided the framework for continuous development over the last forty-five years, and has yielded significant results. The First Five-Year Plan focused on the development of basic infrastructures like roads, power and telephone networks. Subsequent five-year plans have widened the development remit, with the most recent plan, the Ninth Five-Year Plan (2002/03 – 2007/08), highlighting a diverse array of issues to be tackled including decentralization and devolution of power to the grassroots, management of public services, poverty alleviation and private sector growth.

Inspired by His Majesty the Fourth King's vision of maximizing Gross National Happiness (GNH), Bhutan has always placed her people at the centre of its development efforts. "Bhutan 2020" established the goal "to ensure future independence, sovereignty and security of our nation-state," guided by six main principles: "identity, unity and harmony, stability, self-reliance, sustainability and flexibility". The report of the Government, "Good Governance Plus 2005", reiterates the important roles that ICT and media play in enhancing good governance, in particular decentralization and democracy in the country. Bhutan has also adopted the SAARC Development Goals and UN Millennium Development Goals as its national development targets.

The National Assembly, Royal Court of Justice, *Lhengye Zhungtshog* (Council of Ministers), the constitutional bodies, and the ten sectoral Ministries are the organizational units that play the most crucial role in governance. At the sub-national level, the country is administered through 20 Dzongkhags (districts) and 205 Gewogs (blocks), which have increasingly become the focus of decentralization and development efforts.

In the context of the information, communications and transport sectors, the draft Constitution of Bhutan enshrines that:

> *There shall be freedom of press, radio and television and other forms of dissemination of information including electronic.*
>
> *A Bhutanese citizen shall have the right to information.*
>
> *The State shall encourage and foster private sector development through fair market competition and prevent the growth of commercial monopolies.*
>
> *The State shall encourage the free participation in the cultural life of the community to promote the arts and sciences and to foster technological innovation.*

The Vision and Mission of the Ministry of Information and Communications (MoIC) are as stated below:

Vision:

Connecting the unconnected and establishing a harmonious knowledge-based society.

Mission:

Promoting the development of reliable and sustainable information, communications and transport networks and systems and facilitating the provision of affordable and easier access to associated services, particularly to meet the basic social needs and help improve living standards of people in rural and far-flung communities of Bhutan, for the ultimate purpose of making a meaningful contribution to Gross National Happiness.

The organizational set up of the information, communications and transport sectors within the context of the overall governance system is illustrated in Figure 1.

Figure 1: Organization of the Information, Communications and Transport Sectors
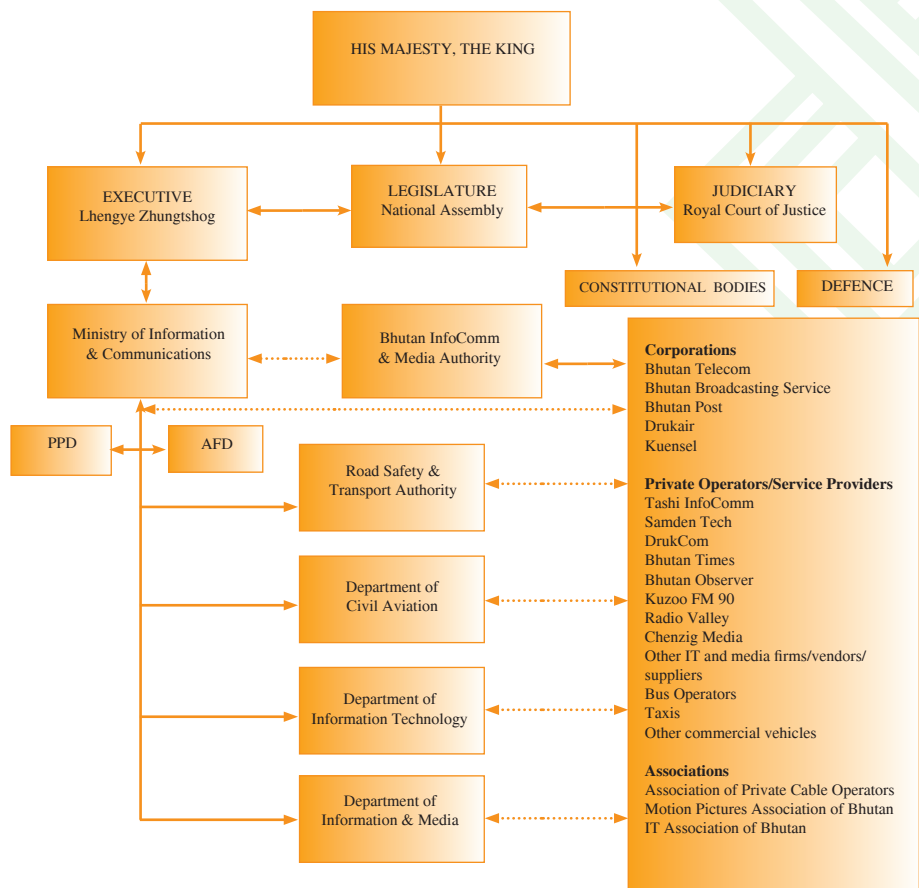
1.2   REPORT OBJECTIVES

*T*he main objective of this report is to provide up-to-date information on the information, communications and transport sectors to stakeholders and the general public by:

- Providing a situation analysis of these sectors, including identifying associated challenges and opportunities;

- Highlighting on the significant sectoral achievements during the last five years;

- Illustration of the ongoing programs and projects;

- Throwing light on the proposed major Tenth Plan programs and projects;

- Suggesting policies, plans and programs for the information, communications and transport sectors post 2013.

1.3   REPORT STRUCTURE

The report is structured as follows:

- Part 1 introduces the report providing general background information and stipulates its objectives and structure.

- Part 2 provides an analysis of the information, communications and transport situation in the Kingdom;

- Part 3 describes the significant achievements made during the Ninth Five-Year Plan, i.e. for the period 2002/03–2006/07, excluding the extended fiscal year 2007/08;

- Part 4 describes ongoing programs and projects, some of which would be completed during 2007/08 and others that would spill-over into the Tenth Plan;

- Part 5 highlights the proposed major Tenth Plan programs and projects;

- Part 6 concludes the report, by looking at possible policies, plans and programs beyond 2013.

PART 2   SITUATION ANALYSIS

2.1   ICT, MEDIA AND POST

(a)   INFORMATION AND COMMUNICATIONS TECHNOLOGY

*O*ver the last few decades, significant progress has been made in the establishment of telecommunication and, information and communications technology (ICT) infrastructure and provision of related services across the country. The first telephone network in Bhutan was established in 1963. It was only in 1998 that a fully digital national telecommunication network interconnecting all the twenty Dzongkhags (districts) and major towns was established. The main transmission backbone network consists of 155Mbps digital microwave routes connected to the digital switching system. Lesser traffic spur routes consist of 34Mbps and 8Mbps microwave radios. Digital Multiple Access Subscriber System (DRMASS) is deployed in areas with smaller requirements. Rural services have been extended using Wireless Local Loop (WLL) technology and Very Small Aperture Terminal (VSAT). Some of the major urban centers like Thimphu, Phuentsholing, Paro, Wangduephodrang and Punakha are connected using optical power ground wire (OPGW). The national backbone transmission network thus comprise OPGW, digital microwave radios, VSATs and the Thimphu Satellite Earth Station.

BT's Satellite Earth Station in Thimphu

Bhutan Telecom Limited (BT), the incumbent operator, provides fixed-line and mobile telephony, Internet and other value-added ICT services in all twenty Dzongkhag headquarters, some sections of the national highway, and numerous other parts of the country. BT's B-Mobile launched its mobile service on 11 November 2003. B-Mobile's customer base at the end of December 2006 reached 78,185 as against BT's 33,592 fixed-line customers. Fixed-line and mobile teledensities have reached 5.3% (from 2.8% in 2002) and 12.3% respectively.

Figure 2 shows BT's network coverage. Figure 3 depicts the comparative growth of fixed-line and mobile services in Bhutan.

Figure 2: BT's Network Coverage
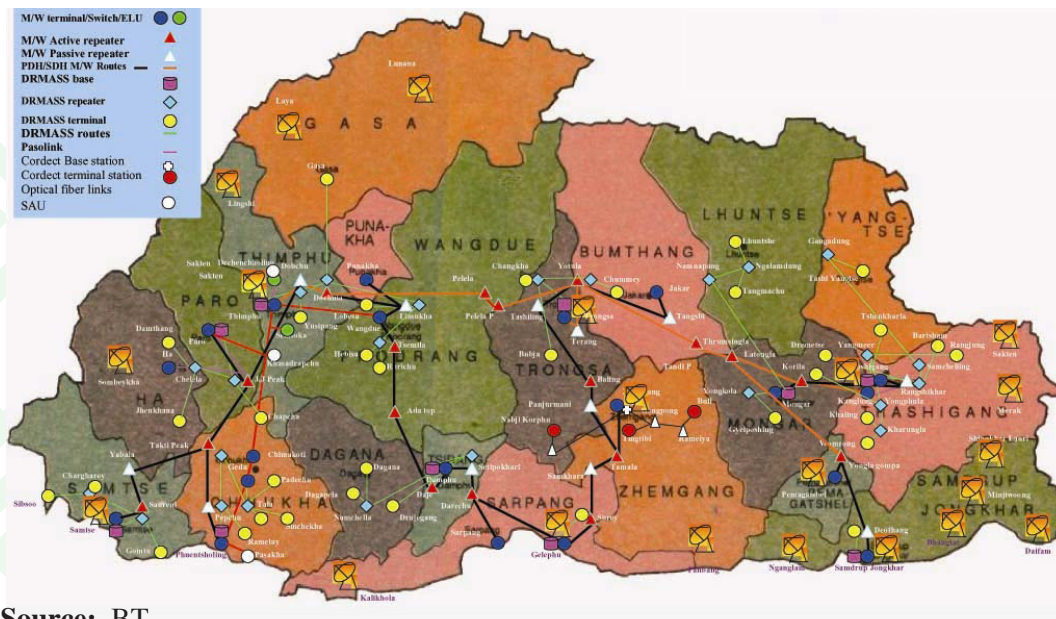
Source: BT

Figure 3: Comparative Growth of Fixed-line and Mobile Telephony

Source: BT

In keeping with the market liberalization policy of the Royal Government, two new Internet Service Providers (ISPs), namely DrukCom Private Enterprise and Samden Tech Pvt. Ltd. were licensed in 2004 to provide VSAT-based Internet and value-added services. 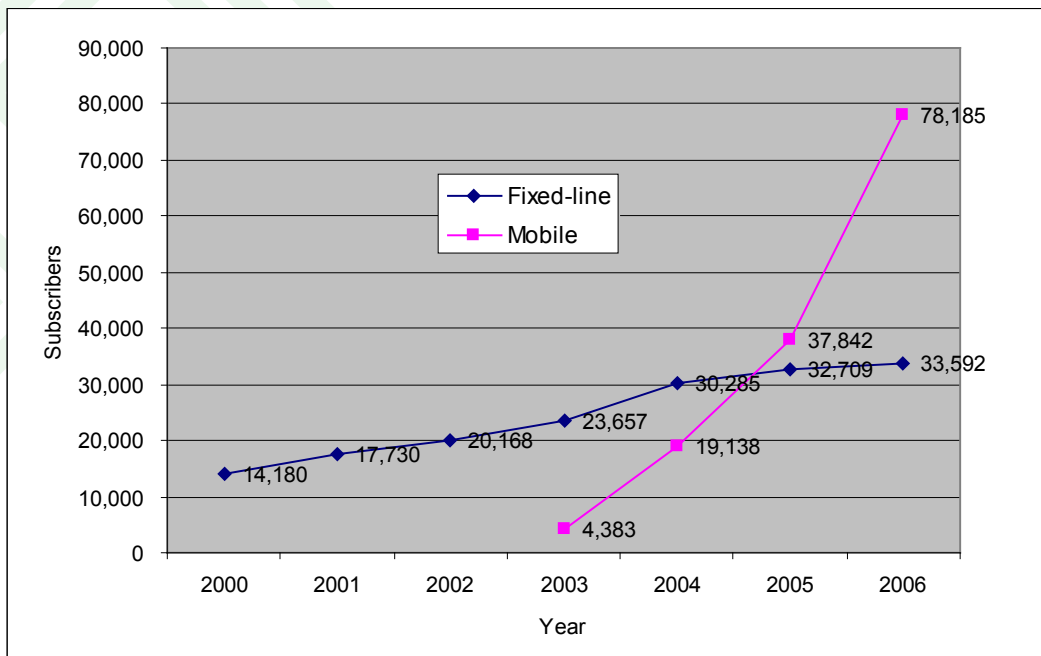A second mobile operator, Tashi InfoComm Ltd., has also been awarded a licence in 2006 through an open bidding licensing process.

IT businesses have also grown in the last four to five years. There are about 45 firms dealing in IT businesses such as software, hardware, networking solutions etc. Additionally, there are about 19 private IT training institutes in operation.

The Ministry of Trade and Industry (MTI) has issued about 35 licenses for Internet cafés. Of these, about 19 are in operation, most of which are concentrated in Thimphu and Phuentsholing areas.

As an overarching guiding principle, the Bhutan ICT Policy & Strategies (BIPS) was formulated in 2004 involving all stakeholders including the Government and private sector. One of its policy objectives is to create a "High-Tech Habitat" in the country, which requires the creation of an enabling environment for private sector participation in the ICT sector. The enactment of the *Bhutan Information, Communications and Media Ac*t by the 85th Session of the National Assembly established the necessary legal framework for development of ICT and media, and their effective deployment for national socio-economic growth.

(b)   MEDIA

*T*he growth of the media industry has been in consonance with the socio-economic development and political changes taking place in the country. Mass media in Bhutan until recently comprised of *Kuensel*, the national newspaper, the Bhutan Broadcasting Service (BBS), the public service radio and TV, the Internet and cinema. The Department of Information and Media was established in 2003 to coordinate the development of the media sector in Bhutan. The Department's institutional plan, mandate and structure have been aligned with the relevant provisions of the Bhutan Information, Communications and Media Act.

BBS Logo

Kuensel's Printing Press

Kuensel was established in 1965 and has been the only print media in Bhutan until 2006. It was started as an Official Gazette to act as a communication bridge between the Royal Government and the people of Bhutan. Kuensel was de-linked from the Government and established as an autonomous corporation by Royal Decree in October 1992, giving it the necessary "flexibility to grow in professionalism and to enable it to be more effective in fulfilling its important responsibility to society".

In the beginning of 2006, under a media liberalization policy, two private newspapers – *Bhutan Times* and *Bhutan Observer* – were licensed. Within a year, both newspapers have reached a circulation level of nationwide coverage. The introduction of competition has unleashed the potential of the print media to stir public debate, shape opinion and contribute to the overall political discourse – mainly for the educated elite. In fact, it has grown to be a powerful force of democracy having initiated online debates and editorials that touches issues of social and national significance.

BBS is the national public service broadcaster providing radio and television services across the Kingdom. It started as a radio station in 1973, run by a group of Bhutanese youths. It was corporatized in 1992 through Royal Decree. In 1999, BBS introduced the country's first live telecast. By end of 2005, its FM radio service covered all 20 Dzongkhags. Today, BBS provides 96 hours of TV programming and 76 hours of radio programming in a week. Its radio programmes are broadcast in four main languages –Dzongkha, *Sharchhopkha*, *Lhotshamkha* and English while TV programmes are broadcast in Dzongkha and English. Since February 2006, BBS TV has gone nationwide using satellite technology. Currently, 44 towns in Bhutan can watch BBS TV directly. The satellite footprint also extends to about 40 countries in the region, as can be seen from Figure 4.

BBS operates as a corporation through a Board of Directors. However, all its capital development and most of its operating costs are met from the Government exchequer. Only about 16% of its operating costs are generated from advertisements, production and sale of its programmes.

**Figure 4: BBS TV Satellite Footprint**
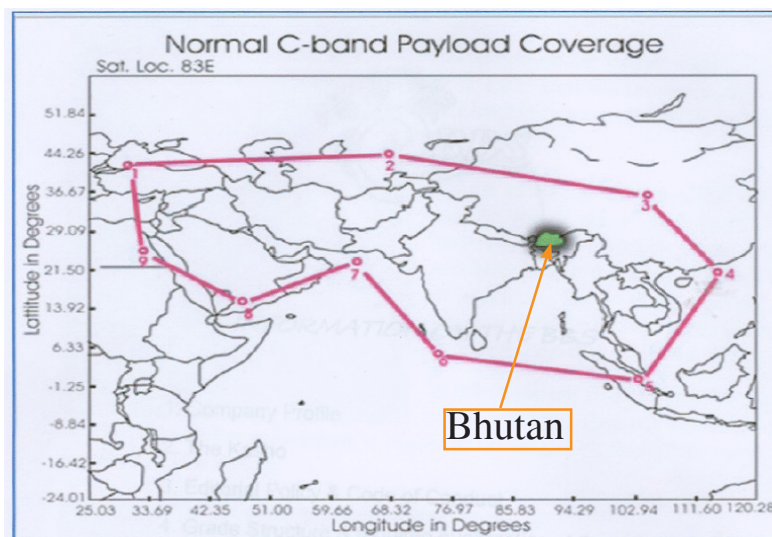
Source: BBS

Three additional FM radio licenses have been issued by the regulator, Bhutan InfoComm & Media Authority (BICMA), viz. to Kuzu FM 90, Radio Valley and Chenzig Media. Kuzoo FM 90 and Radio Valley are operational. Kuzoo FM 90, which is on-air round the clock, is part of the Kuzoo SOCIETY which also comprises www.kuzoo.net and the Kuzoo SOCIETY newsletter. Kuzoo caters to the youth and aspires to be the "voice of the youth of Bhutan" and to "inform the youth of Bhutan". The Radio Valley station broadcasts a host of interactive programmes besides airing all genres of English and Bhutanese songs from 8.00 a.m.to 9.30 p.m. People also have the choice to post articles, poems, messages or concerns on the station's official website, www.radiovalley.bt, for airing. Listeners are also given an opportunity to sing or host shows on Saturdays and Sundays. A guest jockey show is being featured on Sundays.

Cable television was formally introduced in the country along with the Internet in 1999. At present, there are 52 cable TV operators operating in all 20 Dzongkhag headquarters and other populated areas. These operators provide up to 31 foreign channels including the mandatory BBS channel. Most of these operators are registered withthe Association of Private Cable Operators (APCO).

Bhutan has a rich tapestry of unique performing arts. Its oral story telling culture, *lozey*, *ole* and *tsangmo* are some of the finer depictions that have survived the test of times. The annual *tshechus* held in different districts, towns and villages provide setting for the sustenance of performing arts. Besides the religious rituals and dances, *tshechus* are tantalizing platforms to showcase the cultural heritage of the country wherein the best of the community's artists perform.

During the last decade or so, Bhutan has been witnessing some positive trends particularly in the audio visual and film industry. The content of the productions may not all reflect the Bhutanese culture in its pure form, but nevertheless the subject and the context are Bhutanese. More importantly, the productions appeal to a majority of the indigenous Bhutanese population.

Figure 5: Map Showing Media Presence in Bhutan
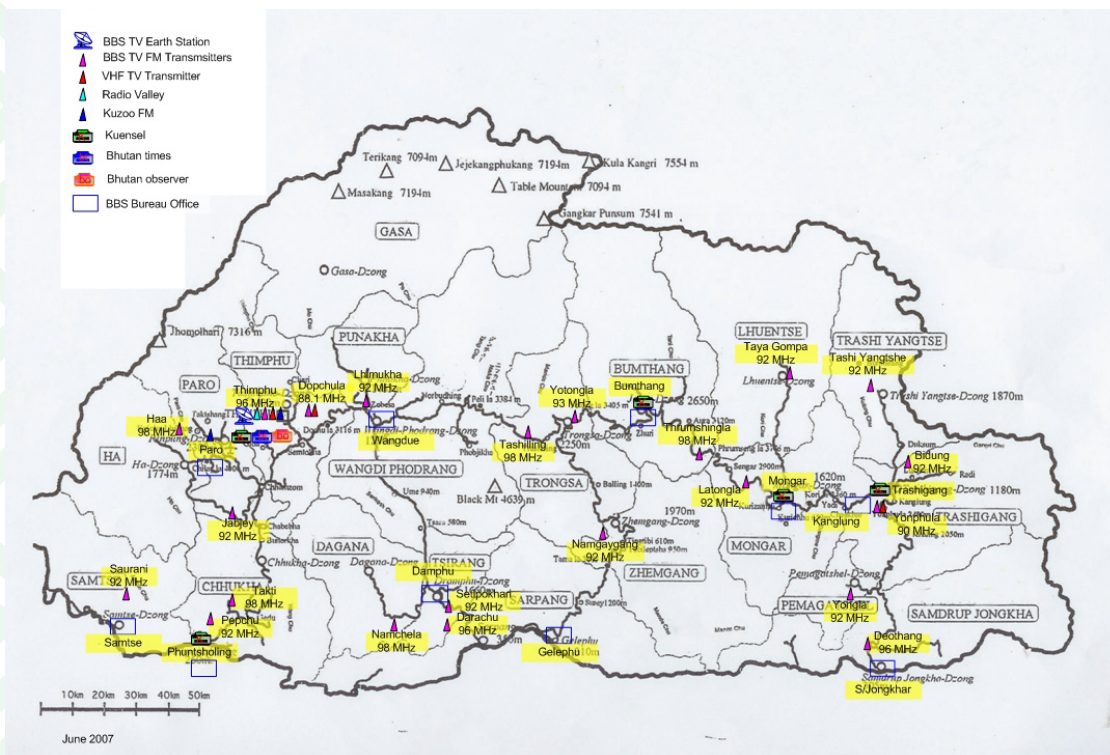
What is also rather remarkable about the development of the industry was the near absence of any strategic Government initiative or investments for development of the audio visual and film industry *per se*. And yet the Bhutanese audio-video industry, pioneered by a few private companies, has now reached a status where their productions are pirated and sold in bordering towns of India and the Autonomous Region of Tibet, China. The same holds true of the Bhutanese films as well.

(c)   POST

*T*he 1990s have seen profound changes in the postal sector worldwide. Likewise, the postal sector in Bhutan has also undergone some major changes. Postal operations were corporatized beginning 01 October 1996, with the trading name "Bhutan Post". The national postal network consists of 90 outlets including 2 General Post Offices, 43

Post Offices, 3 Agency Post Offices and 42 Community Mail Offices. There are, at present, 130 letter boxes and 2,420 Post Office boxes in the country. Given the terrain and topography of the country, feasible letter service is relatively slow. Bhutan Post has experienced a decline in the volume of letters and EMS over the past three years. All forms of electronic transmission – fax, Internet, e-mail or electronic bill payments – are eating into its core business. The average letter volume ranges anywhere from 5,000 to 6,000 per day.
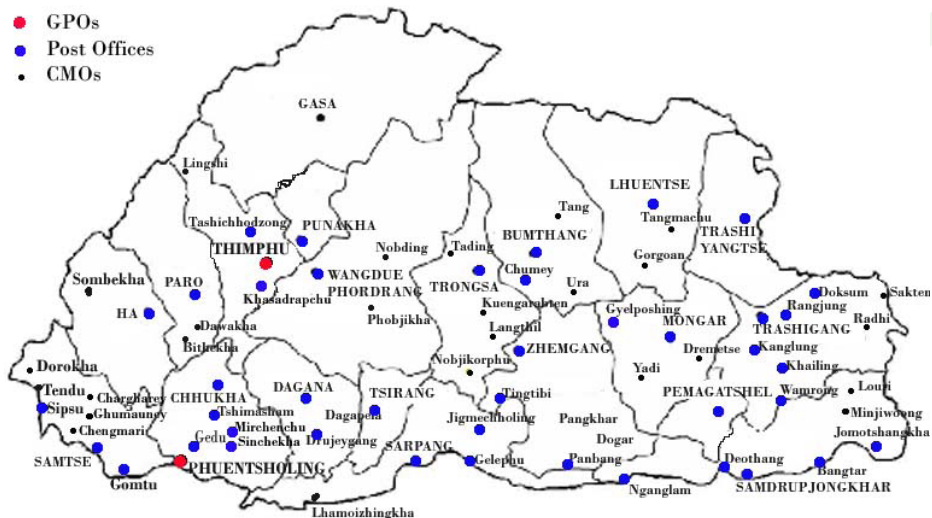

Bhutan Post's EMS Van

As a part of its modernization program, Bhutan Post has identified several new products and innovative services. Among others are the Electronic Counter Services, Track-and-Trace, One-Stop-Counter and Accounting Computerization.

Figure 6 shows the national postal network being operated by Bhutan Post.

Figure 6: National Postal Network

2.2   TRANSPORT

(a)   SURFACE TRANSPORT

*T*he Road Safety & Transport Authority (RSTA) has its origin to the 1960s when the erstwhile Bhutan Government Transport Service (BGTS) started providing passenger transport services in the country. Consequently, it was transformed into a commercial entity, which also specialized in bus building activities.

Privatization of passenger transport services began in 1985 on a pilot basis and was achieved fully by October 1991. BGTS was transformed into a regulatory unit to monitor and develop facilities for operation of these services by private bus operators. Consequently, all activities related to the administration and enforcement of motor vehicle related activities, which used to be administered by different government agencies such as Royal Bhutan Police (driver licensing and roadworthiness testing) and Department of Revenue & Customs (vehicle registration and associated functions),were integrated under RSTA since January 1997.

A Private-run Passenger Transport (Toyota Coaster) Bus

In addition to its traditional function of monitoring and regulating passenger transport services, new mandates include vehicle emission testing (privatized since March 2006), promoting road safety, traffic and transport management, regulating taxis and other commercial vehicles, and development of transport infrastructure and facilities such as bus terminals, public toilets, offices and bus sheds.

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RSTA has four functional divisions namely Registration & Licensing, Transport Development, Transport Management & Contract Administration, and Road Safety & Traffic Management Division. It is supported by the Traffic Division of the Royal Bhutan Police (RBP) in enforcing the Road Safety & Transport Act and associated Regulations. Motor vehicle and transport related services are administered and delivered through the RSTA's four Regional Offices, which are further supported by 16 Base Offices covering most Dzongkhags. The list of Regional Transport and Base Offices is provided in Table 1.

Table 1: Regional Transport and Base Offices

Regional Transport Office	Base Office
Thimphu	Thimphu Paro Haa Wangduephodrang
Phuentsholing	Phuentsholing Tshimasham Samtse
Samdrupjongkhar	Samdrupjongkhar Trashigang Monggar Trashiyangtse
Gelephu	Gelephu Trongsa Bumthang Tsirang/Damphu Zhemgang

Surface transport infrastructures, primarily in the form of integrated passenger terminal and bus sheds, are available at the four Regional Transport Offices only. Public amenities, such as passenger waiting sheds, vehicle service centers, fuelling stations, parking facilities, telephone booths, medical shops, public toilets etc., along the prmary highways are generally not available. Restaurants and hotels that operate along some of the primary roads are expensive, unhygienic or inadequate.

Besides regulating and enforcing passenger transport services, RSTA delivers the following services to the public:

- Vehicle registration and annual renewal, including ownership change;

- Driver licensing (both professional and non-professional), renewal of licenses and license variations;

- Conducting periodical refresher courses for both professional and non-professional drivers;

- Roadworthiness testing, twice annually for commercial vehicles and annually for non-commercial vehicles;

- Pre-departure inspection of passenger transport vehicles;

- Maintaining and compiling monthly passenger flow statistics on all routes;

- Enforcing traffic regulations including emission testing in collaboration with the Traffic Police;

- Prescribing and monitoring service standards and facilities for passenger transport vehicles;

- Maintaining and disseminating information on departure and arrival of buses;

- General surprise inspection of all kinds of motor vehicles on traffic violtion; and

- Awareness campaign/safety messages/public notifications.

A Driving Test in Progress

The number of vehicles in the country has increased dramatically during the last decade, particularly in the larger towns of Thimphu, Phuentsholing, Samdrupjongkhar and Gelephu. The number of vehicles has increased by 145% during 1997 to 2006. See Table 2.

Table 2: Trend in Motor Vehicle Growth, 1997 – 2006

Year	No. of vehicles	Increase	% increase (year to year)
1997	13,584		
1998	15,629	2,045	15
1999	18,288	2,659	17
2000	19,463	1,175	6
2001	22,494	3,031	15
2002	24,430	1,936	9
2003	25,003	573	2
2004	26,740	1,737	7
2005	29,914	3,174	12
2006	33,241	3,327	11

Traffic Flow on the Lungtenzampa Bridge, Thimphu

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The surface transport modal split differs significantly as can be deduced from Table 3.

Table 3: Year-wise Surface Transport Modal Split, 2000-2006

Year		Buses & Trucks	Light Vehicles	Two Wheelers	Taxis	Others [1]	Total
2000		2938	7337	7763	770	655	19463
2001		3560	8777	8165	1188	804	22494
2002		3517	10071	8371	1423	1048	24430
2003		3799	11428	7507	1560	709	25003
2004		3883	13359	6583	1785	1130	26740
2005		4352	15374	7138	2050	1000	29914
2006	No. of Vehicles	4547	17599	7930	2056	1109	33241
	Modal split (%)	14	53	24	6	3	100

Buses and taxis provide passenger transport services for inter-Dzongkhag connectivity as well as within urban areas. Passenger transport services are available in 18 of the 20 Dzongkhags. Service in Pemagatshel Dzongkhag is considered not viable since people prefer to travel in trucks owned by the mining industries that operate more than 30 trucks between Pemagatshel and Samdrupjongkhar every day. Gasa Dzongkhag head-quarter is yet to be connected by motorable road.

While passenger services are provided customarily by buses, trucks are permitted to carry passengers in exceptional cases where the road conditions make bus transport difficult. A range of ordinary and comfortable buses, from Indian-to Japanese-make, operate in Bhutan. Services to and from Thimphu are generally considered profitable. Maximum frequencies of services operate on the Thimphu-Phuentsholing, Thimphu-Gelephu and Paro-Phuentsholing routes.

Passenger transport fare is based on the operating cost and thus fare rates differ according to the type of services and operating conditions. Use of public transport system has grown remarkably by 24% between 2003 and 2006. Beginning from May 2007, seven groups have been formalized by the Government to operate passenger transport services in the country.

Accessibility and equity of passenger transport services are ensured through subsidy to private operators operating on non-profitable routes (mainly in the form of the Government paying interest on loans for procurement of buses by private operators). Country-wide, there are a total of 68 routes and the frequency of services on different routes range significantly with some routes operating up to 11 services on a cross-basis every day.

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[1]"Others" include earth moving equipment, power tiller, road rollers, fork lifts, CD and vehicles with BHT registration.

Public transport services in Thimphu city are provided by Bhutan Post using 14 buses, each with a 30-seater capacity. The city service is subsidized by the Government. There is no dedicated city service in other towns.

Table 4 provides information on the number of public transport travelers during 2003-2006.

Table 4: Number of Public Transport Travelers

Year	Number of Travelers
2003	726,677
2004	620,117
2005	628,916
2006	897,851

Revenue management is another important mandate of the RSTA, mainly in the form of charges and fees covering the following:

- Vehicle registration, renewal and ownership transfer fees;

- Fees and charges related to driver licensing; and

- Fines and penalties for traffic infringement and other violations.

Revenue collection has increased successively over the years as indicated below:

- Nu. 78.814 million in 2002/03

- Nu. 88.144 million in 2003/04 (registering a growth of 11%)

- Nu. 92.982 million in 2004/05 (registering a growth of 5.5%)

- Nu. 104.369 million in 2005/06 (registering a growth of 12%)

While considerable improvements have been made in the provision of safe, comfortable, affordable and reliable passenger transport services in the country, accidents have resulted in 660 deaths during 1997-2006 and injured over 2,495. With the number of motor vehicles increasing by almost 145% between 1997 and 2006, motor vehicle related offences have increased by manifolds as indicated in Table 5.

Table 5: Year-wise Motor Vehicle Accidents and Causes of Accidents

Year	No. of MVA	Death		Injured		Causes of Accidents							Major	Minor
		M*	F	M	F	A/C	UL	H/E	M/D	En	P/A	H/R		
1997	196	19	04	162	32	10	15	122	35	14	32	09	75	121
1998	219	72	28	116	46	04	22	153	31	09	21	05	89	130
1999	230	61	15	148	38	16	24	144	36	10	34	07	85	145
2000	290	48	10	204	59	19	27	167	48	29	28	04	121	169
2001	268	44	07	187	39	18	22	144	54	30	30	19	127	141
2002	622	53	04	277	55	36	66	389	76	55	66	51	185	437
2003	706	40	16	248	72	49	72	451	70	64	71	72	151	555
2004	812	64	09	283	93	35	79	546	80	72	89	77	248	564
2005	696	34	05	175	72	31	19	518	78	50	88	77	210	486
2006	940	71		389		28	52	651	95	114	80	81	345	595

Main causes of motor vehicle accidents include reckless driving, speeding, mechanical failure, drink driving, unlicensed driving, road condition and weather related factors.
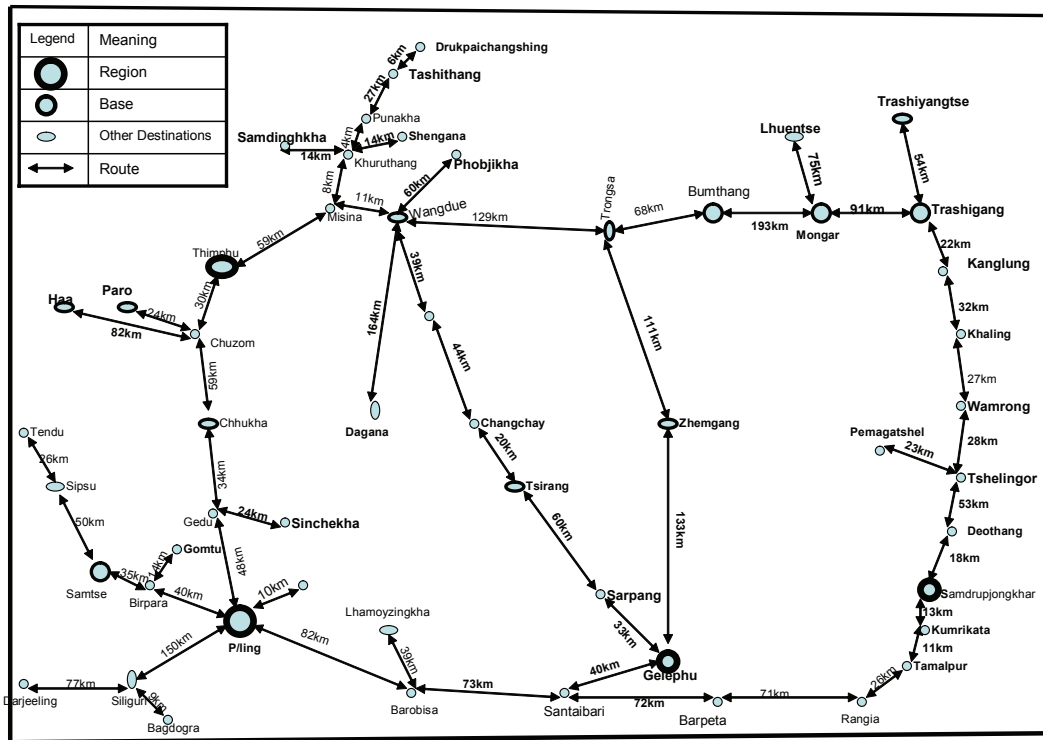
Initiatives on transport safety have so far been limited to highway patrolling, roadworthiness inspection, refresher driving courses, safety education through media, enforcement of safety regulations and pre-departure inspection for passenger transport vehicles. These measures need to be beefed up.

International connectivity by land is possible only through India using the four main exit and entry points at Phuentsholing, Gelephu, Samtse and Samdrupjongkhar. Phuentsholing is the main gateway for international trade (about 80%), followed by Samdrupjongkhar and Gelephu. Beyond Bhutan's international border, the road corridor Phuentsholing – Jaigaon – Hasimara – Siliguri – Kolkata/Haldia is the single most important transport and transit route. Transport connectivity and transit to Bangladesh and Nepal are also possible through India. The seaports of Kolkata and Haldia are the main maritime gateways for international trade to countries other than Bangladesh and Nepal.

To further enhance Indo-Bhutan and international connectivity, the Government of India is assisting Bhutan in undertaking feasibility study to link five border towns in Bhutan namely Phuentsholing/Pasakha, Samtse, Samdrupjongkhar, Nganglam, and Gelephu, from the corresponding nearest Indian railheads.

* MVA - Motor Vehicle Accidents, M - Male, F - Female, Alc - Alcohol, UL - Unlicensed driving, H/E - Human error, M/D - Mechanical defect, En - Environment related/road and weather condition, P/A - Pedestrian Accidents, H/R - Hit & Run.

Figure 7 shows the surface transport network in Bhutan.

Figure 7: Surface Transport Network

Source: RSTA

(b)   CIVIL AVIATION

*T*he Department of Civil Aviation (DCA), established in January 1986, is responsible for providing air traffic services; operation and maintenance of airports; and, setting and monitoring safety standards for all other regulatory aspects of the civil aviation sector in the country. The primary roles of the DCA are:

• Promotion of civil aviation through clear environmentaly sustaiable development policies in accordance with international principles;

• Development of aviation regulations in line with international standards, and their enforcement on the aviation industry through safety oversight; and

• Development of infrastructure and provision of aeronautical services for safe and efficient aviation.

Since its establishment, the DCA has undergone major transformation over the years. It has evolved from being a small agency to a multifaceted and professionally responsible organization. From its modest beginning with a handful of people in 1986, it has now grown into a competent department with 9 technical sections and over 132 employees. The following are the 9 technical sections:

- Flight Operations;
- Airworthiness;
- Aerodrome;
- Communication and Navigation Aids;
- Air Traffic Control;
- Aviation Meteorology;
- Rescue and Fire Fighting;
- Aviation Security; and
- Airport Management.

At present, DCA is both the regulator and provider of aerodrome and air navigation services. Thus, there is no clear separation of regulator and service provider functions, which causes ambiguities and overlaps at times. However, in line with the Civil Aviation Master Plan (CAMP) recommendations, the process has already begun to create a clear structural and functional separation between the regulatory and service provider mandates.

The Civil Aviation Act, first passed in 1990, which was later revised and re-enacted in 2000, the Bhutan Air Navigation Regulations, and other international Requirements providethe legal and regulatory framework for safety and security of air transport operations in Bhutan. The existing Act and Regulations, however, do not sufficiently reflect the international standards for ensuring safe and secure operation of flights and hence the need for further review and amendments.

Bhutan ratified the Convention on International Civil Aviation (Chicago Convention) and became a member of the International Civil Aviation Organization (ICAO) in 1989. Further to being an ICAO contracting state, Bhutan is also a party to the following international Conventions:

- Hague Convention, since 28th December 1988;
- Montreal Convention, since 28th December 1988; and
- Tokyo Convention, since 25th January 1989.

Drukair Corporation, which is 100% government-owned, is the only air operator in the country. Operation of international air transport services is governed by the rights and privileges agreed in the Bilateral Air Service Agreements. Bhutan has at present Bilateral Air Service Agreements with the following countries:

- India;
- Nepal;
- Bangladesh;
- Thailand; and
- Myanmar.

As per the provisions of these bilateral agreements, Drukair operates to six destinations in four countries – Bangkok, Kolkata, Gaya, New Delhi, Kathmandu and Dhaka. The induction of Airbus A319 in October 2004 prompted strong focus on increasing the utilization of the aircraft and improving the airline's financial performance. As a result, fresh bilateral consultations were held with Nepal, India, Bangladesh and Thailand between 2004 and 2006, which resulted in increased flight frequencies, capacity and routes for Drukair.


Drukair's Network

Due to the higher capacity of Airbus A319 aircraft and increased traffic rights obtained through bilateral negotiations, Drukair's annual passenger volume and revenue increased significantly. The total number of passengers including 3rd, 4th and 5th freedom traffic increased from 63,194 in 2004 to 115,694 in 2006, as illustrated in Table 6.

Table 6: Total No. of Drukair Passengers, 2002 – 2006

Year	No. of Passengers	% Increase
2002	42,990	-
2003	50,055	16.43
2004	63,194	26.25
2005	96,285	52.36
2006	115,694	20.16

Similarly, the revenue earned by Drukair increased from 613.46 million in 2004 to 1,181.69 million in 2006, as shown in Figure 8.

Figure 8: Drukair's Revenue Figures, 2002 – 2006
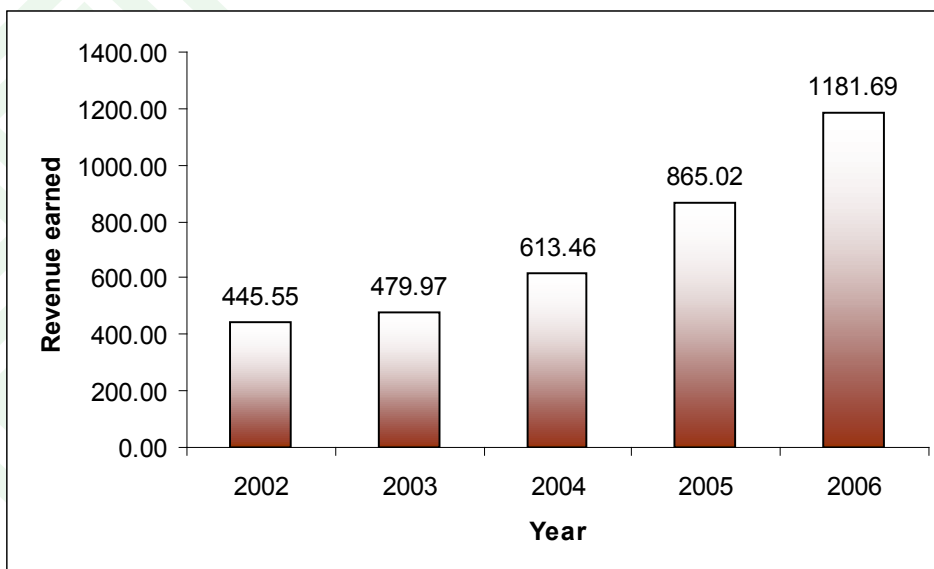
Flight operation into Paro is possible only during daytime under Visual Flight Rules (VFR) condition. Low monsoon clouds continue to cause flight disruptions. In 2005, there were 4 flight diversions and 53 flight delays due to bad weather at Paro. During the winter season, high velocity wind does not permit flight operations into Paro in the afternoons.

International air transport activity in the country by and large remains confined to Paro airport. The existing airport terminal infrastructure, grossly underutilized during normal operations, can barely accommodate increased passengers resulting from additional flights operated during peak tourist seasons. In 2006, Paro airport handled 76,254 passengers compared to 38,809 in 2002, an increase of about 97%. See Table 7. Service delivery standards at the airport are continuously being improved. Recent measures introduced

include increase in the number of immigration counters, clubbing passenger service charge with the airfare, combining immigration and customs declaration forms etc.

Table 7: Total Passenger Flow at Paro International Airport

Year	2002	2003	2004	2005	2006
Total No. of Passengers	38,809	39,511	52,585	70,522	76,254

Security at the airport has been strengthened through construction of new perimeter security fence, up-gradation of security equipment and closed-circuit television (CCTV) system.

The aerodrome safety has been improved through extension, re-surfacing and strengthening of the runway, expansion of apron and taxiway, establishment of a dedicated aerodrome inspection section and, appointment and partial training of an aerodrome inspector.

The Airport Rescue & Fire Fighting Section is adequately equipped to handle any emergencies at the airport. The procurement of a Rapid Intervention Vehicle (RIV) and additional fire fighting and medical ambulance vehicles has further enhanced the section's capability.

Apart from Paro airport, there is no other usable domestic airport in the country at present. The runways in eastern Bhutan (e.g. Yonphula), built in 1968, cannot be used for regular air traffic in its present state due to inadequate design and obstacle clearance.

Paro International Airport

Despite major concerted efforts put in during the Ninth Plan, domestic air service is yet to be launched. At present, most of the heliports in the country remain under the control of the Royal Bhutan Army (RBA). Data obtained from reliable sources indicate up to 89 heliports scattered around the country, with different surface conditions. However, study focusing on the access and usability of these heliports for commercial purposes is yet to be carried out. The Government has approved a cross-subsidy scheme to encourage private operators to introduce domestic helicopter service in the country.

2.3   CHALLENGES AND OPPORTUNITIES

(a)   ICT, MEDIA AND POST

The challenges faced by the ICT sector include:

- Limited understanding and awareness of the role of ICT in development, in general;

- Absence of an adequate financing system to encourage private sector participation;

- Lack of foreign investment in the sector;

- Capital-intensive nature of investments in ICT infrastructure and systems;

- Land-locked and small domestic market;

- Very low diversification of ICT businesses, largely dominated by hardware vendors;

- Limited pool of ICT expertise and skills;

- Lack of R&D policy to facilitate development of generic and industry-related solutions;

- Weak regulatory capacity.

The opportunities for the ICT sector include:

- Increasing recognition of ICT as a necessary tool to achieve development objectives;

- Globalization of local content, culture and heritage;

- Leap-frogging technological development stages;

- Modern technology- and service-neutral legal framework in place;

- Private sector keen to participate and invest in the market;

- Operation of the Universal Service Fund to meet the needs of the people, particularly in rural and uneconomical areas.

The media sector also faces certain challenges including:

- Limited media professionals including media regulatory specialists;

- Small market and hence no economies of scale;

- Limited revenue generation source (e.g. government advertisements);

- Difficulty faced in producing Dzongkha edition of newspapers due to limited readership base;

- Emergence of new media like 'digital media';

- Capital-intensive nature of media infrastructure investments;

- Limited support from the Government.

The opportunities for the media sector include:

- Government's recognition of the important role that media can play particularly in decentralization and democracy;

- Coordinated and managed development of the media industry, being in the growing stage;

- Autonomy of the regulatory authority;

- Documentation and preservation of Bhutan's rich culture, tradition, art and music;

- Global marketing and use of ICT in promoting media development.

The challenges faced by the postal sector include the following:

- Bhutan Post has to meet two-fold obligations. On the one hand, it has to be fully self-sustainable; on the other, it is required to meet a range of social obligations

including provision of postal service in uneconomical areas;

• Bhutan Post's network of post offices, despite being the most extensive network in the country, is relatively underdeveloped as far as modernization is concerned, and thus remains underutilized and burdened by excessive fixed costs;

• Given the mountainous terrain, feasible letter service is relatively slow and e-mail becomes almost an unbeatable competitor, thereby inflicting heavily on its revenue;

• Bhutan Post faces competition from other entities like BT, DHL, other private courier service providers etc.;

• Lack of skilled and professional manpower;

• Small domestic market.

The opportunities for the postal sector include:

• Embracing new ICTs, and joining other market players in providing new and innovative services;

• Improving customer service and building a brand name;

• Future growth in the hydropower sector will provide new business opportunities for the postal sector, as the large number of Indian workers will require extensive postal, consignments and money transfer facilities;

• Increasing literacy rate, which will increase the use of post-related services and products;

• Increasing number of tourists and visitors;

• Carrying out agency functions on behalf of the financial institutions etc.

(b)   TRANSPORT

Development of the surface transport sector is slowed down by the following factors:

• Travelling speed limited by low quality, narrow and winding roads;

• Dramatic increase in the number of vehicles puts immense pressure on the existing

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urban infrastructure and triggers numerous adverse effects such as air pollution, traffic congestion and accidents;

• Services to remote areas are either inadequate or unreliable due mainly to seasonal flow of passengers, high operatingcosts, unsatisfactoryroad conditions, and less number of operators willing to operate in such routes;

• Lack of safety and communication equipment hinders fair and consistent enforcement as well as timely provision of search and rescue services;

• Low patronage of urban transport system makes services unviable and unattractive for private sector participation;

• Base offices are manned by skeletal manpower with two personnel in some base offices while others have only one staff, stalling effective implementation of roasafety and transport regulations;

• Lack of trained and professional staff;

• Lack of reliable accident database, making it difficult to plan and implement preventive road safety measures.

Despite the above constraints, the surface transport sector has the following opportunities:

• With increase in patronage of public transport services, private bus operators are expected to improve their sustainability and profitability;

• Passengers can avail comfortable and safer services with more private operators choosing to induct imported buses into their fleet;

• Professionalism and accountability of transport operators can be enhanced with the new operational grouping system;

• Surface transport, being the principal mode of transportation within the country, would directly benefit remote communities through enhancing rural accessibility and coverage;

• Abundant opportunities exist for improving delivery of public services including passenger buses and taxis;

• A Surface Transport Master Plan had been formulated to guide the growth of the sector;

- Excellent state of bilateral relationship and goodwill with the Government of India (GoI) provides ample opportunities for promoting bilateral and intra -regional transport connectivity and trade.

The challenges faced by the civil aviation sector include:

- Weather-dependent and difficult operating conditions of the Paro International Airport;

- Limited airport terminal infrastructure;

- Involvement of more than one security agency at the airport poses coordination problems, command and control, and accountability issues;

- Limited institutional capacity particularly in carrying out the safety oversight functions effectively;

- Extremely small domestic air transport market.

The opportunities for the civil aviation sector include:

- A forward-looking Civil Aviation Master Plan for the next 15-20 years;

- Growth of the tourism industry;

- Inherent limitations of road transport network;

- Good regional and international relationships.

PART 3   SIGNIFICANT ACHIEVEMENTS, 2002/03-2006/07

3.1   ICT, MEDIA AND POST

(a)   ICT

(i)   East-West Backbone Transmission Network

The East-West microwave backbone transmission network has been upgraded from 34Mbps to 155Mbps, enhancing the traffic-carrying capacity between Thimphu and the Eastern Dzongkhags. With higher transmission bandwidth available now, BT is able to provide leased circuits to Dzongkhags as well as expand its mobile services.

Yongla Goenpa Repeater Station

The existing fiber optic transmission system connecting Thimphu, Paro and Phuentsholing has been upgraded from 155Mbps to 622Mbps. With the increase in the transmission capacity, BT has the capacity to provide broadband services in these areas.

(ii)   Dzongkhag Local Area Network

Local Area Networks (LANs) have been set up in all 20 Dzongkhags with Internet access facility where there was reliable telephone connectivity. This has helped improve

ICT penetration in the Dzongkhags and also enhance the productivity and efficiency of the Dzongkhag administrations through facilitating wider sharing of information and their timely dissemination to the public. MoIC has initiated the process of providing training to relevant staff in the Dzongkhags to help optimize the use of the network.

D-LAN Training

(iii)   Thimphu Wide Area Network (Government Intranet)

The Thimphu Wide Area Network (WAN) – also called the Government Intranet – links all the government agencies, corporations and autonomous agencies in the capital city. This broadband optical fibre network now facilitates secure, efficient and reliable communication across all public agencies in Thimphu and immensely contributes towards realizing the role of ICT in enhancing good governance.

(iv)   Mobile Cellular Service

BT launched B-Mobile cellular service on 11 November 2003. By February 2007, mobile service has been extended to cover all 20 Dzongkhag headquarters. Besides the Dzongkhag headquarters, coverage has also been extended to satellite towns, major population centers and some portions of the highways connecting these places. As of April 2007, B-Mobile has installed 48 Base Transceiver Stations (BTS) in 20 Dzongkhags covering 103 Gewogs.

Meanwhile, Tashi InfoComm Ltd. was awarded the second mobile cellular licence in November 2006 through an open bidding process.

(v)   ICTization of Schools

Hundred community primary schools were provided with two computers and a printer each, with free Internet facilities for a year where feasible. One teacher in each of these schools was trained in basic computing skills. This has helped in creating ICT awareness among the primary schools especially in the rural areas.

(vi)   National Broadband Network Master Plan

A National Broadband Network Master Plan has been formulated. The Plan will serve as the guiding policy and planning document for expansion and development of broadband network down to the Gewog level. The Master Plan will be implemented during the Tenth Plan.

(vii)   Systems and Applications

The use of ICT in government operations facilitates speedy, transparent, accountable, efficient and effective interaction with the public, citizens, businesses and other agencies. Withinthe government, e-government is being implemented leading to significant cost savings in government operations.

Some of the systems and applications that have been implemented by various agencies in the Government are listed in Table 8.

Table 8: Some Existing Systems and Applications

Agency	System/Application	Purpose
RCSC	*Zhiyog*	Record civil service information
MoHCA	Bhutan Civil Registration System	Record and process census data
MoIC	E-RaLiS (Vehicle Registration and Licensing System)	Record and process vehicle registration and driver licensing
MoH	In-patient Recording System	Records medical history of in-patient
	DIS (Drugs Information System)	Maintains the drug list and inventory status of drugs in JDWNRH
MoLHR	Labour Net	Online approval of foreign workers
	Job Portal	Facilitates job matching between employers and job seekers

MoF	Bhutan Automated Customs System (BACS)	Record and process import & export information
	Consolidated Budget & Accounting System (CBA)	Consolidate budget and accounts of Government agencies
	Tax Management System (PIT, CIT, BIT)	Records and process all taxes
MoWHS, BT, BPC	Utility Billing System (Electricity, Water, Telephone)	Billing system for utilities
MoE	Examination Result Processing System	Processes schools examinations results
	Personal Information System	Records Employee details
MTI	Import License System	Process and manages Import Licenses
	License Management System	Process Industrial License Information
	Industry Information System	Manages Industry-related statistics
	Bhutan Intellectual Property System	Keeps intellectual property information
MoFA	Machine Readable Passport	Issue and update of passports
High Court	Case Information System	Recording & maintaining cases
	Personnel Information System	Maintaining employees status
Royal Audit Authority	Audit Information Management System	Store and manage information on auditing
	Personal Information System	Official utility
Center for Bhutan Studies	Ep-Info	Data entry
	SPSS (Statistical Package for Social Sciences)	Data analysis of survey
Royal Monetary Authority	Banking Account System	Central banking accounts
	SWIFT	Secure financial message transactions
	FOREX Release System	Foreign currency authorization & release
NPPF	NPPF System	Records and maintains NPPF member accounts
NEC	Environmental Information Management System	Keeps record of the environment conditions
Election Commission	Bhutan Electoral Database System	Maintains records of election system
Anti-Corruption Commission	CSPR 2.3	Data entry

However, most of these systems/applications have been developed to address the internal needs of agencies and hence do not support interoperability or communication with other agencies' systems. A majority of the applications are government-centric and does not ease the problems of citizens in accessing these services.

(viii)   Dzongkhag Web Template

Dzongkhag Web Template has been developed for all 20 Dzongkhags with the aim to promote e-governance in the Dzongkhags. The Template provides a platform through which Dzongkhags can disseminate information and provide services to the people. Dzongkhag officials have been trained on administering and managing the Template. To enhance accessibility of government information, most government organizations also have their own websites.

(ix)   Bhutan Portal

The Bhutan Portal has been launched as a first step towards promoting a one-stop source of all information about Bhutan and a "one window" system for online e-services. Applications such as the Labour Net, Bhutan Civil Registration System and online processing of travel documents as well as other systems under development would be made accessible through this portal in the near future.

(x)   Market Liberalization

Supply of IT hardware and software has been fully liberalized. There are about 45 firms dealing in IT businesses such as software, hardware, networking solutions etc. Additionally, there are about 19 private IT training institutes in operation.

MTI has issued about 35 licenses for Internet cafés. Of these, about 19 are in operation, most of which are concentrated in Thimphu and Phuentsholing.

The exclusive monopoly right enjoyed by BT was abolished effective July 2005 paving the way forward for managed competition and liberalization of the telecommunications market. Two private ISPs have been licensed and a second mobile operator is in the process of starting its operations. As a result, the tariff for various Internet packages and telecommunication services are being rationalized. Most of all, DrukNet's dial-up Internet service is offered free of charge.

(b)   MEDIA

(i)   Department of Information and Media

The Department of Information and Media (DoIM) was established in 2003. The Government approved its institutional plan, mandate, and structure in November 2005. The Government has also approved the Information and Media Policy in the same year.

(ii)   Legal and Regulatory Framework

The 85th Session of the National Assembly enacted the Bhutan Information, Communications and Media Act putting in place the much-needed legal framework for regulation of ICT and media markets.

The following bye-laws have been adopted in keeping with the relevant provisions of the Bhutan Information, Communications and Media Act:

- Regulations Governing Foreign Filming in Bhutan;

- Regulations Governing Accreditation of Journalists;

- Code of Ethics for Journalists; and

- Rules Governing Newspapers, Printing Press and Books.

(iii)   Introduction of Competition

Two private newspapers have been licensed in February 2006. Bhutan Times was launched on 30 April 2006 and Bhutan Observer on 02 June 2006. Likewise, Kuzoo FM 90 and Radio Valley FM 99.9 have been licensed to operate FM radio services.

(iv)   BBS TV Coverage and National Presence

BBS TV now broadcasts for ten hours daily and since February 2006, has gone nationwide using satellite transmission technology. Currently, more than 44 towns in Bhutan can watch BBS TV directly. The satellite footprint also extends to about 40 countries in the region.

BBS has also established 13 bureaus in different parts of the country, viz. Gelephu, Jakar, Kanglung, Monggar, Paro, Pemagatshel, Phuentsholing, Samdrupjongkhar, Samtse, Trongsa, Tsirang, Wangduephodrang, and Zhemgang.

BBS TV Dish in Thimphu

(v)   Institutional Strengthening of BBS

An HRD Master Plan, a Business Master Plan and an MSO Master Plan have been developed for BBS. The HRD Master Plan aims to develop a cadre of motivated and competent media professionals through focused scheduling of trainings, ensuring optimum utilization of limited financial resources and maintaining proper database of manpower development. The BBS Business Master Plan provides a clear roadmap and strategies to improve its revenue generation capabilities for the period 2005-2010. The MSO Master Plan is one of BBS's strategies to generate more revenue from its MSO business portfolio.

(vi)   Cable TV Service

Cable TV service has reached all the 20 Dzongkhag headquarters and major population centers. There are 52 cable operators and some 30,000 customers.

There are about 31 channels provided by the Cable TV operators. BBS is the only channel that telecasts local news and national programmes. Some operators maintain their own channels, which feature local advertisements and some entertainment.

(c)   POST

(i)   Integrated Postal Reform and Development Plan

An Integrated Postal Reform & Development Plan (IPDP) has been developed with the aim to improving the performance of the organization both in terms of output and managerial action. The IPDP outlines some eight projects for implementation during 2005-2008, with a total project cost of US$1.256 million.

(ii)   Multiyear Integrated Project

The Multiyear Integrated Project (MIP) for 2004-2006 was reviewed and upgraded. Under the project, computerization of some of the post offices has been completed.

(iii)   E-Post Project

E-Post service has been launched in six remote places of Merak, Shingkhar Lauri, Minji-woong, Laya, Sombekha and Lunana using VSAT technology. The project was implemented through a multilateral cooperation involving BT and other bilateral and international partners.

(iv)   Point-of-Sales Software

For optimal utilization of the extensive postal network, Bhutan Post has installed the Point-of-Sales software, Meghdoot '98, supplied by India Post. It has considerably improved counter services in terms of operational efficiency, quality of service and, most importantly, its image.

Thimphu GPO Counter Services

3.2   TRANSPORT

(a)   SURFACE TRANSPORT

(i)   Physical Infrastructure

The construction of a modern bus terminal and office building at Phuentsholing has been completed. This modern complex, which is located away from the town center, will help to significantly reduce congestion and permit smooth circulation of vehicular as well as pedestrian traffic. The building offers separate facilities to the bus operators and the enforcement agencies. Delivery of public services is expected to enhance to a great extent.

Phuentsholing Bus Terminal and Office Building

(ii)   Vehicle Registration and Renewal

A new system of vehicle registration and renewal has been introduced. With this, vehicle owners now have the option of taking out registration for up to five years.

(iii)   Safer Taxis

In addition to vehicles that are authorized for operation as taxis so far, Maruti Alto, Wagon R and Versa, and Hyundai Santro Xing are now allowed to operate as taxis to enhance safety. However, Maruti Omni Vans would be gradually phased out.

Taxis – Changing with time

(iv)   National Transport Policy

The National Transport Policy has been developed and adopted. This document provides a basic framework to guide the development of surface transport sector in the country. It lays emphasis on providing a safe, efficient, affordable and commuter-friendly transport system in the country. The document will be subject to periodical review and amendment.

(v)   Privatization of Vehicle Emission Testing

Vehicle emission testing has been privatized since March 2006. This was essentially done with a view to limit government role to regulatory and policy functions, and to encourage the involvement of private sector. Moreover, it was felt this particular activity would be delivered efficiently and better by the private sector.

Signboard – Thimphu Vehicle Emission Testing Center

(vi)   Networking and Computerization

A LAN connecting the Head Office in Thimphu and Thimphu Regional Transport Office has been set up and interlinked with all Regional Offices using Internet facilities.

Computerized database system called Registration & Licensing Information System (e-RaLIS) has been developed to maintain and up-date information pertaining to vehicles and drivers.

(vii)   Passenger Movement Information

Passenger movement information are available in bus terminals at Thimphu and Samdru-pjongkhar through cable TV.

(viii)   Surface Transport Master Plan

The Surface Transport Master Plan has been formulated to guide the development of surface transport sector. The study has identified and prioritized development needs in the surface transport sector, focusing on transport services and facilities rather than the road infrastructure. This is expected to guide and ensure the implementation of development programs in a planned and phased manner.

(ix)   Road Safety Programmes

Road safety has been a priority of the RSTA and for this reason, a series of refresher courses (for professional and non-professional drivers) and workshops have been conducted in different places, by turn. Other road safety initiatives included the following:

- Course on "Road Safety and Traffic Discipline" focusing on women drivers and students;

- Workshops on "Effective Enforcement of Transport Act & Regulation" for Traffic Police and Motor Vehicle Inspector (MVI) have also been conducted;

- Periodical survey of road conditions to ascertain the problem areas from transport safty point of view, which are consequently shared with Road Authorities for corrective measures;

- Collection, compilation and continuous up-dating of vehicle accident database have made it possible to analyze major causes of accidents and plan corrective measures to improve drivers' behavior;

- Promoting the use of seat belts in all light vehicles, which are equipped with seat belts;

- Raising awareness on the consequences of using mobile phones while driving;

- Seating capacity in passenger transport buses operating in the hilly region have been reduced to 30 seats to make the services more comfortable and safe;

- Operating life of public passenger buses has been extended from 5 to 7 year for Indian buses and 7 to 9 years for third country imported buses.

Women Drivers on a Refresher Course

(b)   CIVIL AVIATION

(i)   Civil Aviation Master Plan

A Civil Aviation Master Plan (CAMP) has been formulated. The CAMP identifies, quantifies and prioritizes civil aviation development needs for Bhutan over the next 15-20 year period.

(ii)   Airport Security & Flight Safety

The construction of Paro Airport security fencing has been completed enhancing the security of the airport. The airport runway has been extended by 280 meters (160 m on North and 120 m on South end).

Approach roads at the South and North ends of the airport have been aligned and new airport entry gate constructed. Five houses at the South end of the airport has been relocated improving flight safety during approach from the South.

The Paro aerodrome has been certified in October 2006 in compliance with the International Standards with assistance of the ICAO Technical Cooperation Bureau and COSCAP-SA. Universal Safety Oversight Audit was conducted in 2006 as per the ICAO Assembly Resolution A35-6.

(iii)   New Airbus A319

Two Airbus A319 aircrafts, with a seating capacity of 114, has been inducted into Drukair's fleet in October 2004.

Drukair's Airbus A319

A new hangar has also been constructed for the maintenance of Airbus A319.

(iv)   Airport Services

Service delivery at Paro Airport has been improved through the following measures:

- Old Air Traffic Control tower removed enabling aircraft to be taxied to the apron;

- Immigration process expedited through increased number of service counters;

- Passenger Service Charge clubbed with airfare;

- Visa fee for tourists collected at source;

- Immigration and Customs forms merged;

- Tourist information counter opened in the arrival hall;

- Commercial Important Person (CIP) lounge opened at Paro Airport.

(v)   Rescue and Fire Fighting Capacity

Rescue and Fire Fighting capacity at Paro Airport has been enhanced through:

- Procurement of Rapid Intervention Vehicle.

- Additional fire fighting vehicles and medical ambulance.

- Constructing fire training ground and aircraft model for carrying out simulated fire-fighting and rescue training exercises.

(vi)   Communication and Navigation Network

Aeronautical Fixed Telecommunication Network (AFTN) has been rendered operational linking Paro Airport with the communication centre in Mumbai.

(vii)   Bilateral Air Service Agreements

Memoranda of Understanding (MoU) have been concluded with Nepal, India, Bangladesh and Thailand resulting in increased flight frequencies, capacity, and routes.

(viii)   Institutional Strengthening

Human resources have being developed and institutional capacity built through active participation in regional projects like Cooperative Aviation Security Program–Asia Pacific (CASP-AP), Cooperative Development of Operational Safety and Continued Airworthiness Program–South Asia (COSCAP-SA) and EU-Asia Civil Aviation Project. A total of 150 civil aviation personnel including from Drukair were trained in-country under the various projects.

(ix)   River Protection Works

River protection along the river bank adjacent to Paro Airport has been constructed to minimize risks of damage of the airport and associated infrastructure by monsoon floods.

PART 4   ONGOING PROGRAMS AND PROJECTS

4.1   ICT, MEDIA AND POST

(a)   ICT

(i)   Community Information Centers

Thirty-seven Community Information Centers (CICs) have been established as of March 2007. The CIC initiative aims to provide integrated access to ICT and media services which will serve as a common platform for all government agencies to provide information and e-services to rural communities. Ten CICs have been set up in the Post Offices in various Dzongkhags.

Hon'ble Minister at the Tangmachhu CIC

The project will spill-over to the Tenth Plan during which each Gewog will be provided with at least one CIC.

(ii)   National Digital Library of Bhutan

The Department of Information Technology, the National Library, Department of Tourism, Institute of Language and Cultural Studies, Department of Culture, Department of Survey &

Land Records, and Dzongkha Development Commission are collaborating in establishing the National Digital Library of Bhutan (NDLB). The University of Virginia, USA, is providing the technical support and software developed as part of their ongoing project on Tibetan and Himalayan Digital Library. The objective of the NDLB is to:

- Enable Bhutanese individuals and communities to represent their traditions and perspectives domestically and internationally;

- Help in documenting and presenting aspects of Bhutanese life, traditions and culture;

- Promote tourism industry;

- Provide resources for scholars.

So far, the project has created an online Image Management System software which can be used by the Department of Culture to upgrade its database on National Treasures and National Artifacts which can operate online. The software will also be able to provide other online contents such as the Dzongkha Dictionary, journals/monographs, audio-video collections of performing arts collected from the Institute of Language and Cultural Studies, Gazetteers for Bhutan etc.

During the Tenth Plan, following additional content will be made available in the NDLB:

- Information related to indigenous medicine, handicrafts, woodcrafts etc. in audio-video and text format;

- Virtual world on Bhutanese heritage and culture;

- Aspects of Bhutanese life;

- Bhutanese version of Google Earth;

- Portal for publishing research work on Bhutan carried out by Bhutanese and international scholars;

- Good examples of well collaborated works between different organizations (government and corporate) in Bhutan;

- Dzongkha language learning facility including a bi-lingual (Dzongkha and English) digital library software;

- Migration of existing non-standard database of national treasures and artifacts in the Department of Culture to the standard web-based one.

(iii)   Automated Border Management System (ABMS)

The Automated Border Management System (ABMS) is aimed at achieving an integrated cross-sectoral approach to national border management with efficient and secure flow of data/information among various stakeholders while at the same time managing the movement of goods and people into and out of the country. A study pertaining to the roles and responsibilities of the different agencies at the entry/exit points, along with required information has been conducted. Having identified the systems, DIT is currently carrying out the system analysis in consultation with various stakeholders.

(iv)   Rural Telecommunications

With the Rural Telecommunication Project nearing completion, the Royal Government is getting a step closer to fulfilling the objective of providing universal service for all Bhutanese. As of March 2007, about 190 Gewogs are connected to the national network.

(v)   National ICT HRD Master Plan

A comprehensive National ICT HRD Master Plan is being formulated. It will address the issue of human resource requirement for the ICT sector in the context of establishing a knowledge-based information society, taking into account the needs of the country as a whole including those of the government and semi-government organizations, the private sector and research and educational institutions. The Ministry has recruited an internatioal consultant for undertaking the task.

(vi)   IT Park Project

The detailed project profile for establishment of the first IT Park in Bhutan has been prepared and is ready for implementation. The objective of the project is to increase productive employment opportunities in Bhutan through promotion of enterprise development in the IT and IT enabled-services (ITES) sector, enhanced IT skills, and improved access to finance.

A potential site of five acres has been identified and registered in Wangchhutaba above the office complex of Bhutan Agro Industries Ltd., and approved by the Government. The project involves a total investment of US$8 million, which shall be implemented over 5 years, i.e. 2007/08 – 2012/13. The funds shall finance the IT Park related infrastructure; lease-in space for an incubation facility; shared technology center and a data center from the IT Park; an IT skills development program; and IT related hardware and software investment in the financial sector, complimented by a small amount of TA advisory services.

(vii)   Universal Service Fund

A major barrier to achieving universal access in Bhutan is the very significant amount of capital investment required to extend ICT services into rural and underserved areas where harsh geographical terrain and sparsely distributed population pose formidable difficulties. The lack of stable commercial power supply in rural and isolated areas add to the high deployment costs because solar power supply systems need to be installed at repeater and terminal sites.

A draft Framework for Universal Service Fund has been formulated which recommends ways and means to bridge the digital divide in Bhutan. The Rules detailing the *modus operandi* of Universal Service Fund is being formulated by BICMA in keeping with the provisions of the Bhutan Information, Communications and Media Act.

(viii)   Mobile Network Expansion

B-Mobile has signed international roaming agreements with more than 90 mobile operators in 32 countries in different parts of the world. BT is also extending mobile service to remote areas in a phased manner while at the same time planning to upgrade the 2G GSM network to GPRS/EDGE (General Packet Radio Services/Enhanced Data rate for GSM Evolution) capability before the end of 2007. This can make delivery of data over mobile a possibility facilitating innovative content development for both commercial and entertainment purposes.

Tashi InfoComm Ltd. may also launch its service in the second half of 2007.

(ix)   Supporting Business Process Outsourcing

Three call centers, including a Medical Transcription Center, are in the process of being established. This would not only provide a new source of economic activity for the country, but will help address youth unemployment problems. In view of the higher incubation period necessary for such businesses, the government is supporting the private sector in terms of training operators and potential employees, subsidizing connectivity, providing tax breaks etc.

(x)   Digital Signature

A digital signature system is being established. Once implemented, this will facilitate the authentication of communication from one agency to another, increasing the secrity and confidence in electronic transactions such as e-governance, e-commerce, e-procurement, e-business etc.

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(xi)   Systems and Applications

The following systems and applications are being developed by the various agencies:

Table 9: Systems and Applications under Development

Agency	System/Application	Purpose
MoLHR	Office Management System	Facilitate online intra-ministerial works (paperless office)
	PCS for Corporations	Maintain the record of corporate employees and monitor employment in corporations
MoA	Virtual Extension and Research Communication Network (VERCON)	Improve agricultural advisory services for farmers
MoE	Education Management Information System (EMIS)	Tool for management
	Education Staff Welfare Scheme	Staff welfare facility
High Court	Case Management System	Facilitate management of cases
RMA	ICBS (Integrated Central Banking System)	Computerize operations of different divisions of RMA
Anti-Corruption Commission	Complaint Management System	For lodging complaints
MoH	Bhutan Health Management Information System (BHMIS)	Information from BHUs to be collected manually on forms generated by BHMIS and the same is updated in the HQ BHMIS database on quarterly basis through means of portable storage media (e.g. floppy disks, thumb drives, etc.)
	DVED (Drugs, Vaccine and Equipment Division) Management System	Automated version for DVED procedure of tendering, compilation of bids and procurement.

(xii)   E-Governance Project

The project document has been finalized and approved by the Government including the institutional framework for implementation of the project. DIT has initiated the implementation of the project with the development of five key applications during 2006/07, viz. Security Clearance System, Government Intranet Solution, Health Management

System, Agricultural Informatics System, and Education Admission System. The project will be completed by the early part of the Tenth Plan.

In addition, DIT has initiated a project on e-government and e-procurement (e-GP) to enhance the governance of a large proportion of the government expenditure and increase the efficiency of the government's procurement administration. A readiness assessment has been conducted and a roadmap drafted and finalized in April 2007.

(xiii) Enhancing National Backbone and International Connectivity

The MoIC has signed a MoU with Bhutan Power Corporation to collaborate in establishing a robust, reliable and redundant ICT backbone network, in the form of OPGW/ADSS on power lines that could be fairly accessed by all market players resulting in the creation of a level-playing field. The MoIC is also exploring ways and means to enhance Indo-Bhutan and international connectivity and rationalize existing international and Internet rates in view of the fast increasing demand for bandwidth by new entrants such as ISPs, BPOs etc.

(b)   MEDIA

(i)   Policy Guideline on Information Sharing

DoIM is in the process of implementing the "Policy Guideline on Information Sharing", approved by the Government in May 2006 to encourage information sharing between and among public agencies, between public agencies and citizens, and even among citizens themselves. A multi-sectoral team has been formed to accelerate the implementation of this important policy guideline.

(ii)   Capacity Building

DoIM has initiated dialogue with renowned institutes in India and third countries to explore opportunities for education and training of Government information and communication officers and Bhutanese journalists/reporters.

BBS is also implementing a project to enhance its capacity in multi-sectoral program production and TV broadcasting services.

(iii)   Infrastructure Development

BICMA is in the process of procuring modern equipment for reviewing films.

BBS is implementing the following infrastructure projects:

- Construction of National TV Center in Thimphu;

- Installation of 100 kW Shortwave Transmitter;

- TVRO (TV Receive Only) project;

- Establishment of control and monitoring system for its TV network.

Plans are underway to facilitate construction of Movie Halls in major urban centers of the country.

(iv)   Local Content Development and Dzongkha Localization

A strategic component of local content development is the Dzongkha localization project currently being executed by DIT. Under this project, a beta version of Dzongkha Linux has been released in June 2006 which has the capacity to undertake common desktop computing tasks such as word-processing, spreadsheets and power-point presentations in Dzongkha. It also provides browser, chatting, image editor and other common tools in Dzongkha. The entire interface (menus) for these applications is in Dzongkha. The project has also helped develop some in-house capacity to carry out further works related to localization.

Dzongkha Linux Logo

Training has been conducted for the first group of users consisting of Government officials, CIC managers, private sector and the RBP.

(c)   POST

(i)   Easy Pay and Online Tracking System

Bhutan Post is in the process of implementing a facility for Easy Pay & Online Tracking System of both postal and non-postal deliveries. The former will enable payment of different services bill at one stop. The later package will enable the customers to access the status of his/her mail by entering the unique barcode number provided.

(ii)   Gewog Mail Delivery

Gewog Mail Delivery Plan is being implemented in some of the Gewogs in the Western region and other Gewogs in other regions. The frequency of mail delivery will be increased to at least twice a week. This plan could only take-off with RGoB subsidy amount of Nu. 2.5 million.

4.2   TRANSPORT

(a)   SURFACE TRANSPORT

The following projects are in the pipeline:

(i)   Feasibility for Railway Links

The feasibility study for providing railway links to five border areas of Phuentsholing/ Pasakha, Samtse, Samdrupjongkhar, Nganglam and Gelephu are ongoing. Transport time and costs of goods are expected to reduce significantly with the completion of these links.

(ii)   Construction of Bus Terminals

The construction of bus terminal and office complex at Monggar has commenced. Land allotment for construction of a bus terminal at Paro has been finalized, and drawings/ designs are being prepared.

(iii)   Safety, Communications and SAR Equipment

The procurement of basic safety, communications, and Search & Rescue (SAR) equipment has been initiated.

(iv)   RSTA Website

RSTA website is being developed and will be online within 2007. All basic public information will be made available on the website.

(v)   Road Safety Measures

Awareness campaign on road safety will continue including through print and broadcast media. Similarly, Refresher Courses for drivers of commercial vehicles will continue to be conducted.

(vi) Eco-friendly Urban Transport

Options for introducing eco-friendly urban transport are being explored. The main objective is to provide cheaper and reliable modes of transport to city commuters; reduce congestion and travel time; minimize motor-vehicle related accidents and deaths; reduce pollution and conserve natural environment; and, enable better management of traffic flow.

(vii) International Transport Connectivity

Recommendations made under SAARC Regional Multimodal Transport Study, South Asia Sub-regional Economic Cooperation (SASEC) program and BIMSTEC are being pursued for implementation.

(b) CIVIL AVIATION

(i) Feasibility Study for Second International Airport

The feasibility study for second international airport at Gelephu is ongoing. An expert team from the Airports Authority of India accompanied by DCA officials visited Gelephu in May 2006 to gather first-hand visual information on the potential airport sites. A basic meteorology observatory has been installed at the selected site for collection of meteorology data.

The preliminary report has been received by the RGoB and feedback provided to GoI emphasizing on the urgency to finalize the second visit by Indian experts for undertaking a detailed feasibility assessment and formulation of master plan for the Airport.

(ii) Resurfacing of the Paro Airport Runway

The existing runway resurfacing and extension is in progress and will be completed by the end of 2007. The resurfacing will increase the runway strength from 22 PCN (Pavement Classification Number) to 42 PCN required for Airbus A319 operation.

(iii) Capacity Development Project

The two-and-half year Capacity Development Project (CDP), the agreement of which was signed between DCA and Swedish Aviation Development in October 2006, will focus on air traffic management development, airport development, and legal and institutional development. Under this project, the Master Plan for domestic airports at Yonphula, Bumthang, Bartsam and Phuentsholing will also be developed. The committed funding for the project is SEK12 million.

(iv)   Co-operative Aviation Security Program – Asia Pacific

The Co-operative Aviation Security Program – Asia Pacific (CASP-AP) is a regional program aimed at ensuring compliance with Conventions, ICAO SARPs and guidance materials related to aviation security by enhancing Aviation Security (AVSEC) capabilities of the participating states. It also aims at creating a regional structure for co-operation and co-ordination in AVSEC matters and for training AVSEC personnel. Bhutan is also a partner to this program. This project commenced from December 2004 with an initial duration of three years.

CASP-AP Delegates with H.E Lyonpo Leki Dorji

(v)   Co-operative Development of Operational Safety and Continuing Airworthiness Program – South Asia

Bhutan joined this pioneering partnership program at the sub-regional level, the Cooperative Development of Operational Safety and Continuing Airworthiness Program – South Asia (COSCAP-SA). The project office was first established in Kathmandu, Nepal, in February 1998, and was relocated in Colombo in September 2005. The project was initially approved for five years (1998-2002) only but latter on it was extended by another five years from 2003 to 2007. The 16th COSCAP-SA Steering Committee Meeting held in Kathmandu, Nepal from 27-29 November 2006 has agreed for further extension of the project duration by five years (2008-2012).

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This collaboration is a landmark progress in the field of aviation safety. The project is set towards enhancing safety and inspection capability through various training programs. COSCAP-SA has produced guidance materials and manuals for use by flight operations and airworthiness inspectors. Bhutan is closely working with COSCAP-SA and actively participating in its activities. With the expansion of the program, the COSCAP-SA will be able to address safety issues and provide necessary guidance for the comprehensive audit under systems approach. The benefits to DCA and Drukair in terms of training opportunities and expertise in hand for consultation and advice are enormous.

PART 5   PROPOSED MAJOR TENTH PLAN PROGRAMS AND PROJECTS

5.1   ICT, MEDIA AND POST

(a)   ICT

The proposed major ICT programs and projects include:

(i)   Implementation of the National Broadband Network Master Plan

The implementation of the National Broadband Network Master Plan is aimed to take broadband services closer to the people at the grassroots, and facilitate access to information and improve delivery of public services by building a robust and reliable nationwide broadband infrastructure. The network will serve as the common conduit for voice, data and video services.

The Master Plan also integrates implementation of OPGW/ADSS on selected power transmission routes.

(ii)   Establishment of ICT Centers

ICT Centers including Regional ICT Centers will be established during the Tenth Plan, to foster balanced ICT development in the country. The Regional ICT Centers will provide backstopping services to the Dzongkhags and to CICs. The implementation of the project on Community Information Centers will also continue to cover all the 205 gewogs and most of the larger communities in the country.

(iii)   Establishment of IT Park

Bhutan's first IT Park will be established in Wangchhutaba under Thimphu Dzongkhag. The implementation of the project aims to increase productive employment opportunities in Bhutan through promotion of enterprise development in the IT and IT enabled-services (ITES) sector, enhanced IT skills, and improved access to finance. Following are the expected benefits:

- Addresses Bhutan's needs for ICT first;

- Builds ICT skills for the new economy;

- Facilitates ICT industry clustering behavior, hence cluster-based ICT markets and FDI promotion;

- Establishes RUB-public-private sector links;

- Promotes entrepreneurship and businesses as "incubators" (e.g. call centers, data centers, medical transcription center, networking, etc.);

- Deploys ICT to employ people, create demand and generate exports;

- Connects Bhutan with the world's development and industry partners;

- Improves enterprise competitiveness using ICT (such as through efficiently enabling economic access to Bhutan's tourism, hydro power, cultural heritage, ecology and governance by the international market);

- Links Bhutan with the global economy and Bhutanese entrepreneurs with international businesses.

(iv)   Implementation of the E-Governance Project

With the implementation of the e-governance project, government services will become available online. This will include clearances, approvals and other government transactions. It will also include deploying ICT to improve the outreach and quality of essential services such as education, health, agriculture, etc.

This project will seek to further capitalize on the investments that have already been made by different agencies on development of ICT applications. It aims to integrate existing systems and development of new applications that can improve service delivery of agencies to make the Government efficient, responsive and citizen-centric. The use of technology offers immense opportunity for the Government to examine and re-engineer its processes to redefine the role of bureaucracy as articulated in the Good Governance Plus.

(v)   Establishment of the Himalayan ICT Center of Excellence

A prestigious Himalayan ICT Center of Excellence is planned to be established in the country, preferably in Bumthang, to meet both the national and regional research and training needs in the field of ICT, in close collaboration with the Royal University of Bhutan (RUB). The Center will provide a national focal point for industry-oriented research and training, moving from a condition of little know-how, inadequate institutions, and an under-supply of trained scientists and engineers to that of an ICT-based economy.

(vi)   Implementation of the ICT HRD Master Plan

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A comprehensive National ICT HRD Master Plan being formulated at present will

be implemented in the Tenth Plan. It will address the issue of human resource requirement for the ICT sector in the context of establishing a knowledge-based information society, taking into account the needs of the country as a whole.

(vii)   Internet Exchange Point

A National Internet Exchange Point (IXP), also known as a Network Access Point (NAP), will be established to maximize the existing infrastructural base for Internet service provision in the country and foster competitive provision of Internet services. This will allow ISPs to exchange traffic between their networks through mutual peering agreements at minimal cost, with better efficiency (in terms of bandwidth and latency) and increased speed. Networks can interconnect directly, via the exchange, rather than through third party networks, and the cost of delivering traffic to upstream providers or to faraway places will be minimized by keeping it within and between adjacent ISPs.

(viii)   E-Waste Management

Electronic waste, or e-waste, is of concern largely due to the toxicity of some of the substances such as lead, mercury, cadmium and a number of other substances. E-Waste includes computers, entertainment electronics, mobile phones and other items that have been discarded by their original users. Disposed electronics are a considerable category of secondary resource due to their significant suitability for direct re-use (for example, many fully functional computers and components are discarded during upgrades), refurbishing, and material recycling of its constituent raw materials.

In Bhutan's context, this is especially important considering that Bhutan has always prided itself for its pristine environment. The country's environment will continue to be a selling point when it markets itself as a special tourist destination.

During the Tenth Plan, a study would be undertaken to determine the magnitude of the problem, if any, and suggest a corrective course of action. The scope of action could be a combination of public education and awareness, new regulations, etc.

(ix)   Data Disaster Recovery Center

At present, most service providers such as banks, BT, BPC, and government agencies have their own systems for providing services. They also have the backup of the system in the same premises. The disadvantage of this structure is that if there is a natural disaster like fire, earthquake or a major problem in the network, the system goes down and customer services are affected. Further, while the services can be restored the data will be lost during the disaster. Therefore, it is very critical to have a Data Disaster Recovery Center (DDRC) in the country to assist the service providers. Once set up,

this facility can also be marketed to regional and global firms requiring such services. The key factor for proper working of a DDRC is locating in different geographical zones.

This project could be initiated by a service provider or the government in partnership with private firms/companies.

(x)   Computer Emergency Response Team

Computer and system breakdowns are regular features in government offices and big companies. Virus, uncontrolled use of pirated software and lack of adequate maintenance infrastructure and systems all contribute to this problem. While this is considered as a part of life at present, it will be unacceptable in the future as the country begins to depend more and more on computer systems for core government and business services. Keeping organizational information assets secure in today's interconnected computing environment is a true challenge that becomes more difficult with each new ICT product and each new intruder tools. How secured the country's network is and the mechanism set in place when an emergency occurs will also be a consideration that business firms will factor in while assessing whether to invest in Bhutan.

The Computer Emergency Response Team (CERT) will act as a coordination centre readily available to respond to and tackle any emergency computer (e.g. computer virus) and network security incidents. Usually the organization handles computer security incidents and vulnerabilities, publish security alerts, and develop information and training on information security. CERT composes a team of people responsible for coordinating responses to viral incidents within an organization.

A CERT can be a *formalized team* or an *ad hoc team.* A formalized team performs incident response work as its major job function. An ad hoc team is called together during an ongoing computer security incident or to respond to an incident when the need arises.

(b)   MEDIA

The proposed Tenth Plan programs and projects include:

(i)   Media Literacy Awareness and Education

Media literacy awareness programs will be conducted to raise general awareness of media literacy among the public. Media will be introduced as a subject in educational curriculum. Media events will be organized from time to time to showcase innovative and creative media products and services.

(ii)   Preservation and Development of Local Content

Initiatives to preserve local content including oral tradition content and digital archiving of religious texts will be implemented. Further, the government will support HRD and capacity building in media and promote the development of appropriate local content. A music school will also be established.

Movie halls will also be established in major urban centers through public-private partnerships. The ongoing Dzongkha localization project will be beefed up and research will be undertaken on spoken form of the language to help develop a text to speech system for Dzongkha language and other applications.

(iii)   Free, Responsible and Sustainable Media

Focused measures need to be put in place to ensure a free, responsible and sustainable media in a competitive environment. Some of the activities include providing HRD support to media agencies, establishment of a media education and training institute, operationalization of the National ICT and Media Development Fund, institutional strengthening of BBS etc.

(iv)   Independence of the Regulatory Body

BICMA will be re-structured and strengthened based on the relevant provisions of the Bhutan Information, Communications and Media Act 2006. The regulatory body must function independent of any political interference or influence by market players in its decision-making processes.

(c)   POST

Following are some of the key projects that Bhutan Post will take up during 2008-2013:

(i)   Establishment of Correct Addressing and Postal Code System

Although post codes and Zone Improvement Plan (ZIP) codes have played important roles in other countries, Bhutan does not have this system in place. Post codes or ZIP code channel the deliveries to customer's locations. In a way, post code or ZIP has become customer locators. It also suggest that mail travels more efficiently (and therefore faster) when senders use it in their addresses. The introduction of post code system is also envisaged to assist in greater democratic governance through ease of postal communication system. The project is estimated to cost at least Nu. 13 million. Bhutan Post is seeking assistance from the UPU and other donor agencies for its implementation.

(ii)   Feasibility Study on Postal Savings Scheme

The idea is to provide banking services through the post offices network. In most countries, the Post Office network is probably the most extensive network of retail outlets. This also applies to Bhutan. Thus, this network could facilitate the distribution of financial services of various kinds in economic and rural development. Financial services should be offered to the whole population of Bhutan, both urban and rural, in a geographically accessible way and in an affordable manner.

Bhutan Post has identified a consultancy firm, NethPost, in the Netherlands to carry out a feasibility study for Postal Banking in Bhutan in the first half of 2007.

(iii)   Review of Postal Policy and Legislation

Bhutan Post is in the process of drafting a new Postal Services Bill with an aim to update global developments in the postal sector as well as cover private enterprises engaging in courier and postal-related businesses. The main provisions will include the Terms of Reference of the Postal Regulator and the Licensing of Postal Operators. The Bill and associated Regulations will be finalized towards the end of 2007. On enactment by the National Assembly, the new Act will replace the Bhutan Postal Corporation Act 1999.

(iv)   Development of Logistic Services

Bhutan Post is planning to develop logistics service. Under the Multi-year Integrated Program, the UPU International Bureau fielded a consultancy mission to Bhutan on "Logistics Services". The consultant carried out studies to determine the scope of logistics service, identify the facilities and equipment required and the possibility for taking a strategic partner to provide logistics services.

(v)   Institutional Strengthening of Bhutan Post

The main challenge for Bhutan Post is to foster a more commercial outlook in its management and staff without losing the sense of social obligations. The following institutional strengthening measures will be undertaken:

- Organizational restructuring to gain a more commercial orientation and to provide a stronger ICT capability;
- Review of job classification and remuneration;
- Introduction of a performance-based review and reward system;
- Training and re-training of employees at all levels with emphasis on commercial skills such as sales, marketing, business management etc.

(vi)   Real Estate Development

Bhutan Post plans to construct new buildings at various locations. The Board in 2006 approved the construction of two five-storied buildings at Phuentsholing and one four-storied building at Trongsa. The architectural design for the building is under process and the construction may begin in late 2007 after obtaining loans from financial institutions.

The Management also insured most of its buildings from 2006 onwards against fire as these were not insured earlier. Furthermore, in order to maintain the real value of its building properties, the Management started an active maintenance policy from 2006.

(vii)   Tie-up with an International Courier Company

Bhutan Post has been trying to cooperate with the FedEx Express for business in Bhutan. The discussion started in March 2006 with the visit of the Managing Director and General Manager, Business Development & Marketing to Delhi to meet Mr. Taarek Hinedi, Managing Director, FedEx Express, India. Mr. Hinedi also visited Bhutan in October, 2006 to continue the discussion. As a follow-up, a lot of business information has been exchanged between the two parties. We expect to launch the FedEx business in Bhutan to be run by Bhutan Post as a franchisee from its principal company in the first half of 2007. This collaboration will give Bhutan Post the much-needed training and quality of service standards which is vital for future growth of Bhutan Post.

(viii)   Philately Project

Bhutan will celebrate the Coronation of the Fifth King and the Centenary of Monarchy by organizing various activities and events during the year. For this festive event, Bhutan Post is looking forward to an incredible year ahead and has planned a wide range of activities. Some of the products include:

- Release of CD/DVD Stamp to celebrate the Coronation and Centenary celebration in 2008;

- Release of Normal Stamps with First Day Covers;

- Philatelic Exhibition;

- Souvenir items such as caps, T-shirts, key chains and mugs, special calendar, post cards, mobile post office;

- Free Post Day.

5.2   TRANSPORT

(a)   SURFACE TRANSPORT

The proposed major Tenth Plan programs and projects include:

(i)   Alternate Modes of Transport

- Feasibility study for ropeways and implementation on a pilot basis since these are generally considered to be a suitable substitute for roads in terrain with significant differences in altitude. For this reason, detailed feasibility studies would be under taken and some ropeway infrastructure implemented.

- Feasibility study on inland waterways – A preliminary examination of the country's four river systems indicate possibilities of developing the Pho-chhu, Mo-chhu and Manas rivers as inland water transport system. Manas can be extended to provide connectivity to India using Brahmaputra river and further to Bangladesh and Kolkata/Haldia.

- In addition to linking the five border towns, feasibility for developing an east-west light rail transit system would be undertaken for implementation in the subsequent plans. This rail network will originate from Sipsu and terminate in Daifam connecting several points in between with an extension to Gelephu.

(ii)   Urban Transport

- Electric trolley buses are widely used in different parts of the world to provide urban transport. These buses are considered particularly advantageous in hilly areas as electric power is more effective than diesel for climbing steep hills and trolley buses' rubber tires have better adhesion than wheels on steel rails. Trolley buses are also especially favoured where hydropower is abundant and cheap.

- Monorail or Sky Train is a rail-based mass transit system built on elevated structure providing fastcheap, emission free and energy efficient transportation system. It is safe, reliable, fast, environment-friendly and provides problem-free transport in all kinds of weather conditions. Most importantly, land requirement would be comparatively less for building stations in inter-mediate points since the proposed route would follow the river system. To start with, the sky train system could begin from Dechhencholing until Babesa along the Wangchu passing through different stop points. The link could be extended to Khasadrapchuand onward to Paro town via the international airport.

- Battery-operated buses are already in use in several countries and therefore could be explored as an urban transport option. This technology would be piloted in Thimphu and Gelephu. Thereafter, depending on the suitability and sustainability of this option, battery-operated buses may be introduced in Phuentsholing and Samdrupjongkhar considering short commuting distances.

(iii)   Infrastructure Development

Infrastructure development will be mainly in the form of integrated bus terminals with associated facilities such as offices, bus sheds, and public toilets. Other facilities include highway amenities such as vehicle facilities, rest areas, public call offices, parking areas, passenger waiting sheds etc. along most primary roads. Wheel-chair ramps will also be constructed at bus terminals for physically disadvantaged people.

(iv)   Road Safety, Enforcement and Transport Research

Road safety program will continue to receive priority attention through appropriate and regular interventions. Transport research and institutional capabilities will be enhanced concurrently during the Tenth Plan. Road Safety, post accident management and awareness program. Under this program, road safety education and awareness will be carried out, automatic vehicle testing machine and accident rescue equipment will be procured and training conducted for search and rescue operation. In addition, Regulatory and Operating Standards, and policy instruments will be developed where lacking.

(v)   Passenger Transport Services

- Passenger transport services will be enhanced in terms of access and frequency of services in remote areas, inter-Dzongkhag routes, and urban transport through an appropriate subsidy mechanism.

- Quality of services will be closely monitored and more comfortable buses inducted into the transportation fleet by private operators.

(vi)   Institutional Capacity and Public Service Delivery

- Enhancement of public service delivery through deployment of ICT and e-services, automated driving testing and introduction of intelligent transport system (e.g. using Global Positioning System) will receive major attention during the Tenth Plan.

- Capacity of enforcement agencies will similarly be developed through training, creation of new Base Offices and collaboration with regional and international organizations.

(b) CIVIL AVIATION

The proposed major Tenth Plan programs and projects include:

(i) Aligning National Laws and Regulations with International Standards

A sound regulatory and institutional framework is a critical starting point for improving aviation safety and security. Strategic measures will be taken during the Tenth Plan to review and amend the existing Civil Aviation Act, Regulations and Standards to achieve compliance with International Conventions and Protocols that Bhutan has ratified, and to the ICAO Standards & Recommended Practices (SARPs). Organizational reforms will also be carried out to strengthen the regulatory arm of the Department.

(ii) Establish Domestic Helicopter Service

Development of infrastructure and introduction of Domestic Helicopter Service will continue to have high priority in the Tenth Plan. The principal strategy for launching the domestic helicopter service will be through the involvement of the private sector. Based on the lessons learnt from several failed attempts in the past to introduce domestic helicopter service in the country, specific intervention measures will be adopted to address the main concerns of the potential operator.

(iii) Establish Domestic Fixed-wing Infrastructure

Considering the country's long-term need for domestic air service using fixed-wing aircraft, feasibility studies will be carried out for establishing domestic air service infrastructure across various regions of the country and Master Plans will be developed. The construction of domestic airstrips at Bumthang, Yonphula/Bartsam and Phuentsholing will be taken up to put in place the required infrastructure for fixed-wing operations.

(iv) Search & Rescue (SAR) and Medical Evacuation Capability

DCA will focus on developing Search & Rescue and Medical Evacuation services capability in the country. The main activities under this program are establishing Search & Rescue sub-centre and put in place the SAR agreements with Government of India.

(v)   Establish Second International Airport

Considering the country's long-term need for an international airport with Instrument Landing System (ILS) capability, site surveys and feasibility studies for identifying an airport with ILS capability will continue to have high priority. Priority in the Tenth Plan will be on developing airstrips with basic air navigation and aerodrome services capable of handling flights diverted from Paro airport with a provision for future expansion into an ILS-equipped airport.

(vi)   Develop Paro International Airport

The following activities will be carried out under this program to enhance safety and to accommodate the growth of passenger flow in the future:

- Develop flood mitigation program;

- Upgrade and develop existing communication, navigation, meteorological service;

- Upgrade and develop existing security, emergency response and surveillance systems;

- Expand existing and construct additional facilities.

(vii)   Improve Service Delivery

Delivery of public services will continue to receive the highest priority. Following activities will be undertaken under this program: Establish and promote service standards, and establish monitoring and feedback mechanisms to develop staff competency.

PART 6   BEYOND 2013 …

(a)   ICT

The following plans and programs are envisaged for the ICT sector:

- Establishing about three IT Parks in other regions to support the activities of the Government and promote ICT businesses in other parts of the country;

- Taking broadband to the village level deploying innovative and costeffective solutions;

- Institutional strengthening of the regulatory body, based on the principles of accountability, transparency and consistency of decision-making processes, and more focused on ex post regulatory measures;

- Building a more secure and redundant backbone and spur networks suitable for achieving ubiquity of ICT access across all parts of Bhutan;

- Establishment of ICT Hardware Plant.

(b)   MEDIA

The following programs and projects are foreseen:

- Establishing an enabling environment to sustain and manage competition in the media market;

- Enhancing measures to improve professionalism in the media sector;

- Increasing the role of media in governance and democracy;

- Improving the content and quality of media services;

- Increasing the radio and TV broadcast airtime;

- Developing modern infrastructure for public access to media services.

(c) POST

The following are the plans and programs envisaged post 2013:

- Develop an electroic point-of-sales system in major post offices to provide:

    - Agency bill payment services;
    - Agency savings bank services;
    - Agency insurance services;
    - Money transfer;
    - Sales records and receipts;

- Entering into logistics business and e-commerce;

- Focusing on customer-orientation and branding;

- Diversification of business portfolios;

- Introducing intelligent national postal networking.

(d) SURFACE TRANSPORT

The following plans and programs are envisaged post 2013:

- Completion of railway links to the five border towns in Bhutan from corresponding rail heads in India;

- Implementation of the urban transport system using eco-friendly options such battery buses, electric trolley buses and mono-rail/sky train in the capital region;

- Implementation of the east-west rail light transit system connecting Sipsu in the west to Daifam in the east with an extension to Gelephu;

- Implementation of the ropeway transport system;

- More focused road safety programmes;

- Development of transport infrastructure mainly in the form of integrated bus terminals and amenities along the primary highways;

- Implement Intelligent Transport System including the Global Positioning System for traffic monitoring and management, and SAR operation;

- Enhance public service delivery system through extensive use of ICT and online applications;

- Deregulation of passenger transport services.

(e)   CIVIL AVIATION

Beyond 2013, the following plans and programs are envisaged for the civil aviation sector:

- Liberalization of air transport in South Asia within the SAARC framework (e.g. South Asian Common Asian Market 2020);

- Capacity development and institutional strengthening;

- Expand airline network and reduce dependency on 5th freedom traffic;

- Upgrade airport infrastructure and services to meet international standards;

- Fully functional International Airport at Gelephu with ILS facility.

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GLOSSARY

ABMS	Automated Border Management System
ADSS	All Dielectric Self Supporting
AFD	Administration & Finance Division
AFTN	Aeronautical Fixed Telecommunication Network
APO	Agency Post Office
AVSEC	Aviation Security
BBS	Bhutan Broadcasting Service
BGTS	Bhutan Government Transport Service
BICMA	Bhutan InfoComm & Media Authority
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BPC	Bhutan Power Corporation Limited
BPO	Business Process Outsourcing
BTL	Bhutan Telecom Limited
BTS	Base Transceiver Station
CAMP	Civil Aviation Master Plan
CASP-AP	Cooperative Aviation Security Program – Asia Pacific
CCTV	Closed Circuit Television
CDP	Capacity Development Project
CERT	Computer Emergency Response Team
CIC	Community Information Center
CIP	Commercial Important Person
CMO	Community Mail Office
COSCAP-SA	Cooperative Development of Operational Safety and Continued Airworthiness Program – South Asia
DCA	Department of Civil Aviation
DDRC	Data Disaster Recovery Center
DHL	Adrian Dalsey, Larry Hillblom and Robert Lynn (After the Founders)
DIT	Department of Information Technology
D-LAN	Dzongkhag LAN
DoIM	Department of Information & Media
DRMASS	Digital Radio Multiple Access Subscriber System
DVD	Digital Versatile/Video Disc
EMS	Express Mail Service
EU	European Union
FDI	Foreign Direct Investment
FM	Frequency Modulation
GNH	Gross National Happiness
GoI	Government of India

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GPO	General Post Office
GPRS/EDGE	General Packet Radio Service / Enhanced Data rate for GSM Evolution
GSM	Global System for Mobile communications
HRD	Human Resource Development
ICAO	International Civil Aviation Organization
ICT	Information and Communications Technology
ILS	Instrument Landing System
IPDP	Integrated Postal reform and Development Plan
ISP	Internet Service Provider
IT	Information Technology
ITES	IT-Enabled Service
IXP	Internet Exchange Point
JDWNRH	Jigme Dorji Wangchuk National Referral Hospital
LAN	Local Area Network
LCO	Local Cable Operator
Mbps	Mega bits per second (1 x 106 bits per second)
MIP	Multi-year Integrated Project
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoF	Ministry of Finance
MoFA	Ministry of Foreign Affairs
MoH	Ministry of Health
MoHCA	Ministry of Home & Cultural Affairs
MoIC	Ministry of Information & Communications
MoLHR	Ministry of Labour & Human Resources
MoU	Memorandum of Understanding
MoWHS	Ministry of Works & Human Settlement
MSO	Multi-Service Operator
MTI	Ministry of Trade & Industry
NDLB	National Digital Library of Bhutan
NPPF	National Pension & Provident Fund
Nu.	Ngultrum (Bhutanese Currency)
OPGW	Optical Power Ground Wire
PCN	Pavement Classification Number
PO	Post Office
PPD	Policy & Planning Division
RBA	Royal Bhutan Army
RBP	Royal Bhutan Police
R&D	Research & Development
RCSC	Royal Civil Service Commission
RGoB	Royal Government of Bhutan

RMA	Royal Monetary Authority
RSTA	Road Safety & Transport Authority
RUB	Royal University of Bhutan
SAARC	South Asian Association for Regional Cooperation
SAR	Search & Rescue
SARPS	Standards and Recommended Practices
SASEC	South Asia Sub-regional Economic Cooperation
SEK	Swedish Kroner
TA	Technical Assistance
TV	Television
TVRO	TV Receive Only
UN	United Nations
UPU	Universal Postal Union
USA	United States of America
VFR	Visual Flight Rules
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WLL	Wireless Local Loop
ZIP	Zone Improvement Plan

ABOUT THE MINISTRY OF INFORMATION & COMMUNICATIONS

The Ministry of Information & Communications, established in July 2003, is the government agency responsible for overseeing the development of information, communications and transport sectors comprised of ICT, media, post, surface transport and civil aviation. The overall objectives of the Ministry are to tap the potential of ICT and media for socio-economic development and facilitate safe and reliable surface and air transport system in Bhutan. Its mandate thus includes coordination and facilitation of the development of an efficient, a reliable and relevant ICT and media infrastructure and services, and fostering the development of a safe and sustainable surface and air transport in the country.

The Ministry's organizational structure is as depicted below:
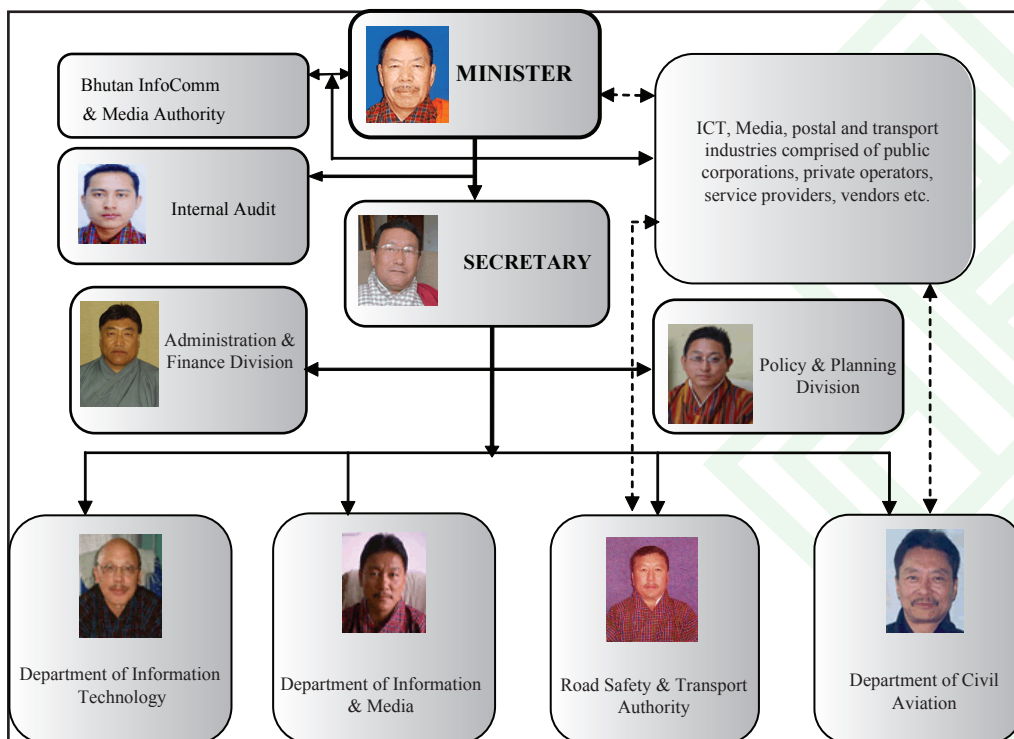
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