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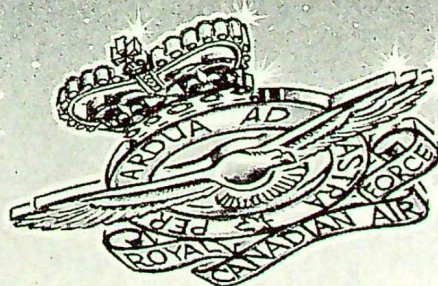
*Roundel*

VOL. 13, NO. 6

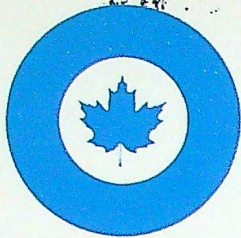
JULY-AUGUST 1961

SPECIAL ISSUE

The  
**RCAF**  
1960-61



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T H E

# Roundel

Published on the authority of the Chief of the Air Staff, Royal Canadian Air Force

VOL. 13, NO. 6

JULY-AUGUST 1961

## THE RCAF 1960-61

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### *On The Break*

This being the second special issue in succession, several articles have had to be re-scheduled for publication at a later date. All regular features and departments will re-appear beginning in the September issue. We again solicit contributions for and constructive criticism of your service magazine.

*The Editor.*

Views expressed in THE ROUNDel are those of the writer expressing them. They do not necessarily reflect the official opinions of the Royal Canadian Air Force.

*politan*, CC-106 *Yukon* and the C-130B *Hercules*, with their increased range, speed and carrying capacity.

## Foreword

THE following pages contain a review of the manner in which the Royal Canadian Air Force carried out during the past year the roles and responsibilities assigned to it by the Government.

This period was for the RCAF one of modernization in equipment and techniques for many of its principal roles. Although these advances were important in themselves, they take on added significance when viewed in the perspective of the past decade. In this era of rapid and complex technological developments in the means of warfare, it is not enough to measure progress on the basis of one 12-month period, isolated from the past.

Looking at the capabilities of the RCAF today, against the background of the early '50s, the true nature and degree of advancement becomes apparent. For instance, at the beginning of the decade our first-line maritime patrol aircraft was the World War II *Lancaster*. Since then, we have conceived, designed and built in Canada an aircraft, the *Argus*, that is unsurpassed in the world in the field of anti-submarine warfare. Along with the *Neptune*, the *Argus* gives the RCAF a maritime force qualitatively second to none.

In 1950-51 *Vampires* and piston-driven *Mustangs* were our first-line fighters; the CF-100, which was to become the backbone of our air defence force, was still being flight tested and production was just starting in Canada on the F-86 *Sabre* to equip the RCAF's air division of the NATO air arm in Europe. Today we are preparing to re-equip the Canadian-based CF-100 squadrons with the F-101 *Voodoo*; two *Bomarc* sites and a SAGE control centre are under construction as part of the well-developed NORAD defence structure; and a new aircraft is taking shape for No. 1 Air Division in the CF-104, with more than double the speed of the *Sabre*.

In the early '50s, too, the RCAF had just assumed the responsibility for one of Canada's new international commitments for the United Nations, carrying troops and supplies in *North Star* transports across the Pacific for the Korean War. Today our air transport experience has become global, our commitments have multiplied to include regular flights to Europe and Africa, and our capabilities are being revamped and expanded with the introduction into service of the CC-109 *Cosmo-*

In 1950 the air force ceiling on personnel was raised to 19,643 and the following year to 25,566 officers and men. By 1957 that ceiling had doubled and has since remained constant, despite the continual increase in commitments. More important, perhaps, than numbers was the increasingly high standard of training required of, and given to, our personnel throughout the decade. Our training organization modernized its methods and broadened its programs to meet the complexities in the field of electronics, missilery and engineering. Members of the service can take great pride in the fact that the high calibre of our training is internationally recognized.

A complete new concept of logistics control was introduced into the RCAF in 1960 when the new electronic computer at Air Materiel Command was put into operation to increase the efficiency and economy of the RCAF supply system.

It is in retrospect, too, that the RCAF's non-military contribution to the nation becomes apparent. For example, by 1951 the RCAF had completed the major part of its aerial survey operations, photographing previously uncharted areas of Canada. Maps were made from these aerial photographs which have assisted substantially in the opening of the Canadian North during the past decade. From a relatively modest start with World War II aircraft, the RCAF's search and rescue organization has developed into a highly efficient safety force, equipped in 1960 with the CSR-110 *Albatross* specially designed for the job. Over the years the RCAF has been in the forefront of new navigational and operational methods in the north and has given civil aviation confidence to extend its operations into the undeveloped regions of Canada.

Viewed in relation to the past ten years, 1960-61 was unquestionably a year of progress for the RCAF, a year in which many plans approached or reached fruition. This is not to say that the air force does not have a great deal to do to keep pace with the demands of the future. But with its present structure, trained manpower, know-how and modernized equipment, the RCAF faces these challenges with confidence.



Hugh Campbell  
Air Marshal, Chief of the Air Staff

# RCAF ORGANIZATION

## AIR FORCE HEADQUARTERS

Chief of the Air Staff



A/M Hugh Campbell, CBE

**T**O CARRY out its tasks the RCAF has organized itself on a functional basis. This means that although overall policy direction is retained at Air Force Headquarters (AFHQ) in Ottawa, each major role is administered by a separate commander and his staff from a command headquarters (CHQ). The chain of authority and responsibility continues on down from the CHQ through the commanding officer of each station and ultimately, through the unit commanders on the station to the newest recruit.

Air Force Headquarters is composed of the Chief of the Air Staff and his specialist staff. The staff, which develops air force policy, is divided into four primary divisions: Operational, Technical, Personnel and Comptroller. The Vice Chief of the Air Staff is responsible for the operational efficiency of the RCAF. The Air Member for Technical Services is responsible for policy and

plans concerning aeronautical engineering design, maintenance and inspection, construction, and requirements affecting equipment and supplies. Policies dealing with personnel are directed by the Air Member for Personnel, while matters related to budget and finance, together with the efficient use of RCAF resources, are the responsibility of the Comptroller.

The RCAF's five commands and air division each perform a different type of duty. With its headquarters at St. Hubert, Air Defence Command is composed of all units whose special role is the air defence of Canada and who participate with the United States Air Force in the air defence of North America. Air transport is the responsibility of Air Transport Command Headquarters at Trenton. Units and stations whose main task is the training of personnel are administered and supervised by Training Command Headquarters in

Vice Chief of the Air Staff



A/V/M D. M. Smith, CBE

Air Member for Technical Services



A/V/M J. A. Easton, OBE

Air Member for Personnel



A/V/M W. A. Orr, CBE

Comptroller



A/V/M I. C. Cornblat

Winnipeg. Maritime Air Command Headquarters at Halifax is responsible for the aerial patrolling and guarding of the sea approaches to Canadian coasts. Air Materiel Command, with headquarters at Station Rockcliffe, is responsible for the provisioning, warehousing and distribution of materiel and for the technical guidance and control of maintenance activities throughout the RCAF.

The remaining major formation in the RCAF comprises the 12-squadron No. 1 Air Division under NATO in Europe. Because the term "command" does not have a comparable usage in the other NATO air forces, the formation is described as an air division, with headquarters at Metz, France.

The foregoing pertains in the main to the organization of the Regular Force. In addition, support is provided by the Auxiliary units and squadrons, the Primary Reserve (including members of the University Reserve Training Plan), and the Supplementary Reserve (composed of personnel with prior service in the Regular).

The RCAF Auxiliary is composed of a group of citizen airmen who train for useful RCAF tasks on a part-time basis and thus provide a reserve of trained personnel for use in an emergency. There are four different types of auxiliary units: flying units training for the support of rescue and survival operations in the event of an emergency; technical training units training technicians to maintain the aircraft flown by the flying units; medical units specializing in emergency rescue techniques; and aircraft control and warning units augmenting those of the RCAF Regular. Because the introduction of semi-automaticity has resulted in a reduced requirement within the air defence system for control and warning operations personnel, these latter units are currently being disbanded. Major im-



A/V/M L. E. Wray, OBE,  
AFC

AIR TRANSPORT  
COMMAND



A/V/M W. R. MacBrien,  
OBE

AIR MATERIEL  
COMMAND



A/C W. I. Clements,  
OBE

TRAINING  
COMMAND



A/C R. J. Lane,  
DSO, DFC



A/V/M C. L. Annis,  
OBE



A/V/M H. M. Carscallen,  
DFC

provements in the radar warning systems permitted the standing down last year of the volunteer Ground Observer Corps located south of the 55th parallel.

The RCAF maintains close liaison with the Royal Canadian Air Cadet League and the RCAF Association. The Air Cadet League is composed of 332 active squadrons with a total strength of some 25,500. Summer camps of two weeks duration are held at RCAF Stations Sea Island, Trenton, Saint Jean and Greenwood. The RCAF awarded flying scholar-

ships to 250 senior air cadets and during the year 653 cadets enlisted in the Regular Force.

The RCAF Association is made up of former air force members. Its aims are to promote fellowship, to encourage aeronautics in all its forms, to support the RCAF, its reserve and the air cadet movement, to assist in the welfare of ex-airforce personnel, to perpetuate the traditions of the RCAF and to strive for peace. During 1960-61 the RCAF carried out an active program aimed at furthering its stated objectives.

# OPERATIONAL FORCES

## Air Division Forces

Number One Air Division is Canada's contribution to the integrated military forces of NATO in Europe and is part of the Fourth Allied Tactical Air Force.\*

There are four wings in No. 1 Air Div., controlled by division headquarters located at Metz, France. Each wing is equipped with two *Sabre* (day-fighter) squadrons and one CF-100 (all-weather interceptor) squadron: No. 1 Wing is located at Marville, France; No. 2 Wing at Gros Tenquin, France; No. 3 Wing at Zweibrucken, Germany; and No.

\* Some 270 RCAF personnel serve on the various staffs of NATO higher formations, such as Supreme Headquarters Allied Powers Europe (SHAPE) and its subordinate headquarters, i.e. Allied Air Forces Central Europe (AAFCE) and 4 ATAF.

4 Wing at Baden-Soellingen, Germany.

Besides the squadrons of aircraft, the division operates a tactical air control centre, a high-powered long range search radar to provide warning and identification control of the division's aircraft, and No. 30 Air Materiel Base, Langar, England. No. 137 Transport Flight at Langar and No. 109 Communications Flight at Gros Tenquin provide air transport support with *Bristol Freighters* and *Dakotas*.

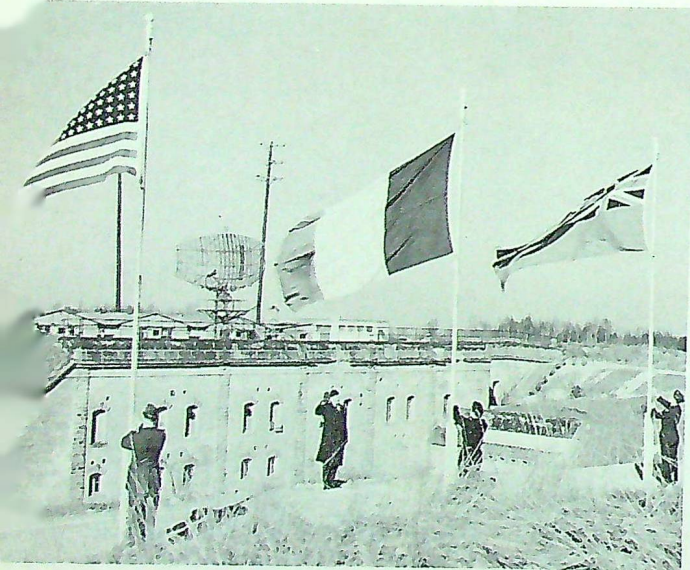
A continuous alert called "ZULU" is maintained. Aircrew standing by in alert hangars can be airborne within minutes after the "scramble" order. The Tactical Air Control Centre near Metz co-ordinates the operational training carried out within Air Division. Each day and night,

*Sabre* and CF-100 aircraft perform exercises to keep the operational performance of radar and aircraft at a high level.

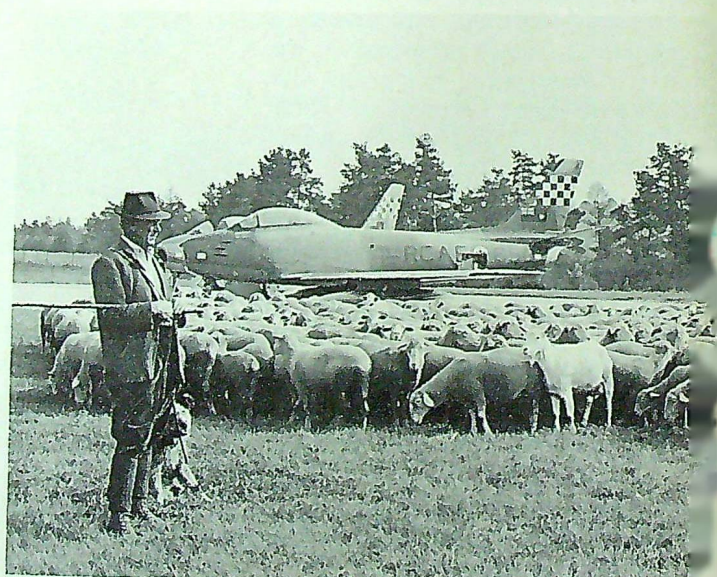
During the past year, Air Division was involved in two large scale exercises to test its mobility, flexibility and combat readiness in its air defence role. In the spring of 1960 a maximum number of sorties were flown against the UK in support of the RAF Fighter Command annual air defence exercise. All squadrons were involved over a three-day period. The second large scale exercise was a NATO exercise in the fall of 1960, which involved all the NATO army, navy and air forces in the European theatre.

Air Division squadrons fly to bases in Belgium, Germany, Denmark, Norway and Italy, and operate there

Tri-nation flying control centre near Metz



Pastoral scene at No. 1 Wing, Marville, France



for a period of 10 days each under the NATO squadron exchange system. In return, Belgian, American, German, Danish, Norwegian and Italian aircraft, aircrews and groundcrews operate out of Air Division bases.

Since March 1957 a small RCAF unit has been maintained at Decimomannu on the island of Sardinia for the *Sabre* and CF-100 squadrons in Europe to carry out machine gun and rocket air firing exercises. Canadian squadrons use this range in conjunction with German and Italian fighter squadrons. The effectiveness of the training obtained at this Air Weapons Unit by both air and ground crews is illustrated by the RCAF's air firing record. No. 1 Air Division *Sabre* pilots have won three times in a row the Guynemer Trophy, emblematic of air-to-air gunnery supremacy in Allied Air Forces Central Europe.

With the buildup of the European national forces in NATO over the years since World War II, it is be-

coming possible to give the purely defensive role to individual European countries and to give the remaining NATO forces a stronger role as a deterrent. As a consequence of this changed concept, Canada in 1962 will replace the interceptor day-fighter *Sabre* with the CF-104 in its strike reconnaissance role. Preparatory work for the changeover is now underway.

## Air Defence Forces

The RCAF's Air Defence Command, in co-operation with assigned forces of the United States, contributes to the air defence of North America. With headquarters at St. Hubert, P.Q., ADC units are deployed throughout the length and breadth of Canada to warn, control and intercept against hostile attack.

This deployment is closely integrated with that of US forces under the operational control of North American Air Defence Command (NORAD) to provide the best possible

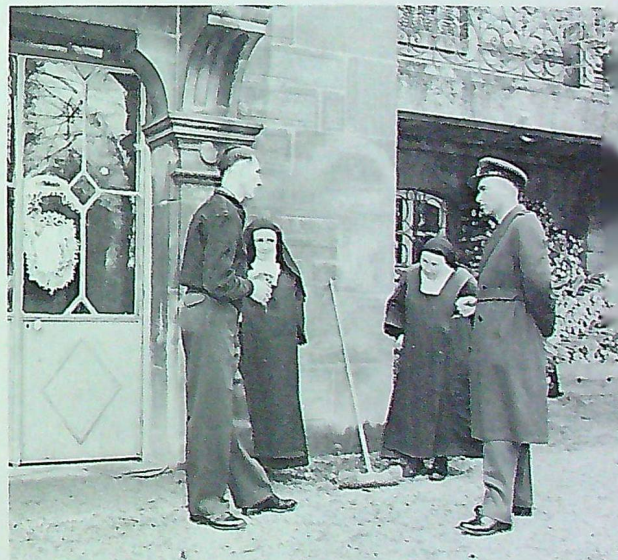
coverage against any attacker. To detect an attack and to provide the needed warning for deterrent forces and defensive weapons to be brought into action, control and warning systems have been established: the Distant Early Warning (DEW) Line, where ADC is responsible for operational control of the Canadian section; the Mid-Canada Line (MCL) which is completely ADC operated; and the Pinetree System, some of whose stations are manned by RCAF and some by USAF personnel. Last year the RCAF employed nine squadrons of CF-100 all weather interceptors at Comox, North Bay, Uplands, St. Hubert and Bagotville. These are being reduced to five squadrons, which will be re-equipped with F-101 *Voodoo* supersonic jets.

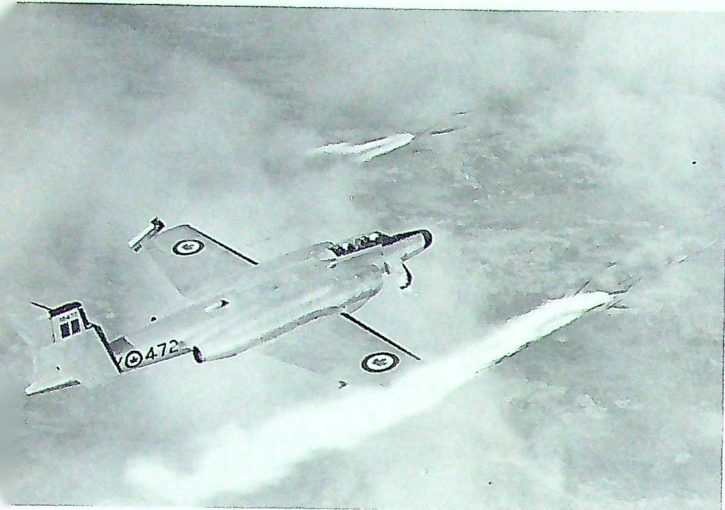
Efficiency of air defence forces is maintained at a high level in peacetime by carrying out exercises that will test every component of the air defence system. Last September, a larger exercise, utilizing aircraft pro-

Guynemer Trophy winners in 1960

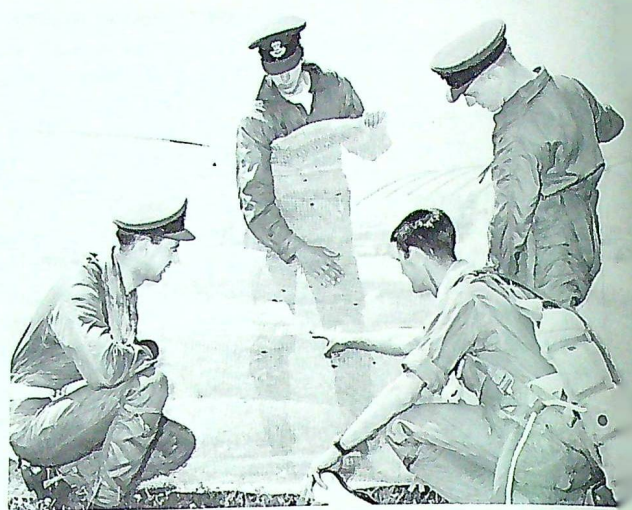


RCAF personnel help French nuns rehabilitate girls' school





CF-100 over Primrose Lake range near Cold Lake



Sabre pilots check gunnery target at Chatham

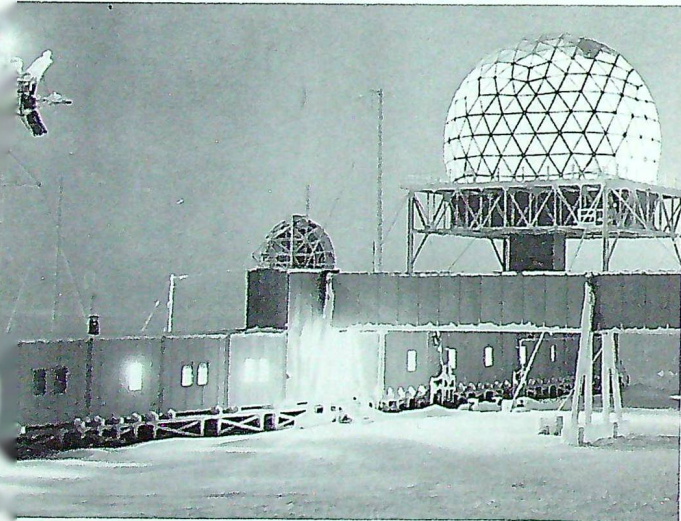
vided by the USAF's Strategic Air Command as hostile aircraft, simulated an attack on the North American continent. All ADC facilities were involved. The first warnings of the attack were received from the DEW Line and defensive forces were alerted. Additional information was obtained as the strike aircraft proceeded southerly and penetrated the

MCL. Defensive forces were readied and as the strike aircraft came within range of the control radars of the Pinetree Line, ground control intercept directors scrambled defensive fighter aircraft to meet the invaders. After completion of the exercise, analyses of actions taken led to strengthening of the system.

Besides carrying out large and

small-scale exercises, Canada's air defence crews are given periodic live-firing evaluations over Primrose Lake range near RCAF Station Cold Lake. Results are carefully tabulated and credits awarded not only on the number of hits achieved by particular aircraft but on flying ability, the ground crews' effectiveness, and the controllers' proficiency. Another sys-

DEW Line sends instantaneous warning from Arctic rim to Combat Operations Centre at ADCHQ, St. Hubert



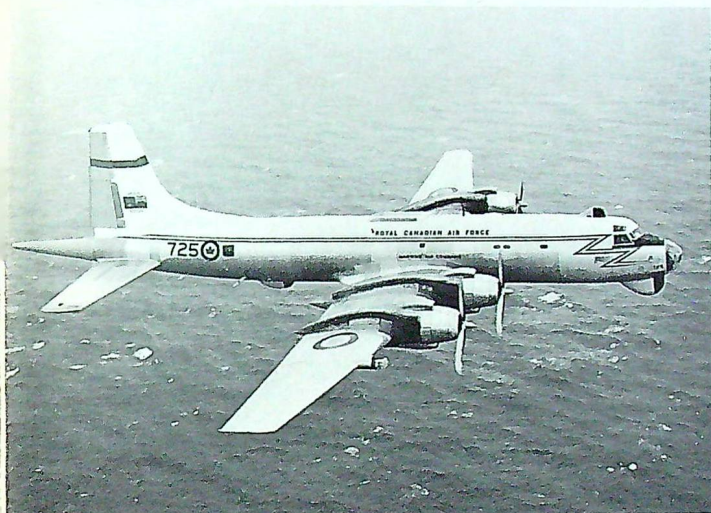
tem of evaluating the combat capability of individual units and ensuring that all squadrons are trained to a common standard is brought about through periodic inspections by the ADC air staff visiting team.

Operational training units are located at Chatham, N.B., and Cold Lake, Alta. No. 1 OTU at Chatham is responsible for the operational training of all *Sabre* pilots proceeding overseas to meet the requirements of No. 1 Air Division. No. 3 OTU at Cold Lake, is responsible

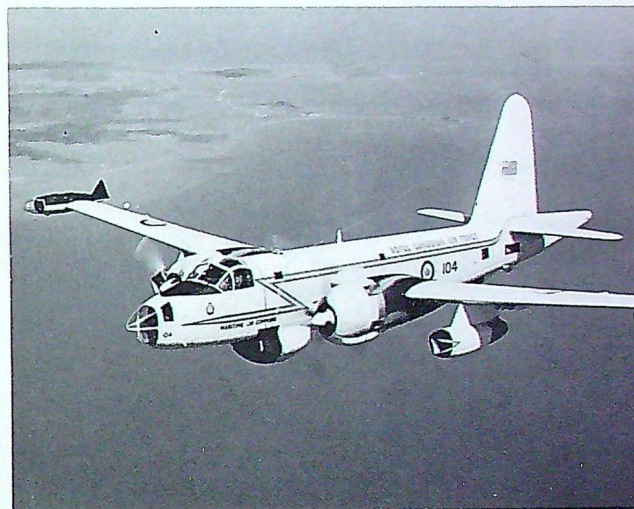
for the operational training of the all-weather fighter aircrews needed within the NORAD system and the Air Division. Aside from the initial operational training being conducted at these two stations, both units conduct courses in advanced air defence techniques for key squadron personnel.

During the past year ADC has been involved in a transition period. While it carries out the operations of the day, it is also deeply involved in a program of modernization of

equipment and specialized training to operate new air defence weapons systems. Two *Bomarc* bases are under construction at North Bay, Ont., and La Macaza, P.Q. Additional heavy radars and gap filler stations are being installed to strengthen the warning and control capability. An underground semi-automatic ground environment (SAGE) control centre is nearing completion at North Bay. These re-equipment programs are described more fully elsewhere in this issue.



Argus patrols over Atlantic



Neptune patrols over Pacific

## Maritime Forces

The RCAF trains and maintains maritime air squadrons on the Atlantic and Pacific coasts, and co-operates with RCN and USN forces in the defence of the maritime approaches to North America. Maritime Air Command (MAC) Headquarters is located in Halifax, with stations at Greenwood, N.S., Summerside, P.E.I., and Torbay, Nfld., and, on the west coast, a squadron based at Comox, B.C.

Combined operational headquarters have been established, one on each coast, to control maritime operations of the RCN and RCAF in peacetime. In war the Maritime Headquarters Atlantic at Halifax, together with all the Canadian maritime forces assigned to NATO, become part of the organization of the Supreme Allied Commander, Atlantic (SACLANT). Maritime Headquarters Pacific at Esquimalt, B.C., controls all Canadian maritime forces assigned

for operational tasks in both peace and war.

Three *Argus*-equipped squadrons are based at Greenwood (Nos. 404 and 405) and Summerside (No. 415). One *Neptune*-equipped squadron operates from Comox (No. 407). Operational training is conducted at Summerside on *Neptune* aircraft and crews destined for *Argus* squadrons go from there to the *Argus* Conversion Unit at Greenwood.

Maritime Air Command Headquarters also controls the operation

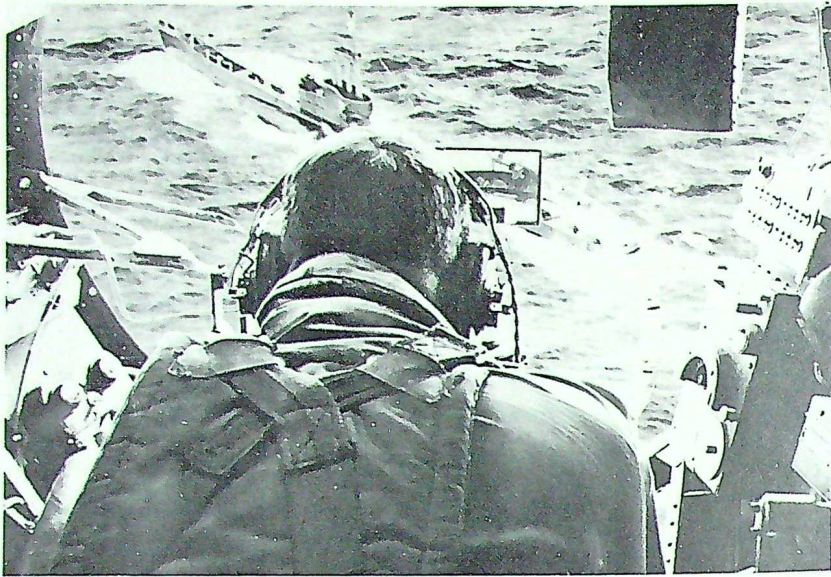
## Air Transport Forces

Air Transport Command, with headquarters at Trenton, Ont., is the air transport agency for the Department of National Defence as required in peace, war or emergency. Its forces are located with a view to meeting Canada's national requirements as well as our international responsibilities. The main units of ATC, based at Trenton, Namao, Downsview, Rockcliffe and Uplands, can be quickly deployed to any part of the world.

During the past year the modernization of ATC led to substantial growth in its operational capability. This capability is maintained in peacetime through a wide variety of duties, including the rotation of Canadian military personnel from Europe to Canada, transportation of United Nations troops in the Middle East, ferrying of personnel and supplies to the Middle East and the Congo, transporting supplies to Europe for the RCAF's Air Division and the Canadian Army Brigade, supply operations in the Arctic and transportation of Canadian soldiers in Army/RCAF exercises.

These operations, in addition to meeting current requirements, help maintain ATC in the high state of operational readiness required for modern hostilities. With emphasis on speed and time, it has become essential that combat troops be moved into a specific area as rapidly as possible after the outbreak of hostility. This requires aircraft capable of quickly airlifting large numbers of troops and equipment over great distances by trained personnel who know how to plan, organize and implement such an operation.

Two new aircraft now in ATC service which have increased the RCAF's capability for such assignments are the *Yukon* and *Hercules*. The former, which begins operations this summer, can carry 30,000 lbs. of cargo over 4,000 miles. The *Hercules*,



Nose view of submarine during combined maritime operations

of No. 103 Rescue Unit at Greenwood, No. 107 Rescue Unit at Torbay, and No. 101 Composite Unit at Dartmouth. In addition the AOC participates in the direction of the Joint Maritime Warfare School located in Halifax in co-operation with the Flag Officer, Atlantic Coast.

Constant training is carried out to ensure that the operational squadrons are prepared to fulfill their anti-submarine warfare role. During the past year MAC aircraft participated in five NATO exercises for a total of 46 days, joined with US naval forces in six exercises that lasted for 44 days and spent a further nine days with other elements of Canada's maritime forces in two large scale Canadian exercises at sea. These exercises train aircraft, ships and submarines to operate together efficiently in the discharge of a common task.

In addition, MAC participated in 15 exchange visits with aircrews of the United Kingdom and the United States during the year. In this program, an RCAF crew and its aircraft spent a week operating from

an RAF or USN base while a crew and aircraft from the other services replaced the Canadian crew at its home base. The contribution of this program to co-operation and our increased knowledge of operating techniques of our allies is important.

Operations under the control of Maritime Commanders, Atlantic and Pacific, continue in a never-ceasing cycle in which crews and aircraft monitor the wide ocean areas on both of Canada's coasts to exercise control that is prudent in peacetime and essential in war. During 1960, a total of 20,650 flying hours was expended on this task.

Joint RCN/RCAF training is carried out by the warfare school in Halifax which teaches tactics and operational concepts to airmen and sailors alike. Several levels of courses are conducted from the Senior Course, where the broad strategic aspects of maritime warfare are studied, to the Air Operating Team courses where aircraft and ships' crews study joint tactics and participate in tactical exercises together.

which came into RCAF service in 1960, is capable of carrying over 90 fully equipped combat troops and can land or take off on almost any kind of runway, or open field in an emergency. Its range allows it to airlift troops to Europe and most countries in the world. These aircraft make possible the airlifting of a 1,000-man battalion equipped with light arms, jeep transport and a limited supply of rations over long distances in one operation.

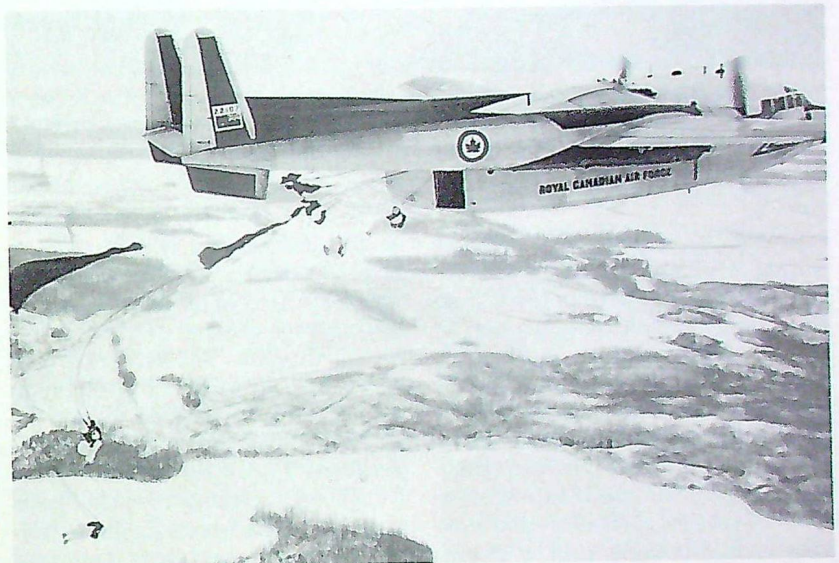
The wide variation of ATC assignments provides experienced personnel for almost any situation. During the course of a year, air and groundcrews may operate anywhere from the Congo to the Arctic. When the United Nations requested air transport for the Congo operation last summer, the RCAF was able to provide personnel experienced in UN African operations after four years of somewhat similar service in the Middle East.

Diversified duties also contribute to the efficient operation and full employment of the aircraft. For the past several years, No. 426 Squadron in Trenton has been operating *North Stars* through the Azores to Langar, England, with supplies for the Air Division and Army Brigade. They have also been returning freight to Canada while simultaneously carrying personnel. From September to December last year, ATC flew approximately 1,000 Army personnel from Canada to Europe and returned the same number as part of the Canadian Army Brigade 1960 rotation. A great reduction in supply costs for Canada's NATO forces will result when the *Yukon*, with its greater cargo carrying capabilities, replaces the *North Star*. The *Yukon* can fly the 3,400 miles non-stop from Trenton to Marville, France, in slightly less than ten hours.

Air Transport Command forces, although not maintained specifically to meet United Nations commitments, have been playing a promi-

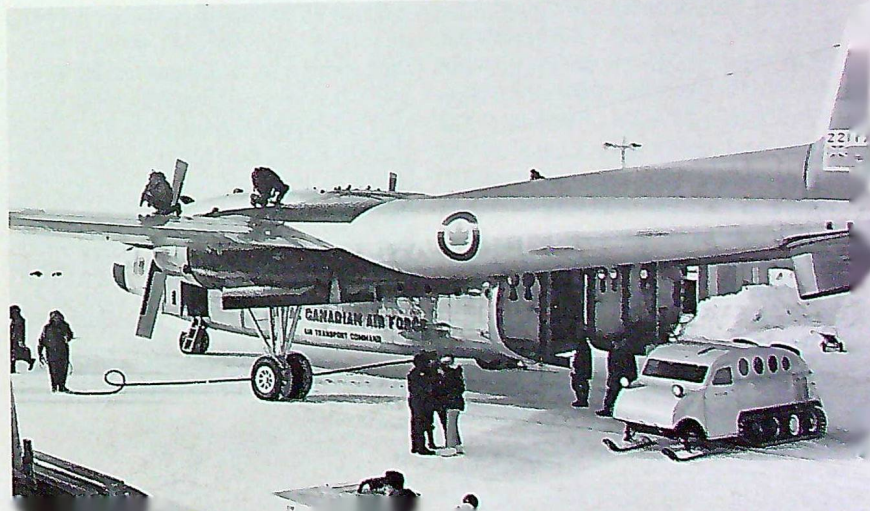


Hercules gobbles up freight for long, fast haul



Paratroops evacuate Flying Boxcar during "Snow Chinthe" exercise

Arctic resupply operations are standard ATC task





In the Congo, F/L D. H. Kuhn chats with Ghanaian soldier of the UN force



A/C C. G. W. Chapman, Air UN transport commander, inspects RCAF communications centre in Leopoldville

ment part in support of UN police actions. Operation 'Mallard' in support of UN operations in the Congo was commenced late last summer. In the first phase of this commitment, 24,000 pounds of meat and 20,000 pounds of powdered milk were flown from Trenton to Leopoldville in the Congo on short notice. In the second phase, ATC maintained an intensive airlift of troops, equipment and supplies to that country over a 28-day period. Initially, two *North Stars* landed each day after a 6,000 mile trip from Canada. It was later possible to reduce these flights to one a day and in the end more than 200 army and air force personnel and nearly 200,000 pounds of freight were carried from Canada. The third and continuing phase of the operation consists of two scheduled flights each week between the UN staging unit at Pisa, Italy, and Leopoldville, to carry supplies, equipment and personnel for the United Nations.\*

RCAF operations in support of the United Nations Emergency Force

in the Middle East, which have almost become routine after four years, were increased in efficiency last year by the replacement of the *Dakota* by the *Caribou*. The latter, particularly suited to Middle Eastern landing strips, because of its short take-off capabilities, is used for transport purposes. The *Otters* are used by the RCAF on air reconnaissance operations along the Israeli-Egyptian border and also on short transport flights.

Included among ATC's varied operations in 1960 were two international mercy missions carrying materiel and medical personnel to disaster areas in distant lands. When a series of earthquakes struck the city of Agadir, Morocco, in March 1960, Canada immediately des-

\* In addition to the long-range airlift, the RCAF has contributed to UN Congo operations by providing specialized staff for UNOC HQ. RCAF personnel set up and still head administration of the internal UN air transport system. Telecommunications technicians installed a "single side band" transmitter and operate it as a high frequency voice circuit between ATCHQ and the RCAF detachment at Leopoldville.

patched *North Star* aircraft with its contribution of 6,647 pounds of medical supplies and eight medical personnel. Owing to its readiness state, No. 426 Sqn. was able to place a crew and aircraft on one hour's standby for the mission. Chile's earthquake disaster resulted in a far greater airlift requirement. Using five *North Star* aircraft, ATC crews flew 25 tons of food, shelters, medical supplies and field hospitals to the devastated area. These aircraft also provided shuttle flights between Santiago and Puerto Mont, Antofagasta and Victoria, transporting evacuees and Red Cross supplies.

Unscheduled flights were made to many parts of the world. On these trips government leaders were carried on diplomatic missions and the Canadian members of the International Supervisory Truce Team to Saigon, Indo-China. Command aircraft also airlifted personnel and equipment to Ascension Island in the South Pacific where the Defence Research Board was testing missile detection equipment.

National commitments handled by ATC during the past year included army co-operation exercises, Arctic reconnaissance and supply operations, emergency evacuations and search and rescue missions.

Combined operations with the army, such as the "Snow Chinthe" exercises in northern Canada, involved dropping paratroopers, aerial photography, landing and unloading soldiers and equipment on rough, unprepared fields. A major army supply operation in 1960 saw ATC aircraft airlift 2,132,000 pounds from Thule, Greenland, to Alert in the extreme north of the Canadian Archipelago.

Supplies and personnel were also flown from Thule and Resolute Bay to the weather bases at Isachsen, Mould Bay and Eureka. Christmas parcels and food were parachuted to these lonely Arctic outposts in 'Operations Santa Claus'. Weekly scheduled flights are carried out from Trenton to the Arctic.

In late May, RCAF and civilian aircraft joined forces to form an armada of planes to fly the entire population of Gagnon, P.Q., from their flame-encircled town. RCAF aircraft and personnel also provided assistance in P.E.I. and in B.C. during forest fires in those provinces.

During the year No. 408 (Area Reconnaissance) Sqn. continued to fulfill special DND photographic requirements and, in its area reconnaissance role, maintained surveillance over the Canadian Archipelago. The squadron carried out regular flights over the Arctic Islands and, to assist the Department of Transport, it regularly carried a DOT ice observer who gathered information for long-range ice forecasting.

New aircraft placed in ATC service last year, in addition to the *Yukon*, *Hercules* and the *Caribou*, were the medium range *Cosmopolitan* to replace the *Dakota* on domestic flights and the *Albatross* with its tri-phantom landing gear for search

and rescue work. The Command, through No. 102 Composite Unit at Trenton, is responsible for search and rescue operations in the Ontario-Quebec region.

## Search and Rescue

The RCAF continues to discharge the government's responsibilities for search and rescue for all international flights over Canadian territory and over large ocean areas off the east and west coasts. Similar services are also provided for domestic civil and military air traffic. In addition, the RCAF is charged with the responsibility for co-ordinating assistance to marine craft in distress in Canadian coastal areas and in the Great Lakes. For organizational purposes, the overall area is divided into four search and rescue areas, each of which is administered by a command headquarters. Flying units, with aircraft and other facilities appropriate to the region, are established at strategic locations within each search and rescue area and aircraft and crews are held in readiness for operations at all times. Control of search and rescue is exercised by Rescue Co-ordination Centres, operating in conformity to the principles and recommended practices endorsed by the International Civil Aviation Organization.

H-21 effects rescue at sea



During 1960 the RCAF handled 2,953 search and rescue alerts, many initiated by aircraft whose only difficulty was a temporary loss of radio contact with controlling ground agencies. Thus, in 1,797 instances, RCAF action was confined to checking communication facilities. However, 1,156 incidents arose which required the despatch of search and rescue aircraft, marine craft, para-rescue teams or ground search parties. These cases were classified as aircraft incidents (197), marine cases (486), mercy flights (196), and miscellaneous (277). Miscellaneous incidents included emergency airdrops of food and medical supplies to isolated communities, search for missing persons and assistance in fighting forest fires. A total of 6,900 flying hours were expended on all search and rescue activities for the year. This figure includes flying done, under RCAF co-ordination, by other services and civil operators. It represents an increase of 1,500 hours over 1959. More than 85% of the flying time was spent on searches for missing civil aircraft, mainly of the light, single engine variety.

All except two of 48 missing aircraft were found. The two inconclusive cases both occurred in the early winter and heavy snowfalls immediately after the aircraft's disappearance were complicating factors in both cases. Search operations were suspended only after all reasonable hope for the existence of survivors had been exhausted. Survivors were found in 16 of the cases involving aircraft and a total of 43 persons were rescued during the year.

The year 1960 saw the appointment, by the Department of Transport, of three marine co-ordinators to the headquarters staff of the appropriate RCAF commands to provide specialist advice and assistance in the co-ordinating of marine search and rescue.

# TRAINING AND LOGISTICS

IT is axiomatic that any military force is only as effective as its training and logistics systems. Both Training Command and Air Materiel Command have been geared to meet the era of complex technology and automaticity which the RCAF has entered in the '60s.

## Training

The continued modernization of the RCAF exerts pressing demands for the training of highly skilled personnel to operate new equipment, weapons and systems of defence. Training Command, with headquarters located in Winnipeg, continued during the year to provide skilled officers and airmen for current operations and probable jobs of the future through courses and projects of all kinds. Training was carried on at six air training, four ground training, and one combined air/ground training stations.

Using facilities both inside and outside the air force, training authorities built up cadres of operational maintenance personnel to instruct air and groundcrews on the *Yukon*, *Cosmopolitan* and *Albatross*. Plans were also commenced for the initial training of personnel for the CF-104. Some officers and airmen were trained on the operation and maintenance of the *SAGE/Bomarc* system but the important accomplishment in this field was the completion of plans for the total *SAGE/Bomarc* training program.

The establishment of the Air Force College, which includes Staff College to prepare senior officers for higher appointments, and the Staff School to prepare junior officers for future staff appointments was another training highlight.

Looking at both current and future needs, officers' courses were instituted for guided missiles and space

technology indoctrination electronic counter-measures, *SAGE* indoctrination and computers.

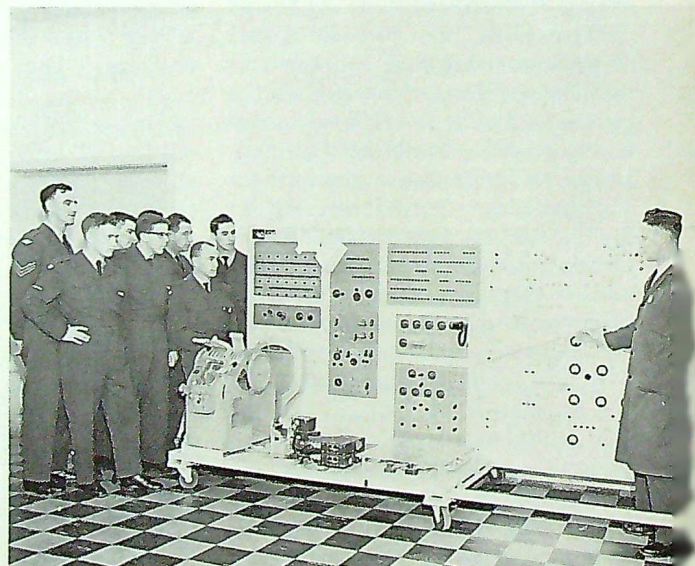
The evolution of technical trades in the RCAF led to a new course in electronics training for all technical airmen, and the introduction of equipment demanded new training syllabi, particularly in the electronic, mobile support and fire prevention trades.

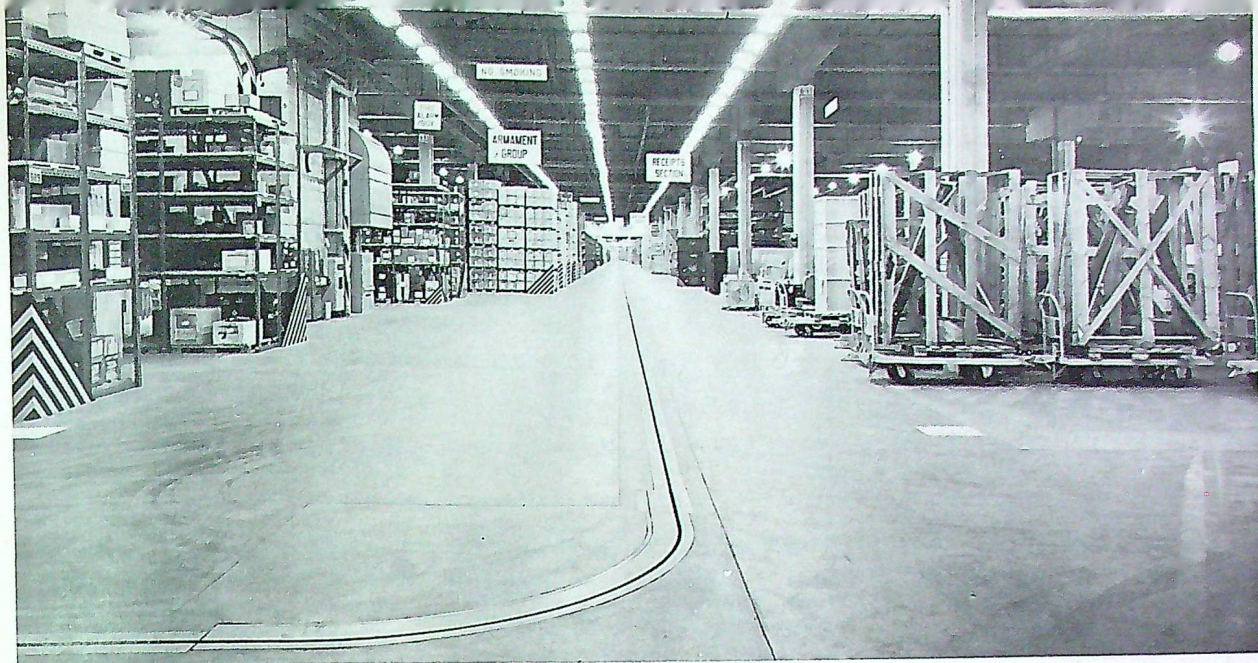
About 700 officers received basic training. Among them were aircrew trained as pilots, navigators or radio officers, officers enrolled or commissioned from the ranks and a small number of Danish and Norwegian aircrew trainees under a bilateral agreement signed with their governments in 1957. Approximately 2,300 airmen and 700 airwomen received basic training at schools located at Aylmer, Camp Borden, Clinton and Centralia in Ontario. 163,501 hours were flown on the training of aircrew in 1960-61.

Embryo radio navigators deplane from *Dakota* trainer



Electrical technicians study the *Argus* master control panel functions





Warehouse at No. 7 Supply Depot, Namao, covers an area of 22½ acres

## Logistics

The past year has been significant in RCAF logistics. More new types of aircraft were introduced into the service than in any comparable period subsequent to World War II. The design, engineering and development of the CF-104 were finalized and production proceeded to the hardware stage; the *Bomarc* with its associated SAGE control centre, radars and communication network advanced from the planning to the pre-installation stage; and all this was matched by the acquisition of materiel in other fields, particularly in navigation, electronics, communications, anti-submarine warfare, and training.

The impact of this re-equipment program was felt throughout the whole of the logistics system. Re-equipment involves design and engineering, the determination and acquisition of all associated support equipment, inspection for quality, issue of maintenance procedures, identification, cataloguing and acquisition of spares and components, and, finally the distribution of the equipment

along with its support equipment and spares. Taken in total, the load imposed was greater than in previous years.

There follows a brief review of logistic activity in the major fields of Supply, Maintenance and Quality Control.

### SUPPLY

The basic role of supply is to arrange the equipping or re-equipping of units and then to ensure their support. Many improvements of major importance were recently made in the supply function, particularly in the fields of cataloguing, storage, distribution and disposal.

Cataloguing in the military sense is the process of accurately identifying, describing and classifying all items of materiel both required and in use, so that users can precisely identify and requisition their requirements.

The RCAF has subscribed to the NATO catalogue technique and has been faced with the colossal task of converting the existing catalogue of 280,000 items to the new system. This is four times the number of

items stocked by Canada's largest mail-order house.

Substantial progress was made and catalogues covering several materiel categories were issued, providing clear cut identification of inventory items. A striking example of standardization and cross-servicing potentialities in this process is provided by the CF-104 where the RCAF, West Germany, Belgium, the Netherlands and Italy are developing a common catalogue and greatly reducing the cost by common funding.

To take care of storage and distribution the RCAF operates four supply depots in Western Canada, Central Canada, the Maritimes and in the United Kingdom for direct support of the Air Division.

A major advance in the control of depot activities was the institution in 1960 of a system connecting these depots with Air Materiel Command Headquarters at Rockcliffe, by means of data transceivers operating through landline and radio networks. This provides AMC with a complete updated daily record of the entire RCAF depot holdings, and has resulted in a degree of re-



Year-round aerodrome maintenance necessitates modern snow-removal equipment

sponsiveness and control hitherto impossible; manual methods simply cannot cope with 2,000,000 transactions a year.

The importance of a sound disposal program is probably secondary only to the acquisition of materiel in a business where rapid obsolescence is the rule. An aggressive and recently accelerated disposal program produced concrete returns with the result that some 90,000 catalogue items, including some 370 aircraft, have been eliminated from inventory — making available additional needed space and enabling the closure of five satellite storage sites.

#### MAINTENANCE

To attain maximum potential, and to ensure the most economical use of its equipment, the RCAF must expend a very substantial portion of its resources in the maintenance of that equipment. This involves not only the provision of repair and overhaul facilities but also the timely issue of technical data to users and an efficient system for reporting unsatisfactory conditions and technical failures.

In line with the broad policy of keeping a healthy aeronautical industry in being, over 70% of the repair and overhaul work not done by the user units is contracted to industry. In the interest of maintaining a small capability and a

continuing knowledge of all maintenance processes, the remaining small percentage is done at RCAF repair depots. In total \$86,000,000 was spent on aircraft maintenance alone in 1960-61. This is a reduction from the high of \$100,000,000 back in 1958. The downward trend is likely to be reversed, however, as the full impact of the introduction of more complex aircraft is felt.

The issue of technical data to users of equipment is almost completely via engineering orders out of AMC. During the year, 140 new orders were issued to cover new equipment and 6,000 amendments were made to existing orders.

The requirement for the provision of technical information to all users was thoroughly reviewed in 1960. Possible trends towards over-elaborate presentations were checked and provision made for a better product at less money by more complete control of procurement, distribution and amendment.

The system of reporting unsatisfactory conditions and technical failures of equipment in use continued to receive constant attention. Planning was commenced to adapt the IBM computer at AMCHQ for the analysis of reports to produce faster and more accurate indications of changing trends, thus enabling more rapid corrective action. The volume of these returns is such as to require

a system of automatic processing; 185,000 were processed last year.

One of the major achievements in the maintenance field was the introduction of a mobile system for the frequent calibration of test equipment used for repair and alignment of sensitive and complex electronic equipment. This system, called CALVAN, goes from station to station carrying out tests. Besides achieving its primary purpose of calibration it is estimated that this system has, as a by-product, reduced repairable arisings by 50% with an annual saving of \$1,000,000.

#### QUALITY CONTROL

The function of product inspection and of the manufacturing processes in the production of aeronautical equipment which involves flight safety, is performed largely by the RCAF under a system known as Quality Control. This system is centrally controlled from AMCHQ and executed by staffs across the country located and operating in close association with industry.

The reputation of the RCAF in this field has won such renown that in the past year a number of foreign governments, in placing contracts for defence materiel in Canada, have stipulated as a condition to their orders that the quality control inspections be performed on their behalf by the RCAF.

# PERSONNEL SUPPORT

NEITHER machines nor equipment are the most important items in the RCAF inventory. The only indispensable is people. If it is important that the technical side of the service be properly supported, it is also important that support be provided for RCAF personnel.

An important item of personnel support is family housing in a service where 72% of the male service establishment is married. Certain RCAF establishments are located in urban areas where housing is no particular problem. There are, however, an estimated 28,300 married personnel in Canada and 4200 married personnel in Europe, living either in isolated localities or near towns of small population which cannot provide living accommodation to air force personnel. Consequently the RCAF is obliged to provide the amenities which are essential to the well being of its personnel and their dependents. At year end, RCAF dependents were occupying 12,126 Canadian and 2,016 European service married quarters. This marked an

increase of about 700 over the previous year. In addition, 556 units were under construction.

With housing, of course, go schools. Department of National Defence schools are built either because no suitable existing schools are available, or because air force children will over-tax existing facilities. In January, 1960, 40 dependents' schools with a population of 14,126 pupils were in operation at RCAF bases throughout Canada. Additionally, schools were maintained at six overseas bases and teaching staffs were provided at three other overseas international schools to take care of the needs of 4,154 air force pupils. Teaching staffs approximated 613 in Canada and 221 overseas.

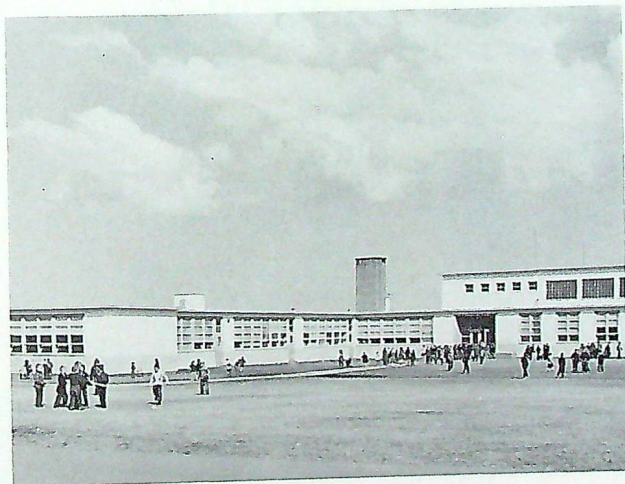
Neither are religious needs neglected. With the construction of 13 chapels last year at isolated radar units, permanent chapels are now provided at approximately 90% of the RCAF bases. To look after the spiritual welfare of serving personnel and those dependents occupying married quarters, the Service em-

ployed 41 regular force chaplains and 15 part-time civilian officiating clergymen of the Roman Catholic faith and 56 chaplains and 11 officiating clergymen of other denominations.

Through the initiative of personnel in sponsoring fund-raising projects and through the efficient management of non-public undertakings such as messes, institutes and canteens, most units accumulated sufficient resources to improve existing, or provide new, non-public facilities to promote welfare and recreational activities. Many worthwhile projects were completed last year. Skating rinks were built, artificial ice plants were provided for skating and curling and hockey clubs were equipped and supported, all with little, if any, contribution by the public. They are self-financed and self-maintained. Additionally, one percent of the gross profits of all institutes was, as in the past years, contributed to the Benevolent Fund.

The need for sports and recreation has been recognized by the RCAF.

Typical RCAF dependents' school



Typical RCAF chapel



In addition to an extensive program for training in physical fitness, the RCAF has published two books on the subject which met with international acclaim. The RCAF's 5BX Plan for Physical Fitness became, in 1960, the all-time best seller of books published by the Queen's Printer. This booklet was followed by its

sister publication, the RCAF XBX Plan for Women Personnel, it is already meeting with some of the public popularity of the earlier pamphlet.

The three full-time bands of the RCAF once again participated in practically every type of engagement from station parade to concert tour.

In addition to these full-time bands, most RCAF units, both Regular and Auxiliary, have volunteer bands composed of Service tradesmen who donate generously of their spare time so that parades and other military activities can be conducted in the traditional manner.

## DEVELOPMENT

**T**HE RCAF's continuous development program is designed to improve the effectiveness of the air force and also prolong the useful life of RCAF equipment. It involves the testing and evaluation of such things as electronic equipment, weapons systems, synthetic training

systems, flight instruments, personal flying equipment and aircraft performance.

Within the RCAF development, evaluation and testing are concentrated largely in two units: The Central Experimental and Proving Establishment and the Institute of Aviation Medicine.

assists the Canadian Armament Research and Development Establishment (CARDE) of the Defence Research Board (DRB) in projects assigned by the Department of National Defence. The detachment at Cold Lake, known as the Air Armament Evaluation Detachment (AAED), takes on projects designed to ensure that aircraft armament systems meet specifications and fulfill military requirements. The Rockcliffe detachment evaluates and proves specialized mobile support equipment and designs and tests modifications to standard mobile equipment to fit it to special RCAF needs.

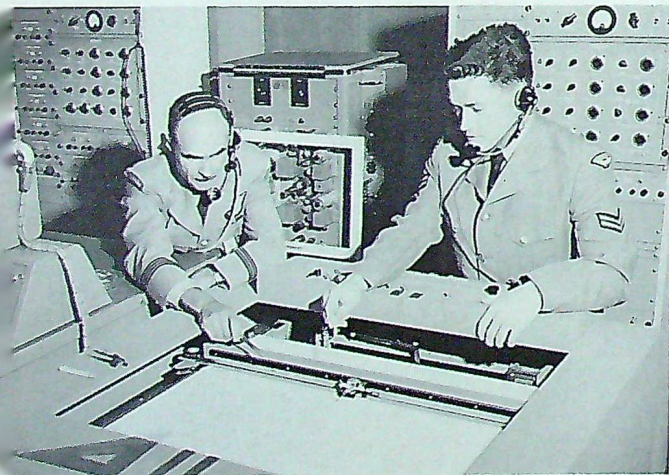
In addition to its close working arrangements with DRB and NRC,

### CENTRAL EXPERIMENTAL & PROVING ESTABLISHMENT

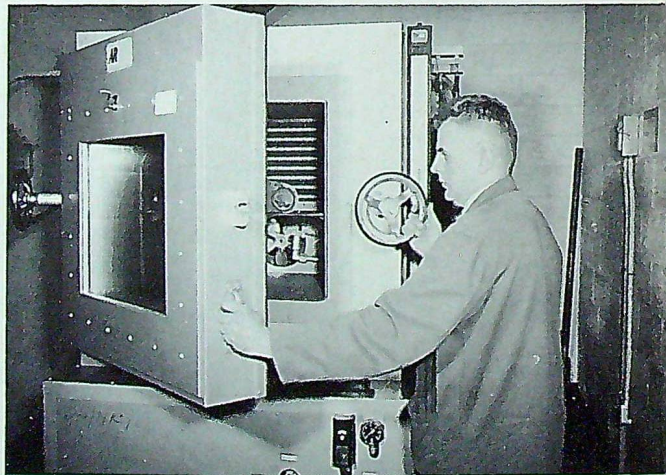
CEPE comprises the parent headquarters at Uplands, Ont., a flight unit at the same station to support the National Aeronautical Establishment, and three detachments at Valcartier, P.Q., at Rockcliffe, Ont., and at Cold Lake, Alta.

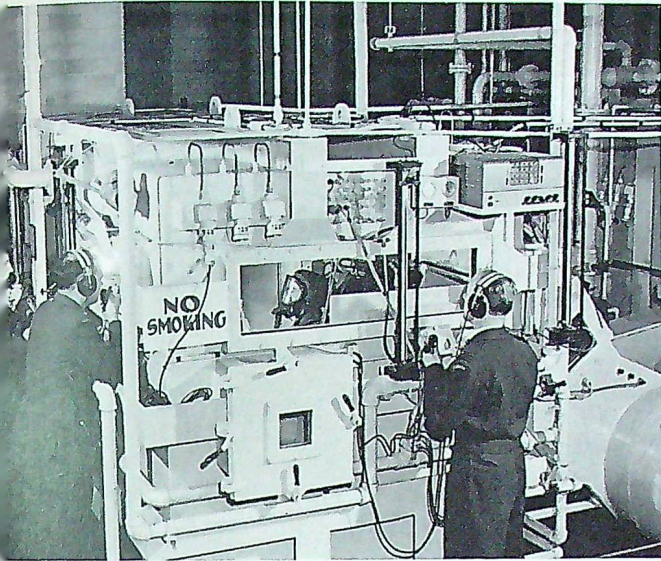
The headquarters unit controls all project work assigned to CEPE and investigates and evaluates problems pertaining to aerodynamics, air worthiness, electronics, instruments, photography, navigation and mechanics. The detachment at Valcartier

AAED personnel at Cold Lake monitor live firing trials over Primrose Lake range

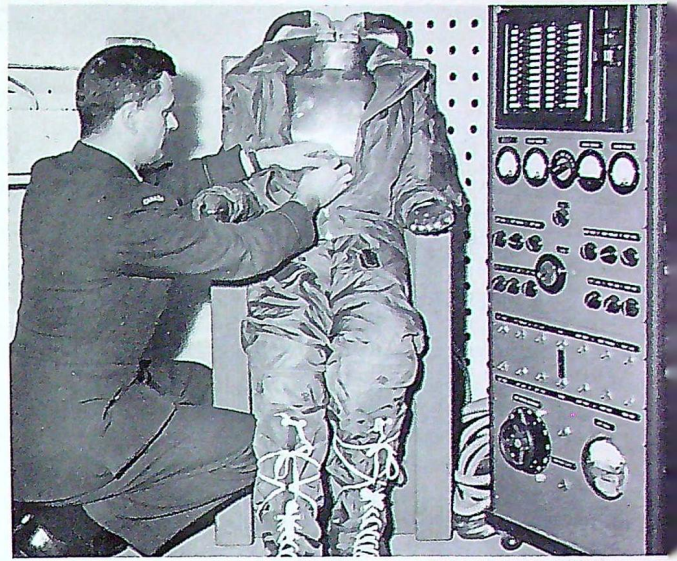


At Uplands a CEPE technician prepares to test airworthiness of an altimeter





A volunteer tests a new high-altitude pressure suit in the IAM decompression chamber



The "copper man" helps IAM personnel evaluate flying clothing temperature extremes

CEPE maintains liaison with military research establishments in the United Kingdom and the United States. For a number of years, CEPE has conducted extreme cold weather testing of British aircraft for the UK's Ministry of Aviation.

Generally stated, CEPE carries out detailed engineering and flight tests, evaluation of new types of aircraft before they are brought into service, acceptance flight testing of new aircraft as they come off the production line and acceptance of all aircraft after major repair by civilian contractors. Its responsibilities also extend to the evaluation of flight simulators and mobile support equipment. CEPE tests and evaluates a large part of RCAF operational equipment under environmental conditions varying from extreme cold to extreme heat and humidity.

During 1960 CEPE was assigned a total of 120 projects requiring test and development. These projects ranged in complexity from designing and testing a pin for an aircraft ejection seat to the evaluation, and flight testing of the *Yukon* and *Cosmopolitan* aircraft. They required deployment of CEPE elements to such

locations as Churchill, Man.; Eglin Air Force Base, Florida; the USN Missile Test Centre at Point Mugu, California; Ascension Island and the United Kingdom. They demanded flights ranging from local tests to a trans-polar trip from Alaska to Boscombe Downs, England.

In the past year CEPE tested and accepted 308 aircraft, and its aircrews logged more than 14,000 hours flying time.

#### INSTITUTE OF AVIATION MEDICINE

The safety of RCAF aircrew has been greatly augmented by research the IAM has conducted into the dangers of anoxia, aeroembolism, vertigo, decompression sickness, "G" forces resulting from acceleration and deceleration, and extreme temperatures.

During 1960 the IAM maintained a high level of activity and demonstrated, once again, the wisdom of retaining a scientific and medical staff to solve service problems associated with aeromedicine and human engineering. Some of the problems were associated with new RCAF aircraft, such as the oxygen

and escape systems of the CF-104 and seating arrangements in the *Yukon*.

Other problems were of more physiological and medical significance. These include studies on vibration in high speed aircraft at low altitudes, the use of corneal lenses and the testing of the RCAF pressure suit to simulated altitudes of 70,000 feet. Work on new fabric materials has been of particular interest both for new flying suits and also for cold weather clothing for the arctic. In this connection, the IAM has supplied material to the Department of Northern Affairs for trial by department personnel in the area of Cambridge Bay.

The RCAF's IAM has accepted the additional responsibility of tri-service bioscience support for the Canadian military. The emphasis will remain aeromedical but a considerable amount of help in the way of practical applied physiology will now be available to both the army and the navy. Naval and army personnel attached to the institute will form a nucleus from which the scientific assistance will be passed to those services.

# SAFETY PROGRAMS

**T**O PREVENT accidents which may result in injury or death or in damage to equipment, the RCAF continues vigorous safety campaigns in all operations, particularly in flight safety, fire fighting and motor vehicle driving.

## FLIGHT SAFETY

The increase in speed and complexity of aircraft since World War II has put added demands on both groundcrew and aircrew in preventing accidents either in flight or on the ground.

The results achieved in flight safety over the past ten years are gratifying. In 1960, for example, the RCAF was involved in approximately 60% fewer accidents than in 1957. This significant reduction was achieved despite the increasing proportion of jet flying hours and the introduction of several new types of aircraft. The financial loss to the air force in 1960 was approximately 40% of the loss in 1952.

With the introduction of several new types of aircraft in 1961 (e.g. the CF-104, first supersonic aircraft to enter service in the RCAF), the groundwork for the safety campaigns associated with these aircraft

has already been laid and a continuing effort will be made to prevent accidents associated either with faulty maintenance or pilot errors.

## FIRE FIGHTING

In the past year the RCAF's fire losses were the lowest on record. The average dollar loss per fire dropped sharply to \$194 per fire, in sharp contrast to the average loss of almost \$12,000 per fire in 1952.

In 1960 the RCAF reinstated a basic course for firefighters whose graduates are considered to be the equal of the best firefighters in North America. The training methods used on this course stirred up a great deal of interest among civilian firefighters' units and the RCAF received many requests for information about the methods it used in training.

The RCAF rendered assistance to civilian firefighters' units and in some instances extinguished fires themselves on properties outside of RCAF units. The air force worked closely with civilian organizations in a continuing education program and took a particularly active part in the annual Fire Prevention Week in October.

For the second successive year an RCAF station (Uplands) has won both the National Fire Protection Association grand Award and the Howard Green Trophy in annual international competition for excellence in the field of fire safety education and performance.

## DRIVING SAFETY

In the area of safe driving the RCAF has been highly successful in its endeavours to reduce motor transport accidents. During 1960 RCAF vehicles were involved in 1.83 accidents for every 100,000 miles driven. This rate compares favourably with the figure of 5.1 accidents per 100,000 miles in 1952.

Probably the most significant factors in effecting this reduction have been strict driver training, safety education, safe and skilled driving competitions, vehicle maintenance, user control and thorough supervision. Not surprisingly, RCAF drivers have consistently won awards in inter-service competitions.

As a by-product of safety education in the driving of service vehicles, there has been a noticeable decrease in the number of accidents involving private motor vehicles driven by air force personnel.

Constant training keeps RCAF firefighters at the top in their field



# MANAGEMENT IMPROVEMENTS

**M**ANAGEMENT engineering and management analysis are part of a general program in the RCAF aimed at continually improving the effectiveness and economy of all operations. Specialist staffs are maintained to assist and advise managers. The variety of studies undertaken by management specialists in the past year included studies in the fields of mobile support equipment, forms control, pay accounting, conduct of correspondence, supply activities, production of engineering orders and aircraft maintenance.

The recommendations resulting from the first mentioned study are now being implemented. Although it will be some time before the total effects are known, implementation of recommendations, particularly regarding cost recording, is producing better control of personnel and vehicle establishments, thereby promoting increased effectiveness of these resources.

The forms control study is another example of a study having long term results. It has meant the formation of a forms control and design section, not only to save in forms production costs, but also, through analyses of forms in their cause-effect relationships to procedures

and methods, to achieve increased effectiveness.

Because of the large part of the budget they consume, the fields of supply and maintenance have been the special targets of both the management engineering staffs and the managers themselves. As a result significant forward strides have already been made.

## SUPPLY MANAGEMENT

The recent introduction of the IBM 705 Computer, the second in Canada, was the greatest single advance in RCAF supply management. The first program on the computer, that of supplying daily updated returns of all RCAF stock holdings was set up in 1960. Now, RCAF units or contractors, no matter where located, requisition requirements by radio or teletype directly to Air Materiel Command HQ. The computer processes each requisition, selects the item required and the supply depot best located and issues instructions. All this permits smaller stock holdings with obvious economies.

The second program dealing with the application of the computer to reprovisioning was prepared last

year and will be implemented in 1961.

Another recent improvement was the adoption of a Hi-Valu program which provides the means to concentrate on the high-cost portion of the inventory and meet all needs with minimum stocks. The savings anticipated can be appreciated when it is realized that the Hi-Valu range of materiel is approximately 80% of the value of the inventory tied up in about 4% of the total items.

Motion-Time-Method studies have not been neglected. Notable improvements have been achieved from MTM studies of supply function at various depots and units. As an example, manpower requirements at 1 Supply Depot, Downsview, have actually decreased in the face of an expanding workload.

## MAINTENANCE MANAGEMENT

Achievements in the supply field have been paralleled in the maintenance field. In the past year, management engineering staffs provided personnel to record data regarding the CC-106 and, later, the CF-104 aircraft as early as possible, thus ensuring sound decisions on logistics, personnel, procedures and operations which will have profound effect on the future life of the aircraft.

As an example of specific achievements which have already registered their effect, a review was made of the specifications for repair and overhaul work done by industry. The findings resulted in annual savings of \$2,000,000 in one program alone and triggered management studies of unit maintenance organizations to streamline the procedures and more carefully balance the personnel with the unit maintenance workload.

All in all, the management studies continued in the past year to achieve the improvements forecast when the RCAF, acting as a leader in the military field, set up specialist management staffs in 1955.

Control room for the IBM 705 Computer



# RESOURCES

**T**HE principal resources utilized by the RCAF in the performance of its tasks are manpower, materiel and money. As there are definite limitations on each type of resource, their judicious selection, allocation and use determine the effectiveness of the RCAF as an organization.

## Manpower

Being a volunteer service, the RCAF depends upon the free will of Canada's youth for its manpower requirements. Statistics reveal, however, the Service is successful in attracting the type of personnel it requires. With the strength set by the government at a maximum of 51,000 officers and airmen, the actual strength on 31 March 1961 was 50,571 composed of 9,367 officers and 41,204 airmen as follows: male

officers 9,040; female officers 327; airmen 38,580; airwomen 2,624.

Manning the RCAF with enough people to perform its many specialized tasks, and still remain within the 51,000 ceiling, requires an accurate two-year-in-advance forecast of several factors: the number who will leave the service, the number in each trade required as replacement, bearing in mind changing service commitments and the fact it takes from one to two years to recruit and train many of the tradesmen. Last year 772 officers and 3,731 other ranks were obtained as replacements, the need for which had been forecast two years previously.

Officers are obtained from several sources. They may be commissioned from airman rank; granted commissions on direct entry through

recruiting centres; transferred to the Regular Forces from the Reserves; or graduated from the Regular Officer Training Plan or the University Reserve Training Plan.

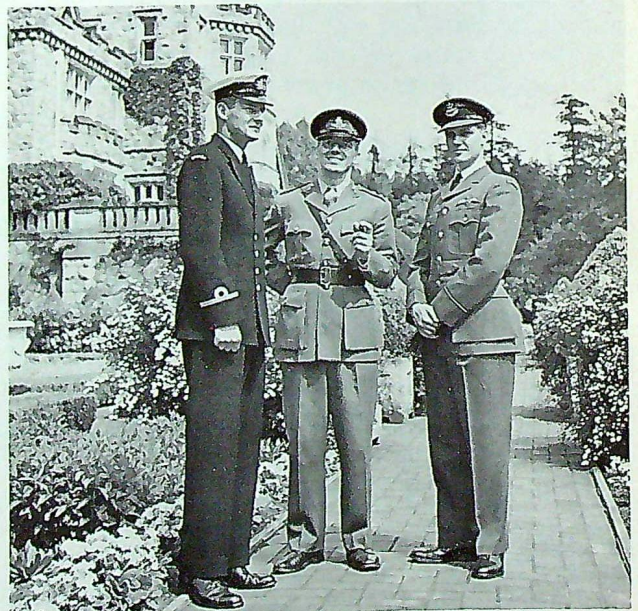
**RCAF REGULAR OFFICER TRAINING PLAN**—The planned annual production is 150 graduates, made up of 80 aircrew and 70 technical list officers. Approximately 62 of this number are produced through the Service Colleges—Royal Roads, Royal Military College and College Militaire Royale; the remaining 88 must be trained at 17 universities across Canada. Since the beginning of the plan in September 1952, a total of 641 graduates, 354 from universities and 287 from service colleges have entered the RCAF.

**UNIVERSITY RESERVE TRAINING PLAN**—Students are trained under this plan in nearly all lists with the exception of aircrew, and upon graduation are eligible for appointment to regular

This year for the first time the Governor General presented the colours at RMC graduation ceremonies at Kingston



Graduate cadets of the three services pose on the grounds of Royal Roads



commissions with the rank of flying officer.

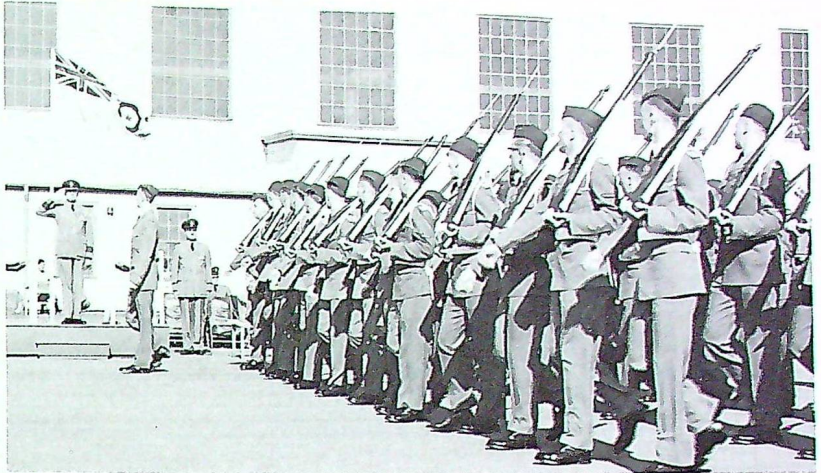
Of the 3,800 students who joined the plan since its inception in 1948, approximately 440 have transferred to the regular force and 1,700 have remained in the reserve. At the end of fiscal year 1960-61 strength was 550 male and 105 female flight cadets. The intakes were changed during the year to bring the composition of the plan more in line with that of the regular force. As a consequence, the proportion of technical trainees will increase to 50% of total strength and the number of female flight cadets will be reduced to the comparatively small proportion of the Food Services List.

## RECRUITING

All airmen are recruited directly from civilian life through 17 recruiting units. Accommodation is shared with the navy and army in six of these units and it is expected that another four RCAF units will move to combined Canadian Armed Forces Recruiting Centres in 1961. In 1960 enrolments through the recruiting centres were:

|                          |             |       |
|--------------------------|-------------|-------|
| Airmen                   | — skilled   | 542   |
|                          | — unskilled | 2033  |
| Airwomen                 | — skilled   | 101   |
|                          | — unskilled | 1055  |
| Non-flying List Officers |             |       |
|                          | — male      | 39    |
|                          | — female    | 4     |
| Nurses                   |             | 80    |
| Flight Cadets            |             |       |
| (regular aircrew)        |             | 318   |
| Regular Officer          |             |       |
| Subsidization Plan       |             | 285   |
| Medical Officer          |             |       |
| Subsidization Plan       |             | 25    |
| Female — Dietitian       |             | 1     |
|                          |             | —     |
| Total                    |             | 4,483 |

This does not mean, however, that only 4,483 applicants were interviewed. During the year 40,916 persons sought information regarding service with the RCAF. Of these, 20,919 were screened for enrolment. The



Both male and female recruits receive basic training at St. John, P.Q., manning depot



Aircrew prepare for maritime patrol



majority were turned down because of their inability to meet educational or aptitude standards.

## Materiel

To carry out its assigned roles the RCAF obviously needs materiel—catalogued today in approximately 280,000 different items. These items vary from the insignificant bolts in supply sections to the latest and largest aircraft, the *Yukon*. They may be in the form of bush clothing or *Caribou* aircraft at El Arish, parkas or *Hercules* at Resolute Bay, flying suits or CF-104s in the Air Division.

Some of the major procurement and construction programs of the RCAF in its efforts to keep modern are:

**ARGUS** Maritime Patrol Aircraft—Delivery of the 33rd and final *Argus* aircraft to the RCAF took place during 1960. This aircraft, which was developed specifically to meet the threat of submarine warfare, has been in RCAF service since 1958. Operational trials extending over two years have been completed and the effectiveness of the *Argus* in the anti-submarine role has been established. Further improvements to the aircraft will be made as more effective anti-submarine detection systems are developed.

In order to provide adequate training at reasonable cost for the *Argus* crews, it has been necessary to develop an electronic apparatus which will simulate operational conditions for pilots, navigators, engineers and radar operators. The flight simulator portion has been delivered and is being fully utilized at the maritime squadron base at Greenwood, N.S. The portion for training in anti-submarine tactics is being brought into use.



**YUKON** Transport—Soon to take over from the *North Star* the bulk of the RCAF's long range military transport workload, 12 of these aircraft were ordered from Canadair Ltd. and have now begun entering squadron service for user trials.

The giant transport is powered by four Rolls-Royce Tyne turboprop engines. It will be adaptable

as a cargo carrier (over 30 tons of cargo), a passenger carrier (134 passengers) or as a casualty evacuation aircraft (80 litter cases), and will be able to fly non-stop from Trenton to France in approximately 10 hours.

A *Yukon* flight simulator will be delivered during 1961, to be used for training pilots and flight engineers.



**HERCULES** Transport — The need for a replacement aircraft with similar cargo loading features to, but with better performance than the *Flying Boxcar* was recognized. As neither the *Yukon* nor any other Canadian manufactured aircraft meets these special requirements, it was decided to purchase four *Hercules* aircraft from the Lockheed Corporation in the United States. The *Hercules* has the necessary rear-end loading features, it can carry more than 17 tons of cargo for 1500 nautical miles at a speed of 300 knots, and can operate from short runways and unprepared fields. Four of these aircraft were delivered to the RCAF during the latter part of 1960.



**CARIBOU** Medium Transport — A conventionally powered twin-engined transport aircraft with short take-off and landing characteristics and provision for rear-end loading, the *Caribou* is designed and built by DeHavilland of Canada Limited at Toronto, and will carry 28 passengers or the equivalent in freight. Four of these aircraft were ordered in August 1960 to be used in operations in support of the UN. Three of the aircraft are now with the RCAF Unit of the UNEF in Egypt, and the fourth is being used for conversion training and communications flights in Canada.



**COSMOPOLITAN** Medium Transport — Developed from the well-proven Convair 440 but differs from the 440 in that it is considerably faster. The *Cosmopolitan* is powered by Napier Eland turbo-prop engines and stressed to carry cargo.

Ten *Cosmopolitans* were ordered from Canadair Ltd. in 1958, the first being delivered in April 1960 and the tenth in February 1961. This aircraft is now in regular service as a medium range military cargo and passenger carrier.



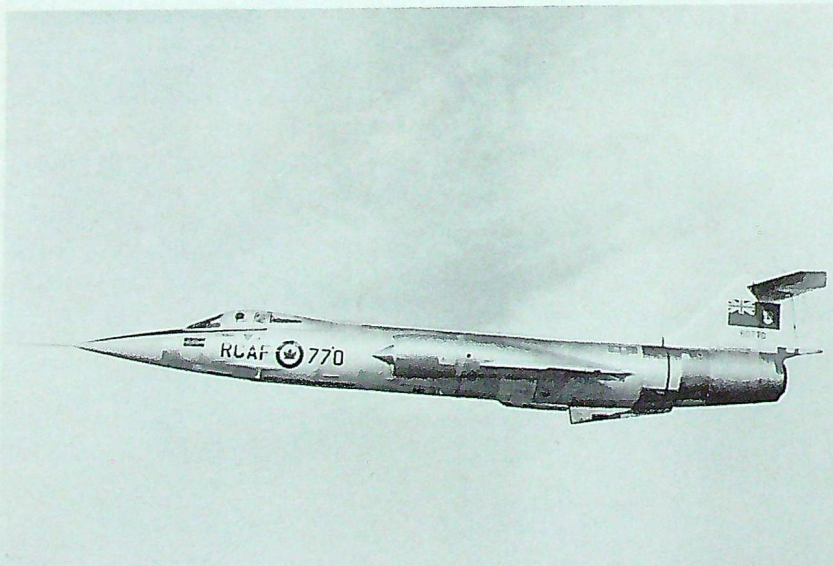


**ALBATROSS** Amphibian — In May 1958 ten *Albatross* aircraft were ordered from the Grumman Corp. in the US to replace obsolete *Cansos*, now over 20 years old. The *Albatross* can operate from water, snow, or dry land runways and will be used for search and rescue in coastal waters, the arctic archipelago and the Canadian mainland.

Delivery of the 10 *Albatross* was completed between September 1960 and January 1961, and the aircraft now are stationed at Greenwood, Trenton, Winnipeg and Sea Island.



**OTTER** Utility Transport — This is a light utility transport, in RCAF service since 1954 for search and rescue operations. It can be adapted for use on wheels, skis, or floats. Built by DeHavilland of Canada, it is a single-engine aircraft which carries a maximum of 10 passengers. Twenty-seven new *Otters* were ordered in late 1959 and have now been delivered to the RCAF for use by the auxiliary squadrons to prepare for survival operations.

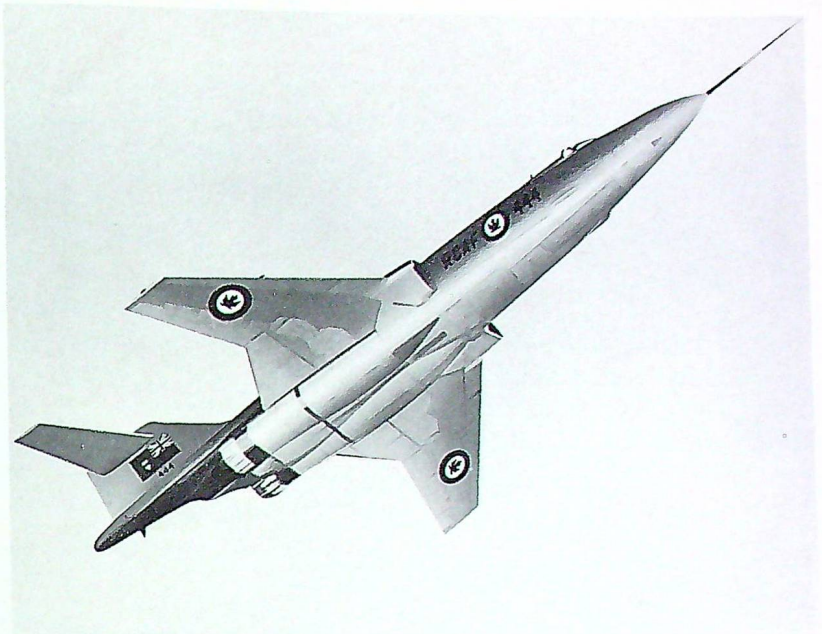


**CF-104** — To strengthen NATO forces in Europe the RCAF will replace the *Sabres* of the Air Division with the supersonic CF-104 for use in a strike reconnaissance role. Two hundred have been ordered from Canadair Ltd., Montreal, and deliveries were commenced during the first part of 1961. The turbojet engine which will power this aircraft is being manufactured by Orenda Engines Ltd., Toronto. In addition, 14 dual-place trainer versions of the same aircraft have been ordered from the Lockheed Aircraft Corp., in the United States.

Apart from the actual aircraft, a good deal of major equipment connected with the CF-104 program is

being manufactured in Canada, and this will produce some additional export business. For example, the CF-104 Flight Simulator being manufactured in Montreal by Canadian Aviation Electronics Ltd., has been ordered in substantial numbers by West Germany, Belgium and Holland.

**VOODOO** — Replacing the CF-100 in Canada's five all-weather interceptor squadrons will be this proven, supersonic two-manned aircraft. Manufactured by the McDonnell Aircraft Corp., it is the newest member of the *Voodoo* family.



## CADIN PROGRAM

The CADIN (Continental Air Defence Integration North) program involves the installation of a number of new radar stations and two *Bomarc* squadrons in Canada, and the conversion of the air defence

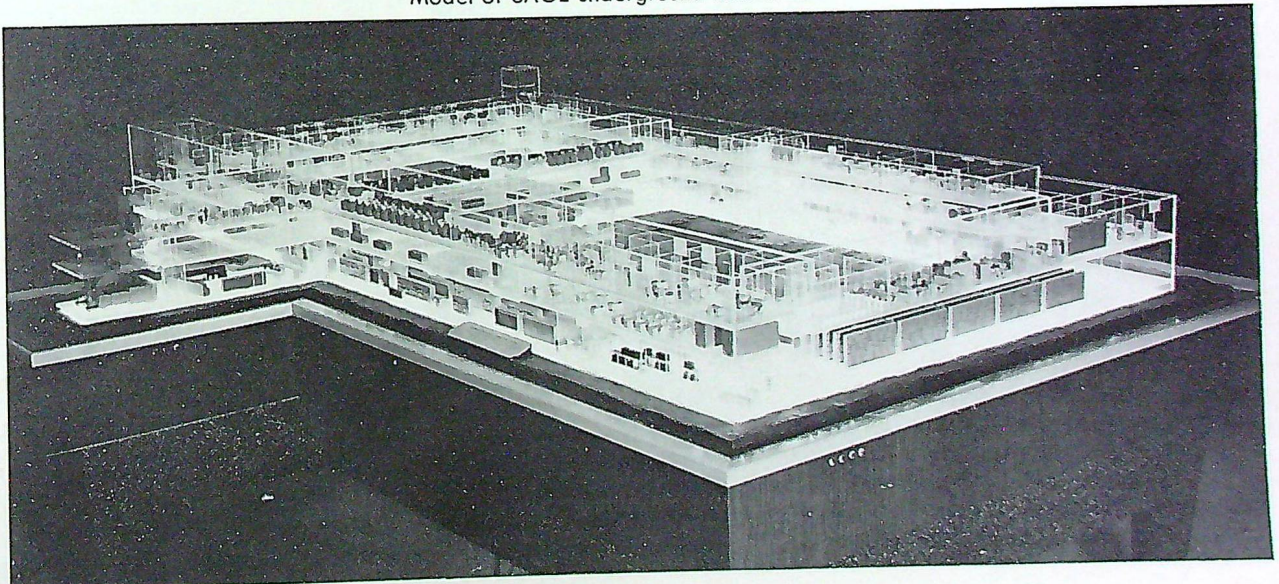
network to the semi-automatic ground environment system (SAGE). The RCAF is responsible for the construction work being done in Canada.

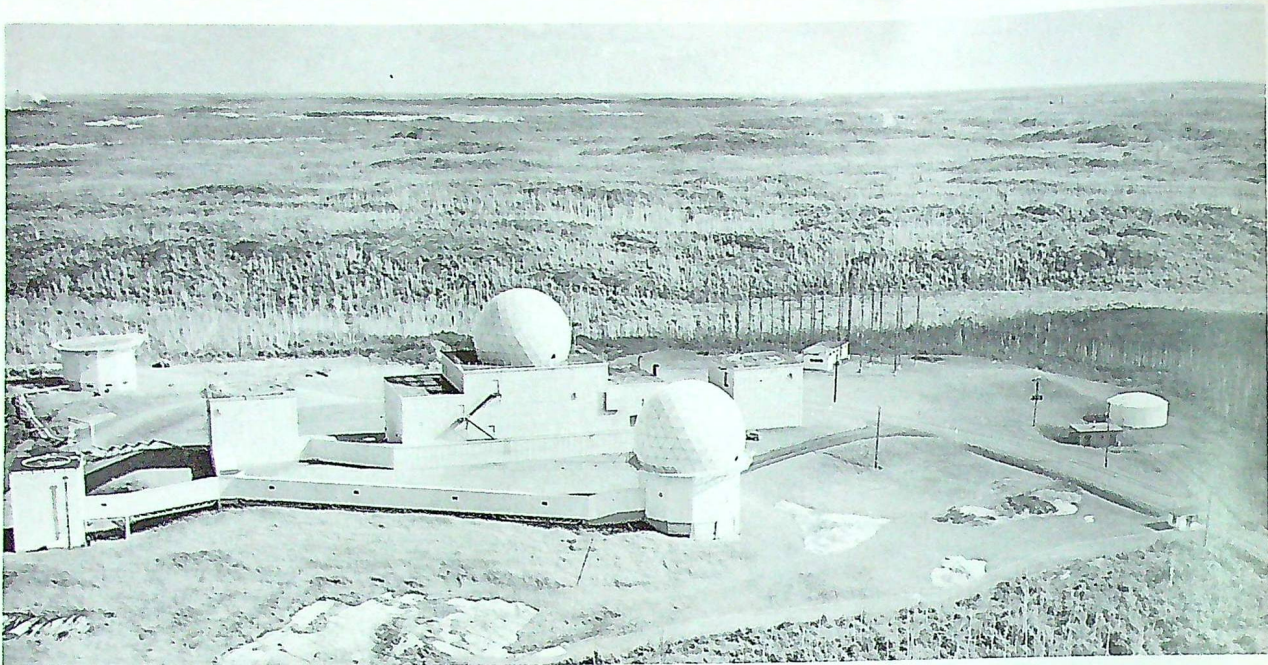
Extensive construction has been carried out in connection with the two *Bomarc* squadrons and the

SAGE Control Centre, being built underground for maximum protection against attack. The *Bomarc* squadrons will become operational in late 1961 or early 1962.

**PINETREE SYSTEM** — Of the original 10 strictly Canadian ground control interception stations

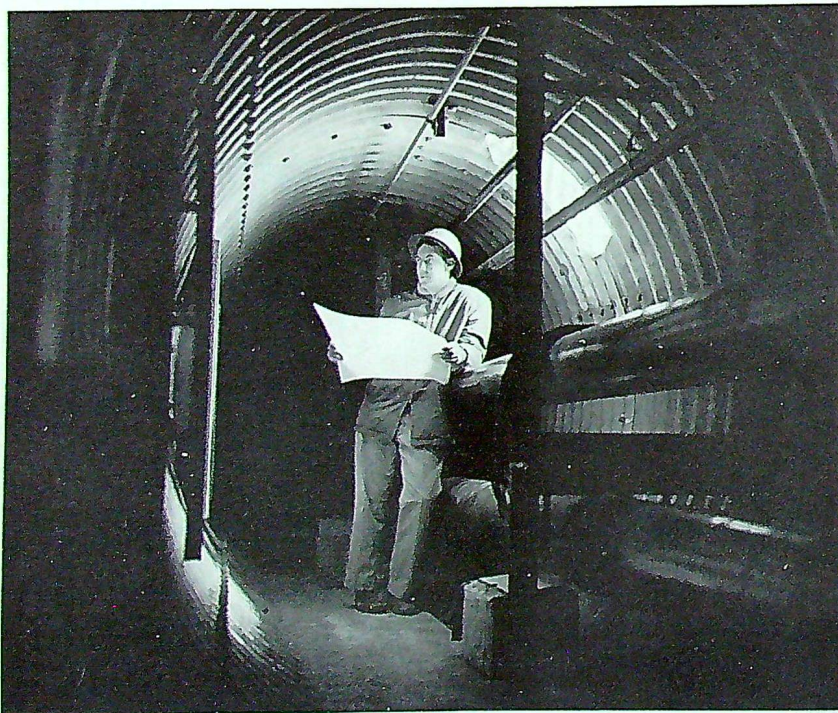
Model of SAGE underground control centre





Rigid plastic shelters have replaced inflatable radomes at Pinetree stations such as Falconbridge

Engineer inspects underground utilidor at North Bay Bomarc project



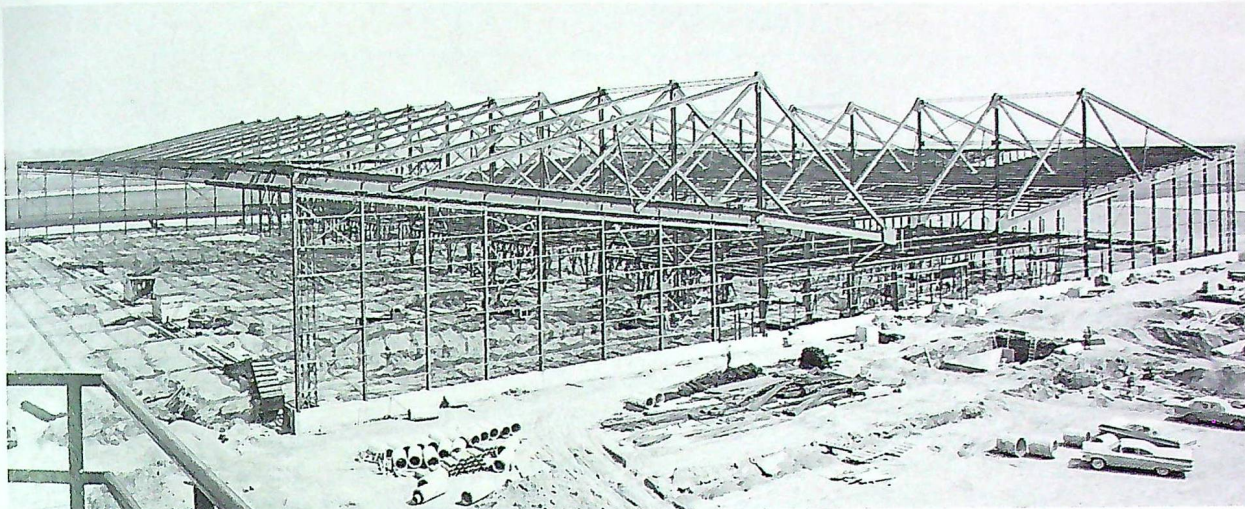
on the Pinetree Line, nine have been fitted with new, higher power and longer range radar sets. Much of this work has been done within the last year and a half. Also at 13 Pinetree stations the inflatable radomes were replaced by rigid plastic shelters which have proven more satisfactory.

Last month it was officially announced that the RCAF will take over financing and manning of several additional Pinetree stations which, up to now, have been USAF operated.

### CONSTRUCTION

In addition to the construction undertaken as part of Canada's contribution to the CADIN program, there were several other major construction programs underway during the year. The following are illustrative:

**STRATEGIC AIR COMMAND REFUELLING** — In 1960, a number of USAF aerial tankers were



Cantilever hangar under construction at Trenton

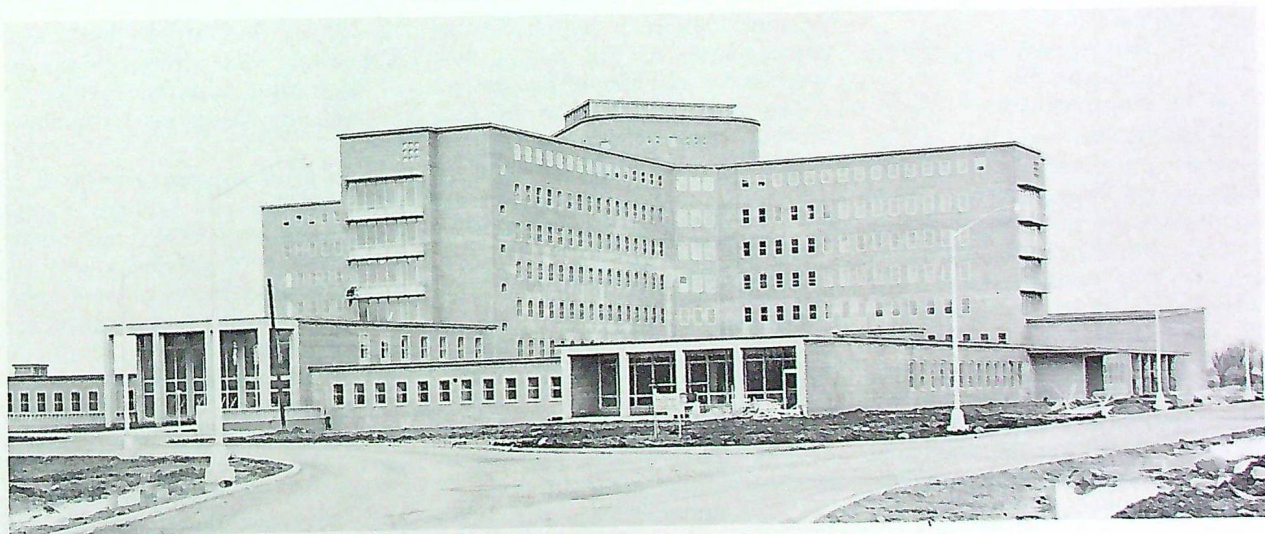
moved into Canada. The aerial refuelling squadrons were accommodated at sites built by the RCAF with USAF funds. Over a two-year period, runways, buildings, fuel dumps, etc., were constructed under this program.

**HANGARS AND AIRFIELD IMPROVEMENTS** — The introduction of the *Argus* aircraft into

Maritime Command and the *Yukon* into Transport Command entails new, large hangars, wider taxiways, longer runways and, in the case of Transport Command, freight and passenger terminals at Trenton, Ont., and Marville, France. Most of the new facilities for Transport Command will be completed this summer.

**NATIONAL DEFENCE MEDICAL CENTRE (NDMC)** — The new National Defence Medical Centre, which was begun in the fall of 1958, is the responsibility of the RCAF's Directorate of Architectural Construction. The RCAF appointed architects, supervised the construction and will maintain the building when it is completed in the summer of 1961.

National Defence Medical Centre in Ottawa



# Fiscal and Budget

The problem of making ends meet is familiar to every wage earner. So is his individual budget plan — which establishes the amounts he should spend on shelter, food, clothing, transportation, etc. To prepare this budget is relatively simple; to follow it faithfully is not so simple. Prices continue to rise, often faster than income, and emergencies occur that need financing.

On a much larger scale the financial problems of the RCAF may be compared to those of the wage earner. Funds to operate the air force are provided by the governments on the basis of estimates prepared some 15 months ahead of the year in which they are to be spent. They are then authorized by parliament in the form of parliamentary votes covering the following categories of expenditures:

- Annual Recurring Costs
  - Military personnel costs
  - Operations and Maintenance costs
- Capital Costs
  - Procurement of equipment
  - Construction
- Development

When the individual runs into an emergency or the higher cost of food disrupts his budget, he is usually able to transfer money into his recurring costs by deferring some capital item, for example a new suit. The RCAF cannot, however, transfer between capital and recurring costs. It faces, therefore, the very difficult task of keeping the recurring cost estimates at an absolute minimum in order that the maximum can be budgeted for capital equipment replacement, so vital to the

preservation of a high degree of operational effectiveness.

In 1955/56, the RCAF's budget was divided evenly between capital expenditures and recurring costs. This ratio has, however, changed as follows:

|         | Percentage |           |
|---------|------------|-----------|
|         | Capital    | Recurring |
| 1956/57 | 44         | 56        |
| 1957/58 | 41         | 59        |
| 1958/59 | 40         | 60        |
| 1959/60 | 33         | 67        |
| 1960/61 | 30         | 70        |

This persistent change in fund allocation has been due to many things. Over the past ten years the RCAF has had to operate with progressively smaller budgets, despite the declining value of the dollar, the acquisition of more and more complex equipment which becomes increasingly expensive to operate and maintain, and the acceptance of more national and international commitments. The appropriation for 1960/61, for example, was \$39 million lower than the 1959/60 appropriation, despite a supplementary appropriation of \$10 million last year for the purchase of equipment.

The appropriations for the past two years were allocated as follows:

|                          | 1959/60                      | 1960/61 |
|--------------------------|------------------------------|---------|
|                          | <i>(millions of dollars)</i> |         |
| Military Personnel       | 242                          | 245     |
| Operations & Maintenance | 305                          | 292     |
| Procurement of Equipment | 211                          | 186     |
| Construction             | 53                           | 55      |
| Development              | 14                           | 8       |
|                          | 825                          | 786     |

Thus, while it was possible to pare money for recurring costs, it was still necessary to defer some

plans for equipment replacement.

How did the RCAF spend its allotments? Of the \$786 million provided, \$761 million was spent. The total provided for capital acquisition was completely spent, including the supplementary appropriation of \$10 million. The underspending was in the recurring area. The treasury books show spending for the year as indicated in Table 1 on page 29. Thus, air force spending for the year was about 97% of the funds provided. The provision was based on estimates which had their initiation some two years previously.

The appropriations for operations and maintenance continue to consume the largest single slice of the RCAF budget. The reasons are understandable. From the standpoint of a combat-ready air force, it is perhaps the most important appropriation — for aircraft, bases, personnel, standards of readiness, combat efficiency, etc., are all given meaning through it. Nevertheless, the RCAF has always been concerned that such a large percentage of its budget must be devoted to financing its operations and maintenance.

As is made apparent elsewhere, to hold the line and perhaps reduce these costs, the RCAF has made great strides in reviewing and remodelling its logistics support operations — supply, maintenance, repair and overhaul. The results of these efforts are self-evident when it is shown that the costs of operating and maintaining the RCAF have been substantially reduced without prejudicing the standards of readiness and operational effectiveness

TABLE 1 — 1960/61 SPENDING

| Category                  | Funds<br>Provided     | Funds<br>Spent | Variance |
|---------------------------|-----------------------|----------------|----------|
|                           | (Millions of dollars) |                |          |
| Military Personnel.       | 245                   | 247.5          | + 2.5    |
| Operations & Maintenance. | 292                   | 267            | —25.0    |
| Procurement of Equipment. | 186                   | 198.5          | +12.5    |
| Construction.             | 55                    | 42.0           | —13.0    |
| Development.              | 8                     | 6.0            | — 2.0    |
|                           | <hr/>                 | <hr/>          | <hr/>    |
|                           | 786                   | 761            | —25.0    |

which the service must maintain.

Let us also examine military personnel costs. In 1956/57 the military personnel costs, including not only pay, but also food, clothing, medical, transportation and laundry, amounted to \$212 million or about \$4150 per capita. Last year they were \$4850 per capita. This increase is the result of many things. In the first place it reflects the increasing maturity of the RCAF. One of the encouraging trends has been a decline in the annual personnel attrition rate, which means an increasing proportion of personnel are achieving long-

er periods of service. This has brought with it, however, a progressive increase to the married component of the service and more dependents. Accordingly, the bills for marriage allowances, subsistence allowance, progressive pay, trades pay, moving and education have all increased.

A more direct cause of the increase in personnel costs has been the two general pay increases authorized since 1956/57; the last one meant increased costs of \$10 million for the period 1 October 1960 to 31 March 1961.

From Table 2 it will be noted that in 1960/61, about \$551 million, or 71% of the budget, was allocated to the operational forces; the remaining \$235 million, or 29% was allocated to the support of the operational forces, particularly training support and logistics support.

While we look at figures generally quoted for the support behind operational forces that pertains in modern service, it is apparent that a very respectable portion of the RCAF money goes directly to the operational capability.

TABLE 2 — BREAKDOWN BY FUNCTION (millions of dollars)

| FUNCTION                    | AMOUNT | PERCENTAGE<br>of<br>RCAF Budget |
|-----------------------------|--------|---------------------------------|
| Contribution to NATO        |        |                                 |
| Allied Command—Europe       | 210    | 27                              |
| Allied Command—Atlantic     | 61     | 8                               |
| Defence of Canada—US Region | 177    | 23                              |
| Transport Forces            | 103    | 13                              |
| Training Forces             | 102    | 13                              |
| Logistics                   | 60     | 8                               |
| Search & Rescue             | 19     | 2                               |
| Command Administration      | 28     | 3                               |
| Reserves and Cadets         | 18     | 2                               |
| Development                 | 8      | 1                               |
|                             | <hr/>  | <hr/>                           |
|                             | 786    | 100%                            |

# LOOKING AHEAD

IN THE years ahead, long-range guided missiles will pose the main military threat to the security of Canada and North America. Although the manned bomber will continue to be an important component of the threat, guided missiles will displace it as the primary instrument of destruction. Since long-range missiles travel at hypersonic speed and great altitude, no satisfactory active defence has yet been devised to counter them.

Progress is being made by Canada's partner in NORAD, the US, in developing defensive systems to detect and destroy intercontinental ballistic missiles in flight. The US projects are being monitored by the RCAF with a view to keeping abreast of progress in this area. In addition, such help as can be given is given by the RCAF. For example, the RCAF installed communication links required in the Ballistic Missile Early Warning System being built by the USAF in Alaska and Greenland.

## MARITIME OPERATIONS

Nuclear-powered submarines capable of launching guided missiles pose a new threat to the North American continent. Because of their speed, silent operation, endurance, and capacity to remain submerged for long periods, they are difficult to detect and track.

The RCAF is co-operating with DRB and the Canadian, British and US navies in research into equipment, techniques, and concepts of operation that will augment the effectiveness of aircraft in anti-submarine warfare and reduce the threat of missile-launching submarines to the minimum. With its long range,

its great variety of sensitive detection gear, and its potential for further development, the RCAF's *Argus* can put into practice the products of maritime research.

## AIRCRAFT CONTROL

Despite the growing importance of missiles and space vehicles, the manned aircraft remains an essential component of military forces. Increased speed, the most significant attribute of modern aircraft, has brought with it a number of problems on which scientists, engineers and technicians are working continuously. Two of the knottiest of the problems associated with high speed are navigation and the length of landing strips. Considerable research is going forward in Canada and other NATO countries to develop an aircraft which can take off and land on small airfields, without sacrificing high speed in flight.

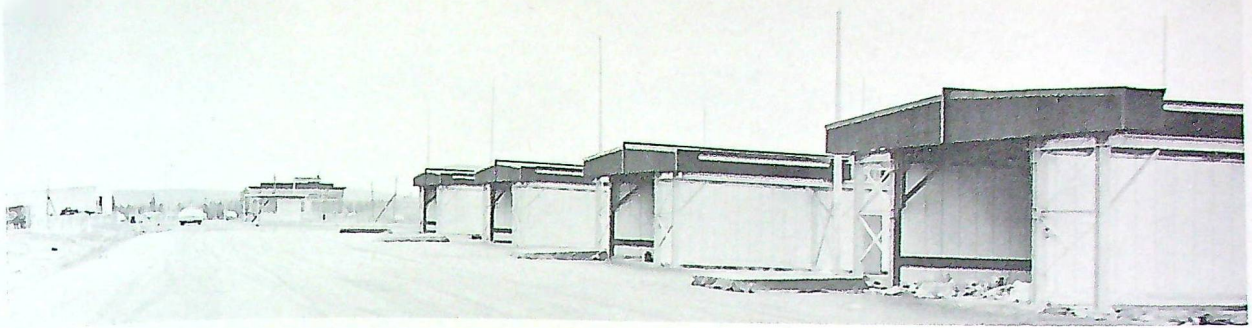
During 1960 several programs to improve navigation facilities were begun. Doppler navigation equipment, which gives instantaneous and accurate readings of ground speed and drift, has been installed in several types of RCAF aircraft. Installation in other types is continuing. Coupled with doppler, the RCAF is adopting several types of computing and data handling systems that make for greater accuracy and efficiency in navigation and air tactics. Among them are the air navigation and tactical system (ANTAC) invented by an RCAF officer, and the "along and across" track computer.

During 1960, great strides were made in the development of systems to supersede the well-known low frequency radio range and the associ-

ated radio compass in the aircraft. This change has become necessary because of increasing demands upon accuracy and efficiency in handling air traffic control of both military and civilian aircraft along continental airways. Consistent with international agreements, visual omnirange (VOR) beacons have now been installed in Canada by the department of transport (DOT) and certain RCAF transport aircraft have been fitted with airborne equipment to use this civilian facility.

To follow close on the heels of VOR and to be compatible with it, the RCAF is installing 37 beacons in Canada of a military ground-based navigation aid, similar to but more accurate than VOR. These beacons are part of a system called tactical air navigation (TACAN) which has only recently been released from military security. During 1960 agreement with the DOT was reached whereby some 17 RCAF TACAN beacons would be co-sited with the DOT VOR beacons to provide a joint facility known as VORTAC. This union of military and civilian facilities permits DOT and the RCAF to benefit from the ground facilities of one another and to realize a considerable saving in the variety of airborne equipment required in their aircraft.

Progress is being made towards the establishment of air surveillance radars at five busy RCAF aerodromes. These facilities provide air traffic control authorities with a means of knowing at all times where aircraft are during approach to and departure from the aerodrome. These radar approach control centres contribute greatly to the flight



Bomarc shelters at North Bay



Rearward communications antennae at Cape Dyer in Canadian Arctic

safety and increased efficiency of present-day operations.

Work is continuing on the re-equipment of RCAF aircraft with ultra high frequency (UHF) communications equipment. Significant improvements have also been achieved in other fields of communications and it would appear that faster techniques using voice transmission may soon replace the morse code in some roles as a means of long-range communication.

Research into improved operation of military aircraft, from the point of view of both effectiveness and safety, is a never-ending task for the RCAF. The many benefits that accrue to the RCAF are being passed along to DOT and other civilian agencies.

Effective and safe improved operation of military aircraft is RCAF aim



## Operation Hopper Stopper Helps Prairie Farmers



ONE of the most recent examples of how the RCAF serves the nation in peace was the emergency airlift last month of 360,000 pounds of insecticide to help combat the prairies' worst grasshopper and cutworm menace in years.

Aircraft of three Air Transport Command squadrons participated, carrying the bug killer from Toronto to Regina and Lethbridge where it was transferred to crop-dusting aircraft and sprayed over two million acres — enough to bring the situation under control until shipments of

the insecticide arrived by rail.

The request for RCAF assistance came from the Saskatchewan government after provincial stocks of insecticide began to run out. Because of hot, dry weather, insect eggs were hatching at a fantastic rate and 14 million acres of farmland were threatened in Saskatchewan alone.

In the above photo at Regina airport, S/L H. R. Cram, pilot of a No. 435 Squadron *Hercules*, compares aircraft payloads with Mr. Leo McKenna, whose *Piper Cub* was used for aerial crop spraying.



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