MINISTERIO DE TRANSPORTES

DIRECCION GENERAL DE AVIACION CIVIL

ESTUDIO DE FACTIBILIDAD PARA LAS MEJORAS Y DESARROLLO FUTURO DEL AEROPUERTO INTERNACIONAL EL COCO

SAN JOSE, COSTA RICA
JUNIO DE 1966

DATOS PARA EL ESTUDIO DE FACTIBILIDAD DE LAS MEJORAS AL AERODROMO EL COCO

Se tomará como guía la hoja "GUIA PARA UN ESTUDIO DE VIABILIDAD".

1. Para llevar a cabo la construcción que hoy se pretende mejorar, se hizo una investigación concluyéndose que serían aprovechados los suelos tipo E-10, retirando del proyecto los de tipo E-11 y E-12. En esta forma,-- quedaría la subrasante clasificada como E-10-F-5, que con pavimento de 73 cm. de grueso, soporta técnicamente las cargas impuestas por los -- jets actuales.

2. Los trabajos que se pretenden efectuar están justificados por la necesidad de aumentar la capacidad del aeropuerto, ya que en la actualidad ésta ha sido superada, siendo urgente:

   a) La expansión de la plataforma de estacionamiento de aviones porque aún ahora que no han entrado en funcionamiento los cargueros jet, existen problemas de falta de espacio.

   b) La necesidad de ampliar la pista, ya que por especificación los aviones deben parar en el 60% de la pista en servicio y en El Coco actualmente están parando en el 85%.

   Los espesores de pavimento han resistido perfectamente el uso durante los once años de servicio del aeropuerto, por lo que su espesor será --

mantenido en las mejoras, para que el trabajo sea homogéneo.

3. Tanto el plano como el folleto que van adjuntos a este informe, definen exactamente la magnitud de las reformas de los trabajos a efectuarse. No se hace referencia a la ampliación del edificio por cuanto se hará mediante remodelación prácticamente dentro de su misma estructura.

4. El Folleto descriptivo enumera los trabajos a realizar en orden de prioridad, de acuerdo con las necesidades más urgentes. Así, se consideró en primer término la ampliación de la pista y de última, la ampliación de los hombros de la pista.

5. La estimación de costo del proyecto ha sido efectuada tomando en cuenta todos los detalles, ya que la experiencia obtenida con los trabajos anteriores se ha utilizado para llevarlo a cabo.

   No se hace mención a compra de terrenos para estos trabajos debido a que todos se ejecutarán en el área que actualmente pertenece al aeropuerto.

   Un diez por ciento del costo del proyecto constituye el renglón destinado a gastos de ingeniería, considerando que para su ejecución, puede contarse con personal del Ministerio de Transportes que actualmente ejecuta trabajos similares. La Dirección General de Aviación Civil, cuenta con técnicos en esta clase de obras que pueden contribuir tanto en la construcción como en el aspecto de mantenimiento.

(a) DATOS DEL SOLICITANTE

El nombre oficial de la oficina gubernamental es: Dirección General de Aviación Civil.

El tipo de entidad es la de organismo técnico y de ejecución, y comprende todos los problemas que presenta la aviación y norma adecuadamente esta actividad.

Fue organizada en octubre de 1949 mediante la Ley General de Aviación Civil y tiene las siguientes responsabilidades:

Velar por el estricto cumplimiento de esta ley y sus reglamentos, de los tratados, convenciones o convenios internacionales, sobre aviación civil, que el Gobierno de Costa Rica haya suscrito y ratificado constitucionalmente; tomar parte en el estudio y resolución de todos los problemas de aviación que sean sometidos a conocimiento del Poder Ejecutivo; proponer al Poder Ejecutivo la adopción, mediante Decreto, de cualquier reglamento, norma o procedimiento técnico aeronáutico recomendado por la Organización de Aviación Civil Internacional (OACI).

(b) MONTO Y DESTINO DEL FINANCIAMIENTO SOLICITADO

Los fondos con que se deberá contar para realizar esta primera etapa del programa de mejoras del Aeródromo El Coco son $ 1.228.876.oo, o sea ₡ 8.172.025.oo, y se invertirán en:

1.	Ampliar la pista en 440 metros por 45 metros ...	$	297.000.oo
2.	Colocar una carpeta asfáltica nueva de 2,000 m X 30 m	$	210.000.oo
3.	Sellar toda la pista 2.440 m X 45 m.....	$	33.000.oo
4.	Pintar la pista y calle de rodaje	$	6.000.oo
5.	Ampliar la plataforma de estacionamiento de aviones en 13.500 metros cuadrados.....	$	108.000.oo
6.	Construir una calle de rodaje paralela a la pista que llega hasta la mitad de la pista con 15.000 metros cuadrados	$	180.000.oo
7.	Instalar una ayuda visual para aterrizajes	$	20.000.oo
8.	Remodelar el Edificio Terminal	$	125.000.oo
9.	Colocar un pavimento en los hombros de la pista .	$	36.600.oo
	SUB-TOTAL.....	$	1.015.600.oo
	Imprevistos 10%	$	101.560.oo
	SUB-TOTAL.....	$	1.117.160.oo
	Costos administrativos e ingeniería 10%	$	111.716.oo
		$	1.228.876.oo

Se usará $ 1.229.000.oo = ¢ 8.172.850.oo

DATOS REFERENTES AL ESTADO DE LOS ESTUDIOS

Debido a que las mejoras recomendadas a efectuar en el aeródromo El Coco, se efectuarán en terrenos que han sido analizados en sus características físicas, previo a la construcción de la pista y plataformas y con el tiempo se ha comprobado que los factores de diseño han concordado con la práctica y a que las estructuras nuevas quedarán en la misma zona analizada y-- que éstas quedan a continuación es obvio que no se necesita buscar nuevos niveles de partida ya que estos están perfectamente establecidos, razón por la cual no es necesario efectuar diversos estudios para verificar cuál es el más acertado, por esta razón los trabajos de topografía se podrán realizar rápidamente así como la confección de los planos respectivos, considero - que un tiempo de seis meses es suficiente para efectuar los planos y especificaciones de los trabajos de esta primera etapa.

PROCEDIMIENTO PROPUESTO PARA LA EJECUCION DEL ESTUDIO

Es indudable que debido a la falta de personal que tiene el Ministerio de Transportes sea necesario sacar a licitación el trabajo de topografía y ejecución de los planos bajo la supervigilancia de la Dirección General de Aviación Civil por medio de su Ingeniero especializado en esta clase de obras,- o también, para aprovechar el próximo verano, utilizar personal de las otras Direcciones para efectuar los estudios y planos de inmediato, ya que -

el procedimiento de Licitación atrasaría mucho más tiempo la realización del proyecto propuesto.

FINANCIACION DEL PROYECTO

Debido a que los cobros por derechos de aterrizaje y alquileres de espacio en el Aeropuerto Internacional El Coco no pueden cubrir el costo de este proyecto, será necesario cobrar a cada pasajero que se origine en Costa Rica y salga por El Coco, la suma de $ 5.oo (cinco dólares) que daría un promedio por año, mínimo, de $ 250.000.oo (doscientos cincuenta mil dólares), suma que será suficiente para pagar intereses y amortización de la primera etapa de las mejoras.

San José, Costa Rica, Junio de 1966.-

UNITED STATES GOVERNMENT

FEDERAL AVIATION AGENCY

AGENCY FOR INTERNATIONAL DEVELOPMENT

Regional Aviation Assistance Group
Latin America
(Based in Panama)

RECOMMENDED IMMEDIATE IMPROVEMENTS AND FUTURE DEVELOPMENT PLANNING FOR EL COCO INTERNATIONAL AIRPORT SAN JOSE, COSTA RICA

January, 1966

Prepared for use by
UNITED STATES A.I.D. MISSION TO COSTA RICA
and
REGIONAL OFFICE, CENTRAL AMERICA AND PANAMA (A.I.D.)
(CAAG ROCAP)

TABLE OF CONTENTS

BACKGROUND DATA

As in the past and undoubtedly for the future, the major international aviation gateway for Costa Rica is El Coco International Airport, serving the capital city San José. This relatively new airport was opened for traffic in 1955, and jet -- aircraft began regular, scheduled operations in approximately 1960. These have included the DC-8, Boeing 707, and Boeing 720-B, operating under both night -- time and daytime conditions, since the airport is equipped with lighting facilities. It is anticipated that Boeing 727, BAC-111, and possibly DC-9 jet aircraft will soon be operating from El Coco as the air carriers convert from present piston equipment. This traffic should be in addition to further traffic from the larger jets previously listed. Key airport facilities presently include one (1) asphalt paved runway (6600 x 150 Ft.), designated 06-24; a modern terminal building with asphalt paved terminal apron; small aircraft maintenance areas and aprons; underground refueling facilities; and taxiway system consisting of only connecting stub taxiways for the apron areas only. There is no parallel - taxiway at the present. The only other operational airport of any consequence - serving San José is La Sabana Airport, which is used almost entirely for domestic flights and only by small piston aircraft. It is located on the western boundary of San José, almost "down-town" in comparison with El Coco, which is approximately 11.0 miles northwest from the city. La Sabana Airport has a turf runway (unpaved), and serves predominantly as the important base for general aviation activities in the San José area. The greater majority of the aircraft

PREFACE

This summary report has been prepared in response to a request from, and is based on discussions with Mr. R.Echandi, Minister of Transportation, Government of Costa Rica. Its execution by the RAAG/LA* was arranged by Mr. H.E. Robinson Chief, CAAG/ROCAP and Mr. A.E. Farwell, Director, USAID/Costa Rica. The report was prepared by Mr.Louis F. Stirminski, Airport Engineer, RAAG, while on assignment in Costa Rica during January 10-23, 1966. Its primary intent is to provide basic planning and preliminary engineering data to assist in establishing a sound program of development for El Coco Airport.

The following references were utilized for this study, and are recommended as basic sources of information for any further detailed planning and design to be done in the future for El Coco Airport development:

(1) RAAG Report, "Proposed Cross-Wind Runway 10-28 and Extension to Runway 6-24 at El Coco Airport", dated November, 1962, prepared by Mr. -- George F. Kilpatrick, Airport Engineer.

(2) Miscellaneous engineering data prepared by Ing. Franz Ulloa H., Airport Engineer, Government of Costa Rica.

(3) "Central American Transportation Study (1964-65", prepared by T. S. C. Consortium for the Central American Bank of Economic Integration (CABEI)

---

* The Regional Aviation Assistance Group/Latin America (RAAG/LA), based in Panamá, R.P. is staffed and maintained by The U.S. Federal Aviation Agency with funds furnished by the Agency for International Development to assist in the planning and execution of civil aviation projects in Latin America.

based here are all in the category Piper, Cessna, Beechcraft aircraft, or less than 12,500 pounds gross weight. Of the roughly 120 aircraft registered in the country, it is estimated that the majority utilize La Sabana Airport rather frequently, since most of these aircraft registered are less than 12,500 pounds -- gross weight. Considerable engineering information and layout data for both airports are contained in reference (1); and it is suggested this reference be consulted along with references (2) and (3) for further information.

CRITICAL AIRPORT NEEDS AND PROBLEMS

Based on investigations of the writer and discussions with local authoritative officials, the major critical airport problems and needs for San José can be summarized as follows:

1. To more adequately and satisfactorily accommodate international jet operations by air carriers serving this airport for the present and future anticipated traffic, certain improvements and expansion of the present runway-apron-taxiway systems are needed.
2. It is indicated that there is the possibility that La Sabana Airport may be closed in the future, and its land converted to a sports and recreational area without any aviation activity permitted. As a result, unless another general aviation airport is developed elsewhere in the San José vicinity, much of the present La Sabana Airport activity (if not all) may eventual-

ly have to be transferred to El Coco. If the latter eventuality does occur, then El Coco will require considerable expansion in terms of property as well as additional facilities to accommodate such large general aviation activity, as is currently concentrated at La Sabana.

3. A definite program for the immediate and long-range development (including possible La Sabana Airport activity transfer) is needed for El Coco International Airport. This program, supplemented with a master plan, would be essential to provide a sound and realistic basis for implementing the necessary construction work and property expansion in an economical and acceptable manner.

4. Although other problems may possibly develop in the future, it appears that the major, overriding problem confronting any major expansion or improvement of El Coco is obtaining the required financing of construction work and real estate acquisition. As a result, an airport development program that is finally adopted should be broken down in stages or phases to minimize the financial burdens on the part of the Government of Costa Rica and to assure that at least the minimum facilities are provided over a period of years to meet aviation requirements, as needed.

MAJOR CONCLUSIONS AND RECOMMENDATIONS

The following are the major conclusions and recommendations proposed for

further consideration by the Government of Costa Rica in regard to the development of El Coco International Airport.

1. It is recommended that the program for the development of this airport be established in three (3) distinct phases or stages, as follows:

   STAGE I Provision of improvements and expansion of only those runway-apron-taxiway facilities essential to international and domestic air carrier operations, based on present and anticipated traffic. Only minor terminal building improvements are also included in this stage.

   STAGE II Initiation of studies, investigations, and necessary action to acquire additional real estate or property to provide for (1) normal expansion of air carrier facilities for LACSA and others; (2) additional land necessary for absorbing general aviation activity and provide for future cross runway, with final areas to be acquired dependent on whether La Sabana activity is all or partially transferred to El Coco; (3) lastly in cooperation with other Government officials, the necessary additional land near the airport to provide for industrial development that utilizes aviation and locations near an airport.

STAGE III Provision of low-cost, gravel-stabilized cross-runway of approximately 3,000 X 75 Ft. and gravel stabilized apron areas at the locations generally recommended previously by Messrs. Kilpatrick and Ulloa. This work can be done in stages and largely by construction forces and equipment of the Government of Costa Rica in order to minimize costs and to facilitate its completion in stages as funds are available. Provision of hangars, utilities, and exact size of the apron areas should be determined when the final decision on the transfer of La Sabana activity to El Coco is rendered. After this -- transfer is in fact a reality, then future planning may consider provision of low-cost bituminous surface treatment for the cross-runway, and possibly portions of the apron, for general aviation requirements only (less than 12,500 pounds - gross weight aircraft). (Note: It is recommended that aircraft heavier than 12,500 pounds gross weight should be confined to the main runway (06-24), except for emergencies. - Thus, design of cross-runway should meet only criteria for use by aircraft of the general aviation category, or less than 12,500 pounds gross weight.

2. It is recommended that a master plan of development be adopted and followed for El Coco and that it be kept current with revisions as required. Suggested master plan layout and drawing is provided in the Appendix.

3. Detailed engineering work, including topography, soil tests, and pavement design, should commence at the earliest for the improvements recommended for STAGE I by whatever engineering forces are available to the Government of Costa Rica. This will help in expediting the completion of the necessary engineering phase of the work contemplated in this stage, as hereinafter described in detail.

4. Depending on financing requirements and the future workload of the engineering staff of the Government of Costa Rica, it may be advisable to obtain the services of a private engineering firm on a full-time basis to assist in portions, or on all phases, of the work proposed for at least --- STAGE I.

5. The required efforts on the part of the Government of Costa Rica should be initiated and taken immediately to resolve or obtain the necessary financing to accomplish STAGE I work at the earliest.

   It appears that the financing for the other stages of the work should be done separately from STAGE I in order not to jeopardize or excessively delay the completion of the work in STAGE I. Moreover, the requirements and work for STAGES II and III are of a more flexible and indeterminate

nature than for STAGE I; therefore, it would be advisable to proceed on a more deliberately gradual and longer range program for carrying out STAGES II and III.

RECOMMENDED STAGE I. WORK SCOPE, PRIORITIES, AND COSTS (U.S. DOLLARS)

Priority No. 1 -- Runway Extension 1400 Ft. (440 Mt.) to East

(Note: This work item includes all necessary grading, drainage, paving, lighting, pipe underdrains on each edge, etc.)

COST: 440 X 45 Mts. = 19,800 Sq. Mts. at $ 15.00 = $ 297.000.00

Priority No. 2 -- New 2 inch Asphalt Surface Course on Existing Runway

(Note: This work item includes removal of badly cracked top $1\frac{1}{4}$ inch of existing 3-inch asphalt surfacing and replacement with approx. 2-inch asphaltic concrete for center 30 Mt. of runway only. Cracking is extensive throughout this surface course, and is due to combination of several reasons: weathering and oxidation of top asphalt layer during past 10 years; possibly inadequate quality and thickness of this layer, and-traffic concentration. The condition of this top surfacing ($1\frac{1}{4}$-inch) is poor now, and will create problems later; therefore, removal and replacement are strongly recommended.)

COST: 2000 X 30 Mts. = 60,000 Sq. Mts. at $ 3.50 = $ 210.000.00

Priority No. 3 -- Bituminous Seal Coat for Entire Runway (2440 x 45 Mts.)

(Note: This work item provides for completion of the paving, sealing cracks on the un-resurfaced portion of existing runway, and also uniformity in color and texture of final runway pavement.)

COST: 110,000 Sq. Mts. at $ 0.30 = $ 33,000.oo

Priority No. 4 -- Runway and Taxiway Painting and Marking

(Note: This item covers the required standard instrument-runway markings, and centerline plus holding markings for the taxiway.)

COST: Lump Sum -- $ 6.000.oo

Priority No. 5 -- Terminal Apron Expansion -- Asphalt Pavement

(Note: This item includes all necessary work for expanding present asphalt terminal apron by 50 x 50 Mts. to the west and 110 x 100 Mts. to the east; thus providing more aircraft parking space.)

COST: 13.500 Sq. Mts. at $ 8.oo = $ 108.000.oo

Priority No. 6 -- New Partial Parallel Taxiway -- Asphalt Pavement (22.5 Mt.)

(Note: This item includes all necessary work to provide a partial parallel -- taxiway (22.5 Mt. width) from terminal apron westward to present - fire-station road or length of 500 Mts. with a new connecting taxiway to the runway at approximately 45 degree angle of intersection.)

COST: 15.000 Sq. Mts. at $ 12.00 = $ 180.000.oo

Priority No. 7 -- VASI Facility on West End of Runway (Landing Visual Aid)

(Note: This simple visual aid consisting of red and white lights is strongly recommended as a safety item for the west runway end, since approximately 70% of all landings and takeoffs are from west to east.)

COST: Lump Sum -- $ 20.000.oo

Priority No. 8 -- Terminal Building Modifications

(Note: This item includes expansion of baggage handling area; provision of new transit passenger lounge; roofing enclosure of main stairs leading to apron loading positions; auto parking expansion; and miscellaneous minor building modifications to be determined by architects later.)

COST: Lump Sum -- $ 125.000.oo

Priority No. 9 -- Runway Shoulder Paving (3.0 Mt. Width)

(Note: To minimize grass maintenance problems, to keep "lighting lane" free of vegetation blockage, and to minimize seepage of water under pavement edges, it is recommended that minimum of 3.0 Mt. width along both runway edges be paved with low-cost bituminous surface treatment (FAA Spec. No. 609) on 15.0 CM base course compacted to 100 % density.)

COST: 4880 x 3 Mts. = 14.640 Sq. Mts. at $ 2.50 = $ 36.600.oo

SUMMARY OF STAGE I PROGRAM

The work program recommended for Stage I with priorities and estimated costs can be summarized as follows:

Priority No.	Work Item	Total Cost (U.S. Dollars)
1	Runway Extension (440 Mts)	$ 297.000.oo
2	Existing Runway Re-surfacing	210.000.oo
3	Runway Bituminous Seal Coat	33.000.oo
4	Runway-Taxiway Painting and Marking	6.000.oo
5	Terminal Apron Expansion	108.000.oo
6	New Partial Parallel Taxiway	180.000.oo
7	VASI Facility	20.000.oo
8	Terminal Building Modifications	125.000.oo
9	Runway Shoulder Paving (3-Mt. Width)	36.600.oo
	Subtotals	$ 1.015.600.oo
	10% Contingencies	101.560.oo
	Subtotals	$ 1.117.160.oo
	10% Engineering and Administrative Costs	111.716.oo
	GRAND TOTAL Stage I Work Costs	$ 1.228.876.oo
	USE: $ 1.229.000.oo	

NOTE:

At current exchange rate of 6.65 colones per U.S. $ 1.00, this Stage I work total cost would be equivalent to 8.172.850 colones of Costa Rican currency.

FINAL EXPLANATORY REMARKS AND DATA

1. The above estimated costs should be adequate at this time as preliminary estimates for budgeting, financing, or planning purposes, pending completion of more detailed engineering analysis and design.

2. Runway extension of 440 Mts. to the east is more economical and feasible because all property is now owned by the airport authority and terrain conditions are much more favorable than on the west end. Any further major runway - extension, however, probably will be on the west end because of the close proximity of the new 4-lane highway on the eastern airport limit.

3. Increasing the runway length from 2000 to 2440 Mts. (8000 Ft.) will enhance safety margins for large jet aircraft on landings and takeoffs under all operating conditions both day and night; it will permit higher aircraft takeoff -- weights, thus increasing present range of non-stop flights originating in San José; and it should result in an increase in airport traffic by other international air carriers who have been reluctant to inaugurate service to San José, - pending runway extension completion.

4. The above estimated costs are based on using essentially the same pavement components and thicknesses as the existing airport pavement. This is considered reasonable at this time, pending completion of soils and final design investigations and analysis, and considering the excellent performance of the - pavements during the past 10 years. Except for the cracking of the surface-course (top $1\frac{1}{4}$-inch layer) on the runway, there is no evidence or past history of any other serious pavement defect or distress on the runway taxiway-apron system. There have been no pavement failures, such as rutting, breakthroughs,

or large-scale deformations of any consequence, which would require complete base subgrade removal and replacement. What pavement repairs have been made were largely confined to removing and replacing by patches the top $1\frac{1}{4}$-inch cracked surface course on the runway only. No repairs or improvements are needed on the terminal apron or its taxiway connections to the runway, as these pavements are in excellent condition. Accordingly, the following pavement design was used in the above estimates, and is recommended for consideration in final design for use in all pavement construction of -

STAGE I:

FAA Spec. No.	Pavement Component	Thickness (Inches)
P-152	Subgrade (Compact top 20.0 CM to 98%)	----
P-154	Compacted Subbase (100% density)	16.0
P-209	Crushed Base Course (100% density)	10.0
P-401	Asphaltic Concrete (Hot-Mix) --- Minimum Depth	3.0
	Total pavement Thickness	29.0 Inches

5. It should be noted that this pavement design should be adequate for jet aircraft with approximately 300,000 pounds gross weight (dual-tandem undercarriage) under critical design loading conditions, based on F-5 subgrade. This is evidently the typical soil and drainage design basis used before in the

original construction, and has proven adequate.

6. Lastly, it is believed that the final design of the future cross-runway(approximately 3,000 x 75 Ft.) for small aircraft should consider siting it at 45 degrees instead of 35 degree intersection with existing runway.

   Preliminary evaluation indicates that this would result in major economies - or lower cost of construction; improved layout of future general aviation areas; and overall more advantageous earthmoving design. The difference in wind coverage with such a 45 degree alignment is considered negligible in - contrast to the other advantages that would result of a rather substantial nature.

7. In conclusion, it is sincerely hoped that this report will be of major assistance and help in establishing a sound program of airport development for El Coco International Airport.