

Attachment 14

DEVIATIONS FROM CRITERIA FOR AIR FORCE AIRFIELD SUPPORT FACILITIES

A14.1. Waiverable Airfield Support Facilities:

A14.1.1. Contents. This section provides information for selected airfield support facilities that are authorized to deviate from criteria presented in this manual with a specific waiver from the MAJCOM. This list is not all-inclusive.

A14.1.2. Army, Navy and Marine Corps Requirements. This attachment does not apply to the Army, Navy, and Marine Corps.

A14.1.3. Fixed Base Airport Surveillance Radar (ASR). Radar that displays range and azimuth typically is used in a terminal area as an aid to approach and departure control. Normally, ASR is used to identify and control air traffic within 60 nautical miles of the airfield. The ASR antenna scans through 360 degrees to give the air traffic controller information on the location of all aircraft within line-of-sight range. The antenna, located adjacent to the transmitter or receiver shelter, is elevated to obtain the required line-of-sight distance.

A14.1.4. Airport Rotating Beacon. Airport rotating beacons are devices that project beams of light, indicating the location of an air base. Detailed siting guidance is found in AFMAN 32-1076, *Visual Air Navigation Facilities*.

A14.1.5. Nondirectional Radio Beacon Facilities. Radio beacon facilities are nondirectional aids used to provide homing, fixing, and air navigation assistance to aircraft with suitable automated direction finding equipment. They consist of two categories: a medium power, low frequency beacon and a medium power, ultrahigh frequency beacon.

A14.1.6. Rotating Beam Ceilometer. The rotating beam ceilometer measures cloud height. It includes a projector, detector, and indicator. The projector and detector are sited in the runway approach 900 meters [3,000 feet] to 1,200 meters [4,000 feet] from the touchdown point. The detector is located closest to the runway threshold; the projector is located 120 meters [400 feet] from the detector. The indicator is installed in the weather observation building.

A14.2. Permissible Deviations from Design Criteria:

A14.2.1. Contents. This section furnishes siting information for airfield support facilities that may not conform to the airfield clearance and airspace surface criteria elsewhere in this manual. Siting must either conform to this guidance or a waiver from the MAJCOM is required. If the equipment renders satisfactory service at locations not requiring a clearance deviation, such locations should be selected to enhance the overall efficiency and safety of operations.

A14.2.2.. Visual Air Navigational Facilities. This term identifies, as a type of facility, all lights, signs and other devices located on, and in the vicinity of, an airfield that provide a visual reference to pilots for guidance when operating aircraft in the air and on the ground. These facilities supplement guidance provided by electronic aids, such as tactical air navigation (TACAN), and precision approach radar (PAR). For detailed siting criteria, see AFI 32-1044 and AFMAN 32-1076. Commonly used visual air navigational facilities are listed below:

A14.2.2.1. Approach lights

A14.2.2.2.. Runway lighting systems

A14.2.2.3. Taxiway lighting systems

A14.2.2.3. Runway distance markers

A14.2.2.4. Runway arresting system markers (locations of pendent cables).

A14.2.2.5. Taxiway signs (pilots' guidance, advisory and other informational signs on the airfield movement area)

A14.2.2.6. Visual Glide Slope Indicator (VGSI) Systems.

A14.2.3. Frangibility Requirement. All aboveground structures identified in this section, except as noted otherwise, must be constructed with breakable couplings or sections designed to support the desired load under specific local wind and ice conditions, but frangible enough to cause minimal damage to an aircraft if struck. Their shear resistance must be calculated with respect to local wind and ice load requirements, and other conditions of the installation. Two examples of such conditions are requirements for above grade aircraft arresting system components and mast-mounted electronic navigation or meteorological equipment whose performance would be adversely affected by movement caused by wind.

A14.2.4. Radar Facilities. These facilities provide air traffic controllers information on aircraft alignment, rate of descent, and relative position in the approach. These facilities include:

A14.2.4.1. Precision Approach Radar (PAR).

A14.2.4.2. Mobile Ground Control Approach (GCA) Facility.

A14.2.4.3. Mobile Radar Approach Control (RAPCON) Facility. See A14.1.3 for fixed airport surveillance radar (ASR) siting guidance.

A14.2.4.3.1. These units may be sited not less than 152.4 meters [500 feet] from the centerline of a runway to the near edge of the equipment. When it becomes necessary, place units between parallel runways that have insufficient distance to allow a 152.4 meters [500 feet] clearance to the centerline of the primary instrument runway and the lesser clearance to the centerline of the other runway. As a rule, these units are not sited between runways that have a separation of less than 304.8 meters [1,000 feet] between centerlines.

A14.2.4.3.2. While it is desirable, from a safety standpoint, to keep these units as low as possible, the final elevation will be determined by the appropriate support agency. The elevation is dependent on the necessary lines of site between the unit and calibration reflectors and the touchdown areas of the runways. If it is necessary to change the existing ground elevation to provide a proper height for these units, follow grading requirements discussed in Chapter 3.

A14.2.5. Emergency Generators, Maintenance and Personnel Facilities. These facilities may be collocated with GCA facilities and mobile RAPCON vans as follows:

A14.2.5.1. Trailers of standard mobile home construction or pre-engineered construction may be used for maintenance and personnel facilities.

A14.2.5.2. The entire GCA or RAPCON complex consisting of radar vans, emergency generators, maintenance and personnel trailers must be confined to a site not to exceed 45.7 meters long by 30.5 meters wide [150 feet by 100 feet], with the long side perpendicular to the main runway. The elevation of antennas and other projections will be held to the minimum essential for proper operation. Make every effort to keep the site as small as possible and to maintain the greatest possible distance from the runway. The perimeter of the site must be clearly marked and all future requirements contained within the area.

A14.2.6. Remote Microwave Link. This equipment provides remote operation and control of PAR and GCA facilities and must be sited adjacent to them. In siting the antenna, make sure that the increase in size of the total complex does not exceed the specified size of the area previously given for the GCA facility and RAPCON facility.

A14.2.7. Precision Approach Radar (PAR) Reflectors. Moving Target Indicator (MTI) reflectors, or “target simulators,” may be sited not less than 45.7 meters [150 feet] from the near edge of a runway nor less than 38.1 meters [125 feet] from the near edge of a taxiway or apron to the centerline of the equipment. The height of these reflectors must be held to a minimum consistent with the operational requirements of the system. MTI reflectors sited less than 152.4 meters [500 feet] from the centerline of any runway must be of frangible construction, using breakaway sections in reflector masts. Tracking reference reflectors must not be installed closer than 152.4 meters [500 feet] to the centerline of any runway, nor exceed 18.3 meters [60 feet] in height above the centerline elevation of the nearest runway at the intersection of the equipment centerline perpendicular with the runway centerline.

A14.2.8. Airborne Radar Approach Reflectors. Airborne radar approach reflectors may be placed not less than 99.1 meters [325 feet] from the runway edge and not less than 121.9 meters [400 feet] nor more than 228.6 meters [750 feet] from the runway centerline to the edge of the equipment in a pattern parallel to the runway.

A14.2.9. Instrument Landing System (ILS):

A14.2.9.1. ILS Localizer Antennas. For best operational benefit, the system should be sited so that the antenna array is on the extended runway centerline, about 457.2 meters [1,500 feet] beyond the stop end runway threshold. As a rule, siting must conform to approach-departure clearance surface criteria discussed in Chapters 3 and 4. In some instances, local factors preclude siting the unit at 457.2 meters [1,500 feet] from the runway. When the siting constitutes an obstruction that cannot be waived, an offset from the extended runway centerline may be considered (see A14.2.9.1.2 below). To be acceptable, an offset site must conform to paragraphs A14.2.9.1.1 and A14.2.9.1.2 listed below:

A14.2.9.1.1. Angle of Divergence. Angle of divergence between the center of the localizer course and the extended runway centerline must not exceed 3 degrees.

A14.2.9.1.2. Offset. Intersection of the centerline and localizer and the extended runway centerline must occur at a point 335.3 meters [1,100 feet] to 365.8 meters [1,200 feet] toward the runway threshold from the Decision Height (DH) point on the glide slope. If the responsible facility engineering activity determines that an offset is feasible and the site is 152.4 meters [500 feet] or more from the runway centerline extended, the localizer may be installed without a waiver of clearance criteria. However, a waiver to operational criteria, TERPS, must be obtained as discussed in Attachment 2. These waivers will be processed at the request of the responsible MAJCOM office, as discussed in Attachment 2.

A14.2.9.1.3. Far Field Monitor (FFM). The FFM is considered part of the localizer system. However, it is sited at the opposite end of the runway. Typical locations are 365.8 meters [1,200 feet] to 914.4 meters [3,000 feet] prior to the landing threshold. FFM antenna height is determined by line of sight to the localizer antenna array. The line of sight requirement can be relaxed if satisfactory localizer signal reception is proven with a portable ILS receiver at the proposed lower height of the FFM site. Just as with the localizer antenna array, the FFM antenna shall not penetrate the approach-departure clearance surface criteria discussed in Chapters 3 and 4.

A14.2.9.2. ILS Glide Slope Antenna. The antenna mast or monitor should be located at a minimum distance of 121.9 meters [400 feet] from the runway centerline to the centerline of the antenna, and should not exceed 16.7 meters [55 feet] in height above the nearest runway centerline elevation. A mast height of over 16.7 meters [55 feet] is permitted if the minimum distance from the runway centerline is increased by 3.1 meters [10 feet] for each 305 millimeters [1 foot] the mast exceeds 16.7 meters [55 feet]. When the mast cannot, for technical or economic reasons, be located at a minimum distance of 121.9 meters [400 feet] from the runway centerline, the minimum distance may be reduced to not less than 76.2 meters [250 feet] from the centerline, provided the basic mast height of 16.7 meters [55 feet] is reduced 305 millimeters [1 foot] for each 1.7 meters [5 feet] it is moved toward the runway from the 121.9-meter [400-foot] point. Glide slope monitor units are considered part of the parent equipment. Emergency power generators must be as close to the facilities they support as practical.

A14.2.9.3. Marker Beacons. Marker beacons support instrument approach procedures. They are located on the runway centerline extended as noted.

A14.2.9.3.1. Outer Marker (OM) Beacon. The OM Beacon marks the point where the aircraft should intercept the glide slope. When the OM beacon cannot be located at this point, it is located between this point and the landing threshold, as close to this point as possible.

A14.2.9.3.2. Middle Marker (MM) Beacon. The MM beacon is located from 609.6 meters to 1,828.8 meters [2,000 to 6,000 feet] from the instrument runway threshold. It marks the point where the glide slope intersects the DH point of a Category (CAT) I ILS.

A14.2.9.3.3. Inner Marker (IM) Beacon. The IM Beacon is located to mark the point where the glide slope angle intersects the DH point of a CAT II ILS. An inner marker beacon is not used on a CAT I ILS. Marker beacons must not penetrate airspace clearance surfaces defined in this manual.

A14.2.10. Microwave Landing System (MLS). Criteria for siting an MLS will be added upon availability.

A14.2.11. Mobile Navigational Aids and Communication Facilities. These units follow the same general siting criteria as their fixed facility counterpart; and the same deviations from standard clearance criteria are permissible. Power generators for these facilities will be located as close to the equipment and in as small a site configuration as possible.

A14.2.12. Mobile Air Traffic Control Towers (MATCT). At least a 152.4 meters [500 feet] distance must be maintained between the centerline of any runway and the near edge of the tower. Power generators may be located in positions adjacent to the MATCT. Communication antennas to be used with these towers which are not mounted on the facility require the same separation from the runway centerline as the parent equipment, fixed or mobile.

A14.2.13. Terminal Very High Frequency Omnidirectional Facility and Very High Frequency Omnidirectional Facility. TVOR and VOR facilities may be located not less than 152.4 meters [500 feet] from the centerline of any runway to the edge of the facility, nor less than 61 meters [200 feet] from the centerline of a taxiway.

A14.2.14. Tactical Air Navigation (TACAN) Facility and Very High Frequency Omnidirectional Radio Range (VORTAC) Facility. When used as terminal navigational aids, the TACAN and VORTAC facilities may be sited not less than 152.4 meters [500 feet] from the centerline of any runway to the edge of the facilities, provided the elevation of the antenna does not exceed 15.2 meters [50 feet] above the highest point of the adjacent runway centerline. For an on-base installation, the

maximum angle of convergence between the runway centerline and TACAN end approach course is 30 degrees (30°) at a point 914.4 meters [3,000 feet] from the runway threshold.

A14.2.15. Runway Supervisory Unit (RSU). An RSU is a transportable or permanent all-weather, control tower type facility used to control or monitor aircraft movement. The RSU complex, consisting of the facility and all support equipment, must be confined to a site not to exceed 15.2 meters [50 feet] long by 15.2 meters [50 feet] wide. A minimum distance of 45.7 meters [150 feet] must be maintained between the near edge of the runway and the RSU facility and support equipment.

A14.2.16. Transmissometer Facilities. Transmissometer facilities measure and record horizontal visibility. They are installed adjacent to the ILS runway. Measurements are in terms of runway visual range (RVR), a reference of how far a pilot of an aircraft should be able to see high intensity runway edge lights. A transmissometer installation consists of a projector, detector, and recording or readout unit (RVR computer). **NOTE:** Transmissometer equipment that supports CAT I and CAT II operations may be sited not less than 121.9 meters [400 feet] from the centerline of the supported runway to the centerline of the equipment nor less than 61 meters [200 feet] from the centerline of any taxiway.

A14.2.17. Wind Measuring Set. The wind measuring set measures wind speed and direction. It consists of a transmitter, indicator and recorder. The transmitter is mounted on a mast and is sited where representative winds of the runway touchdown area can be measured. The recorder is installed in the weather observation building. The transmitter mast must be of frangible construction and may be sited not less than 152.4 meters [500 feet] from the runway centerline to the centerline of the equipment.

A14.2.18. Temperature-Humidity Measuring Set. The temperature-humidity measuring set measures temperature and a dew point of free air passing over a sensor. The set consists of a transmitter and indicator. The transmitter sensing elements are mounted on a pipe mast about 2 meters [6 feet] above the ground installed in a representative location on the airfield. The indicator is located in the weather observation building. The transmitter mast must be of frangible construction and may be sited not less than 152.4 meters [500 feet] from the runway centerline to the centerline of the equipment.

A14.2.19. Wind Direction Indicators:

A14.2.19.1. Wind Cones. Wind cone mountings are of three types. Type I is a hinged steel support; Type II is an anodized tapered aluminum hinged base support; and Type III is an "A" frame, fixed-base support with a pivoted center pipe support. All must be located at least 121.9 meters [400 feet] from the centerline of the runway to the centerline of the wind cone and in a location free from the effects of air disturbances caused by nearby objects. A height of more than 6.1 meters [20 feet] above ground elevation requires a waiver. Type I and Type II wind cone masts must be of frangible construction. For additional information on wind cones, see AFMAN 32-1076.

A14.2.19.2. Landing Direction Indicator (Landing "T" or Tetrahedron). A landing "T" or tetrahedron must be located at least 61 meters [200 feet] from the edge of a runway to the centerline of the equipment.

A14.2.20. General Information for Operational and Maintenance Support Facilities. Detailed siting information is furnished in this section, where appropriate. The list of facilities is divided into two categories: one related to aircraft operations; and one related to aircraft and facility maintenance. When the facility has dual use, it is grouped in the category of its predominant function.

A14.2.20.1. Operational Facilities:

A14.2.20.1.1. Aircraft Arresting Systems and Barriers (net engaging systems). A series of components used to engage an aircraft and absorb the forward momentum of a routine or emergency landing (or aborted take-off). See AFI 32-1043 for detailed siting criteria.

A14.2.20.1.2. Warmup or Holding Pad. The warmup or holding pad is a paved area adjacent to the taxiway and the runway end. It provides a means of bypassing aircraft being held at the runway end for various reasons. For detailed design and siting criteria, see Chapter 6.

A14.2.20.1.3. Arm/Disarm Pad. Arm/disarm pads are used for arming aircraft just before takeoff and for disarming weapons retained or not expended upon the aircraft's return. For detailed siting criteria and other information, see Chapter 6. When a personnel shelter is required, it is considered a part of the arm/disarm complex and must be sited according to explosives quantity-distance criteria as discussed in Attachment 10 and AFMAN 91-201.

A14.2.20.1.4. Helicopter Autorotation Lanes (also called "Slide Areas" or Skid Pads"). Such lanes may be sited on or between active runways without a waiver. Ensure they are sited to prevent conflicts in operations (Clear Zones must not overlap operational areas that will be used simultaneously).

A14.2.20.1.5. Vehicle Control Signs and Traffic Lights. These signs and lights provide drivers with guidance on traffic routes, service yard areas, and similar places. They provide warning information at runway and taxiway crossings and other hazardous points. Vehicle control signs and traffic lights may be located on the airfield movement area (including apron) without a waiver to criteria. In siting vehicle controls signs and traffic lights, make sure that they do not obstruct taxiing or towed aircraft.

A14.2.20.1.6. Runway Distance Markers. These markers are required for runways used by jet aircraft and are recommended for runways used by propeller type aircraft. For detailed siting guidance, see AFI 32-1044 and AFJMAN 32-1076.

A14.2.20.1.7. Aircraft Security System. If a security system or fence is approved by the Air Force for alert apron security, such as the microwave fence sensor or similar system as required by AFI 31-209, approval of the siting by the MAJCOM operation and safety offices will constitute a permanent waiver to airfield criteria. No fence shall penetrate the Primary or Approach-Departure Clearance Surfaces.

A14.2.20.2. Maintenance Facilities:

A14.2.20.2.1. Jet Blast Deflectors. Jet blast deflectors are installed where continual jet engine run-up interferes with the parking or taxiing of aircraft, the movement of vehicles, the activities of maintenance personnel, or where it causes the erosion of pavement shoulders. To provide maximum efficiency, jet blast deflectors must be positioned at their optimum distance from the aircraft. They should be located to maintain nominal aircraft taxiing clearance distance. When these clearances cannot be provided, safety procedures in AFI 11-218 for taxiing aircraft near obstacles must be followed.

A14.2.20.2.2. Floodlights. Floodlights illuminate aprons, alert stubs, specialized pads and other paved areas used for aircraft maintenance, loading/unloading, area security, and other reasons. Floodlights are exempt from apron clearance distance criteria. Ensure minimum aircraft wingtip clearance requirements are provided as discussed in Chapter 6. They are not, however, exempt from the vertical restriction imposed by the 7:1 transitional slope. Any deviation from this restriction must be waived, as discussed in Attachment 2.

A14.2.20.2.3. Fire Hydrants. Fire hydrants may be installed within the apron clearance distances discussed in Chapter 6, provided the height is no more than 610 millimeters [24 inches] above the ground. For additional siting criteria and other information on the location of fire hydrants, see MIL-HDBK-1008C.

A14.2.20.2.4. Explosives Safety Barricades. When barricades are an element in an aircraft alert complex, they are exempt from apron clearance distance criteria in Chapter 6. For information on explosives safety standards, see AFMAN 91-201.

A14.2.20.2.5. Ground Support Equipment (Mobile). Mobile ground support equipment is exempt from apron clearance distance criteria in Chapter 6. Examples of ground support equipment exempt under this category are: aerospace ground equipment, electrical carts, forklifts, towbar trailers, fire extinguisher carts, material handling equipment, flightline maintenance stands, and portable floodlights. Similar equipment may be included in this category. When such equipment is not in use, it must be removed from the aircraft parking area and stored in areas that do not violate lateral clearance requirements or other imaginary surfaces. For the purpose of this manual, equipment in use is defined as support equipment in place not more than three hours before aircraft arrival or three hours after aircraft departure.

A14.2.20.2.6. Flightline Vehicles. Flight line vehicles, such as pickup trucks and vans, are exempt from apron clearance criteria. When not required, these vehicles are relocated away from the vicinity of the parked aircraft.

A14.2.20.2.7. Ground Support Equipment (Stationary). Stationary ground support equipment and the associated safety and security components are exempt from apron clearance distance criteria in Chapter 6. Examples of exempt stationary ground support equipment are centralized aircraft support systems and pantograph refueling systems. This allowance also includes markers for petroleum, oils, and lubricants (POL) supply lines, communications and utility lines, and property demarkation. Ensure proper lighting and fire-safety features are included, and such equipment is located at least 230 meters (750 feet) from the runway centerline, and at least 50 meters (162 feet) from taxiway and taxilane centerlines.

A14.2.20.2.8. Crew Chief Shack. This facility, sometimes identified as an Airfield Maintenance Unit, is a trailer or permanent prefabricated structure that may be located at the end of the runway, close to the arm/disarm pad of the apron edge. It may also be located on an area of the apron where it will not be an obstacle to taxiing aircraft. Explosive quantity distance criteria in AFMAN 91-201 applies.

A14.2.20.2.9. Service Roads. Service roads may be located on the perimeter of alert aprons, around specialized aircraft parking pads, and similar apron areas, without adherence to the 38.1 meter [125-foot] apron clearance distance. In locating these roads, the wing overhang of the largest aircraft using the facility must be taken into account. The distance from the pad to the edge of the road is computed from the centerline of the aircraft's path, plus a 15.2 meter [50-foot] wingtip clearance.

A14.2.20.2.10. Fencing and Barricades (Jersey Barriers). Fencing and barricades are erected on airfields for a variety of purposes. Guidance for locating fences and barricades is the same as guidance for locating service roads as discussed in A14.2.20.2.9. No fence shall penetrate the Primary or Approach-Departure Clearance Surfaces, nor the graded area of the Clear Zone.

A14.2.20.2.11. Wildlife Control Devices. Various devices such as propane cannons, sirens, and traps may require siting within the airfield environment for wildlife control. Ensure these devices are sited at least 30.5 meters (100 feet) from the near edge of runways. When sited

along taxiways and aprons, ensure these devices do not pose a hazard to taxiing or towed aircraft and as a minimum, conform to distance and height criteria for airfield signs (see AFMAN 32-1076).

A14.2.20.3. Miscellaneous:

A14.2.20.3.1. Telephone and Fire Alarm Systems. Telephone and fire alarm system boxes may be located on or in the vicinity of aprons without adherence to apron clearance criteria, providing the height of the structure does not constitute an obstruction to taxiing or towed aircraft.

A14.2.20.3.2. Trash Collection Containers. Dumpsters and similar equipment may be located in the vicinity of an apron without adherence to apron clearance criteria, providing the location does not constitute: an obstruction to taxiing or towed aircraft; or, a hazard to pedestrian or vehicular traffic from the debris. These containers must be placed to provide the minimum wingtip clearances provided in Chapter 6.

A14.2.20.3.3. Landscaping Around Flightline Facilities. All trees and shrubs should conform to the height restriction as discussed in A14.2.20.3.1 or must be located to provide the minimum wingtip clearances provided in Chapter 6.

A14.2.20.3.4. Other Apron Facilities. Facilities other than those previously mentioned within this section may require siting within the 38.1 meter (125 ft) apron clearance area due to their function and purpose. In these cases you must ensure wingtip clearance shown in Table 6.1 is provided. Some examples of these type facilities are hangars, washracks, taxi-through alert shelters, air passenger terminals, movable passenger access platforms (jetways), and weather shelters for sentries.

A14.2.20.3.5. Utility Access Points. Utility handholes and manholes should be constructed flush with grade but do not require waiver if the drop-off at the edge of the foundation is 76 millimeters (3 inches) or less.