

CMI radar and communications site

University of Illinois/Willard Airport, Champaign–Urbana area, Illinois · Approximately 1990–2000

This illustration represents the period when the radar antenna platform was 17 ft above ground. These approximate dates reflect my recollection; the exact date of the subsequent tower elevation has not been established. ATCBI-3 was replaced by ATCBI-5 during that period. The drawing shows the ATCBI-5 configuration, not every equipment arrangement throughout the period.

An occupational RF illustration for HHS: airport surveillance radar, beacon equipment and ground radio transmitters operating around technician work areas.

This schematic reconstruction illustrates the arrangement described in my FAA work account. It helps explain why assessment should address actual maintenance locations and simultaneous sources. The colored surfaces show illustrative radiation directions; their size, brightness and overlap are not measurements of exposure. Sidelobe overlays show illustrative directions and share the source transmitter power; they do not assign the full source power to each lobe. Patterns are clipped at the schematic ground for readability. Radio-envelope size and fading are schematic, not measured service or exposure contours.

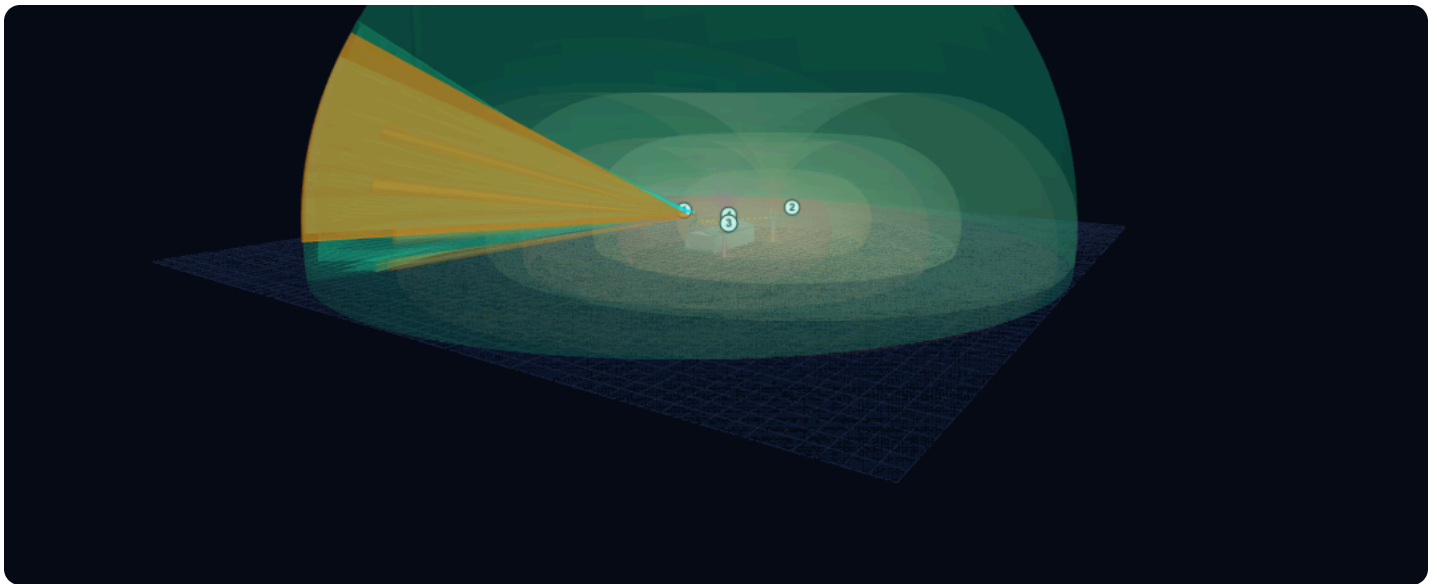


Figure 1. Static view of the schematic. Tower, shelter and radio-platform dimensions are reconstruction geometry, not a survey. Radio fields in this still capture one illustrative keying state.

Source-power key: orange ASR 60 dBm/channel peak; cyan ATCBI directional 50 dBm peak; ATCBI omni 54.77 dBm peak; GRT 40 dBm/channel transmitter output while keyed; 38 dBm at the antenna with 2 dB line loss. These are source values, not received power.

How to read the illustration

Numbered work areas: 1 — radar platform; 2 — northeast ground-radio platform; 3 — southeast ground-radio platform; 4 — equipment shelter. Markers identify schematic equipment/work areas, not a measured body position or exposure level.

Local display scale: Radar surfaces are drawn to 300 ft for visibility. That cutoff is not a near-field boundary, hazard boundary or service-range limit. The stated site service range is 60 nautical miles (about 69 statute miles), which is not drawn here. The perspective retains the shelter as a reference for work locations; it does not show its appearance from 60 nautical miles away. Near-field conditions must be evaluated separately for each antenna and maintenance source at the worker's actual position.

Operation versus maintenance: Figure 1 represents radar and radio-source directions schematically. My work included energized maintenance at transmitter cavities, waveguides, rotary joints and equipment cabinets. The still image does not establish stationary antenna operation during a historical task. The illustration does not reconstruct equipment access or shielding conditions during individual tasks.

The central tower supports the ASR radar and the beacon array above it. The building represents the equipment shelter. The two separate platforms represent ground radio transmitter antenna locations. Orange and cyan surfaces represent the radar and directional beacon patterns. Radio envelopes represent a schematic simultaneously transmitting state.

ASR means airport surveillance radar. ATCBI means air traffic control beacon interrogator. GRT means ground radio transmitter. These are distinct sources and should be assessed together under the operating conditions of the task.

Site account and fixed illustration settings

Item	Included information	Basis and limits
Tower configuration	17-ft radar deck; ATCBI-5 above the ASR-8.	I recall that the ATCBI-3 was replaced by the ATCBI-5 while the tower was still in its 17-ft configuration. I do not remember the replacement date. Antenna-center heights remain schematic.
Radar motion	12.5 revolutions per minute, or one revolution every 4.8 seconds.	The illustration uses the generic ASR-8 rotation rate listed in NTIA Report 13-490, Table C-1. It does not establish the operating state during a particular maintenance task.

Radar and beacon patterns	ASR: 1.35° horizontal full half-power width in the drawing. ATCBI: 2° horizontal full half-power width, with 0.5° schematic upward tilt. Broad upper coverage surfaces show illustrative directions.	The patterns are schematic; site-specific antenna patterns have not been verified. The upper surfaces are illustrative coverage envelopes, not hard exposure boundaries. No site calibration or field-strength scale is represented.
Ground radios	VHF/UHF channels; ATIS represented as a continuous source. The still shows radio channels together to illustrate simultaneous sources.	I recall that simulcasting was often used. The illustrated five-channel grouping is an example, not a verified historical combination. The still does not reconstruct controller-pilot exchanges, a historical transmission log or duty cycle. Aircraft emissions are not drawn.
Radio channels shown	ATIS 124.85; Ground 121.8; Clearance 128.75; Approach/Departure 121.35, 132.85, 133.975, 285.65, 290.225; Guard 121.5 and 243.0 MHz.	The listed frequencies identify the radio channels represented in this illustration. Exact antenna assignments and simultaneous operation at a specific date require configuration records.
Scene scale	Geometry uses feet; drawn radar surfaces stop at 300 ft and radio envelopes extend to 240 ft in this local view.	Display extents only. Neither is a service range, hazard distance or measured exposure contour. The two radio platforms and their radiating heights are provisional geometry.

Transmitter power in dBm

dBm expresses power relative to 1 milliwatt: $\text{dBm} = 10 \log_{10}(\text{power in watts} \times 1000)$. These are transmitter-source values, not received power, radiated power after antenna gain, field strength or dose. Colored beam brightness is not scaled to dBm.

Source / pattern	Peak source power	Time-averaged source power	Basis
ASR-8 main beam and sidelobes	60.00 dBm per channel (1 MW); 63.01 dBm summed source peak if both channels coincide	57.70 dBm per channel (588.6 W); 60.71 dBm summed two-channel average (1,177.2 W)	Calculation uses 0.6 μ s pulses $\times$ 981/s, two channels. These are source powers shared by the radiation pattern; sidelobes do not each receive that full power. The summed peak requires coincident pulses and is not an established site condition.
ATCBI-5 directional beam	50.00 dBm (100 W)	17.19 dBm (0.05232 W)	Calculation uses two 0.8 μ s pulses $\times$ 327/s.
ATCBI-5 omni / P2	54.77 dBm (300 W)	18.95 dBm (0.07848 W)	Calculation uses one 0.8 μ s pulse $\times$ 327/s. The omni pattern is included in the schematic.
Each GRT channel envelope	40.00 dBm (10 W) transmitter output while keyed; 38.00 dBm (6.31 W) at antenna input with 2 dB line loss	Unknown; historical keying fraction is not established	My recollection is that GRT transmitter output was 10 W and line losses could be as high as 2 dB. Actual channel-specific losses remain unknown. The still image cannot determine historical keying fractions or average power.

The power calculations use the stated equipment parameters; historical site settings have not been independently verified. There is no allocation of power among individual beam surfaces and no total-site exposure calculation.

GRT coverage and transmission-line loss

I recall 10 W output per GRT transmitter, with transmission-line losses as high as 2 dB. A 10 W output is 40 dBm. With 2 dB loss, antenna-input power is 38 dBm, approximately 6.3 W. With smaller losses, more power reaches the antenna. Actual channel-specific losses remain unknown.

The illustration uses the same 2 dB case for every radio channel to show the maximum recalled line-loss condition. It does not assign invented frequency-dependent losses. The envelopes extend to a 240-ft drawing radius, with three fading layers; their dimensions and brightness are schematic. Actual frequency-dependent antenna patterns, line losses and service coverage require equipment and configuration information. The drawing ends within the local scene and does not assert that aircraft service ends there.

Why this matters for occupational assessment

My maintenance work involved energized radar and communications equipment. HHS should evaluate whether exposure assessments represent the technician's actual position, equipment access, operating mode, repeated work and simultaneous sources. **A rotating antenna illustration does not characterize close work at transmitter cavities, waveguides, rotary joints or inside equipment cabinets where both non-ionizing and ionizing radiation could be present.**

Assessment should connect task-specific measurements and operating records with information provided to workers and physicians, and with decisions about medical surveillance for current and retired technicians.

Simultaneous sources and building reflections

Figure 1 uses a low, wide perspective with radar, beacon, sidelobe, omni and radio patterns shown together. This schematic simultaneous-source view helps convey how technician work areas can lie among multiple operating sources. It does not establish that every radio channel transmitted at once during a historical task.

Reflection overlays illustrate possible reflection, diffraction and reverberation directions around the shelter. These overlays are illustrative mechanisms, without measured reflection coefficients, material properties or a solved indoor field. Their brightness is not reflected power or an exposure measurement. All surfaces are clipped at schematic ground level.

What this exhibit establishes

This exhibit communicates a site arrangement and operational scenarios. It does not establish a personal RF level, a limit exceedance, a disease cause or safety at a location outside the colored surfaces. Close-range fields, cabinet leakage, indoor transmission, reflections and shielding require their own assessment. Possible equipment-generated X-rays are a separate ionizing-radiation question and are not modeled here.

Source context

Airport identification: [FAA terminal-procedure listing](#) identifies CMI as University of Illinois/Willard, Champaign–Urbana, Illinois.

The site configuration and simulcasting account above are my recollections. Site dimensions and antenna patterns are schematic, not surveyed or measured.

Published technical cross-check: [NTIA Report 13-490 \(October 2012\), Table C-1, printed page 82](#) lists a generic ASR-8 rotation rate of 12.5 RPM. The illustration uses a 1.35° horizontal beamwidth. The NTIA table lists 2.3° for a generic ASR-8; the site-specific beamwidth remains unverified.