

LEGISLATIVE ASSEMBLY OF THE  
NORTHWEST TERRITORIES  
7<sup>TH</sup> COUNCIL, 49<sup>TH</sup> SESSION

TABLED DOCUMENT NO. 23-49

TABLED ON JUNE 21, 1973

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T.D. 23-49

Tabled on June 21, 1973

A DISCUSSION PAPER

FOR

THE PROVISION OF

AIR TRANSPORTATION FACILITIES

IN THE ARCTIC

PRESENTED BY

ARCTIC TRANSPORTATION AGENCY

MINISTRY OF TRANSPORT

Based on a Review of Air Transportation in the Arctic carried out by the Policy, Planning and Major Projects Branch and the Canadian Air Transportation Administration of the Ministry of Transport and the Canadian Transport Commission in 1971.

March 27, 1973.

## INTRODUCTION

The purpose of this paper is to propose for discussion purposes a system of air transportation facilities in the Yukon and Northwest Territories that will enable effective, efficient air transportation to be provided to the residents in accordance with their needs and the traffic available.

As the Canadian Arctic is a vast, sparsely populated section of Canada, rich in untapped resources, air transportation will continue to be a key factor in meeting its social and economic needs. An effective system of air transportation facilities will contribute significantly to the residents' ability to obtain a higher standard of living, quality of life and equality of opportunity.

It would also encourage the viable, economic development of the Territories and enable northern residents to realize their potential contribution to the national economy and the material well-being of Canadians. The evolution of government in the northern territories would be furthered, as well as the maintenance of Canadian Sovereignty.

A continuing, efficient, effective air transportation system is based on a compatible combination of passengers and cargo traffic, size and performance of aircraft and air navigation and airport facilities. That is, aircraft must be of such a capacity and performance that will enable an economic air service to be operated at an acceptable frequency with the air navigation and airport facilities provided.

ABBREVIATIONS

H.I.      High Intensity

L.I.      Low Intensity

ILS        Instrument Landing System

VOR/DME    Very High Frequency Omni Range/Distance  
Measuring Equipment

MOT        Ministry of Transport

AES        Atmospheric Environment Service,  
Department of the Environment.

VASI        Visual Approach Slope Indicator

The establishment of guidelines for the provision of air transportation facilities to be provided at communities will enable the air transportation industry to plan aircraft acquisitions and utilization with a knowledge of the facilities that will be provided.

#### CLASSIFICATION OF AIRPORTS

Airports may be grouped according to population, community role and air transportation route structure.

#### ARCTIC A - (Mainline) Airports

Those airports serving population centres which have some of the following characteristics: -

It is a growing community.

It is a capital or regional administrative centre.

It is served by an air carrier on a scheduled basis.

It has no means of regular transportation other than air.

It has an extensive continuing resource development role.

The communities in this group include: -

Cambridge Bay

Fort Simpson

Fort Smith

Frobisher Bay

Hay River

Inuvik  
Norman Wells  
Resolute  
Watson Lake  
Whitehorse  
Yellowknife.

The following facilities will be provided for the operation of Boeing 737 and 727, and Lockheed Electra and Hercules, and similar turbine aircraft operated on a regular air service.

Runway - 6000' x 150' gravel surface for year round use, 175' graded area on sides of runway and 200' at ends. Hard surfacing of aircraft manoeuvring areas will be considered based on frequency of use, types of aircraft, maintenance costs, etc.

Lighting - R.I. runway lighting, R.I. approach lighting on primary approach. L.I. approach or VASI and threshold identification lights on other approach. Rotating beacon, lighted wind sock.

Approach Aids - ILS

Navigation Aids - VOR/DME, NDB

Passengers - Passenger Terminal Building  
- Aircraft Parking Area

Aircraft Servicing - Refuelling and cargo handling is  
air carriers responsibility.

Communications - Air-Ground and point to point  
communications provided by NOT.

Meteorological - Weather reports and enroute fore-  
casts provided by NOT or AEC.

The Arctic A (mainline) airports would be operated and  
maintained by the Ministry of Transport.

#### ARCTIC B - (Area) Airports

Those airports serving population centres which  
have some of the following characteristics:

It has a population of more than 400.

It is a growing community.

It has no means of regular transportation  
other than air.

It is served by a unit toll air service.

It is an area administrative centre.

It has an active role in resource development.

The communities in this group include: -

Aklavik

Baker Lake

Beaver Creek

Broughton Island

Burwash

Carmacks

Chesterfield Inlet

Coppermine

Coral Harbour  
Dawson  
Eskimo Point  
Faro  
Fort McPherson  
Haines Junction  
Hall Beach  
Holman  
Mayo  
Old Crow  
Rankin Inlet  
Repulse Bay  
Ross River  
Teslin  
Tuktoyaktuk  
Whale Cove

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The following facilities will be provided for the operation of F28, 748, F227, YS11 and similar turbine aircraft operated on a regular air service. These facilities may also be suitable for use of several piston engine aircraft currently in service and by turbine engine aircraft, such as the Lockheed Electra and Hercules and Boeing 737 in some circumstances.

Runway - 5000' x 150' gravel surface for year round use, 150' graded area on sides of runway and 200' at ends. A runway length of 4600' may be acceptable where due to terrain restrictions 5000' is uneconomical or the site is too remote from the community.



- Lighting - M.I. runway lighting. S.I. approach lighting or VASI and threshold identification lights on both ends.  
Rotating beacon, lighted wind sock.
- Approach and Navigation Aids - N.D.B.
- Passengers - Passenger-Cargo shelter  
- Aircraft parking area 150' x 200'
- Aircraft Servicing - Refuelling and cargo handling is air carriers responsibility.
- Communications - At locations where air/ground services not provided by the Ministry of Transport or other Government agencies, aircraft operators will be responsible to arrange for such services as are required for their aircraft operations.
- Meteorological - At locations where weather reporting services are not provided by the Ministry of Transport, Atmospheric Environment Service or other Government agencies, aircraft operators will be responsible to arrange for such services as are required for their aircraft operations.

The Arctic B (area) airports would be operated and maintained by the Governments of the Yukon and Northwest Territories.

ARCTIC C - (Community) Airports

Those airports serving population centres which have

the following characteristics:

It has a population of more than 100.

It has no means of regular transportation other than air.

The communities in this group include: -

Arctic Bay  
Arctic Red River  
Belcher Islands  
Cape Dorset  
Clyde River  
Fort Franklin  
Fort Good Hope  
Fort Liard  
Fort Norman  
Fort Resolution  
Gjoa Haven  
Grise Fiord  
Igloodik  
Lac La Martre  
Lake Harbour  
Pangnirtung  
Pelly Bay  
Pond Inlet  
Port Burwell  
Sachs Harbour  
Snowdrift  
Spence Bay

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Tungsten

Wrigley 162

The following facilities will be provided for the operation of Twin Otter, Skyvan and similar STOL aircraft and will be suitable for use by piston engine aircraft such as the Otter and Beaver.

- Runway <sup>3500 x 100</sup> - 2000' x 75' gravel surface for year round use, 40' graded area on sides of runway and 100' at ends.
- Lighting - Runway and threshold identification lights at both ends. Rotating beacon, lighted wind sock.
- Approach and Navigation Aids - N.D.B.
- Passengers - Passenger-Cargo shelter  
- Aircraft parking apron 100' x 150'
- Aircraft Servicing - Refuelling and cargo handling is air carriers responsibility.
- Communications - At locations where air/ground services not provided by the Ministry of Transport or other Government agencies, aircraft operators will be responsible to arrange for such services as are required for their aircraft operations.
- Meteorological - At locations where weather reporting services are not provided by the Ministry of Transport, Atmospheric Environment

Service or other Government agencies, aircraft operators will be responsible to arrange for such services as are required for their aircraft operations.

The Arctic C (Community) Airports will be operated and maintained by the Yukon and Northwest Territorial Governments.

#### AIDS TO NAVIGATION

The VOR's presently being installed in Canada are optimized from a coverage point of view to accommodate or establish an airway route system. Such an installation in the rugged Arctic environment is a very expensive proposition by virtue of the critical siting requirements of a maximum coverage VOR system. The site selected in this case generally entails extensive site development costs, long access roads and power and control lines. As a consequence of these factors, the costs associated with establishing a VOR/DME system in this environment vary a great deal from site to site.

An Arctic VOR/DME package consisting of equipment and shelter is currently being developed to simplify the installation of such systems in the Arctic. This package will be capable of full enroute service, with the actual coverage obtained being a function of the site selected for the installation. Economies may be achieved where coverage requirements can be relaxed to terminal specifications (30 mile radius) and the installation located at a site near the airport where power and control lines, and access roads are readily available. These VOR's would be sited to provide

primarily the most effective approach and landing aid, and provide as much coverage as possible on the air routes flown.

The development of area navigation systems such as "Omegs" will continue to be monitored with a view to assessing its suitability as the Arctic long range navigation aid.

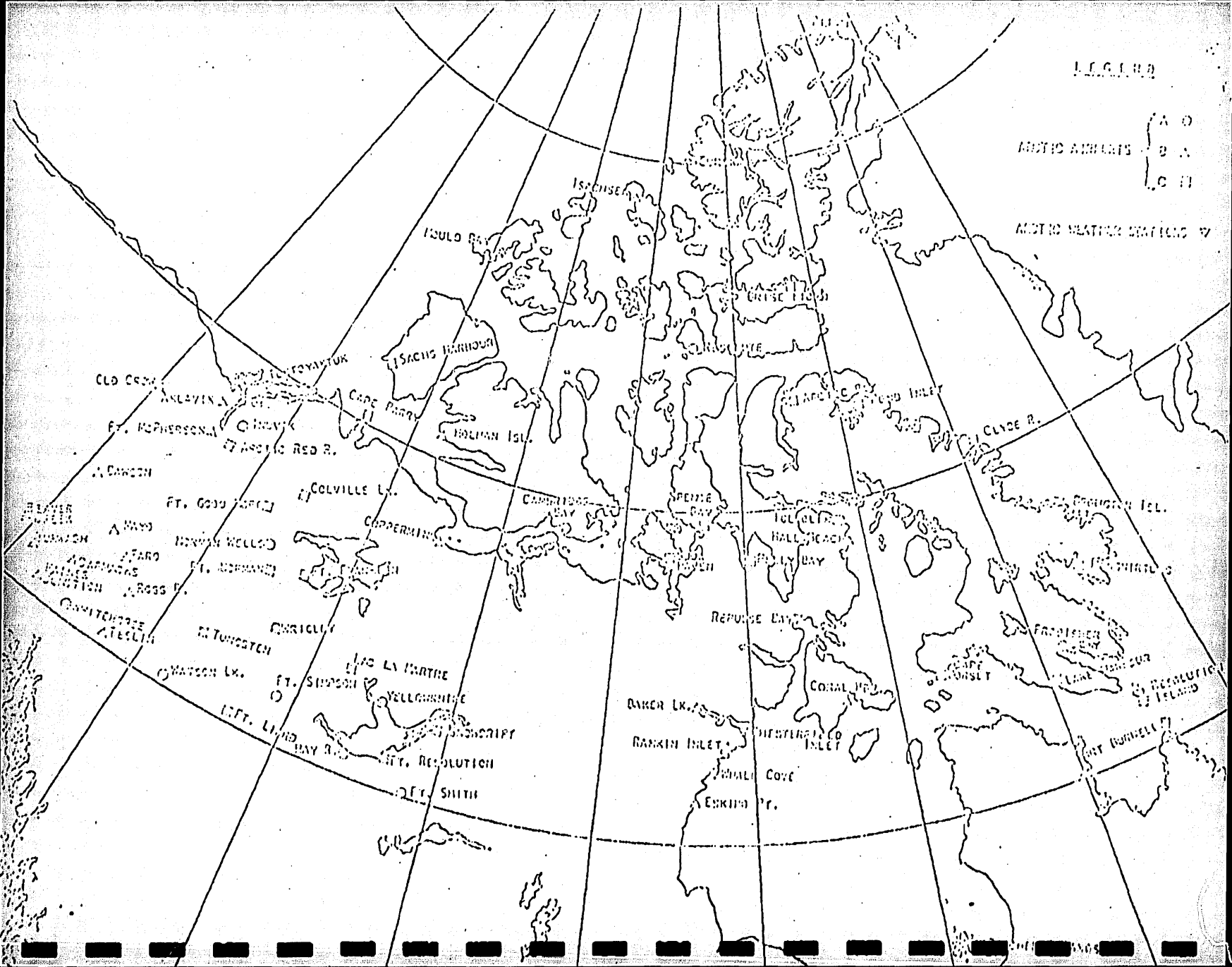
The installation of VOR/DME's as follows would provide improved navigational facilities on the most frequently used Northern air routes.

Edmonton	- Watson Lake, Whitehorse
Edmonton	- Fort Simpson, Wainley, Norman Wells Fort Good Hope, Inuvik
Edmonton	- Hay River, Yellowknife, Contwoyto, Cambridge Bay, Resolute Bay
Winnipeg Churchill	- Baker Lake, Spence Bay, Resolute Bay
Montreal	- Frobisher, Hall Beach, Resolute Bay
Whitehorse	- Watson Lake, Fort Simpson, Yellowknife, Baker Lake, Coral Harbour, Frobisher

LEGEND

ANTIC ANTARES	A O
	B A
	C II

ANTIC WEATHER STATIONS



Spence

Isachsen

GRISE FJORD

ISACHS HARBOR

OLD COVE

TOYAYTUK

CAPE PARRY

ANLAVINA

FT. McPHERRSON

ARCTIC RED R.

HOLLAND ISL.

J. DANSON

FT. GOOD HOPE

COLVILLE L.

CAMMIDGE BAY

SPENCE BAY

CLAYTON INLET

CLYDE R.

BEAVER CREEK

ADAMSON

ADAMSONS

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ADAMSONS

FT. NORMAN

CHAPPELLIN

HALL BEACH

REPUBLIC BAY

BRITISH ISL.

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FT. TONGATE

ENRIKLEN

REPULSE BAY

COAL HILL

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FT. SIMPSON

LAD LA MARTRE

BAKER LK.

RESOLUTION INLET

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FT. LIND

YELLAGNINE

RANKIN INLET

ESQUIA COVE

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

MAY R.

FT. RESOLUTION

ESQUIA COVE

ESQUIA COVE

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FT. SMITH

ESQUIA COVE

ESQUIA COVE

ESQUIA COVE

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY

FRANCIS BAY