A forward look at air defense:

Canada's new concept of

The recent red alert over the West Coast sent CF-100's screaming into the air on a fortunate false alarm. The readiness to action proved the grim 24-hour vigil of Canada and the U. S.'s Continental Air Defense system. But defense is not enough.

Following is an informed account of the high stakes and planning of the strategy to keep the peace:

By Richard Carlton

We dare not lose the grim race for air superiority.

Russia possibly has a three year lead in jet engine development; with production models comparable to engines still on our drawing boards. We know, too, that Russia has the H-bomb, and multijet bombers comparable to our B-52's and Stratojets.

The gap is shrinking.

▸ **Defensive Struggle.** This race for supremacy in the air is paralleled by another race: the development struggle between offensive and defensive air power.

A strong, well-protected offensive force may soon be the best and only defense. Already, it's apparent that aggressors fear only our ability to strike back swiftly and powerfully.

This shift in emphasis is mostly a result of H-bomb development. Smaller numbers of planes, effectively directed, can now cripple an entire continent in one raid. If the enemy can effect such a raid, by stealth, or by out-performing or out-manoeuvring us, then we have no further defense.

Once the bomber or missile has reached its target, there can be no victory over the bomb.

▸ **Intercontinental Missile.** Within this decade, intercontinental missiles may replace the bomber; widening the gap between offensive and defensive potential.

First consideration in plans for air defense must, then, be the protection of our retaliatory strength: mainly the U. S.'s Strategic Air Command. This is the thinking behind construction of a Distant Early Warning (DEW line. Amply warned, the SAC can get in the air, out of danger and into action.

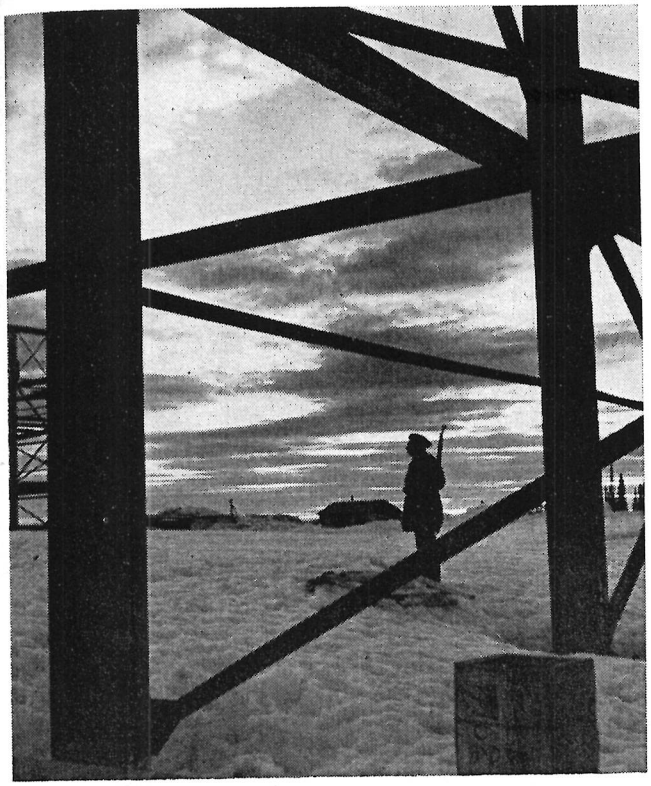
Detection, interception and destruction of invading bombers can only be carried out effectively at the high speeds made possible by modern electronics. Humans simply don't react quickly enough. The result: our greatest hopes for successful defense rest with the infant electronics industry.

▸ **Avionics Defense.** Canada's Air Defense Command is awake to this pre-eminence of avionics. An estimated three out of every five ADC bases are already preoccuplied with electronics work. On USAF bases, the ratio is possibly higher.

Canada's two lines of detection radar are, in reality, networks, capable of locating and tracing all incoming weapons. Their effectiveness varies with the speed, range and height of enemy bombers:

- Increase in bomber speed pushes the network farther outward, to maintain a battlefield beyond any densely populated area.
- For example: a propeller driven bomber detected by the Pinetree network would be intercepted at approximately the same area as a jet bomber detected by the mid-Canada chain.
- Our radar must always be effective at the operational ceiling of incoming bombers.
- Increase in bomber range already forces us to think of Canada's defense as continental defense. It will soon be possible for bombers to attack any point in the continent by entering the continent at any point.

CANADIAN AVIATION JUNE 1955



Continental Air Power

▸ **How Good Is Our Radar.** How does this warning system rate? Modern jet bombers are already challenging the performance of our radar. Quantity production of new detection devices is not sufficient: there's emphasis on quality.

Equipment must be of such high calibre that sudden improvements in any aspect of bomber performance won't leave it obsolete and useless. Electronics production is straining to pace the necessary, fantastic strides in design and development.

So far, the U. S. has maintained a really rapid rate of growth, but it's resulting in an acute shortage of qualified electronics engineers. This points to a more serious problem later on, if Western technical education fails to match the USSR's; in standards, or in numbers.

▸ **Jamming Radar.** The "electronic environment" of today's air power has given birth to a new type of electronics warfare. Using Electronic Counter Measures, invading aircraft can blind our radar, even simulating the presence of non-existent craft.

A single aircraft could appear as a formation of bombers, or a formation as a single plane. The bomber, however, is transmitting signals which can be traced to their source, Location of the aircraft by this method is known as ECCM; Electronic Counter Counter Measures.

The process of "jamming" and tracing can be repeated indefinitely; emphasizing the absolute necessity of maintaining superior electronic equipment.

▸ **Horse-Shoe Defense.** North American defense is only as strong as the weakest front. Although it's been the focal point of public attention, Canada's northern defenses are only one front in a great, horse-shoe shaped ring of radar.

The U. S. floating radar stations and radar-picket planes which protect our coasts, have been too expensive, so far, for Canadian participation.

▸ **All Out Attack.** We're now faced with two distinctly different threats of attack by air. First, there's the possibility of an all-out attack. This would be easy to recognize and locate; but the concentration of attacking bombers or missiles would require an equally concentrated force for interception.

The fighters would have to converge on one point; covering vast distances at fantastic speeds. This establishes the need for a supersonic, long-range, all-weather interceptor.

Designed on the very fringe of today's aerodynamic knowledge, Avro Canada's CF-105 should fill the need. The aircraft is a distinctive project. It is not being duplicated in the U. S. It will replace the CF-100, utilizing the most advanced electronic components.

▸ **Diverse Penetration.** There's also the possibility of another, more subtle type of attack: Many bombers penetrating our radar at widely diversified points.

This type of raid would be more difficult to recognize—no individual radar station would likely detect more than a single unidentified plane. There is also the chance that some bombers might slip through at low levels, undetected.

But Canada's 63,000 Ground Observers prove their worth here. Under favorable weather conditions, it's almost impossible for a plane to slip all the way through unreported, even in the Far North.

Only at the Continental Operations Centre can a raid be properly evaluated. All pertinent data picked up by radar or ground observers from any point on the continent, is relayed to the COC. There, recorded visually on a huge screen, the information can easily be correlated and assessed. The raid detected, interception begins immediately.

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a new concept: Continental Air Power

A special review of Canada's Air Power role in NATO