U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Air Traffic Organization Policy

ORDER
JO 6560.20C

Effective Date:
09/06/2017

SUBJ: Siting Criteria for Automated Weather Observing Systems

This order establishes the siting criteria for automated weather observing systems that provide aviation weather information at airports and heliports. It applies to all federally-owned, as well as, non-federal systems that are to be commissioned by the Federal Aviation Administration (FAA). The Automated Weather Observing Systems include, but are not limited to:

- Automated Weather Observing System (AWOS)
- Digital Altimeter Setting Indicator (DASI)
- Stand Alone Weather System (SAWS)
- Wind Equipment F-420 (WEF)
- Wind Measuring Equipment (WME)
- Surface Weather System (SWS)
- Any other weather equipment providing weather information for aviation purposes

This order also applies to any other weather equipment providing weather information for aviation purposes, including advisory stand-alone, primary, and backup weather equipment. Compliance with this order is required to provide pilots with representative weather information. This order does not apply to the Automated Surface Observation System (ASOS). Refer to the Federal Standard for Siting Meteorological Sensors at Airports (FCM-S4-1994) for ASOS siting guidelines.

Teri L. Bristol
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Distribution: Electronic Initiated By:AJW-144

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Chapter 1. Introduction

1-1. Purpose. This order establishes the siting criteria that are used in the selection of suitable site locations for automated weather observing systems that provide weather information at airports and heliports. This applies to all primary and secondary weather equipment located at airports, heliports, and offshore platforms. Compliance with this order is required to provide pilots with representative weather information. This order implements the standards set forth in the National Oceanic and Atmospheric Administration (NOAA) FCM-S4-1994. However, some additional aviation specific siting requirements have been included. This order must take precedence over FCM-S4-1994 for all FAA applications. This order will be used by the FAA as a basis for developing and implementing specific regulatory or technical documents. The standard applies to all federally-owned and federally-funded systems, as well as non-federal systems that are to be approved by the FAA. Other users of meteorological data exist, and to the greatest practical extent they have been considered in the development of this order as long as it does not adversely impact its primary aviation purpose.

1-2. Audience. This order provides guidance for all personnel responsible for planning, implementation, siting, and accomplishing installation of AWOS.

1-3. Where Can I Find This Order? You can find an electronic copy of this order on the Directives Management System (DMS) website https://employees.faa.gov/tools_resources/orders_notices/. Or go to the MyFAA Employee website, select “Tools and Resources”, then select ‘Orders and Notices’.

1-4. Cancellation. Order 6560.20B, Siting Criteria for Automated Weather Observing Systems (AWOS), dated July 20, 1998, is canceled.

1-5. Exceptions. If systems are installed in accordance with this order, there is a high probability that, as far as location is concerned, the systems will be able to provide the usable information desired. Since desired locations are not always available due to excessive physical or economic reasons, compromises may have to be considered and less than desired locations may have to be selected. If this occurs, it must be understood that the alternative location must still allow the system to provide accurate information. Actual commissioning or approval of an installed site or sensor may be delayed until it functionally demonstrates the validity of the information provided. If the information meets the requirements, it must be commissioned approved. Corrective action will be required if system/sensor information does not demonstrate valid data. This may mean removal of the sensor, correction of whatever is adversely affecting the sensor, or relocation of the sensor or system. Since the desire is to provide accurate and reliable weather information, and since deviation from the standard may result in less than desired results, economic expediency should not be used as the sole basis for acceptance of a less than desired site location.

1-6. Scope. This order is intended to serve as the most fundamental reference for sensor siting. While this order is not of itself regulatory in nature, it is to be implemented through appropriate agency orders. Likewise, this order may be modified or enhanced by agency directives. This order does not require the agency to change existing sensor installations solely to comply with this order. It will be applied as new stations are established. The inclusion and description of a particular sensor in this order does not imply that such sensors will be used in all applications.

In applying this order to the planning of automated weather observing equipment at an airport with a control tower, final siting location must obtain the approval of the control tower manager or flight service station manager, as appropriate. Additionally, FAA District Office (DO) Manager approval is required for the use of any FAA facilities such as power, communications, shelters, towers, etc.

Sensor siting in accordance with this order meets the requirements of Federal Aviation Regulations (FAR) Part 77. An FAA Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) study in accordance with 14 CFR Part 77 of the FAR must be required to determine if the proposed equipment installation is an obstruction to air navigation, navigational facilities/equipment, and communication facilities/equipment.

The standard covers the following weather elements:

- Surface wind speed and direction
- Ambient air temperature
- Dew point temperature/Relative Humidity
- Atmospheric pressure
- Visibility
- Sky condition
- Precipitation type discrimination (rain, snow, drizzle, etc.)
- Precipitation occurrence (Yes/No)
- Freezing precipitation detection
- Precipitation accumulation
- Snowfall-snow depth
- Lightning detection

Refer to the appropriate FAA order for guidance on:

- Shielding and/or venting of sensors, except in general terms
- Special application systems such as those designed to detect low-level wind shear
- Details of grounding, bonding, and lightning protection

Refer to the manufacturers' user's manual for guidance on:

- Details of installation for individual manufacturers' sensors

1-7. Request for Assistance. If a suitable site cannot be located that meets the criteria provided in this order, and all reasonable options have been exhausted, AJW-144 may be contacted to provide further assistance in sensor siting, provide an FAA meteorological study as well as the demonstration of operational/functional validity.

Weather Systems Team (AJW-144)
6500 S. MacArthur Blvd, Bldg. 196
Oklahoma City, OK 73169
Telephone: (405) 954-8427

Chapter 2. Sensor Exposure

2-1. General. Sensor siting must not violate runway or taxiway object free areas, runway or taxiway safety areas, obstacle free zones or instrument flight procedures surfaces as defined in the latest editions of FAA Advisory Circular (AC) 150/5300-13A, Airport Design, or FAA Handbook 8260.3, United States Standard for Terminal Instrument Procedures (TERPS). Notwithstanding these constraints, the sensor exposure must strive to minimize or eliminate the effects of man-made or geographical obstructions. The tower used to mount the wind sensor is not considered an obstruction to the sensor collection system, but it must (with the exception of the temperature, dew point, and pressure sensors) be at least 10 feet (3 meters) away from the other sensors. Sensors should be located as far as practicable from cultivated land to reduce contamination by dust and dirt. It may be necessary to increase the heights of some sensors based on the average maximum snow depth for the location, which must be determined by averaging the maximum annual snow depths over the period of record.

2-2. Pressure Sensor. The pressure sensor will be installed on the airfield, usually in a weatherproof facility (building, shelter, enclosure, etc.). If the pressure sensor is installed indoors, it must be vented to the outside and must utilize a vent header. Siting that will cause pressure variations due to air flow over the venting interface should be avoided. The venting interface must be designed to avoid and dampen pressure variations and oscillations due to "pumping" or "breathing" of the pressure sensor venting and porting equipment. Each sensor must have an independent venting interface from separate outside vents through dedicated piping to the sensors. The sensors should also be located in an area free of jarring, vibration, and rapid temperature fluctuations (i.e., avoid locations exposed to direct sunlight, drafts from open windows, and air currents from heating or cooling systems). If the pressure sensors are sited outdoors, the height of the vent header must not be less than one foot above the average maximum snow depth, or 3 feet (1 meter) above ground level, whichever is higher.

Pressure sensor derived values including altimeter setting, density altitude, and pressure altitude are of critical importance to aviation safety and operations. Great care must be taken to ensure that pressure sensor siting is suitable and accurate. The field and sensor elevations above Mean Sea Level (MSL) elevation must be determined to the nearest whole foot by a qualified surveyor. The distance between the elevation of the pressure sensors and the field elevation must not exceed 100 feet (30 meters). Exceptions to this distance must only be allowed for offshore platforms (chapter 5) that are used for aviation operations, but do not have published instrument approaches direct to the landing area.

2-2.1 Pressure Sensor for Altimeter-Only Systems. The criteria in paragraph 2-2 of this order are applicable to altimeter-only systems, except: (1) The pressure sensor must be installed within 6 nautical miles of the instrument runway threshold, and (2) provided a temperature correction from a properly calibrated temperature source is used in the algorithm used to compute altimeter setting, the elevation difference between the height of the pressure sensors and the field elevation may be increased to 500 feet (150 meters).

2-3. Cloud Height Sensor. This sensor must be mounted on a platform/pedestal with the sensor optics a minimum of 4 feet (1.2 meters) above ground level or above average maximum snow depth. The sensor should be located as far as practicable from strobe lights and other modulated light sources. Exceptions to this distance must only be allowed for offshore platforms (chapter 5) that are used for aviation operations and must **not** have any published instrument approaches direct to the landing area.

2-4. Visibility Sensor. This sensor must be mounted on a platform/pedestal as free as possible from jarring and vibration. Unless otherwise specified by the manufacturer, the lens of the receiver must be pointed in a Northerly direction (See figure 2-1). The sensor should be located as far as practicable from strobe lights and other modulated light sources, as well as clusters of solar panels (farms). The sensor should be located where it will yield readings that are representative of the visibility on the runway. It should not be located in an area that is subject to localized obstructions to vision (e.g., smoke, fog, dust, etc.) nor in an area that is unusually free of obstructions to vision when they are present in the surrounding area. It must be mounted so the optics are 10 ± 2 feet (3 ± 0.6 meters) above ground or 6 feet (2 meters) above the average maximum snow depth, whichever is higher. Keep the area within 6 feet (2 meters) of the sensor free of all vegetation and well drained and any grass or vegetation within 100 feet (30 meters) of the sensor clipped to a height of about 10 inches (25 centimeters) or less. These precautions are necessary to reduce the probability of carbon- based aerosols (e.g., terpenes) and insects from interfering with sensor performance. Forward and backscatter-type sensors must have no obstructions within a horizontal distance of 50 feet (15 meters) that would cause the surrounding air mass to be non-uniform in nature (e.g., buildings). In addition, backscatter-type sensors must have a clear area for 300 feet (90 meters) in the forward (North) octant. Some sensors may require additional clear areas. The clear line of sight requirement for the sensor optics must be as specified by the sensor manufacturer.

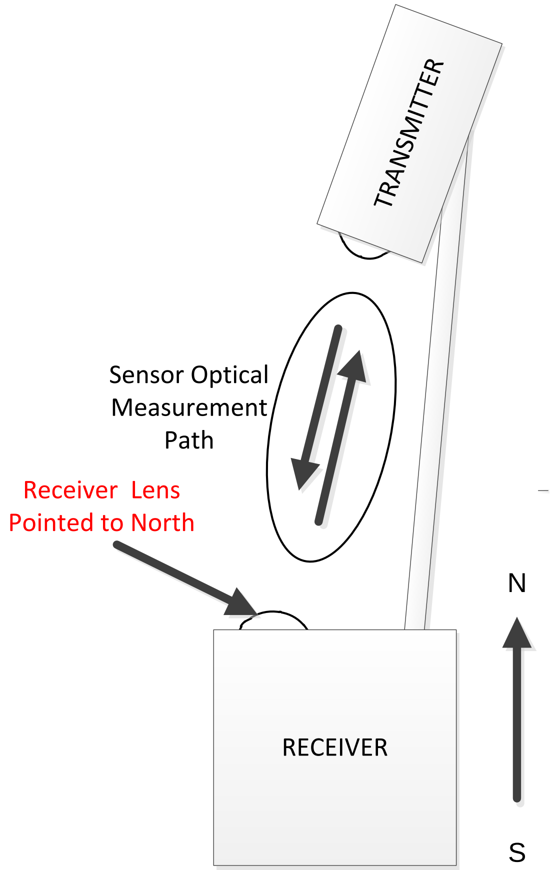

Figure 2-1. Visibility Sensor Alignment to North

2-5. Wind Sensor. The wind sensor (wind speed and wind direction) for AWOS and SWS must be oriented with respect to true North. The surveyor point used to establish the anemometer wind direction orientation must be permanently installed and marked as a reference benchmark for future use. The system software must be used to make required adjustments to magnetic North. The wind sensors (wind speed and wind direction) for SAWS, WEF, WME, and standalone weather equipment must be oriented with respect to magnetic North. The site should be relatively level, but small gradual slopes are acceptable. All alignments listed above are for the wind sensor itself, not the pole or tower.

The sensor must be mounted at 30 to 33 feet (9 to 10 meters) above the average ground height within a radius of 500 feet (150 meters). All obstructions (e.g., vegetation, buildings, etc.) must be at least 15 feet lower than the height of the sensor within the 500 foot radius and be at least 10 feet lower than the height of the sensor from 500 to 1000 feet (see figure 2-2). Where this desired location and clearance is difficult to achieve due to physical or economic reasons, the following definitions should be followed: An object will become a sheltering obstruction if the distance between the sensor and the object is less than ten times the height of the object and the lateral angle from the sensor to the ends of the object exceeds 10 degrees. Sheltering obstructions should be avoided by location choice or removed, if possible. The sensor must also be located such that it is not subject to jet blast from aircraft during engine run-up or taxiing. It must be located such that it is not susceptible to wake vortices from departing or landing aircraft.

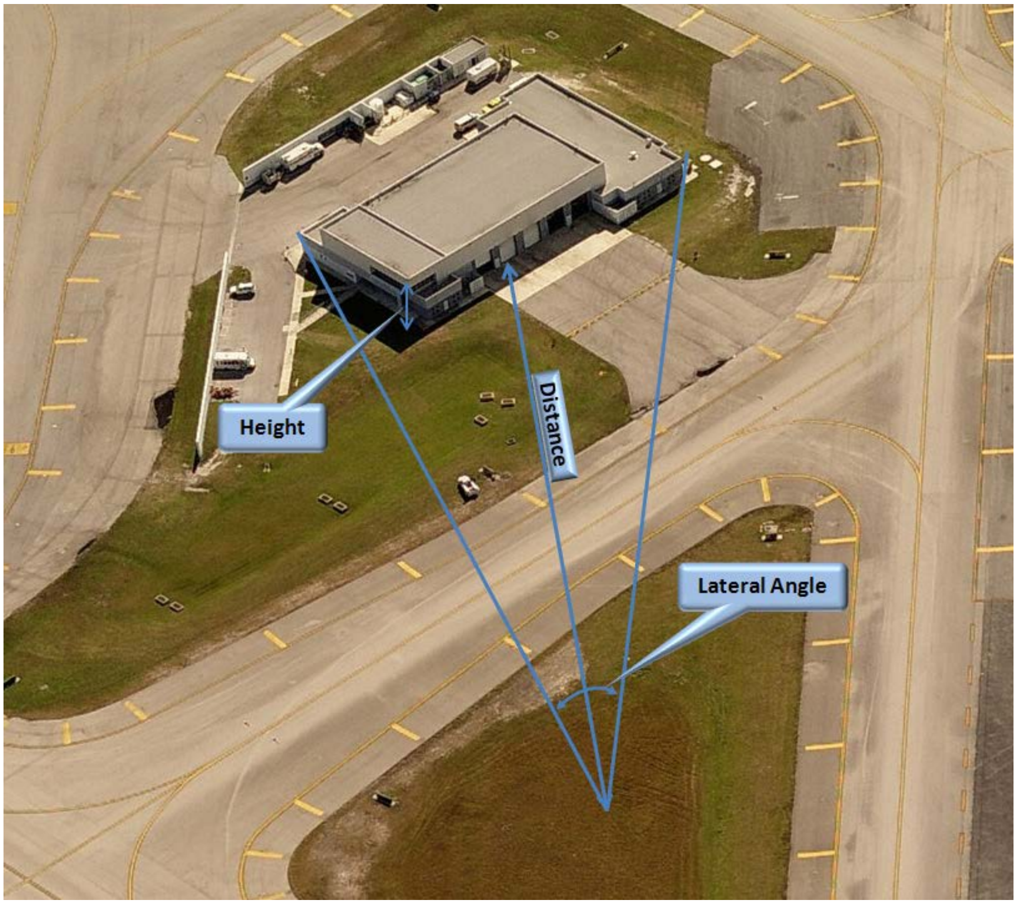

Figure 2-2. Sheltering Obstruction Diagram

Again, if difficult to achieve, a less desirable location may have to be selected; however, after installation, the sensor(s) must demonstrate that accurate and reliable information is being provided. If the wind information is not accurate and reliable, resolution is required. Resolution may require that the sensors be relocated or turned off. Wind sensor mounting on the roof of buildings, including an air traffic control tower (ATCT) should be avoided. Turbulent wind flow is present in the vicinity of rooftops. Engineering a structure on an existing building that would be tall enough to account for such turbulent wind flows would be complicated and costly.

Additional wind sensor siting location information is covered in chapter 3, paragraphs 3-2 and 3-3 of this order.

Instrument Landing System (ILS) Location Exception: The height of a wind sensor installed on the ILS glide slope (GS) antenna tower or on a separate tower in area "A," of figure 2-3, will be reduced, as necessary, such that the height of the complete wind sensor installation (i.e., to include any required air terminal(s) and obstruction lights) does not exceed the height of the glide slope antenna installation. The acceptable height for the wind sensor in this situation is 30 to 33 feet (9 to 10 meters). If side mounting (i.e., perpendicular to a tower) is necessary, a boom must be used to permit installation of the sensor at a minimum of 3 feet (1 meter) laterally from the tower. Side mounting is to be utilized only if top mounting is not practicable and the tower is of open design to allow for free air flow.

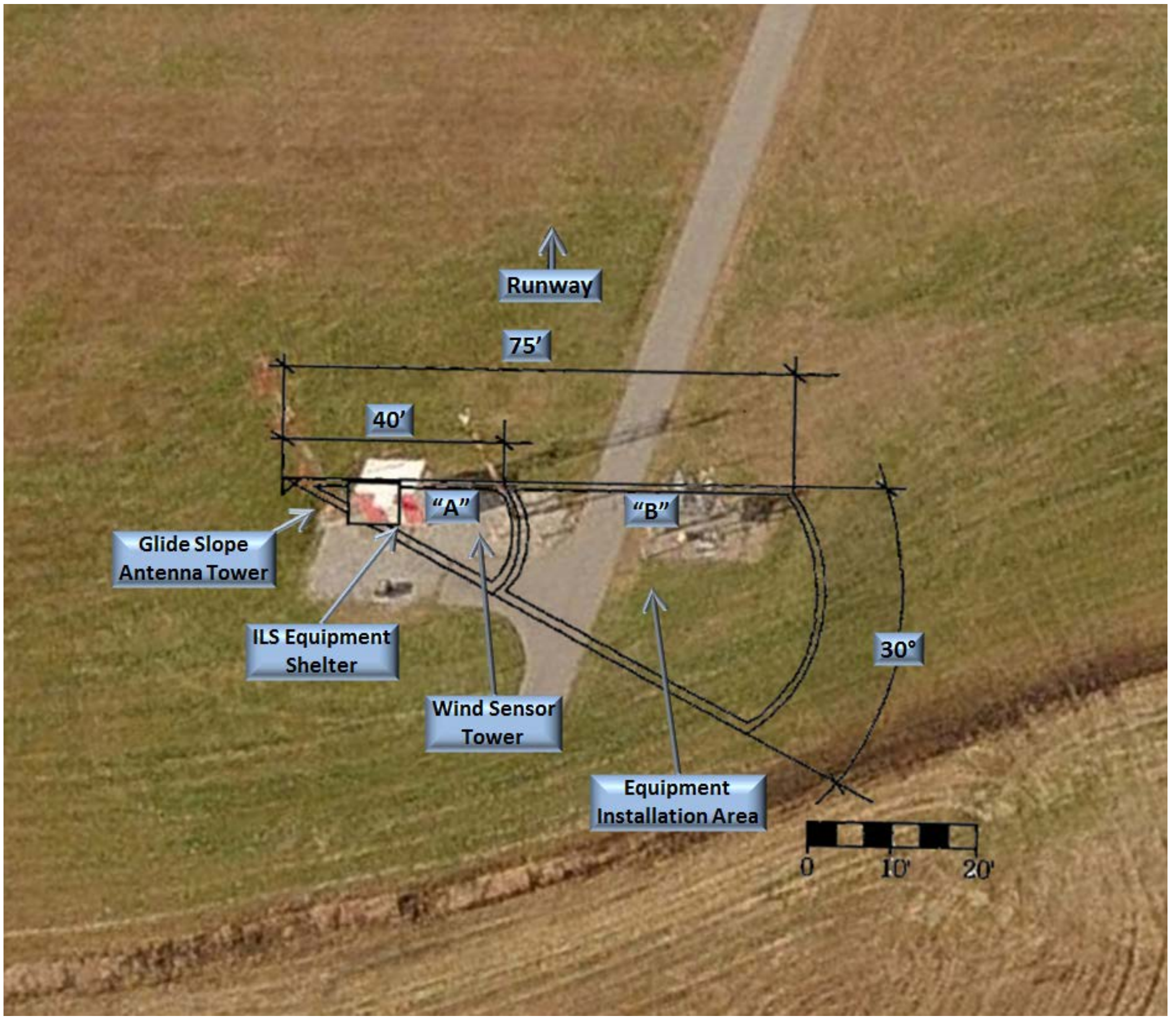

Figure 2-3. Precision Instrument Runway Siting

2-6. Temperature, Dew Point and Relative Humidity Sensors. These sensors must be mounted so that the aspirator intake is 5 ± 1 foot (1.5 ± 0.3 meters) above ground level or 2 feet (0.6 meters) above the average maximum snow depth, whichever is higher. The sensors must be protected from radiation from the sun, sky, earth, and any other surrounding objects, but at the same time, be properly aspirated. The sensors must be installed in such a manner as to ensure that measurements are representative of the free air circulating in the locality and not influenced by artificial conditions such as large buildings, cooling towers, and expanses of concrete and tarmac. Keep any grass and vegetation within 100 feet (30 meters) of the sensor clipped to height of about 10 inches (25 centimeters) or less.

2-7. Lightning Detection (Thunderstorm) Sensor. This sensor must be sited and mounted South in accordance with the manufacturer's recommendations/specifications. For a single station sensor, metal obstructions must be no closer than two times their height above the sensor.

2-8. Precipitation Type Discrimination Sensor. This sensor detects precipitation and discriminates type (e.g., rain, snow). It must be mounted so that the optics are 10 ± 2 feet (3 ± 0.6 meters) above ground or 6 feet (2 meters) above the average maximum snow depth, whichever is higher. Ten feet (3 meters) above ground is the preferred height. If the system is configured with dual heads (transmitter and receiver), the optical axis must be oriented generally North-South with the receiver facing North. The sensor should be located as far as practical from strobe lights and other modulated light sources, as well as clusters of solar panels (farms). The terrain between the receiver and transmitter should be relatively flat. The sensor should be mounted such that the receiver cannot see the transmitted signal of a visibility sensor (paragraph 2-4), if applicable. Since the visibility sensor is required to be oriented North/South, avoid a layout having precipitation type discrimination sensor North or South of the visibility sensor.

2-9. Precipitation Occurrence (Yes/No) Sensor. The precipitation occurrence sensor must be mounted in accordance with the manufacturer's specifications at a convenient height but not less than 6 feet (2 meters) above ground level or 4 feet (1.2 meters) above the average maximum snow depth, whichever is higher. Care must be taken to avoid shielding of the sensor by structures, buildings, and other obstacles.

2-10. Freezing Rain Detection Sensor. The siting requirements for the freezing rain sensor are the same as for the precipitation occurrence sensor.

2-11. Precipitation Accumulation (Liquid or Liquid Equivalent) Sensor. This sensor must be mounted so that the gauge orifice is level and in an area where the terrain is relatively flat. The gauge orifice is defined as the upper rim edge of the collector mouth. The height of the gauge orifice must be as close to ground level as practicable. In determining the height of the gauge orifice, consideration must be given to keeping the gauge orifice above accumulated/drifting snow and minimizing the potential for splashing into the gauge orifice. In operation, the most common gauge orifice height is 1.5 to 5 feet (0.5m to 1.5m).

Surrounding objects must be no closer to the sensor than a distance equal to two times their height above the gauge orifice. An object is considered an obstruction if the included lateral angle from the sensor to the ends of the object is 10 degrees or more (figure 2-2). In order to reduce losses due to wind, an alter-type windshield is recommended to be installed on gauges in areas where 20 percent or more of the annual average precipitation falls as snow. The surrounding ground can be covered with short grass or be of gravel, but a hard flat surface such as concrete gives rise to splashing and should be avoided. Separate sensors may be used to measure liquid and frozen precipitation accumulation (e.g., rain and snow) in which case the above criteria must be followed for each installation.

2-12. Snowfall – Snow Depth Sensor. This sensor must be mounted at least 15 feet (4.5 meters) away from the wind tower over an area which would be expected to have snow cover which is representative of the area of interest. It must be mounted in accordance with manufacturer specifications and recommendations.

2-13. Combination Visibility, Precipitation Occurrence, and Precipitation Accumulation Sensor. The siting requirements for the visibility sensor apply to this combination sensor or any other combinations of the precipitation parameters and visibility.

2-14. Day/Night Sensor. The siting requirements for the visibility sensor apply to this sensor, with the exception of the sensor height. It must be mounted so that the optics are at least 3 feet (1 meter) above ground or 3 feet (1 meter) above the average maximum snow depth, whichever is higher.

Chapter 3. Siting Criteria for Sensor Placement at Airports

3-1. General. This chapter provides criteria for placement of sensors at airports based upon runway category (i.e., visual/non-precision, precision without Runway Visual Range (RVR) instrumentation, and precision with RVR instrumentation). Special care is necessary in selecting appropriate locations for installation of sensors to assure that the resultant observations are representative of the meteorological conditions affecting aviation operations.

> **Note:** No sensor siting must violate runway or taxiway object free areas, runway or taxiway safety areas, obstacle free zones, or instrument flight procedures surfaces defined in the latest editions of AC 150/5300-13A, Airport Design, or FAA Handbook 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

Users of these criteria should consider future plans for the airport that could impact placement of sensors. Such plans would include the addition or removal of precision approaches, RVR instrumentation, runway construction, building construction (e.g., aircraft hangars, etc.). Additionally, users should consider future vegetation growth when determining their impact as an obstruction. The siting environment that is agreed upon at the time of installation must be maintained for the life cycle of the system.

Reliable power availability, telecommunication line distance, and other factors should also be considered when siting automated weather observing systems.

3-2. Cloud Height, Visibility, Wind, Temperature, Dew Point, and Precipitation Sensors. These sensors (cloud height, visibility, wind, temperature, dew point, and precipitation) should be located together. However, the temperature, dew point, and precipitation sensors can be placed at any convenient location on the airport that meets the sensor exposure criteria outlined in chapter 2. The visibility sensor must not be located in known areas of concentrated local ground fog. These would include river banks, lake shores, and other locations where at certain times of the year, a small, very localized fog pocket appears that is not an indicator of the overall weather in the area, and does not obscure the runway.

3-2.1. Airports with Only Visual and/or Non-Precision Runways. The preferred siting of the cloud height, visibility and wind sensors is adjacent to the primary runway 1,000 feet (300 meters) to 3,000 feet (900 meters) down runway from the threshold (see figure 3-1). The primary runway is considered to be the runway with the lowest minimums. The minimum distance perpendicular from the runway centerline must be 500 feet (150 meters). The maximum distance perpendicular from the runway centerline must not exceed 1,000 feet (300 meters). The minimum distance of 500 feet (150 meters) assumes flat terrain. If the elevation of the wind sensor site is above or below the runway elevation, the minimum distance is adjusted by 7 feet for every foot of elevation difference. The adjustment is negative (i.e., the minimum distance is less than 500 feet) if the sensor site elevation is less than the runway elevation. The adjustment is positive (i.e., the minimum distance is greater than 500 feet) if the sensor site elevation is greater than the runway elevation. This preferred siting should be appropriate for most airports with only visual and/or non-precision runways. Should this siting prove to be unnecessarily restrictive, the cloud height, visibility, and wind sensors may be sited at an alternate location on the airport provided the alternate location:

a. Is approved by an FAA OE/AAA study and an FAA meteorological study when the minimum distance perpendicular from runway centerline less than 500 feet.

b. Results in observations that are representative of the touchdown zone of the primary runway.

c. Meets the sensor exposure criteria outlined in chapter 2.

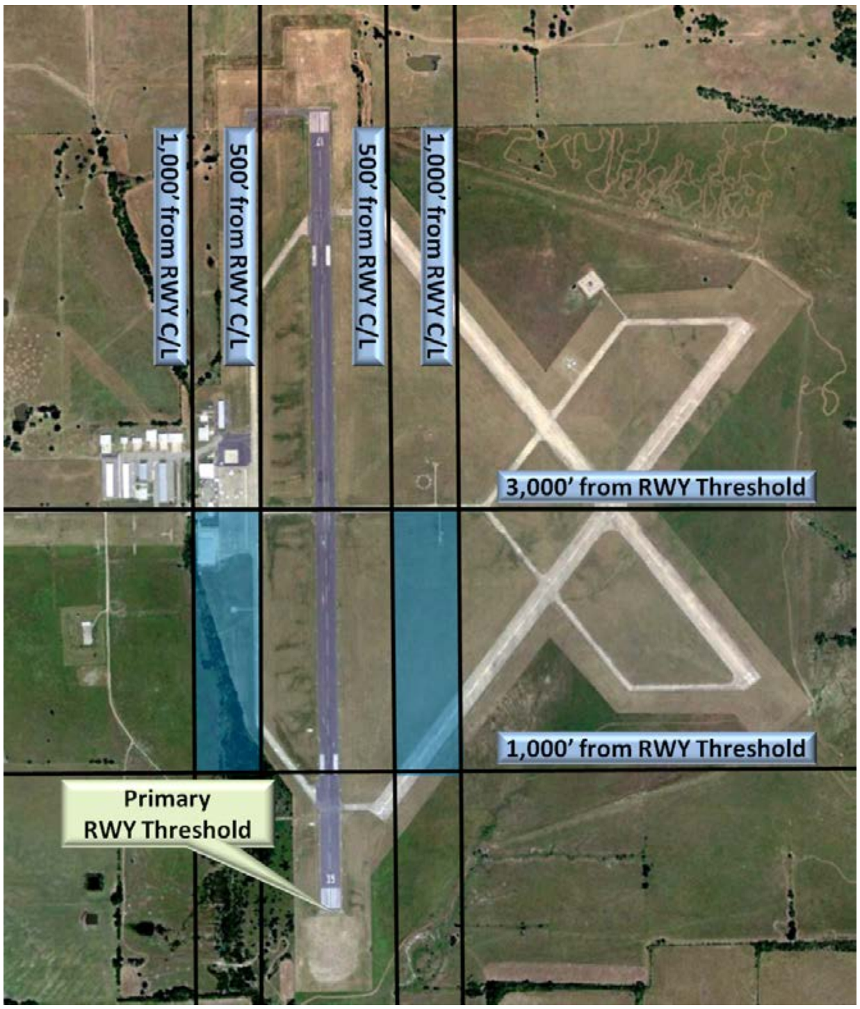

Figure 3-1. Siting Criteria for Airports with Only Visual and/or Non-Precision Runways

3-2.2. Airports with Precision Instrument Runways without RVR Instrumentation. There are two preferred options for siting at these airports.

3-2.2.1. Option 1. The cloud height, visibility, and wind sensors must be located adjacent to the primary instrument runway 1,000 feet (300 meters) to 3,000 feet (900 meters) down runway from the threshold. The minimum distance perpendicular from runway centerline must be 750 feet (230 meters). The maximum distance perpendicular from runway centerline must not exceed 1,000 feet (300 meters). The minimum distance of 750 feet (230 meters) assumes flat terrain. If the elevation of the wind sensor site is above or below the runway elevation, the minimum distance is adjusted by 7 feet for every foot of elevation difference. The adjustment is negative (i.e., the minimum distance is greater than 750 feet) if the sensor site elevation is greater than the runway elevation.

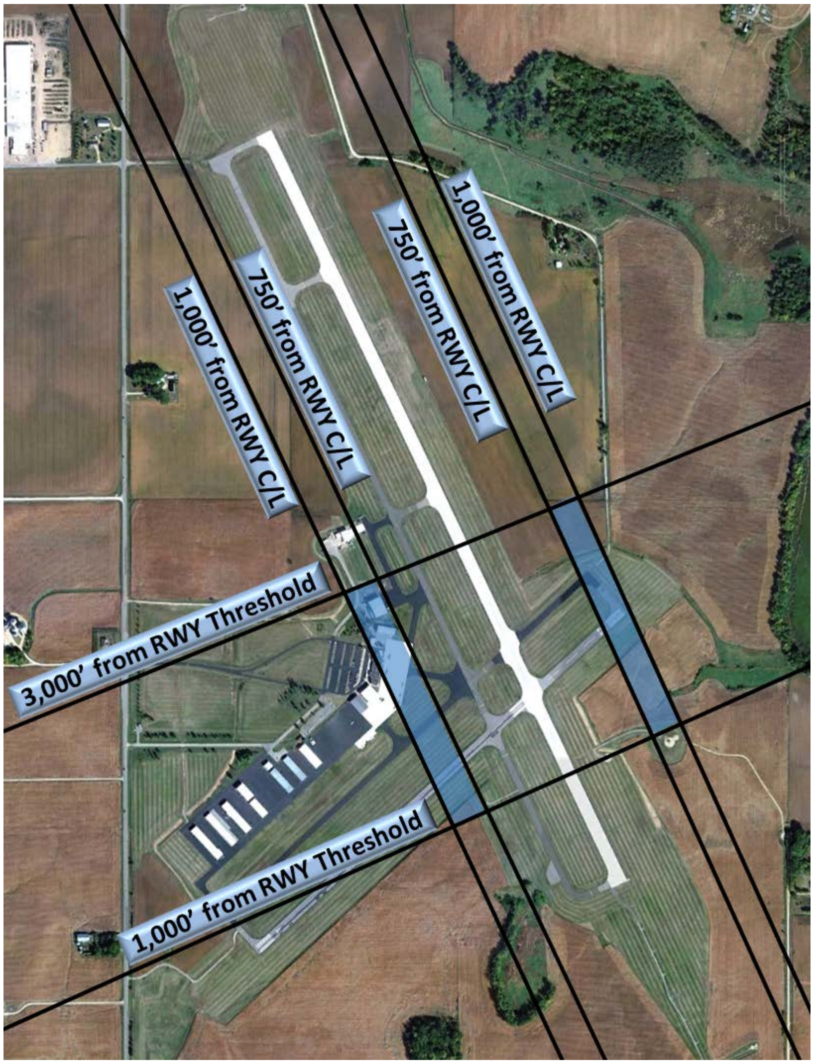

Figure 3-2. Siting Criteria for Airports with Precision Runways without RVR

3-2.2.2. Option 2. The cloud height and visibility sensors must be located behind the glide slope shelter/Microwave Landing System (MLS) elevation station used for the primary precision instrument runway (area "B", figure 2-3).

The wind sensor must be located either on the glide slope antenna tower or on a separate tower. The preferred location is on a separate tilt down style tower as this eliminates the potential safety and interference concerns caused by a fixed glide slope tower. This option must be implemented at airports that have FAA Technical Operations System Specialists available and must not be relocated as a result of remote maintenance monitoring. Under no conditions must anyone have access to an FAA glide slope antenna tower without an FAA specialist present. When mounted on the glide slope antenna tower, the wind sensor must: (1) not extend above the top of the tower, (2) be mounted on a boom a minimum of 3 feet (1 meter) laterally from the tower, (3) be a minimum of 3 feet vertically from any antenna, and (4) be mounted on the side of the tower opposite from the glide slope antenna face.

If joint use of the glide slope antenna tower is not practical, a separate wind sensor tower must be installed immediately behind the glide slope antenna tower (area "A", figure 2-3). The height of the complete installation (i.e., tower plus air terminal(s) and obstruction lights) must not exceed the height of the glide slope antenna tower when installed in this area.

Exceptions: Sensors must not be sited in area "A" or "B", figure 2-3, if the glide slope installation is in violation of a runway or taxiway object free area, runway or taxiway safety area, obstacle free zone, or instrument flight procedures surface as defined in AC 150/5300-13A, Airport Design, or FAA Handbook 8260.3, United States Standard for Terminal Instrument Procedures (TERPS). An FAA OE/AAA aeronautical study must be performed if the glide slope installation is decommissioned or relocated subsequent to the siting of the sensors in areas "A" and "B", figure 2-3.

One of the above options should be appropriate for most airports with precision instrument runways and without RVR instrumentation. Should both options prove to be unnecessarily restrictive, the cloud height, visibility, and wind sensors may be sited at an alternate location on the airport provided the alternate location:

a. Is approved by an FAA OE/AAA study and an FAA meteorological study when the minimum distance perpendicular from runway centerline less than 750 feet.

b. Results in observations that are representative of the touchdown zone of the primary runway.

c. Meets the sensor exposure criteria outlined in chapter 2.

However, in no case must the site selected result in a violation of a runway or taxiway object free area, runway or taxiway safety area, obstacle free zone, or instrument flight procedures surface as described in AC 150/5300-13A, Airport Design, or FAA Handbook 8260.3, United States Standard for Terminal Instrument Procedures (TERPS).

3-2.3. Airports with Precision Instrument Runways with RVR Instrumentation. The cloud height, visibility, and wind sensors must be sited at a location on the airport that will assure the resultant observations are representative of the meteorological conditions affecting aviation operations, and that meets the sensor exposure criteria outlined in chapter 2.

3-3. Wind Only Systems. The wind sensor must be sited at a location on the airport that will assure the resultant observations are representative of the meteorological conditions affecting aviation operations, and that meets the sensor exposure criteria outlined in chapter 2.

3-4. Pressure Sensor. The pressure sensor is not functionally constrained to be at any specific location and may be located anywhere on the airport that meets the exposure requirements in chapter 2, paragraph 2-2 of this order.

3-5. Lightning Detection (Thunderstorm) Sensor. The single station detection sensor must be installed at any location on the airport that meets the requirements of chapter 2, paragraph 2-7 of this order.

3-6. Non-Airport Locations. Any automated weather observing system, used for aviation purposes that are located at a non-airport location must be sited per the same guidance as for airport locations.

Chapter 4. Heliport Siting Criteria

4-1. Non-Airport Heliport Siting Criteria. Automated weather observing system installations at non-airport heliport locations must place the sensors in the vicinity of the takeoff and landing area. Equipment should also be placed where helicopter operations will not influence the environment by causing transient sensor performance (e.g., rotor downwash and blowing dust causing spurious wind and visibility observations). In addition, the installation must not penetrate the approach and departure surfaces defined in the latest editions of FAA Handbook 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), or the surfaces defined in AC 150/5390-2, Heliport Design. In choosing a location, consideration must be given to both Visual Flight Rules (VFR) and Instrument Flight Rules (IFR) approach and departure paths and hover/taxi operations. Another prime concern is the need to locate the sensors so as to avoid, to the maximum extent possible, conditions (sheltering and other local influences) which may result in unrepresentative weather observations. This may be a particular problem for heliports located in urban areas and on rooftops. The sensors, except the pressure sensors, should be located no more than 700 feet (215 meters) from the edge of the takeoff and landing area. The pressure sensor is not constrained to be at any specific location on the heliport, except to be free of rotor-induced or other pressure variations.

4-2. Pressure Sensor. Same as for airports, except the height above or below MSL must be determined for the heliport takeoff and landing area.

4-3. Sensors in the Vicinity of Takeoff and Landing Areas. The sensors for cloud height, visibility, wind, temperature/dew point, precipitation, lightning detection (thunderstorm) must be sited as indicated in paragraphs 4-3.1 through 4-3.6.

4-3.1. Cloud Height Sensor. The sensor location is the same as for airports except the sensor height.

4-3.1.1. Cloud Height Sensor at Ground Based Heliports. The cloud height must be reported with respect to ground level.

4-3.1.2. Cloud Height Sensors at Rooftop Heliports. The cloud height must be reported with respect to ground level.

4-3.2. Visibility Sensor. The sensor location is the same as for airports, except the height is with respect to the takeoff and landing area. To reduce the influence of dust due to rotor-wash, the visibility sensor should not be sited in a location which is downwind (considering the prevailing wind direction) from the takeoff and landing area.

4-3.3. Wind Sensor. This sensor must be oriented with respect to true North. AWOS system software is used to make required adjustments to magnetic North. If side mounting on a tower is necessary, a boom must be used to permit installation of the sensor a minimum of 3 feet (1 meter) laterally from the tower. Side mounting is to be utilized only if top mounting is not practical and the tower is of open design to allow for free air flow.

4-3.3.1. Wind Sensor at Ground Level Heliports. The sensor must be mounted 30-33 feet (9 to 10 meters) above the heliport takeoff and landing area. The wind sensor should be located to the side of the preferred approach and departure track. The sensor should be located away from the sheltering influence of buildings or large trees in accordance with chapter 2, paragraph 2-5 of this order.

4-3.3.2. Wind Sensors at Rooftop Heliports. The wind sensor on a building or other elevated structure should be located at least 20 feet (6 meters) above the highest structure to minimize interference from turbulent wind flow. Rooftop size may require siting the wind sensor elsewhere to preclude penetration of an obstacle identification surface(s). In these situations, siting on an adjacent building may be a viable or even preferred option. It should be noted that many buildings are constructed to the maximum height that would not constitute a hazard to air navigation. Therefore, the above described siting may not be acceptable from an obstruction evaluation standpoint. In these cases, alternatives such as siting on an adjacent building may be necessary.

4-3.4. Temperature, Dew Point, and Relative Humidity Sensors. The sensor location is the same as for airports, except the height is with respect to the takeoff and landing area.

4-3.5. Precipitation Sensor(s). The sensor location is the same as for airports, except the height is with respect to the takeoff and landing area. This guidance applies to precipitation type discrimination sensors, precipitation occurrence (yes/no) sensors, freezing rain detection sensors, precipitation accumulation (liquid or liquid equivalent sensors), and snow depth sensors.

4-3.6. Lightning Detection (Thunderstorm) Sensor. The sensor location is the same as for airports (see paragraph 2-7 of this order).

4-4. Airport Heliport Siting Criteria. When an automated weather observing system is to be sited at an airport which has, or is planned to have a heliport, a site should be chosen which will provide service to both runway and heliport users.

Chapter 5. Offshore Platform Siting Criteria

5-1. General. Due to the extremely limited space on many elevated helipads and offshore platforms, it will be very difficult to meet all siting requirements highlighted in chapter 4. Every effort should be made to alleviate as many as possible. It is critical that all sensors adhere to the mounting height criteria defined in chapter 2. Failure to do so may result in the sensors interfering with each other or becoming adversely effected by the surroundings.

Installation of automated weather observing systems on offshore platforms must place the sensors such that they are representative of the takeoff and landing area, and where helicopter operations will not induce transient sensor performance (e.g., rotor downwash and blowing dust causing spurious wind and visibility observations). However, no installation must penetrate the approach and departure surfaces defined in the latest editions of FAA Handbook 8260.3, United States Standard for Terminal Instrument Procedures (TERPS), or the surfaces defined in AC 150/5390-2, Heliport Design. In choosing a location, consideration must be given to both VFR and IFR approach and departure paths and hover/taxi operations. Another prime concern is the need to locate the sensors so as to avoid, to the maximum extent possible, conditions (sheltering and other local influences) which may result in non-representative weather observations. The sensors, except the pressure sensors, should be located no more than 700 feet (213 meters) from the edge of the takeoff and landing area. The pressure sensor is not constrained to be at any specific location on the heliport, except to be free of rotor-induced or atmospheric influences.

5-2. Pressure Sensors. Same siting criteria as for siting at airports, except the height above or below MSL must be determined for the heliport takeoff and landing area. Every effort should be made to place the sensor in a location that is not subject to excessive vibration (e.g., near motors, generators, etc.). The Sensor should be placed away from engine exhausts, as large temperature variations can affect pressure readings and subsequent altimeter readings. Avoid placing the sensor in a location susceptible to sea spray or other airborne particulates. This could cause the pressure port to become clogged and cause false pressure readings. The sensor should be located such that an accurate measurement of sensor elevation (above mean sea level) can be made.

5-3. Sensors in Vicinity of Takeoff and Landing Area. Cloud height, visibility, wind, temperature/dew point, precipitation, lightning detection (thunderstorm) sensors must be sited as indicated in paragraphs 5.3.1 through 5.3.6.

5-3.1. Cloud Height Sensor. The cloud height sensor location is the same as for siting at airports, except for the sensor height. The cloud height must be reported with respect to mean sea level. Ensure that the cloud height sensor is mounted in a location with an open view of the sky. No portion of the platform should hang over the sensor (temporary or permanent). Avoid siting the sensor in a location where helicopter blades could be spinning above or parked for an extended period of time. The sensor must be placed away from any engine exhausts. Failure to do so may result in erroneous cloud height readings. In addition, residue from exhaust, sea spray and other airborne particulates may adhere to the sensor requiring more frequent cleaning.

5-3.2. Visibility Sensor. The visibility sensor location is the same as for siting at airports, except the height is with respect to the takeoff and landing area. To reduce the influence of dust due to rotor wash on the reported visibility, the visibility sensor should not be sited in a location which is downwind (considering the prevailing wind direction) from the takeoff and landing area. Sensor must be placed away from any engine exhausts. Failure to do so may result in erroneous visibility readings. In addition, residue from exhaust and sea spray will adhere to the sensor requiring more frequent cleaning. Avoid placing the sensor in a location that may be hit with sea spray or other airborne particulates. Every effort should be made to place the sensor in a location that is not subject to a large amount of vibration. Vibration can cause problems with false readings, sensor calibration, and alignment. Solar radiation from reflective surfaces may affect the visibility sensor and should be avoided if possible. Avoid placing the sensor in areas near large solid sections of the platform. Large sections of the metal platform, particularly dark in color, will absorb solar radiation. The heating of this platform will result in thermal currents that may affect the performance of the visibility sensor. Strobe lights or platform work lights may affect the visibility sensor, as well as the day/night indicator on the visibility sensor. Place the sensor as far as practical from these lights. No lights should be in the direct view of the sensor's detector.

5-3.3. Wind Sensor. This sensor must be oriented with respect to true North. AWOS system software is used to make required adjustments to magnetic North. Every effort must be made to mount the wind sensor 20-33 feet (6-10 meters) above the heliport takeoff and landing area. If side mounting on a tower is necessary, a boom must be used to permit installation of the sensor a minimum of 3 feet (1 meter) laterally from the tower. Side mounting is to be utilized only if top mounting is not practicable and the tower is of open design to allow for free air flow. The sensor should be placed in an area to minimize the effects from the structure itself.

The wind sensor should be located on the upwind side of the structure (from the prevailing wind), if possible. The sensor should be placed in an area to minimize the effects from rotor wash from helicopters and sheltering by platform structures. Every effort must be made to place the sensor at least 100 feet, or as far as practical from potential rotor wash. The sensor should be located as close to the elevation of the helipad as possible. Large variations in wind speed and direction are likely from the base of the offshore platform to the top. This will be especially true during inclement weather with rough seas. If side mounting on the platform is necessary, then a boom should be used to mount the sensor a minimum of 3 feet laterally from the platform. This should only occur if the structure surrounding the sensor is open in design allowing for the free flow of air. The sensor should be located away from the sheltering influence of structures in accordance with paragraph 2-5 of this order.

5-3.4. Temperature, Dew Point, and Relative Humidity Sensors. The temperature and dew point sensor location is the same as for siting at airports, except the height is with respect to the heliport takeoff and landing area. Sensor must be placed away from any engine exhausts. Failure to do so will result in erroneous temperature and dew point readings. Avoid placing the sensor in areas near large solid sections of the platform. Large sections of the metal platform, particularly dark in color, will absorb solar radiation. Placing the sensor near or above this area will result in erroneous temperature/dew point readings. Avoid placing the sensor in a location that may susceptible to sea spray to avoid the impact from evaporative cooling processes ("wet bulb" effects). Avoid placing the sensor in an area shaded by the structure itself.

5-3.5. Precipitation Sensor(s). The precipitation sensor location is the same as for siting at airports, except the height is with respect to the heliport takeoff and landing area. Every effort must be made to minimize the effect of sea spray on the precipitation sensor. Avoid placing the sensor near any equipment (e.g., air conditioner) susceptible to condensation. Every effort should be made to place the sensor in a location that is not subject to a large amount of vibration (near motors, generators, etc.). Failure to do so may cause "tipping bucket" style precipitation gauges to falsely tip resulting in erroneous precipitation amounts. Ensure that the precipitation sensor is mounted in a location with an open view of the sky. This guidance applies to precipitation type discrimination sensors, precipitation occurrence (yes/no) sensors, freezing rain detection sensors, precipitation accumulation (liquid or liquid equivalent sensors), and snow depth sensors.

5-3.6. Lightning Detection (Thunderstorm) Sensor. The lightning detection (thunderstorm) sensor location is the same as for siting at airports (see paragraph 2-7 of this order.)

5-4. Infrastructure Volatility. The physical environment on an offshore platform is significantly constrained compared to land-based heliports (See figure 5-1). Site conditions can and will change. Change of ownership generally means platform modifications can be expected; oil derricks may be installed to support platform drilling operations. Additional living quarters or structures can be installed adjacent to existing automated weather observing systems. Installation of cranes and other equipment (e.g. Heating, Ventilation, and Air Conditioning (HVAC) equipment, engine generators) can adversely affect the performance of existing equipment. Installations of automated weather observing systems at offshore platforms need to be constantly monitored for changes to platform infrastructure, prolonged periods of weather sensor anomalies, not explainable by sensor or system failure. It may be useful to maintain an on-site historical record of the automated weather observing system complete with platform information and photographs. Changes to the environment in which the equipment is located will require the verification of siting order compliance.

Figure 5-1. Offshore Platform

Appendix A. Administrative Information

A-1. Distribution. This order will be distributed electronically.

A-2. Other Links to this Order.

a. On the Technical Library website at: http://nas.amc.faa.gov/phoenix/views/technicalLibrary.xhtml?c=ORDER.

b. The Air Traffic System Specialists (ATSS) and all administrative personnel must subscribe to the Auto-Notifications Services for electronic library release notifications at http://technet.faa.gov/. This document can be printed for local use as required.

A-3. Referenced Documents. The latest edition of FAA Handbooks, Orders, and other governmental documents that apply to the requirements, guidance, and procedures referenced in the order are:

a. Federal Standard for Siting Meteorological Sensors at Airports (FCM-S4-1994).

b. Federal Aviation Regulations (FAR) Part 77.

c. FAA Obstruction Evaluation /Airport Airspace Analysis (OE/AAA) Study.

d. FAA Advisory Circular (AC) 150/5300-13A, Airport Design.

e. FAA Handbook 8260.3 United States Standard for Terminal Instrument Procedures (TERPS).

f. FAA Advisory Circular (AC) 150/5390-2, Heliport Design.

A-4. Acronyms.

AC	Advisory Circular
ASOS	Automated Surface Observation System
ATCT	Air Traffic Control Tower
ATSS	Air Traffic System Specialist
AWOS	Automated Weather Observing System
CFR	Code of Federal Regulations
DASI	Digital Altimeter Setting Indicator
DO	District Office
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
GS	Glide Slope
HVAC	Heating, Ventilation, and Air Conditioning
IFR	Instrument Flight Rules
ILS	Instrument Landing System
MLS	Microwave Landing System
MSL	Mean Sea Level
NOAA	National Oceanic and Atmospheric Administration
OE/AAA	Obstruction Evaluation/Airport Airspace Analysis
RVR	Runway Visual Range
SAWS	Stand Alone Weather System
SWS	Surface Weather System
TERPS	Terminal Instrument Procedures
VFR	Visual Flight Rules
WEF	Wind Equipment – F-400 Series
WME	Wind Measuring Equipment