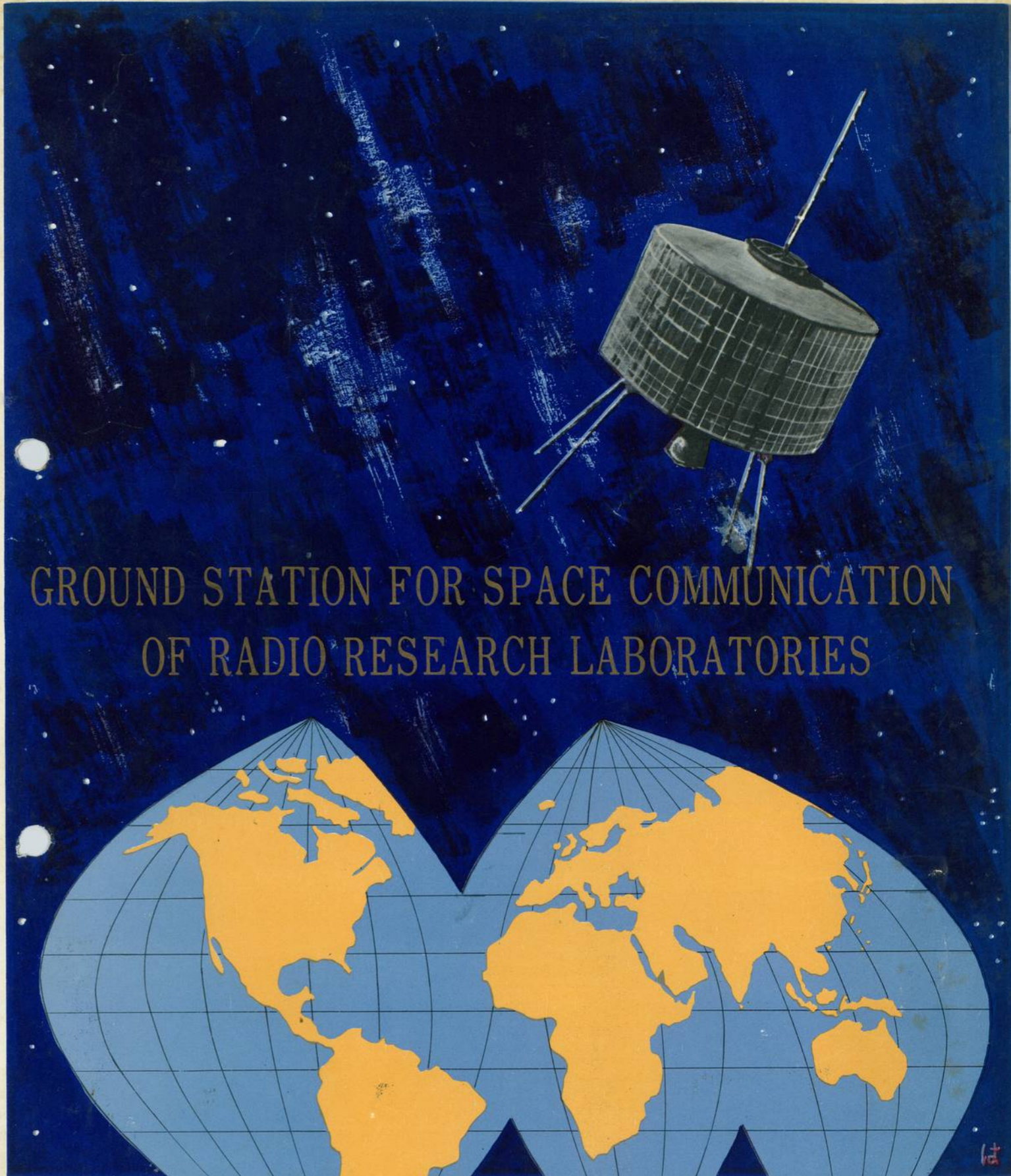
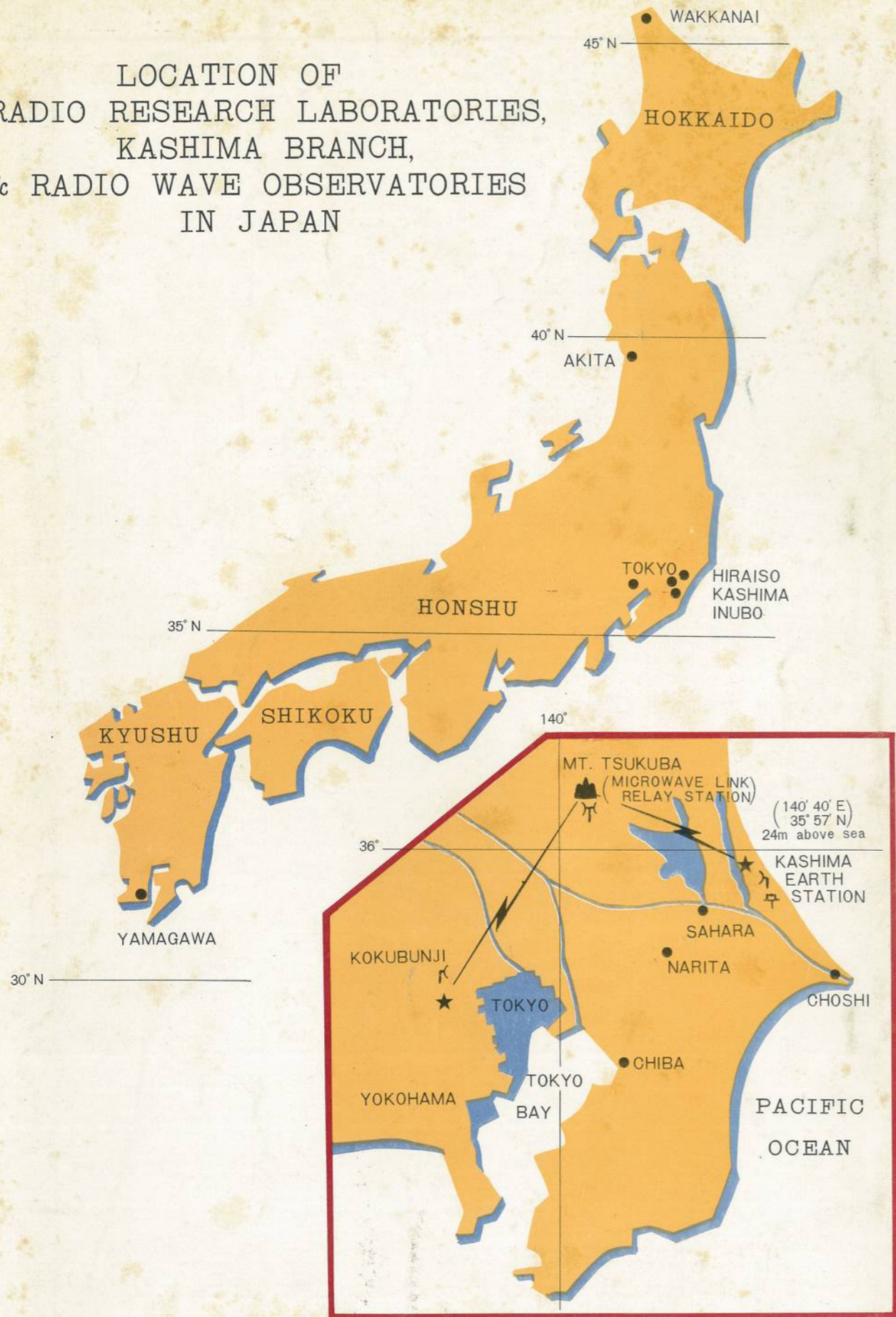


LOCATION OF
RADIO RESEARCH LABORATORIES,
KASHIMA BRANCH,
& RADIO WAVE OBSERVATORIES
IN JAPAN

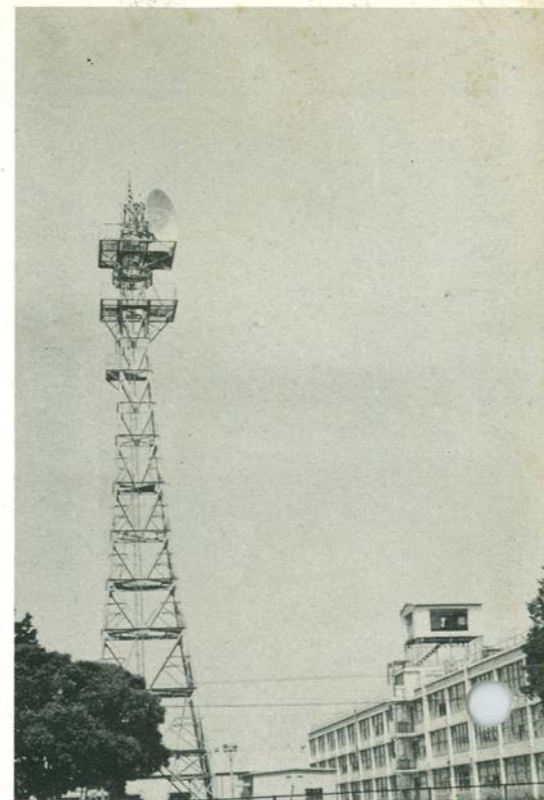


GROUND STATION FOR SPACE COMMUNICATION
OF RADIO RESEARCH LABORATORIES

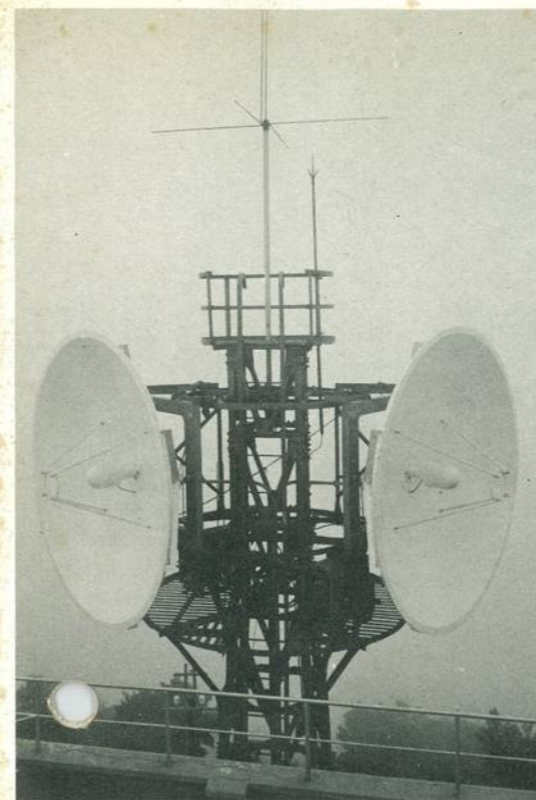
RADIO RESEARCH LABORATORIES, MINISTRY OF POSTS & TELECOMMUNICATIONS
KASHIMA BRANCH (HIRAI, KASHIMA-MACHI, IBARAGI-KEN, JAPAN)



Computer room. (Kokubunji).



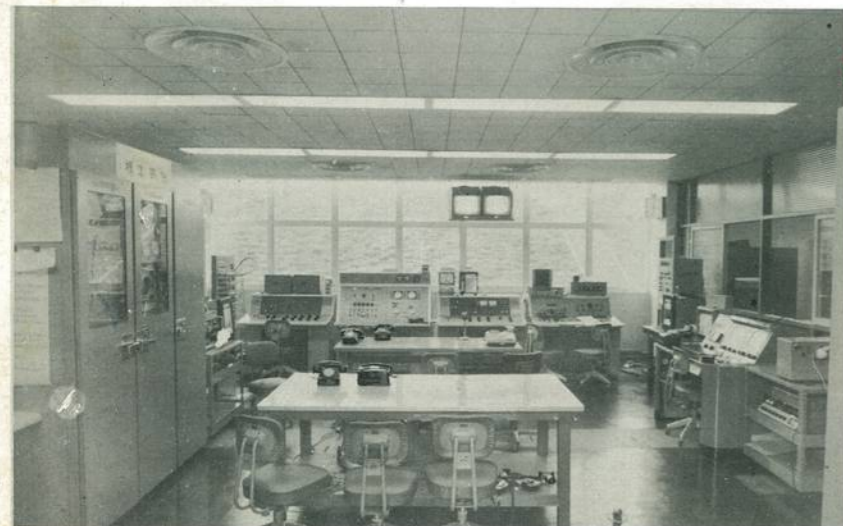
Microwave link terminal antenna and main bldg. (Kokubunji).



Microwave link relay station at Mt. Tsukuba.



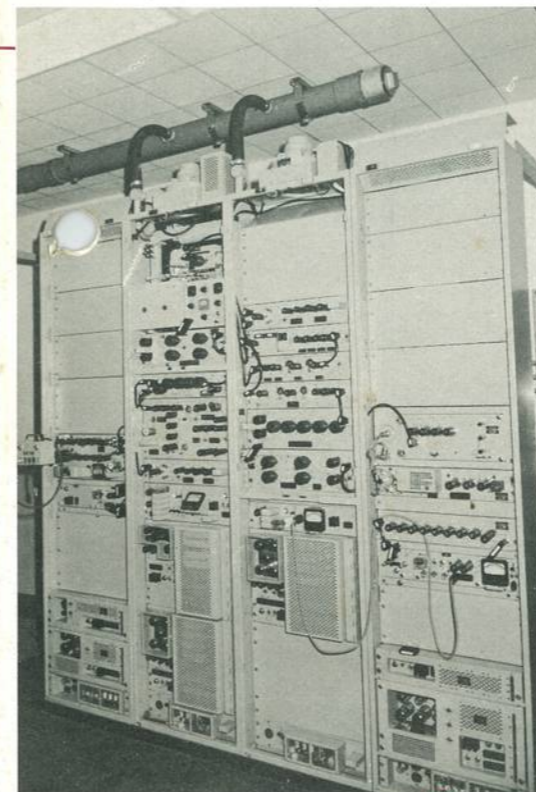
Digital control room. (Kashima).



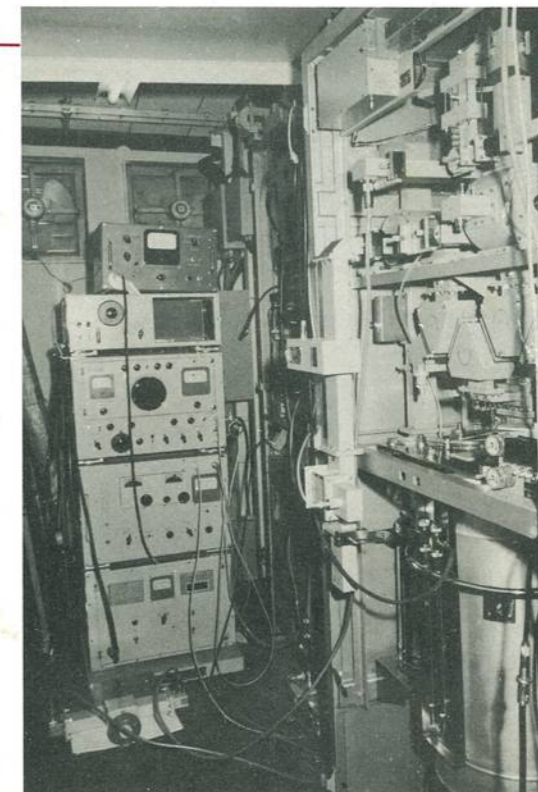
Main control room. (Kashima).



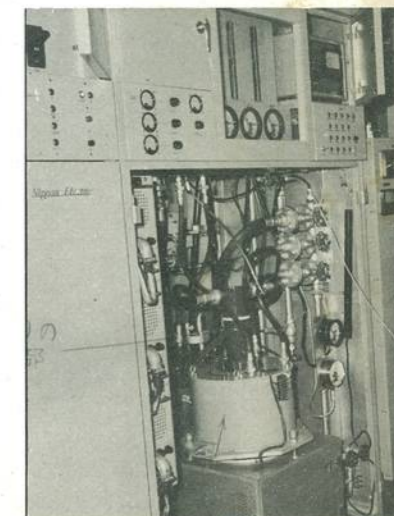
4170Mc communication receiver. (Kashima).



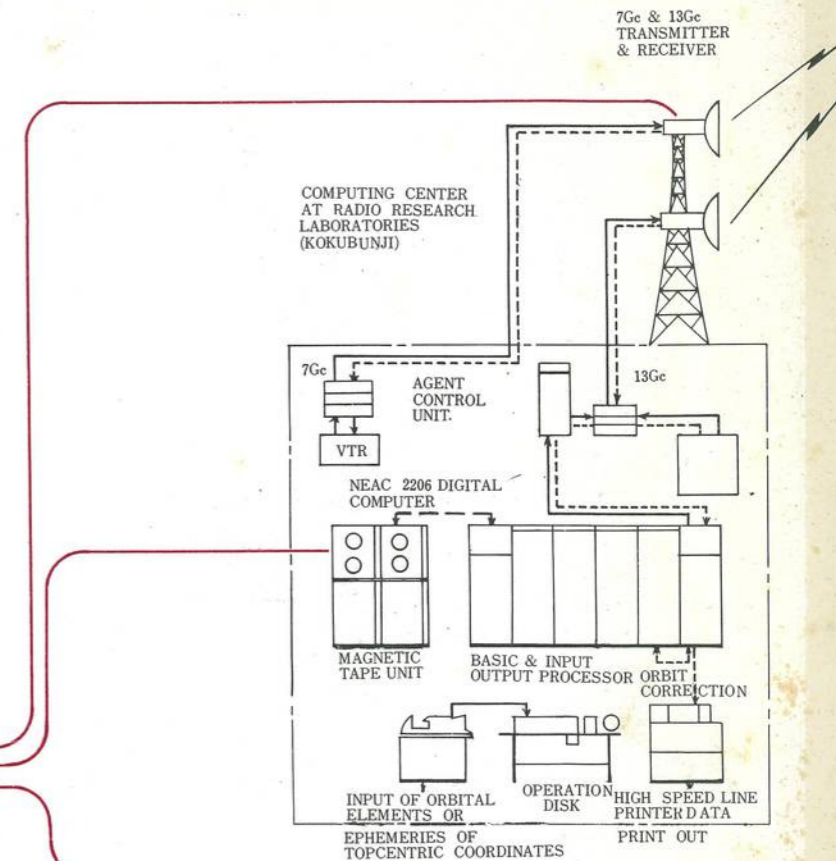
1725Mc communication transmitter. (Kashima).



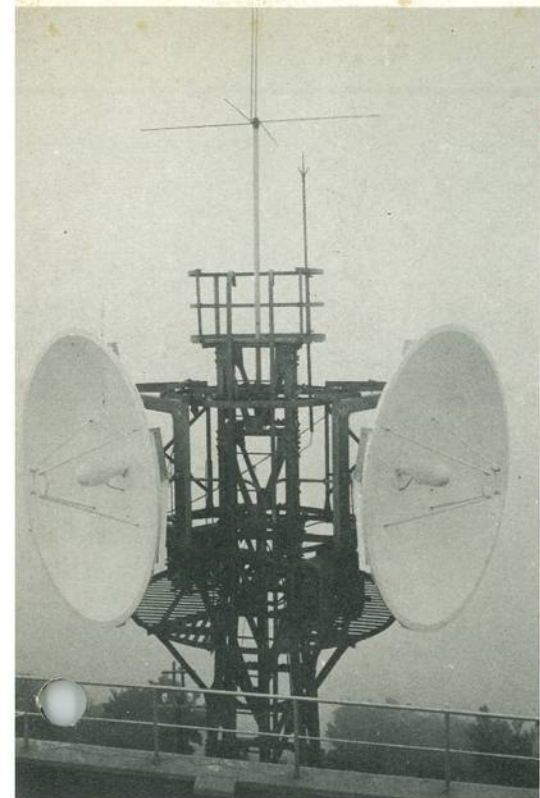
Parametric preamplifier. (revolving cabin on antenna tower).



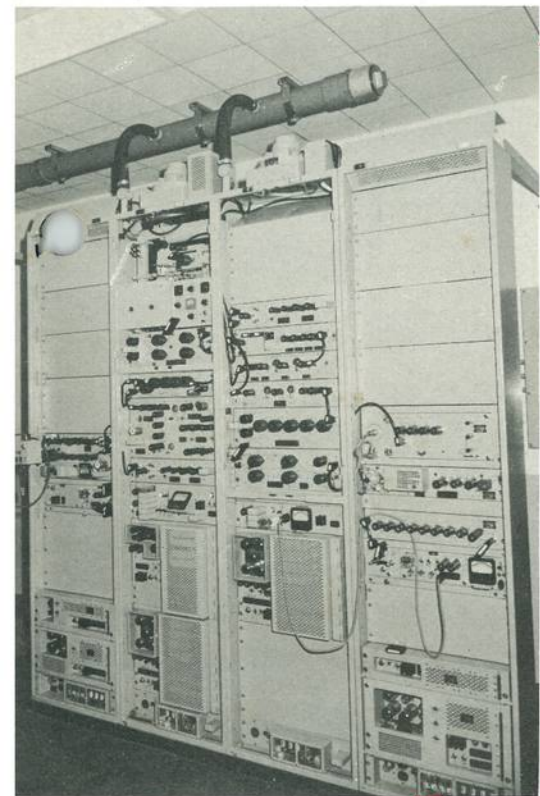
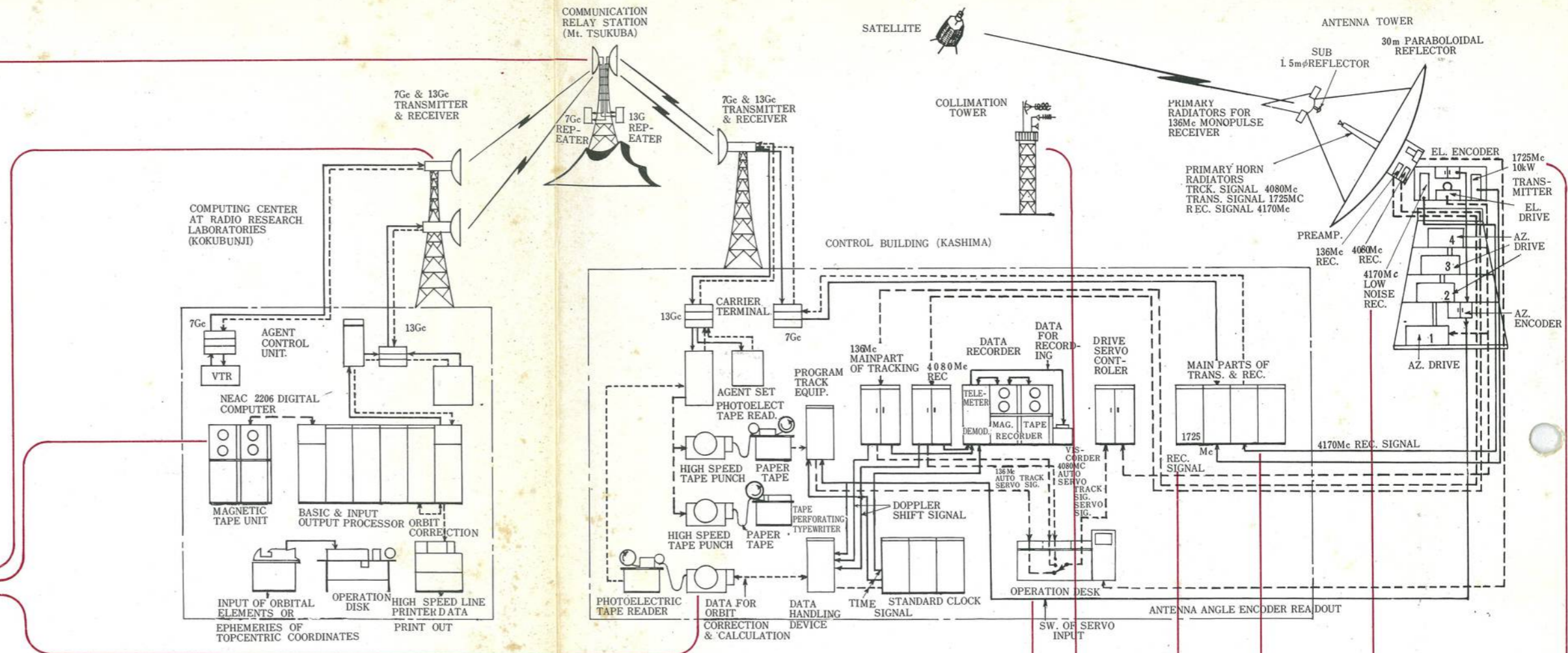
1725Mc trans (revolving cab



BLOCK DIAGRAM OF SPACE COMMUNICATION PERFORMANCE OF RADIO RESEARCH LABORATORIES



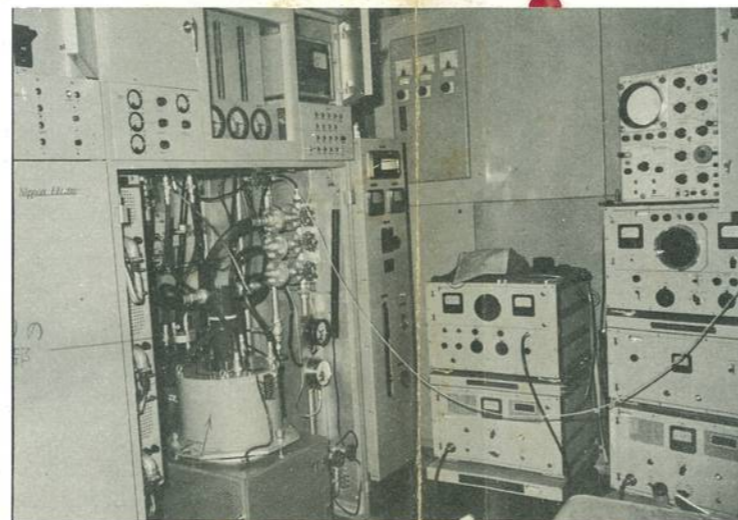
Microwave link relay station at Mt. Tsukuba.



1725Mc communication transmitter. (Kashima).



Parametric preamplifier. (revolving cabin on antenna tower).



1725Mc transmitter power amplifier. (revolving cabin on antenna tower).



Collimation tower (8.8 km to the south-east from the main antenna).



DESCRIPTIONS OF FACILITIES

- Antenna:** Type; azimuth-elevation mounted cassegrain type
 Main Reflector; paraboloid 30m in diameter, focal length 12.8m --
 Sub Reflector; hyperboloid 1.5m in diameter
 Weight; 200 tons (reflector 40 tons; tower 80 tons; gear trains and etc. 80 tons)
 Freq., Gain and Beam Width; 1725Mc, 49dB, 0.5°; 136Mc, 27dB, 6.2°; 4080Mc, 56dB, 0.2°; 4170Mc, 56dB, 0.2°
- Antenna Steering Mode:**
 Program Tracking; steered following the precalculated pointing data.
 Devices; NEAC 2206 computer, agent and agent control set, program track equip., standard clock, data handling device
 Automatic Tracking; simultaneous lobing method
 coarse tracking; freq. 136Mc, accuracy 0.05°
 precise tracking; freq. 4080Mc, accuracy 0.02° Manual and Aided
- Antenna Drive:** Electro-hydraulic drive system
 Driving Power; 100 HP in azimuth, 50 HP in elevation
 Steering Range; ± 360° in azimuth, -1° ~ +93° in elevation angle
 Steering Speed; 1/1000°-7° per sec. in azimuth
 1/1000°-3° per sec. in elevation
- Transmitter:** Freq. 1725Mc; output power 10 kW, freq. BW 14Mc; Klystron power amplification-water cooled
- Receivers:** Communication; freq. 4170Mc, noise temp. 81°K. freq. BW 35Mc, parametric preamplifier (nitrogen liquid cooled), phase lock type demodulator
 Coarse Tracking; freq. 136Mc. NF 7dB, freq. BW 200c/s
 Precise Tracking; freq. 4080Mc, NF 11dB, freq. BW 200c/s
- Microwave Link (Kokubunji-Kashima):**
 7Gc Band; freq. 6580Mc and 6740Mc, freq. BW 17Mc (TV video signal 1ch)
 13Gc Band; freq. 12620Mc and 12690Mc, freq. BW 2Mc (TV voice signal 1 ch, tracking data 1 ch, telephone 8 ch)
- Collimation Tower:** Location; 8.8km to the south-east from the main antenna
 Antennas; 136Mc-herical antenna, gain 10dB, transmission Yagi antenna, gain 8dB, transmission
 1725Mc-horn antenna, gain 20dB, reception
 4080Mc-horn antenna, gain 20dB, transmission
 4170Mc-horn antenna, gain 20dB, transmission
 Optical Target, Dummy Satellite
- Power Source:** Commercial 6600V, 3φ, 50c/s; Capacity 500KVA

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