

5-4 航空保安施設等の現状と問題点

ネパールの空港は、就航する航空機の種類に応じて、4種類（Pilatus 用空港、Twin Otter 用空港、Avro 用空港及び国際空港）に分類されており、航空保安施設も、この4区分に応じて整備・管理されている。各空港区分毎の設備の現状及び問題点等は、次のとおりである。

(1) Pilatus 空港

航空保安施設としての無線施設や照明施設は何も設備されていない。単に滑走路（離着陸に支障ない広さを有しているが、路面は石片で覆われたものにすぎない）があるだけである。

いずれも山岳部に位置しており、気象条件の変化しやすい環境にあるところから、定期路線をもつ空港については、何らかの無線施設が必要となろう。電源については、すでに各地で採用されている太陽電池の導入が最適と考えられる。

(2) Twin Otter 空港

最も数の多い空港であり、最低限度の航空保安施設として管制卓、HF、VHFが各空港に設備されている。空港によっては、これらのほか必要に応じてNDBやPAPIが設置されている。これらの設備は全てフランス製であるが、設備の状況等は、次のとおりである。

a) 管制卓

管制卓には、HF、VHFのほかに時計、気圧計、風向・風速計、サイレン用スイッチ、ラウドスピーカー、レコーダー及びプレーヤー、インターホン（5ch）、電源制御用タイマーが組み込まれている。サイレンやラウドスピーカーは、飛行機の飛来を周辺住民に告げるためのものであり、インターホンは、ターミナルビルや警察との連絡用である。

b) HF（短波送受信機）

フランスのトムソンCSF製TRC 492、出力100WのSSBトランシーバーである。HFは固定局間通信に使用しており、2波のうち1波が選択できるものである。

c) VHF（超短波送受信機）

フランスのナルドー（Nardaux）製T 380、出力10Wのトランシーバーである。VHFは、航空機との交信に使用するものであり、2波のうち1波が選択できる。

HFにしてもVHFにしても、小型の簡便なものであり、日本のアマチュア無線局程度のものである。山岳・丘陵部であり、有線電話はないので、HF、VHF以外の通信手段はない。

d) NDB（無指向性無線標識）

中波の無指向性電波を出力25Wで送信する設備であり、航空機の自動方向探知機によりNDB電波を受信し、空港の方向を知ることができる。後述するVORよりは精度が落ちるが、最も基本的に簡易な無線航法施設である。現状では満足されているが、空港の重要度に応じて検討を要すると思われる（写真5-4-1）。

e) PAPI (進入角指示灯)

着陸最終進入段階の航空機のパイロットに、適切な降下角度を視覚的に指示(適切な降下角以上で白色に、以下の場合に赤色に見える)するものであり、効果のある設備と判断される(写真5-4-2)。

f) 電源設備

地形上、商用電源のない空港のため、太陽電池が使われている。晴天の日に蓄積したエネルギーをバッテリーに充電しておくため、曇天や夜間でも電源は確保されている。地形的な制約があり、日差しの強いネパールでは効果のある設備である。ネパール側のT/Rに太陽電池設置についてのフィージビリティ確認の項目があるが、電力事情が変化し、容易に買電できるようになるまでは、太陽電池による確保は効果的であると考えられる。

電源を入れたまま放置すると、バッテリーが放電してしまうことから、無線機や管制卓のために最大60分、PAPI(消費電力が大きい)のために最大15分のタイマーが管制卓に組み込まれており、工夫がなされている。

Twin Otter 空港の設備は、太陽電池設備を除いて、いずれも古い機材であるが、簡易なものであり、取り替えも比較的容易なものである。現状の輸送状況等を勘案すれば、高度な設備より、維持管理の容易な、これらの比較的簡易な設備が望ましいものと考えられる。

(3) Avro 空港

Avro 空港は、ボカラを除き、タライ平野部に位置しており、インドからの電力供給を受けている点が、Twin Otter 空港と異なる。しかしインドの電力事情は悪く、停電が頻発するほか、電圧変動が大きく(規格220Vに対して100-450V)、必要に応じて電圧調整器が使われているものの、機器の故障の原因の一つになっている。

航空保安施設の設備の現状等は、次のとおりである。

a) HF, VHF

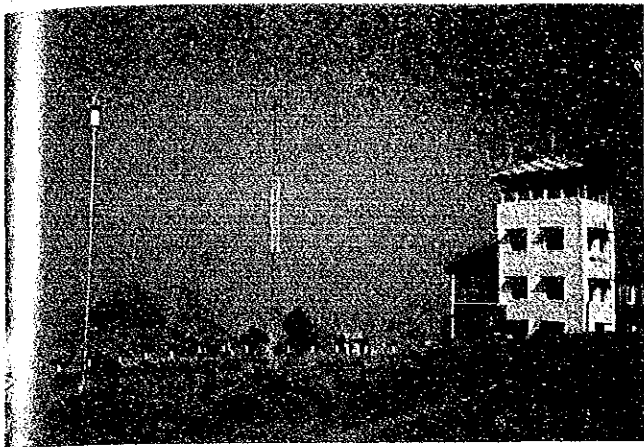
HFは、マルコニ・カナダ製のトランジスタ式のものが使われており、予備として真空管式の旧式タイプのもので置いてある。VHFは、アメリカ製である。HF, VHFとも、2波のうち1波を選択する卓上タイプである。

b) ADF (自動方向探知機)

主要な空港には、VHFのADFを備えている。これは航空機からの対空通信(VHF)の電波を受信し、その到来方向をADFで検知し、パイロットに、その方向を通報するためのものである。ADF局が二つあれば、三角法によりパイロット自らが、自機の位置を知ることができる。

表 5-4-1 航空保安要員

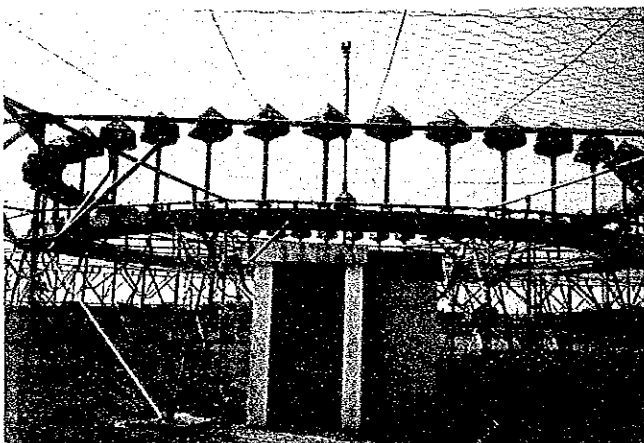
AIRPORTS	STAFFS		
	ATC OFFICER	COM OFFICER	RADIO OFFICER
	管制官	管制通信官	管制技術官
1. Chandragadhi		2	
2. Biratnagar	5	3	2
3. Tumlingtar		2	
4. Bhajpur		1	
5. Lamidanda		2	
6. Rajbiraj		2	
7. Lukla		1	
8. Ramechhap		1	
9. Jarakpur	4		1
10. Simra	4		
11. Bhartpur	3		
12. Pokhara	4		
13. Jomsom		2	
14. Balewa		2	
15. Bhairahwa	7	4	
16. Dang		2	
17. Chaurjhari		1	
18. Dolpa		1	
19. Nepalgunj	5	3	3
20. Surkhet		2	
21. Sanfebagar		2	
22. Doti		2	
23. Bajura		1	
24. Jumla		2	
25. Simikot		1	
26. Bajhang		1	
27. Bajtadi		1	
28. Dhangadhi		2	
29. TIA	21	24	14
30. DCA	7	3	15
TOTAL	60	70	35



▲ 5-4-1 Lamidada空港の航行援助施設
左からNDBアンテナ、HFアンテナ、管制塔



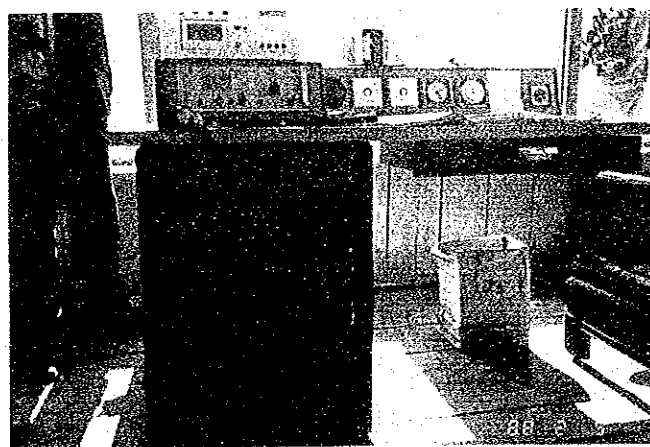
▲ 5-4-2 Lamidada空港
PAPI(進入角指主灯)



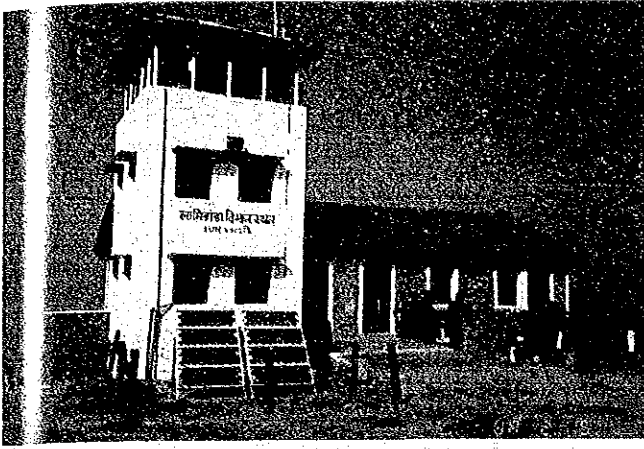
▲ 5-4-3 カトマンズ・トリブバン国際空港の
VOR/DME施設



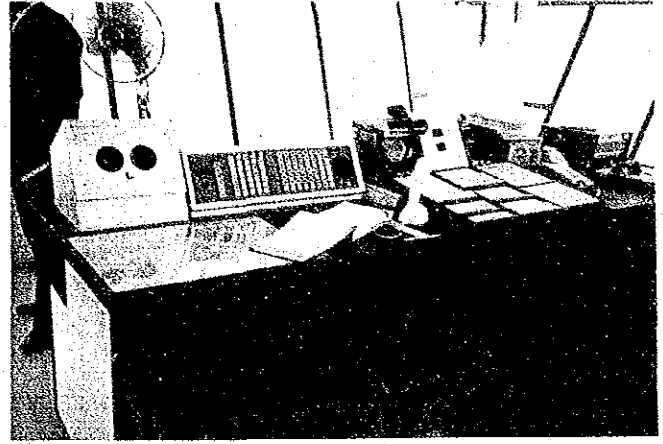
▲ 5-4-4 カトマンズ・トリブバン国際空港の
航空路管制室



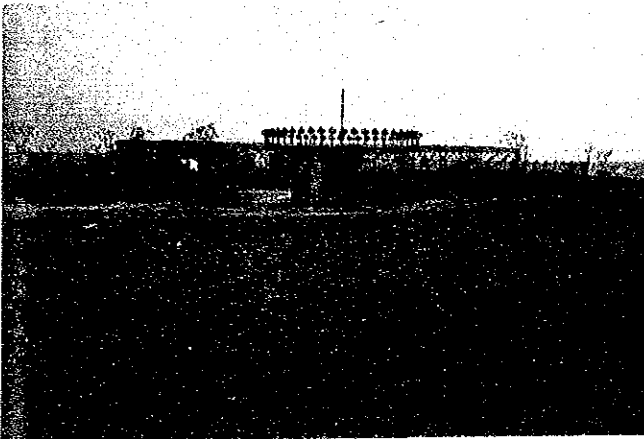
▲① TWIN OTTER空港の管制卓
(Lukla)



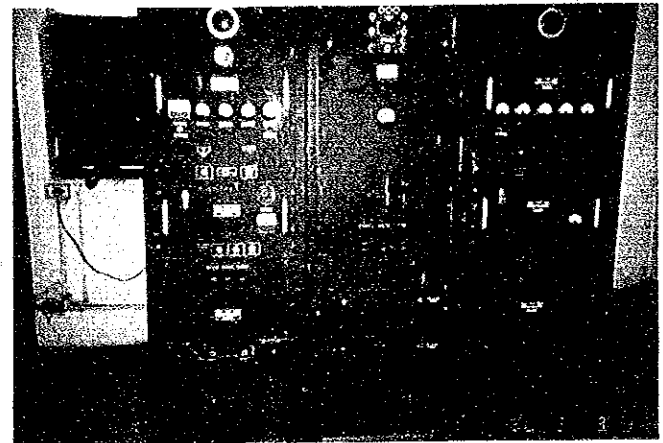
▲② TWIN OTTER空港の管制塔と太陽電池地
(Lamidada)



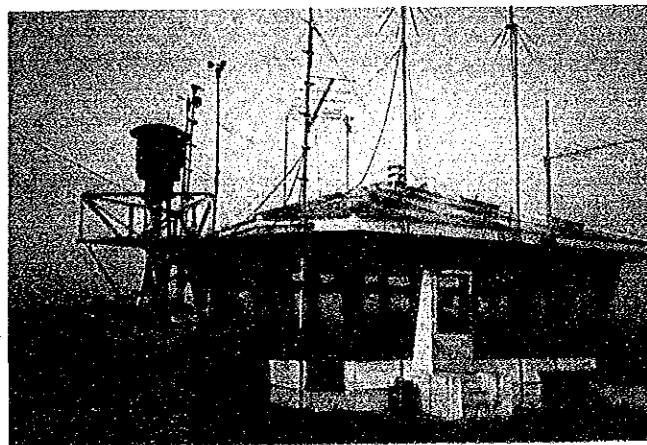
▲③ AVRO空港の管制卓
(Nepalgunj)



▲④ TIAのVOR/DME



▲⑤ TIAのNDB送信機



▲⑥ TIAの現管制塔
(ターミナルビルの屋上)

c) NDB

アメリカやカナダ製の、極めて古い機器が使用されており、日本では見られないものである。ピラトナガール空港のNDBは、87年の雨期の洪水により、機器（アメリカAERO COM製400W）が水没し、現在はフランス製の可搬式（10W）の機器が使用されていた。

トライ平野部での、これらの機器の設備状況は、土盛の上に機器を置くだけに近いために生じたものであり、機器の管理以前の問題として、改善が必要と考える。また、簡易式の設備で、半年もの間使用しており、安全確保面からも、早期に更新すべきであるが、資金不足が、機器の手配のできない原因であることを考えれば、最低限必要な航空保安施設に対する日本からの無償資金協力による援助等の必要性が感じられた。

d) VOR/DME

VOR（超短波全方向式無線標識）の用途は、NDBと同じであるが、精度は、はるかに高い。またDME（超短波距離測定装置）は、航空機にDME局までの距離を知らせるための設備である。カトマンズとネパールガンジ空港だけに設備されているが、ネパールガンジ空港については、電源事情が悪いこと（電圧変動や停電の頻発）、技術者が不足していること、破損した部品のスベーパーツが不足していることが原因で、使われていない。高度の機器導入については、技術者の養成等に十分な配慮が必要であり、ネパールガンジのVOR/DMEが、ネパールでの航空保安施設の管理運営の典型例といっても過言ではないと思われる。

e) AFIS サブセンター

ネパールガンジ空港には、AFIS（国内固定通信網；Aeronautical Fixed Service Station）のサブセンターが設置されているが、運用要員が不足のために稼動しておらず、要員の適正配置を含めた管理体制づくりが、機器の新設より急務と思われる。

(4) トリブバン国際空港（TIA）

ネパール唯一の国際空港であり、現在、国際線ターミナルを中心とした新空港を建設中であり、1988年12月に供用開始が予定されている。同時に管制塔も新しくなるが、その機器はオーストラリアが援助することになっている。管制機器については、新品が導入されるが、移転に支障しない一部の機器は、引き続き使用する計画になっている。

主な航空保安施設についての現況等は、次のとおりである。

a) VOR/DME

空港の南約1kmの地点に設置されており、ネパールで唯一の稼動しているVOR/DMEである。周辺は田畑であり、電波的な設置環境はよい。VORはオーストラリアAWA製100W、DMEはアメリカWILCOX製1,000Wで、それぞれ2台、自動切り替えである（写真5-4-3）。

カウンターポイズは直径約30mで、網目は、人のこぶしが楽に通る程度の、極めて粗い

ものであり、ワイヤーも細く、とても人間が乗れるものでなく、支柱は日本の工事用仮設に似たものとなっている。電源は商用電源であり、スタビライザーが使われている。また、VORは直流で動作しており、バッテリーバックアップしている。VORのモニター用アンテナは一つだけである。

日本のVOR/DMEに比べれば、極めて簡素な設備であるが、一応、ICAOの国際基準は満足されている。とはいえ、精度や信頼性については不安な面があるが、ネパールにおける最も進んだ航行援助施設である点は間違いのないところである。

b) NDB

NDBは滑走路の西側の送信所に設置してあり、管理面では、他の空港に比較してゆき届いている。設備は真空管式で旧式である。

c) 通信施設

固定局間通信のためのHF-SSBと、対空通信のためのHF及びVHFの送受信機がある。TIAはネパールの航空網のキーステーションであるので、設備は整っているが、真空管式の、古くかつ性能の悪い機器であり、国際空港としての観点からは、ぜひとも更新を図るべきものの一つである。

送信所はNDBと同じ建物にあり、受信所は滑走路を挟んで反対に位置するが、いずれも有線ケーブルで結ばれている。

d) 管制塔

現ターミナルビルの屋上に位置し、一応の設備は揃っており、ADFもある。なお、レーダーが無いので、レーダー管制室は無い。

e) 航空路管制室

航空路管制卓は1席のみで、数本のインド寄りの及びインドとの間の航空路を管制しているが、すべてマニュアル管制である。遠距離はHF、近距離はVHFを使って交信しているようである。

f) レーダー施設

ネパールには、航空管制用のレーダーは、TIAにおいても設備されていない。その理由としては、運航回数が少ないこと、運用要員がいないこと、レーダーを保守できる技術要員がいないこと、等であり、現地調査時点での航空局長の認識も、高度で複雑な機器については、運用が困難とのことであった。ちなみに同局長は、パイロットと管制官の免許を有し、これらの実務に極めて明るい人である。

g) 着陸援助施設

ILSは地形的な制約から設備は困難であり、T-VASIが設置されているだけで、日本に比べ、極めて簡易なものである。TIAでは、今後ともILSの設置は困難であり、ライティングシステムによる着陸援助施設の充実に努めるべきであると考えられる。

(5) 管理・運営

航空保安施設の管理・運営要員は、表5-4-1に示すとおりである。管制官の配置されている空港はTIAのほか7空港であり、運航回数の少ない空港であるJanakpurでは4名の要員が配置されているなど、管理体制についての検討が必要になると思われる。航空機に対し、気象状況、滑走路状況、航空保安施設の状況等の情報を提供する管制通信官は、TIAのほか24空港に配置されている。43空港のうち14空港については、管制官または管制通信官は配置されていない。

航空保安施設の状況等の情報を提供する管制通信官は、TIAのほか24空港に配置されている。43空港のうち14空港については、管制官または管制通信官は配置されていない。

航空保安施設の保守・維持管理を行う管制技術官は、TIAを除き、4名が地方空港に配置されているだけで、点検保守等は航空局またはTIAから派遣される技術者によってなされている。限られた要員のなかでは、相互運用や技術基準の徹底等で効果的な方法と思われる。

職員や技術者の養成は、独自の要員養成機関をもっているが、管制官、管制通信官及び管制技術官のように高度の技能を要求されるものについては、外国の養成機関の協力を頼っている。

(6) 問題点

上記の項目でも一部触れているが、航空保安施設に係る問題点として、次の点があげられる。

- a) 空港運用時間については、夜間運航のための航空保安施設は無く、全て日の出から日没までの運用となっている。国際路線の拡大や、国内での就航機数の増加に対応した運航計画に制限が生じるほか、輸送量や運航回数増加に柔軟な対応が困難となる欠点を有している。少なくともTIAについては、遅延での夜間着陸の場合の対応等を考慮し、夜間の着陸が可能な設備を整えることが不可欠と考えられる。
- b) 安定した電源確保は、航空保安施設の稼働にとっても、また電圧変動での機器の故障の減少にとっても、極めて大切なことであるが、現状では問題が多い。ネパールの埋蔵水力発電量は83,000 MWといわれており、現在の開発は、その1%に満たないため、インドから電力供給を受けているが、開発を進めている水力発電は社会・経済的要求のみならず、空港整備においても、その促進が待たれるところである。
- c) 機器の老朽化や機器のパーツ不足は致命的であり、また、機器が多く外国の援助でできていることから、故障のまま放置するケースが多く見受けられ、航空輸送の安全確保からも問題である。更新の時期には、外国からの援助といいながらも、できるだけ基準の統一や機器の統一を図るべきものとする。

付 録

TERMS OF REFERENCE FOR CONSULTANCY SERVICES
FOR THE DEVELOPMENT OF AVIATION IN NEPAL

1. INTRODUCTION

The Government of Nepal recognizes the importance of aviation in the over-all development of the country and plans to stress the development of airports and aeronautical communications in the coming years.

The project described in these terms of reference consists of consultancy services required for the over-all development of the national air transport system in Nepal. The services should include nation wide air traffic and cargo demand forecast with the break-down on expected air routes and aircraft fleet plan, modernization of local airports and aeronautical communication system.

2. OBJECTIVES

The objectives of the consultancy services are divided into three parts as outlined below:

A. PART I

The objective of the consultancy services under PART I will be

- to review and update a nationwide air traffic forecast, domestic and international including both air passenger and air freight, with special reference to Seventh Five Year Plan especially keeping in view the development of roads and other modes of transport. The traffic projection should incorporate break-down for each separate routes.
- to identify the most feasible air transport network system and determine the extent of development of prospective air route.
- to identify domestic airports which need to be retained and developed; and to identify those airports that may be closed due to the availability of alternate modes of transportation.

- to categories the airports according to the level of air traffic, and other relevant factors.

B. PART II

The objective of consultancy service under this part shall be.

- to determine the level of services, physical facilities navigational and communication facilities to be provided under each category of airport identified in PART I.
- to prepare master plans for the airports that forms the part of airtransport network system as identified under part I, including Tribhuvan International Airport.
- to identify a model airport under difference categories, e.g. STOL airport, AVRO airport and an international airport by mutual consultation with DCA officials and with the approval of the National Planning Commission. After the model airports have been identified, feasibility studies for the development of the identified airports should be carried out. If feasible, schematic design and cost estimates for the execution of the development work and/or renovation work of each of the model airport should be prepared. Cost estimates shall also include any additional investments necessary for the utilities and services of the airport and air navigational aid facilities, such as additional roads, power supply and telecommunications. Estimation shall also be made for the operation and maintenance of the airport.

The Consultant shall also identify all constraints that may be encountered in executing the said development and determine alternatives through economic justifications. The consultant shall also analyses the feasibility of using solar energy or other alternative energy sources for the

operation of the airport.

C. PART III

The objective of the consultancy services under this part is to assess the need and the economic justifications for a national aeronautical communications system and an air navigational aid system, and to plan rational system accordingly along with the estimates of their costs.

3. SCOPE OF CONSULTANCY SERVICES

A. GENERAL

The consultants shall provide service required to achieve the objectives outlined briefly in section 2 herein. In conducting their work, the consultants shall fully co-operate with DCA, which will help providing data and local services outlined in the section below. The consultants shall co-ordinate their work with other studies and surveys being carried out by other consultants. The consultants shall, however, be solely responsible for the analysis and interpretation of all data, and for presenting their conclusions and recommendations.

B. REVIEW OF EXISTING DATA

The consultants shall acquire and review all pertinent data and reports of relevant studies, and other related development programs. They must assume, however, that any aviation related field work previously carried out was of preliminary nature and must be rechecked.

C. TRAFFIC FORECAST

The consultants shall review all air traffic data related to the airports and air routes, and make a forecast accordingly. Detailed forecast broken down

into major groups of passengers (origin/destination, foreign/Nepalese, business/tourist), cargo and aircraft movements by type, load factors etc. shall be presented for the year 1990, 1995 and 2000.

D. ECONOMIC ANALYSIS

The consultants shall determine the airports and air routes which need to be improved through economic analysis.

The analysis shall involve an assessment of the effect on air traffic generation, for both the passenger and freight, of potential savings in economic cost to travel and of the potential development of the region.

The economic benefit of the construction of the airport and air navigational aids are those that have direct and indirect impact on the Nepalese economy. They are expected to derive from lower operating costs of aircraft as a result of the improvement of airports and navigational aids, and/or the reduction in costs of airport operations and maintenance. Any possible benefits of international tourist traffic generation to the region should be measured in terms of the gross expenditure of the additional passengers, less the value of the foreign and domestic resources required to procure what they consume in the country.

The consultant shall also assess the socio-economic benefit as the case need be.

On the basis of the above information, the consultants shall calculate the economic rate of the return with its appropriate sensitivity analysis and recommend a schedule of priorities and phasing for the improvements.

E. AIRPORT MASTER PLAN

The consultants shall develop a plan for each of

airports considering the optimum runway length, width and pavement strength (if necessary), the apron size, terminal facilities such as terminal building, staff quarters, Fire station, security fence, cargo shed water supply etc. through an assessment of the existing as well as the optimum aircraft type, route segments route schedules, meteorological conditions, and probable peak hour terminal occupancy or any other constraints. The consultant shall develop a detailed master plan, engineering drawings etc as outlined in PART II for the selected airports under each category. The consultants shall also prepare a maintenance manual for each category of the selected airport and shall recommend an appropriate sum for the annual maintenance of the said airports.

F. AIR NAVIGATIONAL AIDS

A review of the aeronautical communications requirements of the country should be made for its international and domestic needs. The air navigational aids in the country should be listed and a rational system developed to accommodate the country's air routes. Planning criteria are to be in general accordance with the recommendations of ICAO. These criteria could to be modified as and when it may be necessary to comply with the requirements of DCA and NRAC (Royal Nepal Airlines Corporation) and current trends in Civil Aviation.

4. TIME SCHEDULE FOR CONSULTING SERVICES AND REPORTS

The project will, unless otherwise decided by DCA with the approval of HMG, be completed 10 months after the starting date. During the course of the project the consultants shall submit the following reports at the time intervals indicated below. All reports shall be submitted in English, with copy distribution as follows:

A. INCEPTION REPORT

Within 2 months of the Starting Date, stating the consultants proposed work plan for the project, and pointing out any required deviations from these farms of Reference determined after their initial findings in Nepal.

B. PROGRESS REPORT

5 times after submission of the Inception Report and before submission of Draft Final Report, indicating work performed during the reporting period.

C. DRAFT FINAL REPORT

D. FINAL REPORT

5. DATA AND LOCAL SERVICES TO BE PROVIDED BY THE GOVERNMENT

A. DATA

The DCA will provide the consultants with all available data and reports relevant to civil aviation in Nepal and give the consultants free access to such sources of information as may be necessary for the proper execution of the project. Such information not required for inclusion in the various reports shall, during the project and after its termination, be treated as confidential by the consultants.

B. CO-OPERATION OF GOVERNMENTAL AGENCIES

In connection with work by the consultants requiring the co-operation of Government, local governments and other public agencies, the DCA will provide liaison and ensure that the consultants have access to all

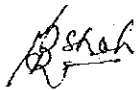
information relevant to their tasks.

C. REVIEW OF WORK IN PROGRESS

The consultant shall also make arrangements at the consultant's cost, for the DCA Officials to visit their offices and review the work in progress made by the consultant during which period the DCA personnel might provide relevant information and clarifications as needed be.

付録 2. SCOPE OF WORK

SCOPE OF WORK
FOR
DEVELOPMENT STUDY OF CIVIL AVIATION
IN
NEPAL
AGREED UPON BETWEEN
DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM
HIS MAJESTY'S GOVERNMENT OF NEPAL
AND
JAPAN INTERNATIONAL COOPERATION AGENCY
FEBRUARY 9TH, 1988
KATHMANDU



MR. LALIT BICKRAM SHAH
DIRECTOR GENERAL
DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM
HIS MAJESTY'S GOVERNMENT OF NEPAL.



MR. KIYOSHI TERASHIMA
LEADER
PRELIMINARY SURVEY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA).

I. INTRODUCTION

In response to the request of His Majesty's Government of Nepal (hereinafter referred to as "HMG/N"), the Government of Japan (hereinafter referred to as "GOJ") has decided to implement the Development Study for Civil Aviation in Nepal (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA") the official agency responsible for the implementation of the technical cooperation programme of GOJ, will undertake the Study in close cooperation with the authorities of Nepal.

The Department of Civil Aviation of HMG/N (hereinafter referred to as "DCA") shall act as the counterpart body to the Japanese Study Team and also act as the coordinating body with other relevant organizations for the smooth implementation of the Study.

The present document sets forth the Scope of Work for the Study.

II. OBJECTIVE OF THE STUDY

The objectives of the study are:

1. To develop schematically as a Master plan, the over-all development of Air Transport System in Nepal, which contributes significantly to the public welfare in remote district, the promotion of tourism sector and the growth of international and domestic trade.
2. To examine the technical, economic and financial feasibility on the priority plans elaborated in said Master plan study.

III. SCOPE OF STUDY

In order to achieve the objectives mentioned above, the Study shall cover the following items:

1. REVIEW AND FIELD WORK

- 1) Reviews of the existing reports and data related to the Study.
- 2) Data collection and supplementary survey.

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2. FORMULATION OF MASTER PLAN

- 1) Analysis and forecast of air transport demand taking into account other modes of transport.
- 2) Evaluation of existing airports and related facilities with special emphasis on, but not limiting to TIA, Pokhara, Lukla, Jumla, Simkot, Phaplu, Mugu, Dhangadhi, Syangboche airports.
- 3) Basic policy for development of airports and related facilities.
- 4) Identification of air transport network to be developed.
- 5) Categorization of airports and determination of necessary related facilities for each category.
- 6) Preparation of Master plan for key airports selected from viewpoints of economic and/or tourism development.
- 7) Recommendation on operational improvement, institutional requirement and management.
- 8) Identification of priority plans.

3. FEASIBILITY STUDY ON PRIORITY PLANS

- 1) Preparation of preliminary design
- 2) Estimation of cost
- 3) Project evaluation
- 4) Preparation of implementation programme

IV. STUDY SCHEDULE

The Study will be conducted in accordance with the attached tentative study schedule.

V. REPORTS

JICA will prepare and submit the following reports in English to HMG/N:

1. Inception Report
30 Copies
At the beginning of the Study

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2. Interim Report
30 Copies
At the end of the Master Plan Study
3. Draft Final Report
30 Copies
At the end of the whole items of the Study
4. Final Report
50 Copies
Within two months after receipt of comments from DCA on the Draft Final Report
5. Monthly Progress Report
10 Copies

VI. UNDERTAKINGS OF HIS MAJESTY'S GOVERNMENT OF NEPAL

1. To facilitate the smooth implementation of the Study, HMG/N Shall make necessary arrangements:
 - 1) To secure the safety of the Study Team.
 - 2) To permit the members of Japanese Study Team to enter, leave and sojourn in Nepal for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees.
 - 3) To exempt the members of Japanese Study Team from taxes, duties and other charges on equipment, machinery and other materials brought into Nepal for the implementation of the Study.
 - 4) To exempt the members of the Japanese Study Team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study.
 - 5) To provide the necessary facilities to the Japanese Study Team for the remittances as well as utilization of funds introduced into Nepal from Japan in connection with the implementation of the Study.

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- 6) To secure permission for entry into private properties and restricted areas in connection with field survey in accordance to HMG procedures.
 - 7) To secure permission for Japanese study team to take all data and documents (including photographs) related to the Study out of Nepal to Japan.
 - 8) To provide medical services as needed. Its expenses will be chargeable to the members of the Japanese study team.
- 2) DCA shall, at its own expense, provide Japanese study team with the following, in cooperation with other relevant organizations:
 - 1) Available data and information related to the Study.
 - 2) Counterpart personnel
 - 3) Credentials or identification cards
 - 3) HMG/N shall bear claims, if any arises against the members of the Japanese Study Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Japanese Study Team.

VII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures in close cooperation with DCA.

1. To dispatch, at its own expense, the Study team to Nepal.
2. To perform technology transfer to the Nepalese counter personnel in the course of the Study.

VIII. CONSULTATIONS

JICA and DCA will consult with each other in respect of any matter that is not agreed upon in this document and that may arise from or in connection with the Study.



ANNEX: TENTATIVE STUDY SCHEDULE

MONTH	1	2	3	4	5	6	7	8	9	10	11	12
STUDY IN NEPAL												
STUDY IN JAPAN												
REPORT	△ IC/R					△ IT/R				△ DF/R		△ F/R

NOTE: IC/R ... Inception Report
 IT/R ... Interim Report
 DF/R ... Draft Final Report
 F/R ... Final Report

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付録 3. MINUTES OF MEETING

MINUTES OF MEETING ON THE SCOPE OF WORK FOR DEVELOPMENT STUDY OF CIVIL AVIATION IN NEPAL

1. Talks were held in Kathmandu during Feb. 2 - Feb. 9, 1988 between the delegations of His Majesty's Government of Nepal headed by Mr. L.B. Shah and JICA Preliminary Survey team headed by Mr. K. Terashima (a list of the two delegations is attached hereto as annex A.) to identify and agree on the Scope of Work for Development study of Civil Aviation in Nepal.

The discussion was held in an atmosphere of cordiality and goodwill.

2. The two sides agreed on the contents of the Scope of Work for the Study which is signed and attached as 'Annex B'.

3. The two sides exchanged views on the following projects as possible priority plans:

- domestic passenger terminal, cargo facilities, fire-fighting complex, maintenance complex and apron extension, etc of TIA.
- new Pokhara airport
- pavement and extension of runway, provisioning of related facilities in certain other airports.

4. The Nepalese delegation proposed that matters related to aviation but, falling within the purview of tourism, such as development of cable car system in Pokhara, investment for tourism projects etc. be also covered by this Study.

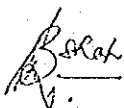
The Japanese delegation suggested that those requests for tourism projects should be submitted to the Government of Japan separately.

5. The Nepalese side briefed on HIG/H requirements for designing, financing, execution and monitoring of projects. The Nepalese side also briefed that the amount of grant aid involved in the Study is also required for the monitoring of the project. The Japanese side noted the requirements.

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6. The Nepalese delegation expressed the hope that the Study will be followed by the financial assistance from the Government of Japan. The Japanese delegation took note of it.
7. With reference to clause 3 of Section VI of the Scope of Work for the Development Study, the two sides agreed that equipments/machines/materials brought into Nepal should either be re-exported, or disposed of in a manner acceptable to and with prior consent of DCA upon completion of the Study.
8. The Nepalese side regrettably expressed its difficulty in providing office space and chauffeured vehicles in the immediate future but assured that all possible assistance would be extended to the Study team.
9. The two delegations reaffirmed their faith in promoting mutual co-operation in civil aviation further enhancing the close and friendly ties between the two countries.



MR. LALIT BICKRAM SHAH
DIRECTOR GENERAL
DEPARTMENT OF CIVIL AVIATION
MINISTRY OF TOURISM
HIS MAJESTY'S GOVERNMENT OF NEPAL



MR. EIYOSHI TERASHIMA
LEADER,
PRELIMINARY SURVEY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)

FEBRUARY 9TH, 1988
KATHMANDU, NEPAL.

ANNEX - A

LIST OF DELEGATES

JAPANESE DELEGATION

1. Mr. K. Terashima (Leader)
Deputy Director General
International Transport & Tourism Bureau
Ministry of Transport.
2. Mr. Y. Kitani
Deputy Director, Construction Division
Aerodrome Department
Civil Aviation Bureau
Ministry of Transport.
3. Mr. K. Uejima
Deputy Director, Radio Engineer Division
Air Traffic Services Department
Civil Aviation Bureau
Ministry of Transport
4. Mr. I. Omaki
Assistant Director
International Cooperation Division
International Transport & Tourism Bureau
Ministry of Transport

NEPALESE DELEGATION

1. Mr. L.B. Shah
Director General
Department of Civil Aviation
2. Mr. M. L. Shrestha
Project-in-charge
Air Transport Development Proj
3. Mr. H.R. Joshi
Under Secretary
Ministry of Tourism
4. Mr. D. R. Sharma
Deputy Director (Technical)
Department of Civil Aviation

Contd....



JAPANESE DELEGATION

5.
Mr. M. Kobayashi
Project Co-ordinator
Social Development Department
Japan International Co-operation Agency
6.
Mr. Takashi Muromoto
Second Secretary
Embassy of Japan.
7.
Mr. H. Ono
Resident Representative
Japan International Cooperation Agency
Nepal Office.

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NEPALESE DELEGATION

5.
Mr. S. Pant
Deputy Director
Department of Tourism
6.
Mr. M.B. Shrestha
Deputy Director
Royal Nepal Airlines Corporation
7.
Mr. G.B. Shrestha
Planning Section Chief
Department of Civil Aviation
8.
Mr. Y.M. Tamrakar
Divisional Engineer No.1
Department of Civil Aviation
9.
Mr. D.S. Rana
Act. Divisional Engineer No.2
Department of Civil Aviation.
10.
Mrs. S. Rajbhandari
Under Secretary
Ministry of Finance

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付録4. QUESTIONNAIRE

QUESTIONNAIRE

Please provide the JICA Contact Mission with the following data and information. This will greatly help JICA to most effectively conduct the Development study of civil aviation in Nepal.

I. General Information

- A) Authorities and Government Agencies Concerned
 - (1) Organization Charts of the Government of Nepal
 - (2) Administrative Organization Charts related to Land transport and Regional Development
 - (3) Administrative Organization Charts related to Your Ministry
- B) National Development Plan and Regional Development Plan
 - (1) Actual Progress of the completed Sixth Five Year Plan
 - (2) Current situation of progress of the Seventh Five Year Plan
 - (3) Current situation, characteristics and future prospects for Regional Development Plan
- C) National Statistics on the Economy
 - (1) Records of the last 10 years and population forecast for each district and major cities
 - (2) Records of the last 10 years and GDP and/or GNP forecast with breakdown of industries
 - (3) Records of the last 10 years and forecast of foreign trade (export and import) values

II. Traffic and Transportation in Nepal

- A) General
 - (1) Priority of main projects taking into consideration the principles from the objectives mentioned below
 - Regional development
 - Resolution of the present bottleneck
 - Meeting basic human needs
 - (2) Records of passenger and cargo traffic by each transportation sector in the past 10 years and forecast
 - (3) Records of international passenger and cargo traffic by each transportation mode in the past 10 years, especially traffic to /from India
 - (4) Problems of traffic in Nepal by each transportation sector
- B) Land Traffic and Transportation
 - (1) Road Network
 - a) Current situation of road network development
 - b) Implementation programme of elongation, improvement and maintenance of roads which the Government of Nepal now has
 - c) Data on road length, width and type attached with their location map
 - d) Current situation and future plans for bridge construction and/or improvement
 - (2) Road Traffic
 - a) Records of the 10 years and forecast of passenger and cargo trips on major roads

- b) Records of the last 10 years and forecast of registered vehicles. Numbers, if available, by each district
- c) Current situation and future prospects for inter-city bus service
- (3) Current situation and future prospects for Railways, Ropeways and Inland-waterways
- C) Air Traffic and Transportation
 - (1) Historical trends of aviation network until now
 - (2) Aviation policy from the view point of role-sharing between air transport and land transport
 - (3) Detailed explanation of aviation status in the Sixth and Seventh Five Year Plan
 - (4) Records of demand forecast in the latest study reports and their details which Department of Civil Aviation (DCA) now has
 - (5) Air traffic statistics of the last 10 years and forecast
 - a) International passengers by route, nationality and purpose of visit
 - b) Domestic passengers by route and airport
 - c) International air cargos by route
 - d) Domestic air cargos by route and airport
 - e) Number of take-offs and landings by route and/or airport
 - f) Monthly and hourly traffic by route and/or airport
 - g) Number of well-wishes and greeters at the major airport

III. Tourism

- (1) Present situation and future prospects of infrastructure for tourism ; for example, number of hotels and beds by region, tour routes in detail, etc.
- (2) Detailed description of past aviation related studies for hotel construction
- (3) Actual number of foreign tourists in the past 10 years and its forecast
- (4) Actual income of foreign currency from tourism in the past 10 years and its forecast with its calculation basis
- (5) Status of tourism in the Seventh Five Year Plan

IV. Aviation

A) General

- (1) History of major airport construction in Nepal
- (2) Description of each airport including purpose, characteristics and relative position of the airports to the other airport ; Please attach location maps and air route map.
- (3) Means of access to the main airports from city centers
- (4) Airport development/expansion projects in the past 10 years. (Names of the projects, brief project description, years, Project cost and finance source, etc.)
- (5) Full Papers of Aeronautical Information Publication (AIP) in Nepal

- B) Facilities
- (1) Planning and design parameters in developing the existing airport (transport demand forecast for the design year, critical aircraft and number of operations, etc.)
 - (2) Facilities layout of the existing airports
 - (3) Dimensions of Runway, Taxiway, Apron and Landing strips ; Please attach plan, profile and section diagrams for each.
 - (4) Utilization status of Apron
 - a) Layout of apron spots by type of aircraft
 - b) Service categories (scheduled domestic, scheduled international, cargo, etc.)
 - c) Tabulation of apron spots occupancy table for a typical week
 - d) Method and capacity of fueling
 - (5) Terminal facilities
 - a) Floor plans and section of each floor level of the terminal building
 - b) Layout diagram of terminal facilities
 - c) Fire station and the number and size of fire engines
 - d) Size, layout and utilization status of parking lots
 - (6) List of existing Air Navigation Facilities
 - a) Lighting facilities
 - b) Air-to-ground telecommunication facilities
 - c) Radio navigation Facilities
 - d) Air traffic control radar facilities
 - e) Meteorological facilities
 - (7) Major problems of the present TIA and its facilities /equipment which do not meet the ICAO's Standards
- C) Natural Conditions
- (1) Meteorological conditions
 - a) Wind rose
 - b) Visibility and cloud height (frequency of occurrence by range)
 - (2) Earthquakes and floods
 - (3) Topographical map
 - (4) Present conditions and future plans for land use around each airport
- D) Laws and regulations
- (1) Civil Aeronautics law and related regulations
 - (2) Aircraft noise standards
 - (3) Tariff structure
 - (4) Agreement etc. on the use of airport facilities by the military
- E) Organization of Department of Civil Aviation (DCA)
- (1) Organization Charts with breakdown of role and functions
 - (2) Present number of personnel in detail by function, classification, etc.
 - (3) Technical staff by education, qualification and professional career, etc.
- F) Royal Nepal Air Corporation (RNAC)
- (1) Present air fare system of RNAC
 - (2) Expected plan or present idea for procuring of aircraft
 - (3) Market share in domestic and international flights in the last 10 years and forecast
 - (4) Profit and Loss and Balance Sheet of RNAC

Extent of the Project and confirmation of details

- 1) A more detailed description of type of demand forecast should be defined for the Project. i.e.; Is demand forecast for air transportation only? Or is it only for other transportation modes as well? Or is it for more precise definition of the future airport needs in detail? Or?
- 2) Detailed description of purpose of demand forecast to be applied to the project. Is it formulation of a long term aviation (airports) development plan? Or, for feasibility studies of designated airport(s)?
- 3) When the above 2 points are clarified detailed definition of the extent of the project may be necessary such as:
air demand forecast ; air route formulation ; airport facility requirements; preliminary cost estimates; managerial organization for air navigation and communication systems
- 4) What is the reason for categorizing the airports in Nepal by STOL and international airports, etc. for future development of each airport.
- 5) What is the purpose and meaning of your airport categorization system.
What category of airport(s) is expected to be improved under the project, what is the development priority order by category?
- 6) What is the reason for studying feasibility of several airports in Nepal under the project?

7) What is the reason for studying the feasibility of solar/wind powered air navigation and communication facilities which have been supplied for 21 airports/airfields in Nepal under different projects?

8) What is the past, present and future financing assistance to be provided from foreign governments and international institutions for aviation development in Nepal?

付録5. 収集資料リスト

No. 1

No.	資 料 名	内 容
1.	STATISTICAL YEAR BOOK OF NEPAL 1987 (Central Bureau of Statistics 1987)	ネパール国の人口・経済・観光・交通・運輸等の各種データを取りまとめたもの (英文 512 ページ)
2.	STATISTICAL POCKET BOOK 1986 (Central Bureau of Statistics 1986年6月)	資料1をポケットブックに取りまとめたもの (英文 262 ページ)
3.	POPULATION MONOGRAPH OF NEPAL (Central Bureau of Statistics 1987)	1952/54, 1971 及び 1981年に実施したセンサスを取りまとめ解説したもの (英文 358 ページ)
4.	ECONOMIC SURVEY F/Y 1986-87 (Ministry of Finance 1987)	GDP, 農業・工業・観光・交通・運輸・貿易等の各種データを図表化し解説したもの (英文 110 ページ, 及び表 75 ページ)
5.	CIVIL AVIATION REPORT 1986	空港・保安施設・通信施設等の整備経過・TIAの旅客・貨物数量等を取りまとめた年報 (英文: 1986年 46 ページ, 1987年 43 ページ)
6.	CIVIL AVIATION REPORT 1987 (5.6とも Department of Civil Aviation)	
7.	NEPAL TOURISM REPORT 1986 (Department of Tourism 1987年5月)	1962~1986年の観光関連の各種データを図表にとりまとめたもの (英文 51 ページ)
8.	NEPAL ROAD STATISTICS 1985 (Department of Roads)	1951年~1985年7月までの5開発地域及びカトマンズ市域の道路整備状況を図表にとりまとめたもの (英文 35 ページ)
9.	FEASIBILITY STUDY REPORT ON POKHARA AIRPORT (Department of Civil Aviation 1984年8月)	ネパールのコンサルタント会社 (S.R. SHRESTHA & CO. (P.) LTD.) の実施したレポートで, 需要予測, レイアウト, コスト算定, 経済・財務分析を取りまとめたもの (英文 168 ページ, 図面 4 葉)
10.	TECHNICAL AND ECONOUICAL FEASIBILITY STUDY OF SYANGBOCHE AIRPQRT (Department of Civil Aviation 1986年12月)	ネパールのコンサルタント会社 (BUILDING DESIGN ASSOCIATES) の実施したレポートで, 資料9と同様の内容を取りまとめたもの (英文 104 ページ)
11.	NEPAL NAVIGATION CHART (International Notow office, DCA)	1987年5月時点でのデータをもとに作成されたネパール国のエア・ルート・マップ (スケール: 1/1,000,000)
12.	MAP OF NEPAL (Survey Department 1985)	ネパール全国の地形図 (スケール: 1/500,000)
13. ②	AIP NEPAL 1977	Aeronamtical Information Publication のネパール国版 (DCA で準備中)

No.	資 料 名	内 容
14.	Present Air Fare and Basis (Royal Nepal Air Corporation)	1987年9月2日現在の旅客・貨物運賃表 (邦人及び外国人) (コピー A4 5枚)
15.	RNAC'S Market Share or Total Air Passenger Traffic from and to Nepal (RNAC Planning Division)	1977/78~1987/88の TIA 出入旅客数と RNAC を利用した旅客数の推移表 (英文コピー A4 1枚)
16.	PROVISIONAL PROFIT & LOSS ACCOUNT (RNAC)	1985, 1986年の損益計算書
17.	RNAC での B 757 導入及び Avro 対応機選定についてのメモ	(英文コピー A4 1枚)
18.	NAV. AIDS FACILITIES LIST (Department of Civil Aviation)	主な空港の航行援助施設のリスト (英文コピー A4 6枚)
19.	NUMBER OF PERSONNELS IN ATC, COM. RADIO OFFICER AT EACH AIRPORT	管制管等技術者の職員内訳 (英文コピー A4 1枚)
20.	RNAC International Flight Schedule	RNAC 国際線時刻表 (英文 1冊)
21.	RNAC DOMESTIC Flight Schedule	RNAC 国内線時刻表 (英文コピー A4 12枚)
22.	Flight Regularity & Punctuality (1986~87)	RNAC 国内線の運航状況を月別にとりまとめた もの (英文コピー A4 1枚)
23.	Domestic Passenger and Cargo Traffic (1975/76~1986/87)	RNAC 国内線の空港間輸送量 (旅客・貨物) を とりまとめたもの (1975/76~81/82は旅客のみ) (英文 A4 12枚)
24.	都市間バスルート料金 (SAJA YATAYAT: バス公社)	カトマンズと各市を結ぶバス公社の輸送をまとめ た表・図 (英文コピー A4 2枚)
25.	Request Proposal for Light-Duty General Purpose Ropeway in the Far Western Corridor of the Kingdom of NePal (Nepal Transport Corporation: 1987年8月)	○ NTC (ネパール運輸公団), ロープウェイの 概要。極西部でのロープウェイ新設計画につい てとりまとめたもの (英文コピー A4 34枚)

付録6. 面会者一覽

MINISTRY OF TOURISM

1 SECRETARY MR.
2 UNDER-SECRETARY, PLANNING DIV. MR.N.R. JOSHY

DEPARTMET OF CIVIL AVIATION

1 DIRECTOR GENERAL MR.L.B. SHAH
2 PROJECT-IN-CHARGE MR.M.L.SHRESTHA
3 DEPUTY DIRECTOR (TECH.) MR.D.R.SHARMA
4 PLANNING SECTION CHIEF MR.G.B.SHRESTHA
5 DIVISIONAL ENGINEER NO.1 MR.Y.M.TAMRAKAR
6 ACT.DIVISIONAL ENGINEER NO.1 MR.D.S.RANA
7 MR.U.B.SHRESTHA
8 MR.H.B.SHRESTHA
9 MR.M.SHRESTHA
10 MR.R.DALI
11 MR.T.C.AMATYA

DEPARTMENT OF TOURISM

1 DIRECTOR GENERAL MR.DIPENDRA PURUSH DHAKAL
2 DEPUTY DIRECTOR MR.S.P.PANTH

UNDP AIR TRANSPORT SUPPORT PROJECT

1 TEAM LEADER CAPT.S.A.FOSSUM
2 CAPT.S.B.SHRESTHA
3 CAPT.A.HEGGE
4 MR.G.P.POUDYAL

ROYAL NEPAL AIRLINES CORPORATION

1 DEPUTY DIRECTOR MR.M.B.SHRESTHA
2 DEPUTY DIRECTOR PLANNING MR.R.R.SHRESTHA
3 ASST. PLANNING OFFICER MR.D.R.DALI

EMBASSY OF JAPAN

1 COUNCELLOR MR.H.KIKUCHI
2 SECOND SECRETARY MR.NUROMOTO

JICA NEPAL OFFICE

1 RESIDENT REPRESENTATIVE MR.H.ONO
2 DY.RESIDENT REPRESENTATIVE MR.

