

JOINT COLLOQUIUM

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THE MELBOURNE WEATHER RADAR

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Mr. Goodman, Engineer of the Bureau of Meteorology's Instrument and Observations Section, described a new radar (Type RC33), manufactured by the Mitsubishi Electric Corporation of Japan, which has been installed in Melbourne by the Bureau for joint use with the University of Melbourne. It will be used for rain observations for weather forecasting, and for research. The specification of the radar is as follows:

Transmitter

Frequency	2800 Mc/s \pm 10 Mc/s (tuneable)
Peak power	500 Kilowatts
Pulse width	0.7 or 2.1 microseconds (switched)
P. R. F.	310 pulses per second

Receiver

S. H. F. Amplifier	Parametric
Noise figure	about 3db ($P_{r_{min}} = -112\text{dbm}$)
Gain	15 db
Mixer	balanced crystals

I. F. Amplifier

Frequency	30 Mc/s
Bandwidth	4 Mc/s or 1.5 Mc/s
Gain	about 100 db
Characteristic	short base "linear" or logarithmic
	0.1 volt output \equiv 10 db input

Antenna

Type	Paraboloid 3 metre diameter
Gain	about 37 db
Beam width (between - 3db points)	about 2.5 degrees

Display equipment

Plan Position Indicator	Max. Range 200 miles
Range Height Indicator	Max. Range 200 miles
	Max. height 60,000 feet
A-scope	Max. range 200 miles

Special features of the system are:-

1. The transmitter, receiver and aerial control unit are mounted on a 200 feet high tower which is part of the Redmond Barry Building at the University.
2. Display and control equipment installed in a nearby laboratory and also in the Victorian Divisional Office of the Bureau, approximately 1 mile away. Connection between the latter and the University is via 65 telephone cable pairs and a standard television coaxial cable and video amplifier supplied by the PMG's Department.
3. Extensive provision for detailed examination of selected targets, by sector scan, off centre and strobed displays.

4. A rainfall intensity computer designed to solve the radar equation for homogeneous rain targets which fill the aerial beam. Corrections are applied for range and atmospheric attenuation and provision is made for the operator to insert estimated values of B and β to satisfy the empirical expression:-

Radar reflectivity of rain = $B(\text{Rainfall intensity})$

Eight levels of intensity can be displayed on the PPI, RHI or A-scope, either as an echo covering those areas where the intensity exceeds a known level or, where the rate of change of intensity is high (such as in a thunder shower), by isopleths delineating points of equal intensity.

After the lecture, the University equipment was demonstrated.