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### Progress report on CB radar equipment July-September 1954 National Research Council of Canada. Radio and Electrical Engineering Division

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NATIONAL RESEARCH COUNCIL OF CANADA  
RADIO AND ELECTRICAL ENGINEERING DIVISION

ANALYZED

PROGRESS REPORT  
ON  
CB RADAR EQUIPMENT  
JULY-SEPTEMBER 1954

Declassified to:  
OPEN

Authority:

Date:

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OTTAWA

OCTOBER 1954

COUNTER-BOMBARDMENT RADAR EQUIPMENT (AN/MPQ-501)GENERAL

The User's Trial at Camp Shilo was completed on July 29. The official report has not yet been released so that results cannot be given in this report. Several sources of error were isolated, particularly in the azimuth system. Considerable trouble developed in the vehicle hydraulic system. However, temporary repairs enabled the vehicle to be kept in service.

When the vehicle was returned to Ottawa in the middle of August, work was commenced immediately on clearing the faults. The vehicle was overhauled, in cooperation with the Vehicle Proving Grounds and a representative of the vehicle manufacturer. A new scanner drive, and a new pinion to reduce antenna backlash, were installed. The azimuth marker circuits were serviced to eliminate drift, and minor modifications were made in the receiver.

The set was then prepared for shipment to Fort Sill, Oklahoma, for a demonstration requested by the U.S. Army. Less than one day was available for overall operating tests before departure, because the schedule had been arranged to coincide with current tests of three U.S. field radars.

TRANSMITTER

Upon return of the set from field trials at Camp Shilo the decision was made to rebuild the transmitter to facilitate servicing. Previous to the field trials numerous design changes had been made to provide increased power, and to satisfy magnetron requirements for more cooling air and greater magnetic clearances. These changes were accomplished only by using expedients totally unacceptable in a final design.

In the new transmitter the same case size has been retained, but otherwise the mechanical arrangement of the transmitter is completely changed. It is now broken down into four sub-assemblies. The air ducting system is extended to prevent water entry. The waveguide connection is altered to remove strain on the magnetron flange and to facilitate disconnection. Additions were made to protect the waveguide connection and air ports during shipment.

Modifications in the form of further pulse lines, charging chokes, and pulse transformers have been carried out to permit operation at pulse lengths and repetition rates required for some other experiments having no connection with the CB project.

RECEIVER

Several minor modifications have been made in the receiving system to improve the performance. The input impedance of the video attenuator has been increased, and the operating characteristics of the output stage of the I.F. amplifier have been altered slightly. These changes have considerably increased the signal voltage obtainable at the input of the video amplifier.



Additional filtering of the plate supply voltage, and a modification of the regulated power supply on the video amplifier chassis, have eliminated ringing which followed long-duration signals of amplitude less than the limit level.

#### TEST SET

A new shield box enclosing the klystron oscillator was installed, and R.F. gaskets were placed at all waveguide connectors. These modifications reduced leakage power to an extremely low level — well below the lowest signal level required for any measurements.

The test set was recalibrated, using a precision attenuator which had been calibrated at 16,000 megacycles. Previously the only available precision attenuators were calibrated at 15,000 megacycles.

The set now provides complete facilities for the measurement of R.F. power, wavelength, and receiver sensitivity. Two photographs of the completed equipment are included in this report.

#### ARMoured PERSONNEL CARRIERS

An NRC engineer attended trials at Camp Borden to observe tests of the British FV 603 and the American M59 armoured personnel carriers. The M59 carrier had been suggested as a possible alternative to the FV603 carrier for the CB equipment, but was found to be quite unsatisfactory as a radar mount.

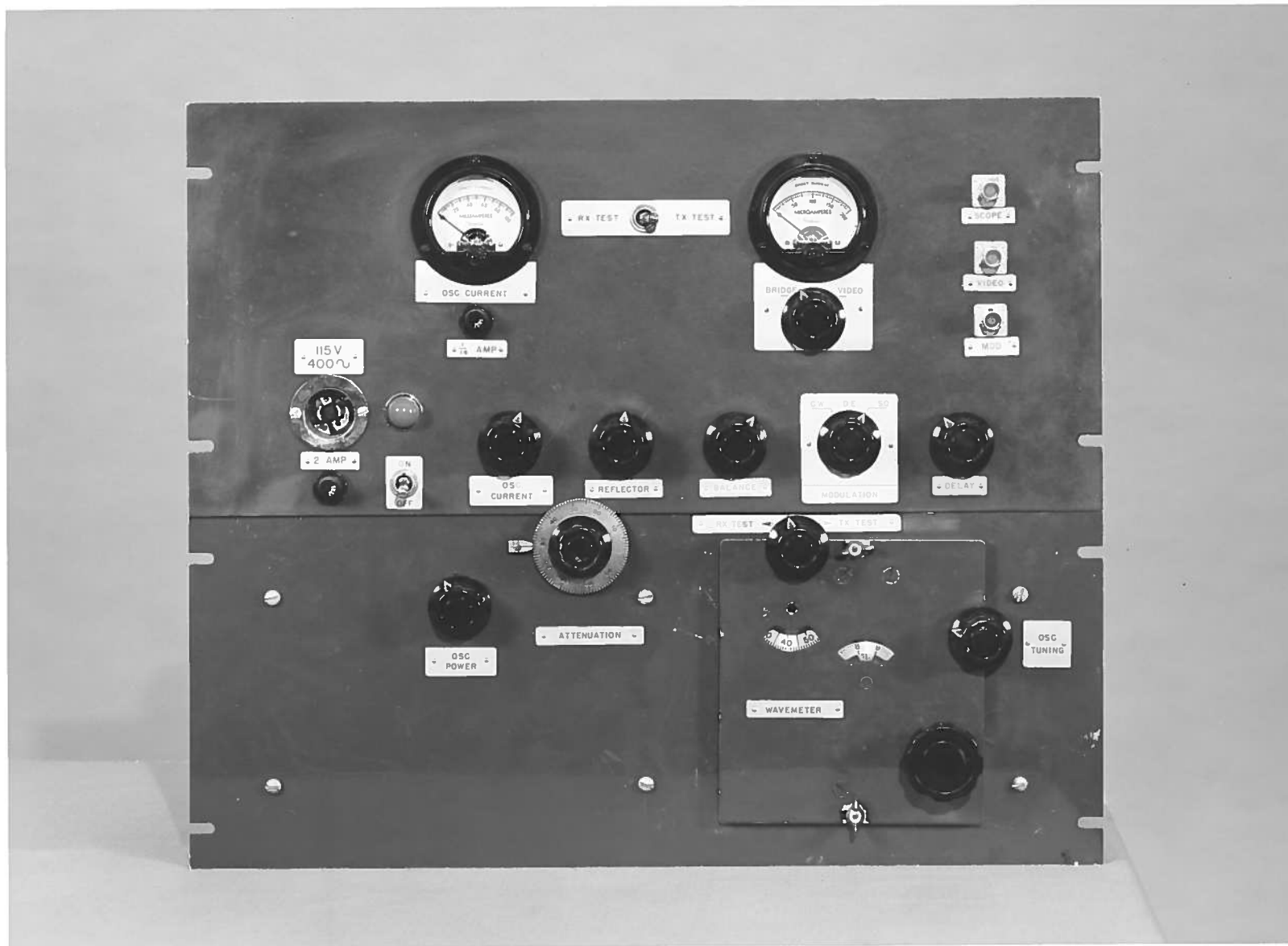
#### PROTOTYPE DESIGN DRAWINGS

Drawings are being prepared which show suggested production-prototype designs for use by Canadian Arsenals Limited. These drawings follow quite closely the design of the experimental model but include changes in two categories:

- a) changes which experience with the experimental model has shown to be desirable;
- b) changes incorporated as a result of requests for additional features.

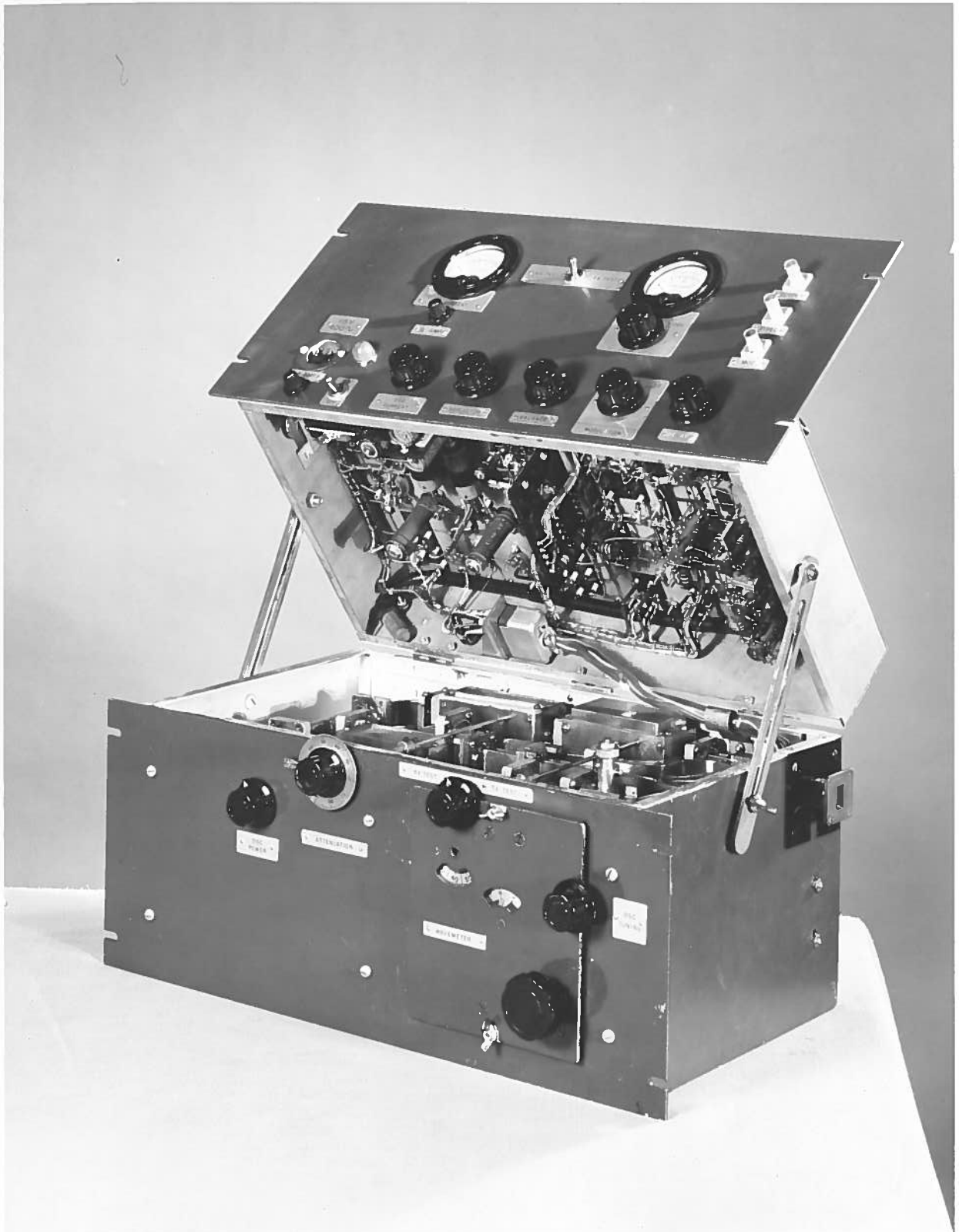
Under (a) can be included:

- 1) elimination of the high-speed scanner drive shaft;
- 2) redesign of the primary worm reduction unit for greater ease of assembly;
- 3) separate pinions on the bull gear for power drive and data take-off. A separate gear box will contain the data-transmitting autosyns driven from a spring-loaded pinion.



RESTRICTED

TEST SET - FRONT VIEW



RESTRICTED

TEST SET—INTERIOR

Under (b) can be included:

- 1) a method of disconnecting the final drive so that the turntable is free to turn;
- 2) an external contracting brake drum in the rotating part of the turntable, so that the antenna may be locked in any position;
- 3) power drive to raise and lower the reflector.

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