AIP

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AMENDMENT 2

14 FEBRUARY 2008

CONSULT NOTAM FOR LATEST INFORMATION

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

AIP Amendment 2

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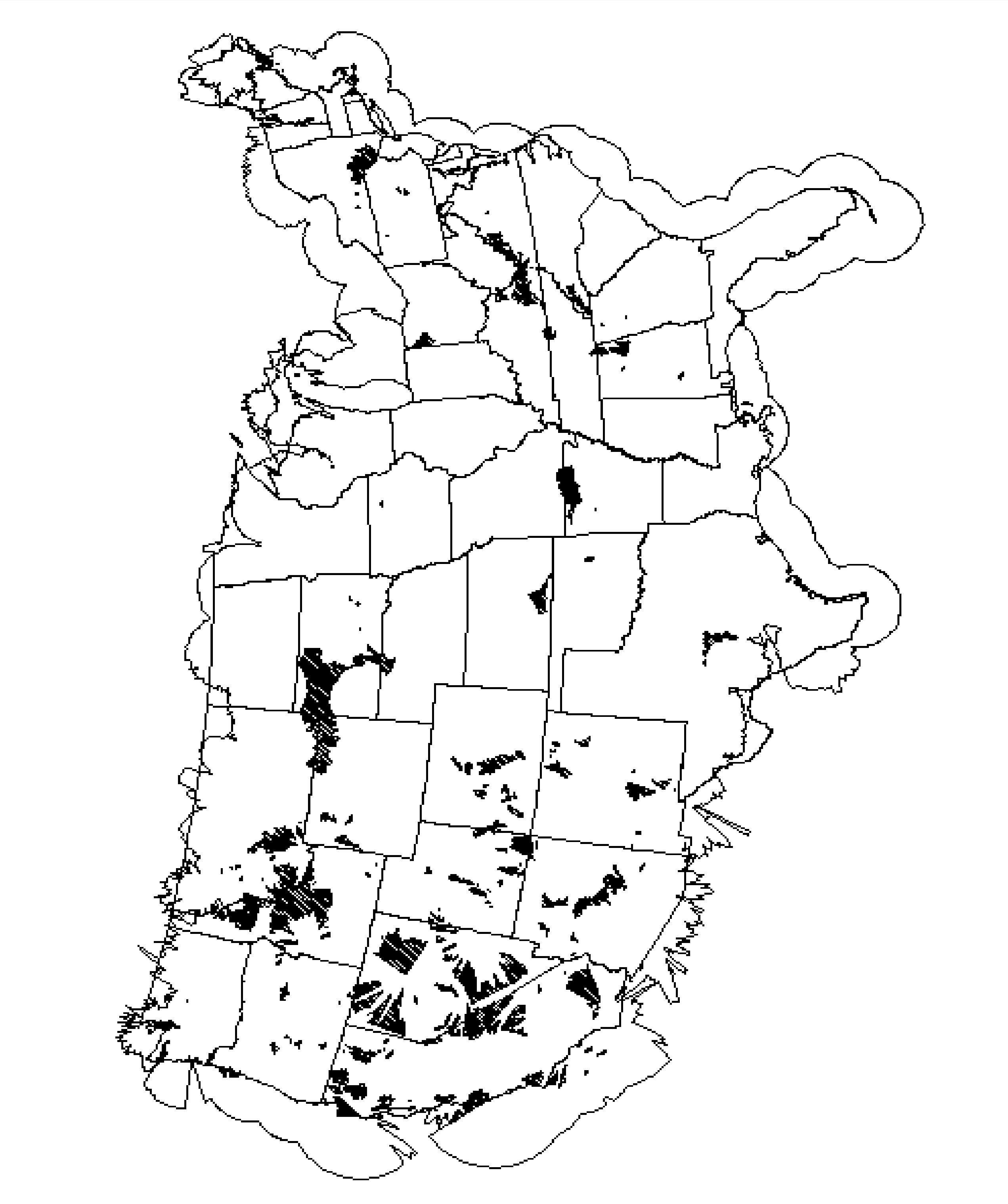
GEN 0.5 List of Hand Amendments to the AIP - Not applicable

FIG GEN 3.5-2

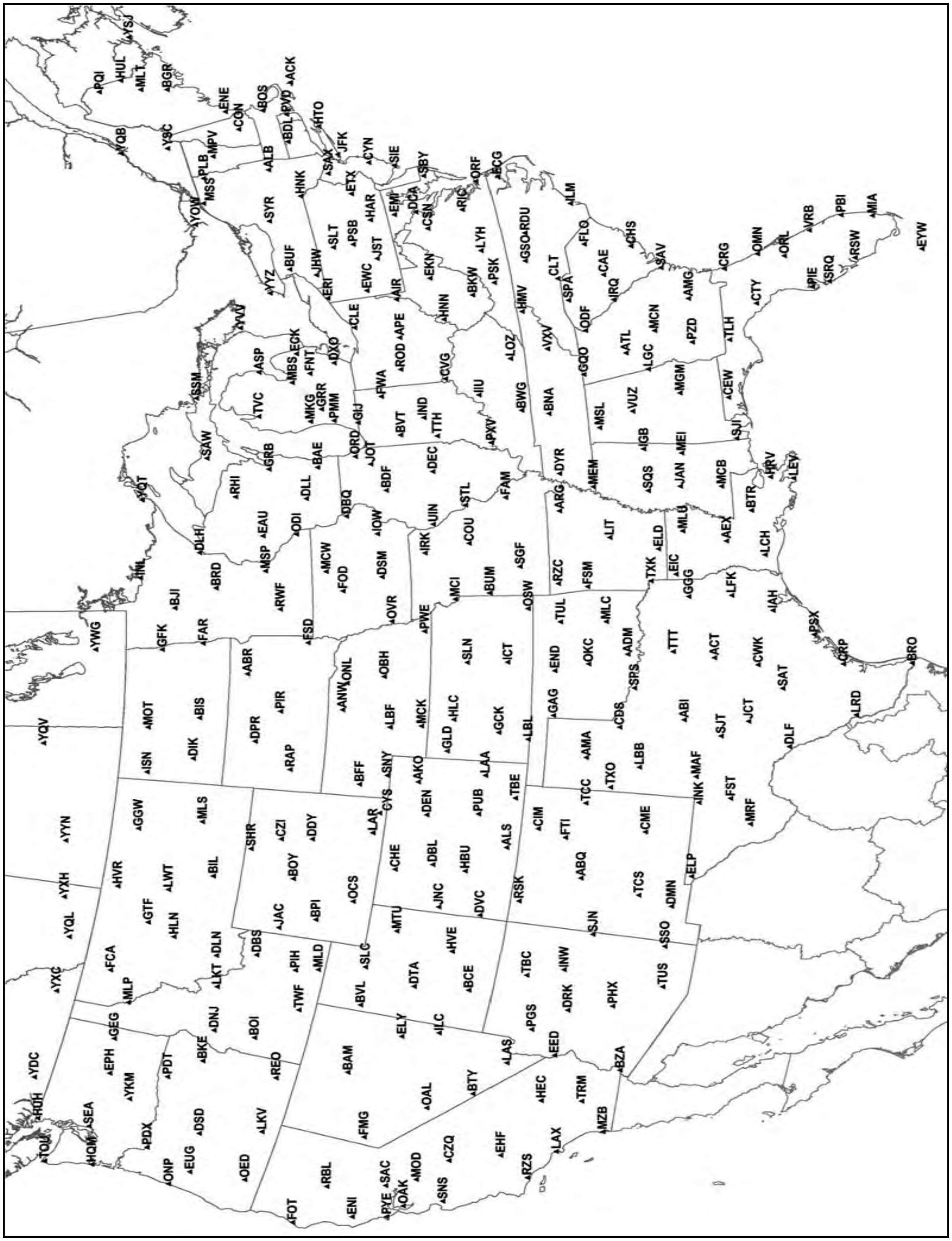
EFAS Radio Coverage Areas



NOTE-

EFAS radio coverage at 5000 feet AGL. The shaded areas depict limited coverage areas in which altitudes above 5000 feet AGL would be required to contact EFAS.

FIG GEN 3.5-3
Inflight Advisory Plotting Chart



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ENR 0.2 Record of AIP Amendments – See GEN 0.2-1

ENR 0.3 Record of AIP Supplements – Not applicable

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ENR 0.5 List of Hand Amendments to the AIP - Not applicable

42.7.5.2 If ATC has assigned an airspeed, aircraft shall adhere to the ATC assigned airspeed and shall request ATC approval before making any change thereto. If it is essential to make an immediate temporary change in the Mach number (e.g., due to turbulence), ATC shall be notified as soon as possible. If it is not feasible, due to aircraft performance, to maintain the last assigned Mach number during an en route climb or descent, advises ATC at the time of the request.

42.7.6 Controller (In Oceanic Class A and E Airspace)

42.7.6.1 Assigns airspeed when necessary for separation of aircraft to comply with 14 CFR, ICAO regulations and procedures, or letters of agreement.

42.8 Traffic Advisories (Traffic Information)

42.8.1 Pilot

42.8.1.1 Acknowledges receipt of traffic advisories.

42.8.1.2 Informs controller if traffic is in sight.

42.8.1.3 Advises ATC if a vector to avoid traffic is desired.

42.8.1.4 Does not expect to receive radar traffic advisories on all traffic. Some aircraft may not appear on the radar display. Be aware that the controller may be occupied with high priority duties and unable to issue traffic information for a variety of reasons.

42.8.1.5 Advises controller if service is not desired.

42.8.2 Controller

42.8.2.1 Issues radar traffic to the maximum extent consistent with higher priority duties except in Class A airspace.

42.8.2.2 Provides vectors to assist aircraft to avoid observed traffic when requested by the pilot.

42.8.2.3 Issues traffic information to aircraft in Class D airspace for sequencing purposes.

42.9 Safety Alert

42.9.1 Pilot

42.9.1.1 Initiates appropriate action if a safety alert is received from ATC.

42.9.1.2 Be aware that this service is not always available and that many factors affect the ability of the controller to be aware of a situation in which unsafe proximity to terrain, obstructions, or another aircraft may be developing.

42.9.2 Controller

42.9.2.1 Issues a safety alert if aware an aircraft under their control is at an altitude which, in the controller's judgment, places the aircraft in unsafe proximity to terrain, obstructions, or another aircraft. Types of safety alerts are:

a) **Terrain/Obstruction Alerts.** Immediately issued to an aircraft under their control if aware the aircraft is at an altitude believed to place the aircraft in unsafe proximity to terrain/obstruction.

b) **Aircraft Conflict Alerts.** Immediately issued to an aircraft under their control if aware of an aircraft not under their control at an altitude believed to place the aircraft in unsafe proximity to each other. With the alert, they offer the pilot an alternative if feasible.

42.9.2.2 Discontinues further alerts if informed by the pilot action is being taken to correct the situation or that the other aircraft is in sight.

42.10 See and Avoid

42.10.1 Pilot

42.10.1.1 When meteorological conditions permit, regardless of type of flight plan or whether or not under control of a radar facility, the pilot is responsible to see and avoid other traffic, terrain, or obstacles.

42.10.2 Controller

42.10.2.1 Provides radar traffic information to radar identified aircraft operating outside positive control airspace on a workload permitting basis.

42.10.2.2 Issues a safety advisory to an aircraft under their control if aware the aircraft is at an altitude believed to place the aircraft in unsafe proximity to terrain, obstructions or other aircraft.

42.11 Visual Approach

42.11.1 Pilot

42.11.1.1 If a visual approach is not desired, advises ATC.

42.11.1.2 Complies with controller's instructions for vectors toward the airport of intended landing or to a visual position behind a preceding aircraft.

42.11.1.3 The pilot must, at all times, have either the airport or the preceding aircraft in sight. After being cleared for a visual approach, proceed to the airport in a normal manner or follow the preceding aircraft. Remain clear of clouds while conducting a visual approach.

42.11.1.4 If the pilot accepts a visual approach clearance to visually follow a preceding aircraft, you are required to establish a safe landing interval behind the aircraft you were instructed to follow. You are responsible for wake turbulence separation.

42.11.1.5 Advise ATC immediately if the pilot is unable to continue following the preceding aircraft, cannot remain clear of clouds, needs to climb, or loses sight of the airport.

42.11.1.6 Be aware that radar service is automatically terminated, without being advised by ATC, when the pilot is instructed to change to advisory frequency.

42.11.1.7 Be aware that there may be other traffic in the traffic pattern and the landing sequence may differ from the traffic sequence assigned by the approach control or ARTCC.

42.11.2 Controller

42.11.2.1 Does not clear an aircraft for a visual approach unless reported weather at the airport is ceiling at or above 1,000 feet and visibility is 3 miles or greater. When weather is not available for the destination airport, informs the pilot and does not initiate a visual approach to that airport unless there is reasonable assurance that descent and flight to the airport can be made visually.

42.11.2.2 Issues visual approach clearance when the pilot reports sighting either the airport or a preceding aircraft which is to be followed.

42.11.2.3 Provides separation except when visual separation is being applied by the pilot.

42.11.2.4 Continues flight following and traffic information until the aircraft has landed or has been instructed to change to advisory frequency.

42.11.2.5 Informs the pilot when the preceding aircraft is a heavy.

42.11.2.6 When weather is available for the destination airport, does not initiate a vector for a visual approach unless the reported ceiling at the airport is 500 feet or more above the MVA and visibility is 3 miles or more. If vectoring weather minima are not available but weather at the airport is ceiling at or above 1,000 feet and visibility of 3 miles or greater, visual approaches may still be conducted.

42.11.2.7 Informs the pilot conducting the visual approach of the aircraft class when pertinent traffic is known to be a heavy aircraft.

42.12 Visual Separation

42.12.1 Pilot

42.12.1.1 Acceptance of instructions to follow another aircraft or to provide visual separation from it is an acknowledgment that the pilot will maneuver the aircraft as necessary to avoid the other aircraft or to maintain in−trail separation. Pilots are responsible to maintain visual separation until flight paths (altitudes and/or courses) diverge.

42.12.1.2 If instructed by ATC to follow another aircraft or to provide visual separation from it, promptly notify the controller if you lose sight of that aircraft, are unable to maintain continued visual contact with it, or cannot accept the responsibility for your own separation for any reason.

42.12.1.3 The pilot also accepts responsibility for wake turbulence separation under these conditions.

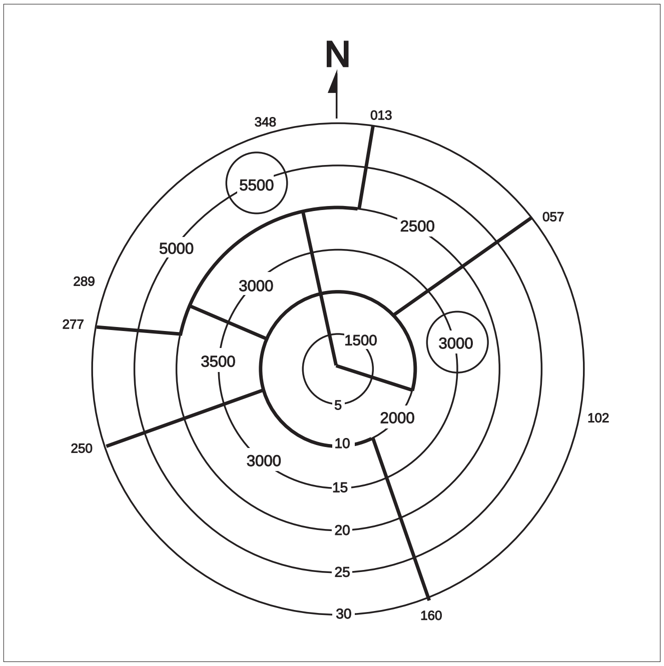
42.12.2 Controller Applies Visual Separation Only:

42.12.2.1 Within the terminal area when a controller has both aircraft in sight or by instructing a pilot who sees the other aircraft to maintain visual separation from it.

42.12.2.2 Pilots are responsible to maintain visual separation until flight paths (altitudes and/or courses) diverge.

42.12.2.3 Within en route airspace when aircraft are on opposite courses and one pilot reports having seen the other aircraft and that the aircraft have passed each other.

FIG ENR 1.5−24
Minimum Vectoring Altitude Charts



12.5 Minimum Vectoring Altitudes (MVAs) are established for use by ATC when radar ATC is exercised. MVA charts are prepared by air traffic facilities at locations where there are numerous different minimum IFR altitudes. Each MVA chart has sectors large enough to accommodate vectoring of aircraft within the sector at the MVA. Each sector boundary is at least 3 miles from the obstruction determining the MVA. To avoid a large sector with an excessively high MVA due to an isolated prominent obstruction, the obstruction may be enclosed in a buffer area whose boundaries are at least 3 miles from the obstruction. This is done to facilitate vectoring around the obstruction. (See FIG ENR 1.5−24.)

12.5.1 The minimum vectoring altitude in each sector provides 1,000 feet above the highest obstacle in nonmountainous areas and 2,000 feet above the highest obstacle in designated mountainous areas. Where lower MVAs are required in designated mountainous areas to achieve compatibility with terminal routes or to permit vectoring to an IAP, 1,000 feet of obstacle clearance may be authorized with the use of Airport Surveillance Radar (ASR). The minimum vectoring altitude will provide at least 300 feet above the floor of controlled airspace.

NOTE−
OROCA is an off-route altitude which provides obstruction clearance with a 1,000 foot buffer in nonmountainous terrain areas and a 2,000 foot buffer in designated mountainous areas within the U.S. This altitude may not provide signal coverage from ground-based navigational aids, air traffic control radar, or communications coverage.

12.5.2 Because of differences in the areas considered for MVA, and those applied to other minimum altitudes, and the ability to isolate specific obstacles, some MVAs may be lower than the nonradar Minimum En Route Altitudes (MEAs), Minimum Obstruction Clearance Altitudes (MOCAs) or other minimum altitudes depicted on charts for a given location. While being radar vectored, IFR altitude assignments by ATC will be at or above MVA.

12.6 Visual Descent Points (VDPs) are being incorporated in nonprecision approach procedures. The VDP is a defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided visual reference required by 14 CFR Section 91.175(c)(3) is established. The VDP will normally be identified by DME on VOR and LOC procedures and by along track distance to the next waypoint for RNAV procedures. The VDP is identified on the profile view of the approach chart by the symbol: **V**.

12.6.1 VDPs are intended to provide additional guidance where they are implemented. No special technique is required to fly a procedure with a VDP. The pilot should not descend below the MDA prior to reaching the VDP and acquiring the necessary visual reference.

12.6.2 Pilots not equipped to receive the VDP should fly the approach procedure as though no VDP had been provided.

12.7 Visual Portion of the Final Segment. Instrument procedures designers perform a visual area obstruction evaluation off the approach end of each runway authorized for instrument landing, straight-in, or circling. Restrictions to instrument operations are imposed if penetrations of the obstruction clearance surfaces exist. These restrictions vary based on the severity of the penetrations, and may include increasing required visibility, denying VDPs and prohibiting night instrument operations to the runway.

12.8 Charting of Close in Obstacles on Instrument Procedure Charts. Obstacles that are close to the airport may be depicted in either the planview of the instrument approach chart or the airport sketch. Obstacles are charted in only one of the areas, based on space available and distance from the runway. These obstacles could be in the visual segment of the instrument approach procedure. On nonprecision approaches, these obstacles should be considered when determining where to begin descent from the MDA (see "Pilot Operational Considerations When Flying Nonprecision Approaches" in this paragraph).

12.9 Vertical Descent Angle (VDA) on Nonprecision Approaches. FAA policy is to publish VDAs on all nonprecision approaches. Published along with VDA is the threshold crossing height (TCH) that was used to compute the angle. The descent angle may be computed from either the final approach fix (FAF), or a stepdown fix, to the runway threshold at the published TCH. A stepdown fix is only used as the start point when an angle computed from the FAF would place the aircraft below the stepdown fix altitude. The descent angle and TCH information are charted on the profile view of the instrument approach chart following the fix the angle was based on. The optimum descent angle is 3.00 degrees; and whenever possible the approach will be designed using this angle.

12.9.1 The VDA provides the pilot with information not previously available on nonprecision approaches. It provides a means for the pilot to establish a stabilized descent from the FAF or stepdown fix to the MDA. Stabilized descent is a key factor in the reduction of controlled flight into terrain (CFIT) incidents. However, pilots should be aware that **the published angle is for information only –** it is strictly advisory in nature. There is no implicit additional obstacle protection below the MDA. Pilots must still respect the published minimum descent altitude (MDA) unless the visual cues stated 14 CFR Section 91.175 are present and they can visually acquire and avoid obstacles once below the MDA. The presence of a VDA does not guarantee obstacle protection in the visual segment and does not change any of the requirements for flying a nonprecision approach.

12.9.2 Additional protection for the visual segment below the MDA is provided if a VDP is published and descent below the MDA is started at or after the VDP. Protection is also provided, if a Visual Glide Slope Indicator (VGSI); e.g., VASI or PAPI, is installed and the aircraft remains on the VGSI glide path angle from the MDA. In either case, a chart note will indicate if the VDP or VGSI are not coincident with the VDA. On RNAV approach charts, a small shaded arrowhead shaped symbol (see the legend of the U.S. Terminal Procedures books, page H1) from the end of the VDA to the runway indicates that the 34:1 visual surface is clear.

12.9.3 Pilots may use the published angle and estimated/actual groundspeed to find a target rate of descent from the rate of descent table published in the back of the U.S. Terminal Procedures Publication. This rate of descent can be flown with the Vertical Velocity Indicator (VVI) in order to use the VDA as an aid to flying a stabilized descent. No special equipment is required.

12.10 Pilot Operational Considerations When Flying Nonprecision Approaches. The missed approach point (MAP) on a nonprecision approach is not designed with any consideration to where the aircraft must begin descent to execute a safe landing. It is developed based on terrain, obstructions, NAVAID location and possibly air traffic considerations. Because the MAP may be located anywhere from well prior to the runway threshold to past the opposite end of the runway, the descent from the Minimum Descent Altitude (MDA) to the runway threshold cannot be determined based on the MAP location. Descent from MDA at the MAP when the MAP is located close to the threshold would require an excessively steep descent gradient to land in the normal touchdown zone. Any turn from the final approach course to the runway heading may also be a factor in when to begin the descent.

12.10.1 Pilots are cautioned that descent to a straight-in landing from the MDA at the MAP may be inadvisable or impossible, on a nonprecision approach, even if current weather conditions meet the published ceiling and visibility. Aircraft speed, height above the runway, descent rate, amount of turn and runway length are some of the factors which must be considered by the pilot to determine if a landing can be accomplished.

12.10.2 Visual descent points (VDPs) provide pilots with a reference for the optimal location to begin descent from the MDA, based on the designed vertical descent angle (VDA) for the approach procedure, assuming required visual references are available. Approaches without VDPs have not been assessed for terrain clearance below the MDA, and may not provide a clear vertical path to the runway at the normally expected descent angle. Therefore, pilots must be especially vigilant when descending below the MDA at locations without VDPs. This does not necessarily prevent flying the normal angle; it only means that obstacle clearance in the visual segment could be less and greater care should be exercised in looking for obstacles in the visual segment. Use of visual glide slope indicator (VGSI) systems can aid the pilot in determining if the aircraft is in a position to make the descent from the MDA. However, when the visibility is close to minimums, the VGSI may not be visible at the start descent point for a "normal" glidepath, due to its location down the runway.

12.10.3 Accordingly, pilots are advised to carefully review approach procedures, prior to initiating the approach, to identify the optimum position(s), and any unacceptable positions, from which a descent to landing can be initiated (in accordance with 14 CFR Section 91.175(c)).

12.11 Area Navigation (RNAV) Instrument Approach Charts. Reliance on RNAV systems for instrument operations is becoming more commonplace as new systems such as GPS and augmented GPS such as the Wide Area Augmentation System (WAAS) are developed and deployed. In order to support full integration of RNAV procedures into the National Airspace System (NAS), the FAA developed a new charting format for IAPs (See FIG ENR 1.5-20). This format avoids unnecessary duplication and proliferation of instrument approach charts. The original stand alone GPS charts, titled simply "GPS," are being converted to the newer format as the procedures are revised. One reason for the revision could be the addition of WAAS based minima to the approach chart. The reformatted approach chart is titled "RNAV (GPS) RWY XX." Up to four lines of minima are included on these charts. GLS (Global Navigation Satellite System [GNSS] Landing System) was a placeholder for future WAAS and LAAS minima, and the minima was always listed as N/A. The GLS minima line has now been replaced by the WAAS LPV (Localizer Performance with Vertical Guidance) minima on most RNAV (GPS) charts. LNAV/VNAV (lateral navigation/vertical navigation) was added to support both WAAS electronic vertical guidance and Barometric VNAV. LPV and LNAV/VNAV are both APV procedures as described in paragraph 12.1.7. The original GPS minima, titled "S-XX," for straight in runway XX, is retitled LNAV (lateral navigation). Circling minima may also be published. A new type of nonprecision WAAS minima will also be published on this chart and titled LP (localizer performance). LP will be published in locations where vertically guided minima cannot be provided due to terrain and obstacles and therefore, no LPV or LNAV/VNAV minima will be published. Current plans call for LAAS based procedures to be published on a separate chart and for the GLS minima line to be used only for LAAS. ATC clearance for the RNAV procedure authorizes a properly certified pilot to utilize any minimums for which the aircraft is certified: e.g. a WAAS equipped aircraft utilize the LPV or LP minima but a GPS only aircraft may not. The RNAV chart includes information formatted for quick reference by the pilot or flight crew at the top of the chart. This portion of the chart, developed based on a study by the Department of Transportation, Volpe National Transportation System Center, is commonly referred to as the pilot briefing.

12.11.1 The minima lines are:

12.11.1.1 GLS. "GLS" is the acronym for GNSS landing system; GNSS is the ICAO acronym for Global Navigation Satellite System (the international term for all GPS type systems). This line was originally published as a placeholder for both WAAS and LAAS minima and marked as N/A since no minima was published. As the concepts for LAAS and WAAS procedure publication have evolved, GLS will now be used only for LAAS minima, which will be on a separate approach chart. Most RNAV(GPS) approach charts have had the GLS minima line replaced by a WAAS LPV line of minima.

12.11.1.2 LPV. "LPV" is the acronym for localizer performance with vertical guidance. LPV identifies WAAS APV approach minimums with electronic lateral and vertical guidance. The lateral guidance is equivalent to localizer and the protected area for LPV procedures is now the same as for an ILS. The obstacle clearance area is considerably smaller than the LNAV/VNAV protection, allowing lower minima in many cases. Aircraft can fly this minima line with a statement in the Aircraft Flight Manual that the installed equipment supports LPV approaches. This includes Class 3 and 4 TSO-C146 WAAS equipment.

12.11.1.3 LNAV/VNAV. LNAV/VNAV identifies APV minimums developed to accommodate an RNAV IAP with vertical guidance, usually provided by approach certified Baro-VNAV, but with lateral and vertical integrity limits larger than a precision approach or LPV. LNAV stands for Lateral Navigation; VNAV stands for Vertical Navigation. This minima line can be flown by aircraft with a statement in the Aircraft Flight Manual that the installed equipment supports GPS approaches and has an approach-approved barometric VNAV, or if the aircraft has been demonstrated to support LNAV/VNAV approaches. This includes Class 2, 3 and 4 TSO-C146 WAAS equipment. Aircraft using LNAV/VNAV minimums will descend to landing via an internally generated descent path based on satellite or other approach approved VNAV systems. WAAS equipment may revert to this mode of operation when the signal does not support LPV integrity. Since electronic vertical guidance is provided, the minima will be published as a DA. Other navigation systems may be specifically authorized to use this line of minima, see Section A, Terms/Landing Minima Data, of the U.S. Terminal Procedures books.

12.11.1.4 LP. "LP" is the acronym for localizer performance. LP identifies nonprecision WAAS minimums which are equivalent to ILS Localizer. LP is intended for use in locations where vertical guidance cannot be provided. The protected area is considerably smaller than the area for the present LNAV lateral protection and will provide a lower MDA in many cases. WAAS equipment capable of LPV also supports LP operations. LPV and LP cannot be published as part of the same instrument procedure due to equipment limitations.

12.11.1.5 LNAV. This minima is for lateral navigation only, and the approach minimum altitude will be published as a minimum descent altitude (MDA). LNAV provides the same level of service as the present GPS stand alone approaches. LNAV minimums support the following navigation systems: WAAS, when the navigation solution will not support vertical navigation; and, GPS navigation systems which are presently authorized to conduct GPS approaches. Existing GPS approaches continue to be converted to the RNAV (GPS) format as they are revised or reviewed.

NOTE-
GPS receivers approved for approach operations in accordance with: AC 20-138, Airworthiness Approval of Global Positioning System (GPS) Navigation Equipment for Use as a VFR and IFR Supplemental Navigation System, for stand-alone Technical Standard Order (TSO) TSO-C129 Class A(1) systems; or AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors, for GPS as part of a multi-sensor system, qualify for this minima. WAAS navigation equipment must be approved in accordance with the requirements specified in TSO-C145 or TSO-C146 and installed in accordance with Advisory Circular AC 20-138A, Airworthiness Approval of Global Navigation Satellite System (GNSS) Equipment.

12.11.2 Other systems may be authorized to utilize these approaches. See the description in Section A of the U.S. Terminal Procedures books for details. These systems may include aircraft equipped with an FMS that can file /E or /F. Operational approval must also be obtained for Baro-VNAV systems to operate to the LNAV/VNAV minimums. Baro-VNAV may not be authorized on some approaches due to other factors, such as no local altimeter source being available. Baro-VNAV is not authorized on LPV procedures. Pilots are directed to their local Flight Standards District Office (FSDO) for additional information.

NOTE-
RNAV and Baro-VNAV systems must have a manufacturer supplied electronic database which shall include the waypoints, altitudes, and vertical data for the procedure to be flown. The system shall also be able to extract the procedure in its entirety, not just as a manually entered series of waypoints.

12.11.3 Required Navigation Performance (RNP)

12.11.3.1 Pilots are advised to refer to the "TERMS/LANDING MINIMUMS DATA" (Section A) of the U.S. Government Terminal Procedures books for aircraft approach eligibility requirements by specific RNP level requirements.

12.11.3.2 Some aircraft have RNP approval in their AFM without a GPS sensor. The lowest level of sensors that the FAA will support for RNP service is DME/DME. However, necessary DME signal may not be available at the airport of intended operations. For those locations having an RNAV chart published with LNAV/VNAV minimums, a procedure note may be provided such as "DME/DME RNP−0.3 NA." This means that RNP aircraft dependent on DME/DME to achieve RNP−0.3 are not authorized to conduct this approach. Where DME facility availability is a factor, the note may read "DME/DME RNP−0.3 Authorized; ABC and XYZ Required." This means that ABC and XYZ facilities have been determined by flight inspection to be required in the navigation solution to assure RNP−0.3. VOR/DME updating must not be used for approach procedures.

12.11.4 CHART TERMINOLOGY

12.11.4.1 Decision Altitude (DA) replaces the familiar term Decision Height (DH). DA conforms to the international convention where altitudes relate to MSL and heights relate to AGL. DA will eventually be published for other types of instrument approach procedures with vertical guidance, as well. DA indicates to the pilot that the published descent profile is flown to the DA (MSL), where a missed approach will be initiated if visual references for landing are not established. Obstacle clearance is provided to allow a momentary descent below DA while transitioning from the final approach to the missed approach. The aircraft is expected to follow the missed instructions while continuing along the published final approach course to at least the published runway threshold waypoint or MAP (if not at the threshold) before executing any turns.

12.11.4.2 Minimum Descent Altitude (MDA) has been in use for many years, and will continue to be used for the LNAV only and circling procedures.

12.11.4.3 Threshold Crossing Height (TCH) has been traditionally used in "precision" approaches as the height of the glide slope above threshold. With publication of LNAV/VNAV minimums and RNAV descent angles, including graphically depicted descent profiles, TCH also applies to the height of the "descent angle," or glidepath, at the threshold. Unless otherwise required for larger type aircraft which may be using the IAP, the typical TCH is 30 to 50 feet.

12.11.5 The MINIMA FORMAT will also change slightly.

12.11.5.1 Each line of minima on the RNAV IAP is titled to reflect the level of service available; e.g., GLS, LPV, LNAV/VNAV, and LNAV. CIRCLING minima will also be provided.

12.11.5.2 The minima title box indicates the nature of the minimum altitude for the IAP. For example:

a) DA will be published next to the minima line title for minimums supporting vertical guidance such as for GLS, LPV or LNAV/VNAV.

b) MDA will be published where the minima line was designed to support aircraft with only lateral guidance available, such as LNAV. Descent below the MDA, including during the missed approach, is not authorized unless the visual conditions stated in 14 CFR Section 91.175 exist.

c) Where two or more systems, such as LPV and LNAV/VNAV, share the same minima, each line of minima will be displayed separately.

12.11.6 Chart Symbology changed slightly to include:

12.11.6.1 Descent Profile. The published descent profile and a graphical depiction of the vertical path to the runway will be shown. Graphical depiction of the RNAV vertical guidance will differ from the traditional depiction of an ILS glide slope (feather) through the use of a shorter vertical track beginning at the decision altitude.

a) It is FAA policy to design IAPs with minimum altitudes established at fixes/waypoints to achieve optimum stabilized (constant rate) descents within each procedure segment. This design can enhance the safety of the operations and contribute toward reduction in the occurrence of controlled flight into terrain (CFIT) accidents. Additionally, the National Transportation Safety Board (NTSB) recently emphasized that pilots could benefit from publication of the appropriate IAP descent angle for a stabilized descent on final approach. The RNAV IAP format includes the descent angle to the hundredth of a degree; e.g., **3.00 degrees.** The angle will be provided in the graphically depicted descent profile.

b) The stabilized approach may be performed by reference to vertical navigation information provided by WAAS or LNAV/VNAV systems; or for

LNAV-only systems, by the pilot determining the appropriate aircraft attitude/groundspeed combination to attain a constant rate descent which best emulates the published angle. To aid the pilot, U.S. Government Terminal Procedures Publication charts publish an expanded Rate of Descent Table on the inside of the back hard cover for use in planning and executing precision descents under known or approximate groundspeed conditions.

12.11.6.2 Visual Descent Point (VDP). A VDP will be published on most RNAV IAPs. VDPs apply only to aircraft utilizing LNAV minima, not LPV or LNAV/VNAV minimums.

12.11.6.3 Missed Approach Symbology. In order to make missed approach guidance more readily understood, a method has been developed to display missed approach guidance in the profile view through the use of quick reference icons. Due to limited space in the profile area, only four or fewer icons can be shown. However, the icons may not provide representation of the entire missed approach procedure. The entire set of textual missed approach instructions are provided at the top of the approach chart in the pilot briefing. (See FIG ENR 1.5-20.)

12.11.6.4 Waypoints. All RNAV or GPS stand-alone IAPs are flown using data pertaining to the particular IAP obtained from an onboard database, including the sequence of all WPs used for the approach and missed approach, except that step down waypoints may not be included in some TSO-C-129 receiver databases. Included in the database, in most receivers, is coding that informs the navigation system of which WPs are fly-over (FO) or fly-by (FB). The navigation system may provide guidance appropriately - including leading the turn prior to a fly-by WP; or causing overflight of a fly-over WP. Where the navigation system does not provide such guidance, the pilot must accomplish the turn lead or waypoint overflight manually. Chart symbology for the FB WP provides pilot awareness of expected actions. Refer to the legend of the U.S. Terminal Procedures books.

12.11.6.5 TAAs are described in subparagraph 12.4, Terminal Arrival Area (TAA). When published, the RNAV chart depicts the TAA areas through the use of "icons" representing each TAA area associated with the RNAV procedure (See FIG ENR 1.5-20). These icons are depicted in the plan view of the approach chart, generally arranged on the chart in accordance with their position relative to the aircrafts arrival from the en route structure. The WP, to which navigation is appropriate and expected within each specific TAA area, will be named and depicted on the associated TAA icon. Each depicted named WP is the IAF for arrivals from within that area. TAAs may not be used on all RNAV procedures because of airspace congestion or other reasons.

12.11.6.6 Cold Temperature Limitations. A minimum temperature limitation is published on procedures which authorize Baro-VNAV operation. This temperature represents the airport temperature below which use of the Baro-VNAV is not authorized to the LNAV/VNAV minimums. An example limitation will read: "**Baro-VNAV NA below -20°C(-4°F).**" This information will be found in the upper left hand box of the pilot briefing.

NOTE-
Temperature limitations do not apply to flying the LNAV/VNAV line of minima using approach certified WAAS receivers.

12.11.6.7 WAAS Channel Number/Approach ID. The WAAS Channel Number is an equipment optional capability that allows the use of a 5-digit number to select a specific final approach segment. The Approach ID is an airport unique 4-letter combination for verifying selection of the correct final approach segment, e.g. W-35L, where W stands for WAAS and 35L is runway 35 left. The WAAS Channel Number and Approach ID will be displayed in the upper left corner of the approach procedure pilot briefing.

12.11.6.8 At locations where outages of WAAS vertical guidance may occur daily due to initial system limitations, a negative W symbol (W) will be placed on RNAV (GPS) approach charts. Many of these outages will be very short in duration, but may result in the disruption of the vertical portion of the approach. The W symbol indicates that NOTAMs or Air Traffic advisories are not provided for outages which occur in the WAAS LNAV/VNAV or LPV vertical service. Use LNAV minima for flight planning at these locations, whether as a destination or alternate. For flight operations at these locations, when the WAAS avionics indicate that LNAV/VNAV or LPV service is available, then vertical guidance may be used to complete the approach using the displayed level of service. Should an outage occur during the procedure, reversion to LNAV minima may be required. As the WAAS coverage is expanded, the W will be removed.

19.2 Radar Monitoring. This service is provided for each simultaneous parallel ILS/MLS approach to ensure aircraft do not deviate from the final approach course. Radar monitoring includes instructions if an aircraft nears or penetrates the prescribed NTZ (an area 2,000 feet wide located equidistant between parallel final approach courses). This service will be provided as follows:

19.2.1 During turn on to parallel final approach, aircraft will be provided 3 miles radar separation or a minimum or 1,000 feet vertical separation. The assigned altitude must be maintained until intercepting the glide path, unless cleared otherwise by ATC. Aircraft will not be vectored to intercept the final approach course at an angle greater than thirty degrees.

19.2.2 The final monitor controller will have the capability of overriding the tower controller on the tower frequency.

19.2.3 Pilots will be instructed to monitor the tower frequency to receive advisories and instructions.

19.2.4 Aircraft observed to overshoot the turn−on or to continue on a track which will penetrate the NTZ will be instructed to return to the correct final approach course immediately. The final monitor controller may also issue missed approach or breakout instructions to the deviating aircraft.

PHRASEOLOGY−
"(Aircraft call sign) YOU HAVE CROSSED THE FINAL APPROACH COURSE. TURN (left/right) IMMEDIATELY AND RETURN TO THE LOCALIZER/AZIMUTH COURSE."

or

"(Aircraft call sign) TURN (left/right) AND RETURN TO THE LOCALIZER/AZIMUTH COURSE."

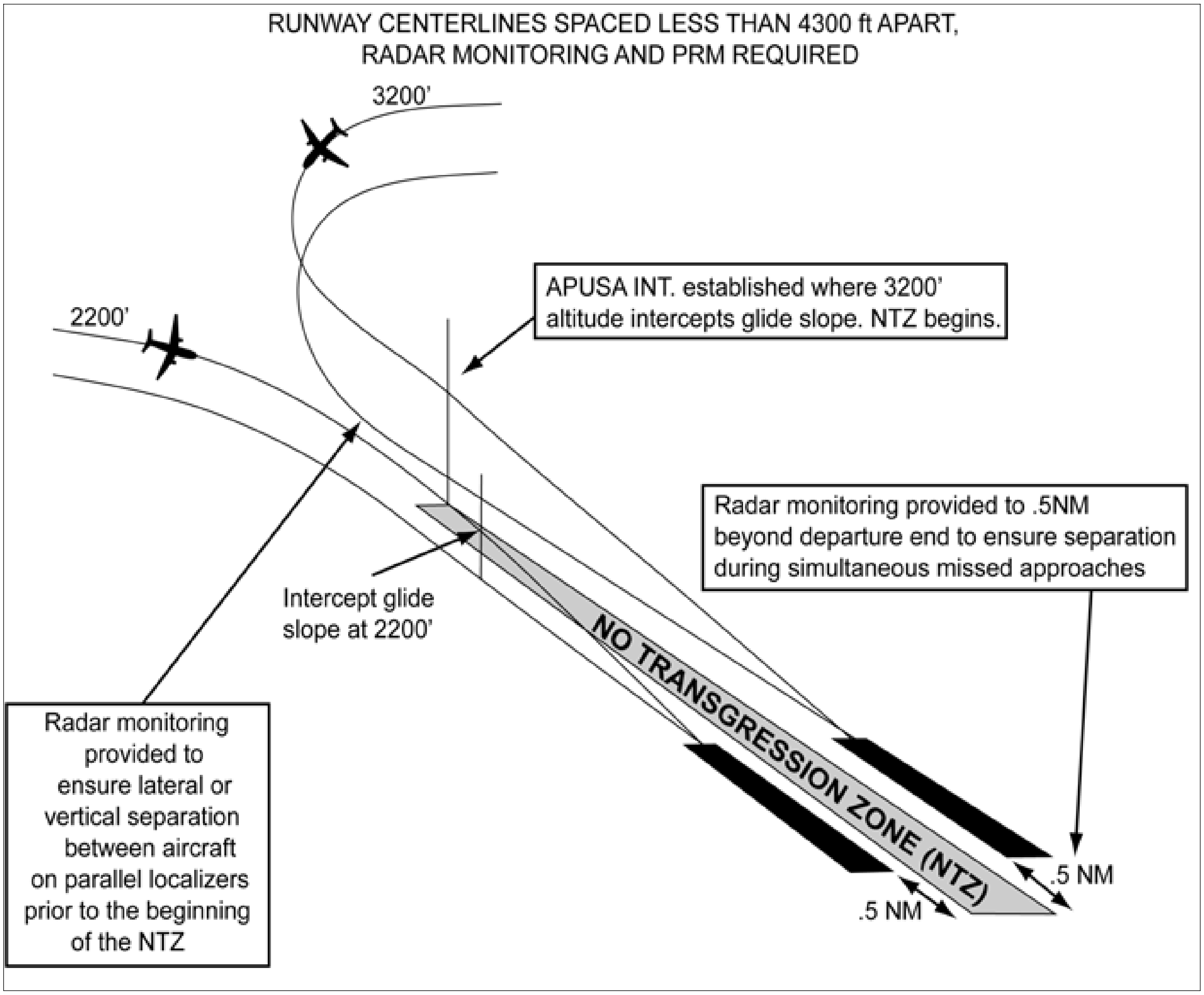
19.2.5 If a deviating aircraft fails to respond to such instructions or is observed penetrating the NTZ, the aircraft on the adjacent final approach course may be instructed to alter course.

PHRASEOLOGY−
"TRAFFIC ALERT (aircraft call sign) TURN (left/right) IMMEDIATELY HEADING (degrees), (climb/descend) AND MAINTAIN (altitude)."

19.2.6 Radar monitoring will automatically be terminated when visual separation is applied, the aircraft reports the approach lights or runway in sight, or the aircraft is 1 mile or less from the runway threshold (for runway centerlines spaced 4,300 feet or greater). Final monitor controllers will not advise pilots when radar monitoring is terminated.

FIG ENR 1.5-28

ILS PRM Approaches
(Simultaneous Close Parallel)



20. Simultaneous Close Parallel ILS PRM Approaches (Independent) and Simultaneous Offset Instrument Approaches (SOIA) (See FIG ENR 1.5-28)

20.1 System

20.1.1 ILS/PRM is an acronym for Instrument Landing System/Precision Runway Monitor.

20.1.1.1 An approach system that permits simultaneous ILS/PRM approaches to dual runways with centerlines separated by **less** than 4,300 feet but at least 3,400 feet for parallel approach courses, and at least 3,000 feet if one ILS if offset by 2.5 to 3.0 degrees. The airspace between the final approach courses contains a No Transgression Zone (NTZ) with surveillance provided by two PRM monitor controllers, one for each approach course. To qualify for reduced lateral runway separation, monitor controllers must be equipped with high update radar and high resolution ATC radar displays, collectively called a PRM system. The PRM system displays almost instantaneous radar information. Automated tracking software provides PRM monitor controllers with aircraft identification, position, speed and a ten-second projected position, as well as visual and aural controller alerts. The PRM system is a supplemental requirement for simultaneous close parallel approaches in addition to the system requirements for simultaneous parallel ILS/MLS approaches described in paragraph 19, Simultaneous Parallel ILS/MLS Approaches (Independent).

preclude side-by-side operations with one or both aircraft in a belly-up configuration during the turn-on. Once the aircraft are established within 30 degrees of final, or on the final, these operations may be conducted simultaneously. When the parallel runways are separated by 4,300 feet or more, or intersecting/converging runways are in use, ATC may authorize a visual approach after advising all aircraft involved that other aircraft are conducting operations to the other runway. This may be accomplished through use of the ATIS.

24.4 Separation Responsibilities. If the pilot has the airport in sight but cannot see the preceding aircraft, ATC may clear the aircraft for a visual approach; however, ATC retains both separation and wake vortex separation responsibility. When visually following a preceding aircraft, acceptance of the visual approach clearance constitutes acceptance of pilot responsibility for maintaining a safe approach interval and adequate wake turbulence separation.

24.5 A visual approach is not an IAP and therefore has no missed approach segment. If a go around is necessary for any reason, aircraft operating at controlled airports will be issued an appropriate advisory/clearance/instruction by the tower. At uncontrolled airports, aircraft are expected to remain clear of clouds and complete a landing as soon as possible. If a landing cannot be accomplished, the aircraft is expected to remain clear of clouds and contact ATC as soon as possible for further clearance. Separation from other IFR aircraft will be maintained under these circumstances.

24.6 Visual approaches reduce pilot/controller workload and expedite traffic by shortening flight paths to the airport. It is the pilot's responsibility to advise ATC as soon as possible if a visual approach is not desired.

24.7 Authorization to conduct a visual approach is an IFR authorization and does not alter IFR flight plan cancellation responsibility. See ENR 1.10, paragraph 11.2, Canceling IFR Flight Plan.

24.8 Radar service is automatically terminated, without advising the pilot, when the aircraft is instructed to change to advisory frequency.

25. Charted Visual Flight Procedures (CVFPs)

25.1 CVFPs are charted visual approaches established for environmental/noise considerations, and/or when necessary for the safety and efficiency of air traffic operations. The approach charts depict prominent landmarks, courses, and recommended altitudes to specific runways. CVFPs are designed to be used primarily for turbojet aircraft.

25.2 These procedures will be used only at airports with an operating control tower.

25.3 Most approach charts will depict some NAVAID information which is for supplemental navigational guidance only.

25.4 Unless indicating a Class B airspace floor, all depicted altitudes are for noise abatement purposes and are recommended only. Pilots are not prohibited from flying other than recommended altitudes if operational requirements dictate.

25.5 When landmarks used for navigation are not visible at night, the approach will be annotated "PROCEDURE NOT AUTHORIZED AT NIGHT."

25.6 CVFPs usually begin within 20 flying miles from the airport.

25.7 Published weather minimums for CVFPs are based on minimum vectoring altitudes rather than the recommended altitudes depicted on charts.

25.8 CVFPs are not instrument approaches and do not have missed approach segments.

25.9 ATC will not issue clearances for CVFPs when the weather is less than the published minimum.

25.10 ATC will clear aircraft for a CVFP after the pilot reports siting a charted landmark or a preceding aircraft. If instructed to follow a preceding aircraft, pilots are responsible for maintaining a safe approach interval and wake turbulence separation.

25.11 Pilots should advise ATC if at any point they are unable to continue an approach or lose sight of a preceding aircraft. Missed approaches will be handled as a go-around.

26. Missed Approach

26.1 When a landing cannot be accomplished, advise ATC and, upon reaching the missed approach point defined on the approach procedure chart, the pilot must comply with the missed approach instructions for the procedure being used or with an alternate missed approach procedure specified by ATC.

26.2 Obstacle protection for missed approach is predicated on the missed approach being initiated at the decision altitude/height (DA/H) or at the missed approach point and not lower than minimum descent altitude (MDA). A climb gradient of at least 200 feet per nautical mile is required, (except for Copter approaches, where a climb of at least 400 feet per nautical mile is required), unless a higher climb gradient is published in the notes section of the approach procedure chart. When higher than standard climb gradients are specified, the end point of the non-standard climb will be specified at either an altitude or a fix. Pilots must preplan to ensure that the aircraft can meet the climb gradient (expressed in feet per nautical mile) required by the procedure in the event of a missed approach, and be aware that flying at a higher than anticipated ground speed increases the climb rate requirement (feet per minute). Tables for the conversion of climb gradients (feet per nautical mile) to climb rate (feet per minute), based on ground speed, are included on page D1 of the U.S. Terminal Procedures booklets. Reasonable buffers are provided for normal maneuvers. However, no consideration is given to an abnormally early turn. Therefore, when an early missed approach is executed, pilots should, unless otherwise cleared by ATC, fly the IAP as specified on the approach plate to the missed approach point at or above the MDA or DH before executing a turning maneuver.

26.3 If visual reference is lost while circling to land from an instrument approach, the missed approach specified for that particular procedure must be followed (unless an alternate missed approach procedure is specified by ATC). To become established on the prescribed missed approach course, the pilot should make an initial climbing turn toward the landing runway and continue the turn until established on the missed approach course. Inasmuch as the circling maneuver may be accomplished in more than one direction, different patterns will be required to become established on the prescribed missed approach course depending on the aircraft position at the time visual reference is lost. Adherence to the procedure will assure that an aircraft will remain within the circling and missed approach obstruction clearance areas.
(See FIG ENR 1.5-31 and FIG ENR 1.5-32.)

FIG ENR 1.5-31
Circling and Missed Approach Obstruction Clearance Areas

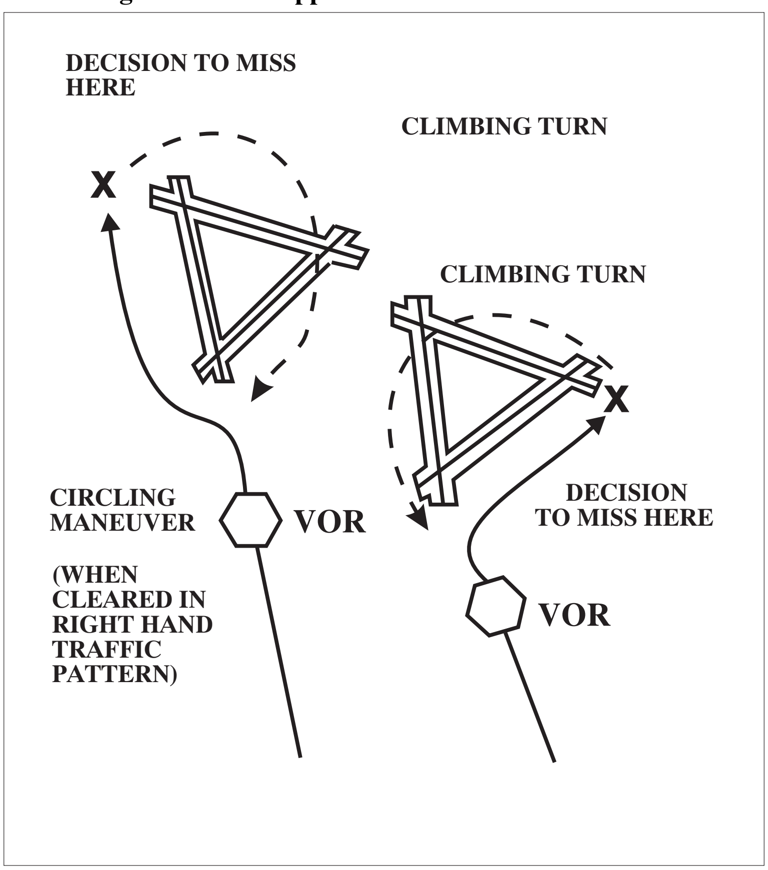


FIG ENR 1.5-32

Missed Approach

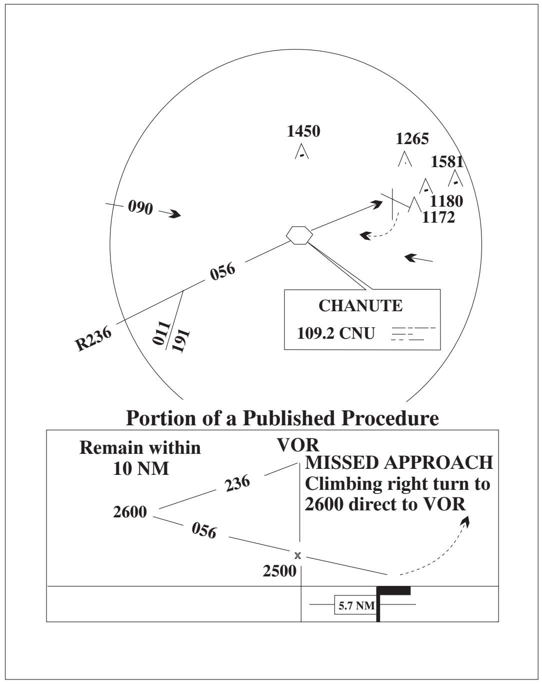
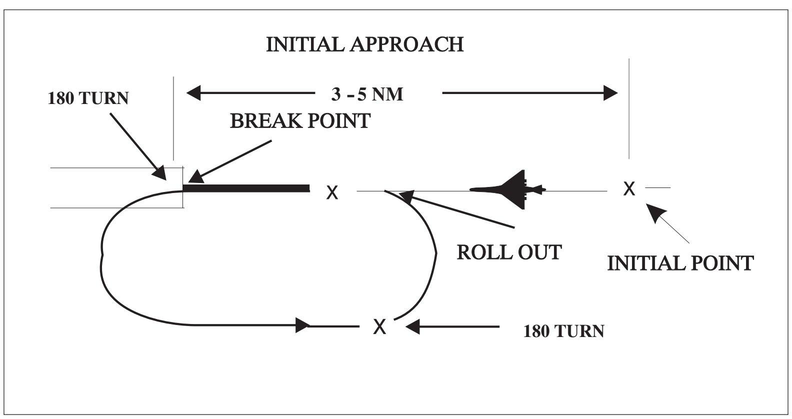


FIG ENR 1.5-33

Overhead Maneuver



26.4 At locations where ATC radar service is provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

26.5 Some locations may have a preplanned alternate missed approach procedure for use in the event the primary NAVAID used for the missed approach procedure is unavailable. To avoid confusion, the alternate missed approach instructions are not published on the chart. However, the alternate missed approach holding pattern will be depicted on the instrument approach chart for pilot situational awareness and to assist ATC by not having to issue detailed holding instructions. The alternate missed approach may be based on NAVAIDs not used in the approach procedure or the primary missed approach. When the alternate missed approach procedure is implemented by NOTAM, it becomes a mandatory part of the procedure. The NOTAM will specify both the textual instructions and any additional equipment requirements necessary to complete the procedure. Air traffic may also issue instructions for the alternate missed approach when necessary, such as when the primary missed approach NAVAID fails during the approach. Pilots may reject an ATC clearance for an alternate missed approach that requires equipment not necessary for the published approach procedure when the alternate missed approach is issued after beginning the approach. However, when the alternate missed approach is issued prior to beginning the approach the pilot must either accept the entire procedure (including the alternate missed approach), request a different approach procedure, or coordinate with ATC for alternative action to be taken, i.e., proceed to an alternate airport, etc.

26.6 When the approach has been missed, request a clearance for specific action; i.e., to alternative airport, another approach, etc.

26.7 Pilots must ensure that they have climbed to a safe altitude prior to proceeding off the published missed approach, especially in nonradar environments. Abandoning the missed approach prior to reaching the published altitude may not provide adequate terrain clearance. Additional climb may be required after reaching the holding pattern before proceeding back to the IAF or to an alternate.

26.8 Missed approach obstacle clearance is predicated on beginning the missed approach procedure at the Missed Approach Point (MAP) from MDA or DA and then climbing 200 feet/NM or greater. Initiating a go-around after passing the published MAP may result in total loss of obstacle clearance. To compensate for the possibility of reduced obstacle clearance during a go-around, a pilot should apply procedures used in takeoff planning. Pilots should refer to airport obstacle and departure data prior to initiating an instrument approach procedure. Such information may be found in the "TAKE-OFF MINIMUMS AND (OBSTACLE) DEPARTURE PROCEDURES" section of the U.S. TERMINAL PROCEDURES publication.

27. Overhead Approach Maneuver

27.1 Pilots operating in accordance with an IFR flight plan in Visual Meteorological Conditions (VMC) may request ATC authorization for an overhead maneuver. An overhead maneuver is not an instrument approach procedure. Overhead maneuver patterns are developed at airports where aircraft have an operational need to conduct the maneuver. An aircraft conducting an overhead maneuver is considered to be VFR and the IFR flight plan is cancelled when the aircraft reaches the initial point on the initial approach portion of the maneuver. (See FIG ENR 1.5-33.) The existence of a standard overhead maneuver pattern does not eliminate the possible requirement for an aircraft to conform to conventional rectangular patterns if an overhead maneuver cannot be approved. Aircraft operating to an airport without a functioning control tower must initiate cancellation of an IFR flight plan prior to executing the overhead maneuver. Cancellation of the IFR flight plan must be accomplished after crossing the landing threshold on the initial portion of the maneuver or after landing. Controllers may authorize an overhead maneuver and issue the following to arriving aircraft:

27.1.1 Pattern altitude and direction of traffic. This information may be omitted if either is standard.

PHRASEOLOGY-
PATTERN ALTITUDE (altitude). RIGHT TURNS.

27.1.2 Request for a report on initial approach.

PHRASEOLOGY-
REPORT INITIAL.

27.1.3 "Break" information and a request for the pilot to report. The "Break Point" will be specified if nonstandard. Pilots may be requested to report "break" if required for traffic or other reasons.

PHRASEOLOGY-
BREAK AT (specified point).
REPORT BREAK.

28. Departure Procedures

28.1 Pre-Taxi Clearance Procedures

28.1.1 Locations where these procedures are in effect are indicated in the Airport/Facility Directory.

28.1.2 Certain airports have established programs whereby pilots of departing IFR aircraft may elect to receive their IFR clearances before they start taxiing for takeoff. The following provisions are included in such procedures:

28.1.2.1 Pilot participation is not mandatory.

28.1.2.2 Participating pilots call clearance delivery/ ground control not more than 10 minutes before proposed taxi time.

28.1.2.3 IFR clearance (or delay information, if clearance cannot be obtained) is issued at the time of this initial call-up.

28.1.2.4 When the IFR clearance is received on clearance delivery frequency, pilots call ground control when ready to taxi.

28.1.2.5 Normally, pilots need not inform ground control that they have received IFR clearance on clearance delivery frequency. Certain locations may, however, require that the pilot inform ground control of a portion of the routing or that the IFR clearance has been received.

28.1.2.6 If a pilot cannot establish contact on clearance delivery frequency or has not received an IFR clearance before ready to taxi, the pilot should contact ground control and inform the controller accordingly.

29. Pre-departure Clearance Procedures

29.1 Many airports in the National Airspace System are equipped with the Tower Data Link System (TDLS) that includes the Pre-departure Clearance (PDC) function. The PDC function automates the Clearance Delivery operations in the ATCT for participating users. The PDC function displays IFR clearances from the ARTCC to the ATCT. The Clearance Delivery controller in the ATCT can append local departure information and transmit the clearance via data link to participating airline/service provider computers. The airline/service provider will then deliver the clearance via the Aircraft Communications Addressing and Reporting System (ACARS) or a similar data link system or, for nondata link equipped aircraft, via a printer located at the departure gate. PDC reduces frequency congestion, controller workload and is intended to mitigate delivery/readback errors. Also, information from participating users indicates a reduction in pilot workload.

29.2 PDC is available only to participating aircraft that have subscribed to the service through an approved service provider.

29.3 Due to technical reasons, the following limitations currently exist in the PDC program:

29.3.1 Aircraft filing multiple flight plans are limited to one PDC clearance per departure airport within a 24-hour period. Additional clearances will be delivered verbally.

29.3.2 If the clearance is revised or modified prior to delivery, it will be rejected from PDC and the clearance will need to be delivered verbally.

29.4 No acknowledgment of receipt or readback is required for a PDC.

29.5 In all situations, the pilot is encouraged to contact clearance delivery if a question or concern exists regarding an automated clearance.

30. Taxi Clearance

30.1 Pilots on IFR flight plans should communicate with the control tower on the appropriate ground control/clearance delivery frequency prior to starting engines to receive engine start time, taxi, and/or clearance information.

31. Taxi into Position and Hold (TIPH)

31.1 Taxi into position and hold is an air traffic control (ATC) procedure designed to position an aircraft onto the runway for an imminent departure. The ATC instruction "POSITION AND HOLD" is used to instruct a pilot to taxi onto the departure runway in takeoff position and hold.

EXAMPLE-
Tower: "N234AR Runway 24L, position and hold."

31.2 This ATC instruction is not an authorization to takeoff. In instances where the pilot has been instructed to "position and hold" and has been advised of a reason/condition (wake turbulence, traffic on an intersecting runway, etc.) or the reason/ condition is clearly visible (another aircraft that has landed on or is taking off on the same runway), and the reason/condition is satisfied, the pilot should expect an imminent takeoff clearance, unless advised of a delay. If you are uncertain about any ATC instruction or clearance, contact ATC immediately.

31.3 If a takeoff clearance is not received within a reasonable amount of time after clearance to position and hold, ATC should be contacted.

EXAMPLE-
Aircraft: Cessna 234AR holding in position Runway 24L.

Aircraft: Cessna 234AR holding in position Runway 24L at Bravo.

NOTE-
FAA analysis of accidents and incidents involving aircraft holding in position indicate that two minutes or more elapsed between the time the instruction was issued to "position and hold" and the resulting event (e.g., landover or go-around). Pilots should consider the length of time that they have been holding in position whenever they HAVE NOT been advised of any expected delay to determine when it is appropriate to query the controller.

REFERENCE-
Advisory Circulars 91-73A, Part 91 and Part 135 Single-Pilot Procedures during Taxi Operations, and 120-74A, Parts 91, 121, 125, and 135 Flightcrew Procedures during Taxi Operations.

31.4 Situational awareness during position and hold operations is enhanced by monitoring ATC instructions/clearances issued to other aircraft. Pilots should listen carefully if another aircraft is on frequency that has a similar call sign and pay close attention to communications between ATC and other aircraft. If you are uncertain of an ATC instruction or clearance, query ATC immediately. Care should be taken to not inadvertently execute a clearance/ instruction for another aircraft.

31.5 Pilots should be especially vigilant when conducting "position and hold" operations at night or during reduced visibility conditions. They should scan the full length of the runway and look for aircraft on final approach or landing roll out when taxiing onto a runway. ATC should be contacted anytime there is a concern about a potential conflict.

31.6 When two or more runways are active, aircraft may be instructed to "POSITION AND HOLD" on two or more runways. When multiple runway operations are being conducted, it is important to listen closely for your call sign and runway. Be alert for similar sounding call signs and acknowledge all instructions with your call sign. When you are holding in position and are not sure if the takeoff clearance was for you, ask ATC before you begin takeoff roll. ATC prefers that you confirm a takeoff clearance rather than mistake another aircraft's clearance for your own.

31.7 When ATC issues intersection "position and hold" and takeoff clearances, the intersection designator will be used. If ATC omits the intersection designator, call ATC for clarification.

EXAMPLE-
Aircraft: "Cherokee 234AR, Runway 24L at November 4, position and hold."

31.8 If landing traffic is a factor during position and hold operations, ATC will inform the aircraft in position of the closest traffic that has requested a full-stop, touch-and-go, stop-and-go, or an unrestricted low approach to the same runway. Pilots should take care to note the position of landing traffic. ATC will also advise the landing traffic when an aircraft is authorized to "position and hold" on the same runway.

EXAMPLE-
Tower: "Cessna 234AR, Runway 24L, position and hold. Traffic a Boeing 737, six mile final."

Tower: "Delta 1011, continue, traffic a Cessna 210 position and hold Runway 24L."

NOTE-
ATC will normally withhold landing clearance to arrival aircraft when another aircraft is in position and holding on the runway.

31.9 Never land on a runway that is occupied by another aircraft, even if a landing clearance was issued. Do not hesitate to ask the controller about the traffic on the runway and be prepared to execute a go-around.

NOTE-
Always clarify any misunderstanding or confusion concerning ATC instructions or clearances. ATC should be advised immediately if there is any uncertainty about the ability to comply with any of their instructions.

32. Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times

32.1 ATC may assign departure restrictions, clearance void times, hold for release, and release times, when necessary, to separate departures from other traffic or to restrict or regulate the departure flow.

32.1.1 Clearance Void Times. A pilot may receive a clearance, when operating from an airport without a control tower, which contains a provision for the clearance to be void if not airborne by a specific time. A pilot who does not depart prior to the clearance void time must advise ATC as soon as possible of his or her intentions. ATC will normally advise the pilot of the time allotted to notify ATC that the aircraft did not depart prior to the clearance void time. This time cannot exceed 30 minutes. Failure of an aircraft to contact ATC within 30 minutes after the clearance void time will result in the aircraft being considered overdue and search and rescue procedures initiated.

NOTE–
1. *Other IFR traffic for the airport where the clearance is issued is suspended until the aircraft has contacted ATC or until 30 minutes after the clearance void time or 30 minutes after the clearance release time if no clearance void time is issued.*

2. *Pilots who depart at or after their clearance void time are not afforded IFR separation and may be in violation of 14 CFR Section 91.173 which requires that pilots receive an appropriate ATC clearance before operating IFR in Class A, B, C, D, and E airspace.*

EXAMPLE–
Clearance void if not off by (clearance void time) and, if required, if not off by (clearance void time) advise (facility) not later than (time) of intentions.

32.1.2 Hold for Release. ATC may issue "hold for release" instructions in a clearance to delay an aircrafts departure for traffic management reasons (i.e., weather, traffic volume, etc.). When ATC states in the clearance, "hold for release," the pilot may not depart utilizing that IFR clearance until a release time or additional instructions are issued by ATC. This does not preclude the pilot from cancelling the IFR clearance with ATC and departing under VFR; but an IFR clearance may not be available after departure. In addition, ATC will include departure delay information in conjunction with "hold for release" instructions.

EXAMPLE–
(Aircraft identification) cleared to (destination) airport as filed, maintain (altitude), and, if required (additional instructions or information), hold for release, expect (time in hours and/or minutes) departure delay.

32.1.3 Release Times. A "release time" is a departure restriction issued to a pilot by ATC, specifying the earliest time an aircraft may depart. ATC will use "release times" in conjunction with traffic management procedures and/or to separate a departing aircraft from other traffic.

EXAMPLE–
(Aircraft identification) released for departure at (time in hours and/or minutes).

32.1.4 Expect Departure Clearance Time (EDCT). The EDCT is the runway release time assigned to an aircraft included in traffic management programs. Aircraft are expected to depart no earlier than 5 minutes before, and no later than 5 minutes after the EDCT.

32.2 If practical, pilots departing uncontrolled airports should obtain IFR clearances prior to becoming airborne when two-way communication with the controlling ATC facility is available.

33. Departure Control

33.1 Departure Control is an approach control function responsible for ensuring separation between departures. So as to expedite the handling of departures, Departure Control may suggest a takeoff direction other than that which may normally have been used under VFR handling. Many times it is preferred to offer the pilot a runway that will require the fewest turns after takeoff to place the pilot on course or selected departure route as quickly as possible. At many locations particular attention is paid to the use of preferential runways for local noise abatement programs, and route departures away from congested areas.

33.2 Departure Control utilizing radar will normally clear aircraft out of the terminal area using instrument departure procedures (DPs) via radio navigation aids. When a departure is to be vectored immediately following takeoff, the pilot will be advised prior to takeoff of the initial heading to be flown but may not be advised of the purpose of the heading. Pilots operating in a radar environment are expected to associate departure headings with vectors to their planned route of flight. When given a vector taking the aircraft off a previously assigned nonradar route, the pilot will be advised briefly what the vector is to achieve. Thereafter, radar service will be provided until the aircraft has been reestablished "on-course" using an appropriate navigation aid and the pilot has been advised of the aircraft's position; or, a handoff is made to another radar controller with further surveillance capabilities.

33.3 Controllers will inform pilots of the departure control frequencies and, if appropriate, the transponder code before takeoff. Pilots should not operate their transponder until ready to start the takeoff roll, except at ASDE-X facilities where transponders should be transmitting "on" with altitude reporting continuously while operating on the airport surface if so equipped. Pilots should not change to the departure control frequency until requested. Controllers may omit the departure control frequency if a DP has or will be assigned and the departure control frequency is published on the DP.

34. Abbreviated IFR Departure Clearance (Cleared . . . as Filed) Procedures

34.1 ATC facilities will issue an abbreviated IFR departure clearance based on the ROUTE of flight filed in the IFR flight plan, provided the filed route can be approved with little or no revision. These abbreviated clearance procedures are based on the following conditions:

34.1.1 The aircraft is on the ground or it has departed VFR and the pilot is requesting IFR clearance while airborne.

34.1.2 That a pilot will not accept an abbreviated clearance if the route or destination of a flight plan filed with ATC has been changed by him/her or the company or the operations officer before departure.

34.1.3 That it is the responsibility of the company or operations office to inform the pilot when they make a change to the filed flight plan.

34.1.4 That it is the responsibility of the pilot to inform ATC in the initial call-up (for clearance) when the filed flight plan has been either:

34.1.4.1 Amended.

34.1.4.2 Canceled and replaced with a new filed flight plan.

NOTE-
The facility issuing a clearance may not have received the revised route or the revised flight plan by the time a pilot requests clearance.

34.2 Controllers will issue a detailed clearance when they know that the original filed flight plan has been changed or when the pilot requests a full route clearance.

34.3 The clearance as issued will include the destination airport filed in the flight plan.

34.4 ATC procedures now require the controller to state the DP name, the current number and the DP Transition name after the phrase "Cleared to (destination) airport," and prior to the phrase, "then as filed," for ALL departure clearances when the DP or DP Transition is to be flown. The procedure applies whether or not the DP is filed in the flight plan.

34.5 Standard Terminal Arrivals (STARs), when filed in a flight plan, are considered a part of the filed route of flight and will not normally be stated in an initial departure clearance. If the ARTCC's jurisdictional airspace includes both the departure airport and the fix where a STAR or STAR Transition begins, the STAR name, the current number, and the STAR Transition name MAY be stated in the initial clearance.

34.6 "Cleared to (destination) airport as filed" does NOT include the en route altitude filed in a flight plan. An en route altitude will be stated in the clearance or the pilot will be advised to expect an assigned/filed altitude within a given time frame or at a certain point after departure. This may be done verbally in the departure instructions or stated in the DP.

34.7 In a radar and a nonradar environment, the controller will state "Cleared to (destination) airport as filed" or:

34.7.1 If a DP or DP Transition is to be flown, specify the DP name, the current DP number, the DP Transition name, the assigned altitude/flight level, and any additional instructions (departure control frequency, beacon code assignment, etc.) necessary to clear a departing aircraft via the DP/DP Transition and the route filed.

EXAMPLE-
National Seven Twenty cleared to Miami Airport Intercontinental one departure, Lake Charles transition then as filed, maintain Flight Level two seven zero.

34.7.2 When there is no DP or when the pilot cannot accept a DP, specify the assigned altitude/flight level, and any additional instructions necessary to clear a departing aircraft via an appropriate departure routing and the route filed.

NOTE-
A detailed departure route description or a radar vector may be used to achieve the desired departure routing.

34.7.3 If necessary to make a minor revision to the filed route, specify the assigned DP/DP Transition (or departure routing), the revision to the filed route, the assigned altitude/flight level, and any additional instructions necessary to clear a departing aircraft.

EXAMPLE-
Jet Star One Four Two Four cleared to Atlanta Airport, South Boston two departure then as filed except change route to read South Boston Victor 20 Greensboro, maintain one seven thousand.

34.7.4 Additionally, in a nonradar environment, specify one or more fixes as necessary to identify the initial route of flight.

EXAMPLE-
Cessna Three One Six Zero Foxtrot cleared to Charlotte Airport as filed via Brooke, maintain seven thousand.

34.8 To ensure success of the program, pilots should:

34.8.1 Avoid making changes to a filed flight plan just prior to departure.

34.8.2 State the following information in the initial call-up to the facility when no change has been made to the filed flight plan: Aircraft call sign, location, type operation (IFR), and the name of the airport (or fix) to which you expect clearance.

EXAMPLE-
"Washington clearance delivery (or ground control if appropriate) American Seventy Six at gate one, IFR Los Angeles."

34.8.3 If the flight plan has been changed, state the change and request a full route clearance.

EXAMPLE-
"Washington clearance delivery, American Seventy Six at gate one. IFR San Francisco. My flight plan route has been amended (or destination changed). Request full route clearance."

34.8.4 Request verification or clarification from ATC if ANY portion of the clearance is not clearly understood.

34.8.5 When requesting clearance for the IFR portion of a VFR-IFR flight, request such clearance prior to the fix where IFR operation is proposed to commence in sufficient time to avoid delay. Use the following phraseology:

EXAMPLE-
"Los Angeles center, Apache Six One Papa, VFR estimating Paso Robles VOR at three two, one thousand five hundred, request IFR to Bakersfield."

35. Instrument Departure Procedures (DP) - Obstacle Departure Procedures (ODP) and Standard Instrument Departures (SID)

35.1 Instrument departure procedures are preplanned instrument flight rule (IFR) procedures which provide obstruction clearance from the terminal area to the appropriate en route structure. There are two types of DPs, Obstacle Departure Procedures (ODPs), printed either textually or graphically, and Standard Instrument Departures (SIDs), always printed graphically. All DPs, either textual or graphic may be designed using either conventional or RNAV criteria. RNAV procedures will have RNAV printed in the title, e.g., SHEAD TWO DEPARTURE (RNAV). ODPs provide obstruction clearance via the least onerous route from the terminal area to the appropriate en route structure. ODPs are recommended for obstruction clearance and may be flown without ATC clearance unless an alternate departure procedure (SID or radar vector) has been specifically assigned by ATC. Graphic ODPs will have (OBSTACLE) printed in the procedure title, e.g., GEYSR THREE DEPARTURE (OBSTACLE), or, CROWN ONE DEPARTURE (RNAV)(OBSTACLE). Standard Instrument Departures are air traffic control (ATC) procedures printed for pilot/controller use in graphic form to provide obstruction clearance and a transition from the terminal area to the appropriate en route structure. SIDs are primarily designed for system enhancement and to reduce pilot/controller workload. ATC clearance must be received prior to flying a SID. All DPs provide the pilot with a way to depart the airport and transition to the en route structure safely. Pilots operating under 14 CFR Part 91 are strongly encouraged to file and fly a DP at night, during marginal Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC), when one is available. The following paragraphs will provide an overview of the DP program, why DPs are developed, what criteria are used, where to find them, how they are to be flown, and finally pilot and ATC responsibilities.

35.2 Why are DPs necessary? The primary reason is to provide obstacle clearance protection information to pilots. A secondary reason, at busier airports, is to increase efficiency and reduce communications and departure delays through the use of SIDs. When an instrument approach is initially developed for an airport, the need for DPs is assessed. The procedure designer conducts an obstacle analysis to support departure operations. If an aircraft may turn in any direction from a runway, and remain clear of obstacles, that runway passes what is called a diverse departure assessment and no ODP will be published. A SID may be published if needed for air traffic control purposes. However, if an obstacle penetrates what is called the 40:1 obstacle identification surface, then the procedure designer chooses whether to:

35.2.1 Establish a steeper than normal climb gradient; or

35.2.2 Establish a steeper than normal climb gradient with an alternative that increases takeoff minima to allow the pilot to visually remain clear of the obstacle(s); or

35.2.3 Design and publish a specific departure route; or

35.2.4 A combination or all of the above.

35.3 What criteria is used to provide obstruction clearance during departure?

35.3.1 Unless specified otherwise, required obstacle clearance for all departures, including diverse, is based on the pilot crossing the departure end of the runway at least 35 feet above the departure end of runway elevation, climbing to 400 feet above the departure end of runway elevation before making the initial turn, and maintaining a minimum climb gradient of 200 feet per nautical mile (FPNM), unless required to level off by a crossing restriction, until the minimum IFR altitude. A greater climb gradient may be specified in the DP to clear obstacles or to achieve an ATC crossing restriction. If an initial turn higher than 400 feet above the departure end of runway elevation is specified in the DP, the turn should be commenced at the higher altitude. If a turn is specified at a fix, the turn must be made at that fix. Fixes may have minimum and/or maximum crossing altitudes that must be adhered to prior to passing the fix. In rare instances, obstacles that exist on the extended runway centerline may make an "early turn" more desirable than proceeding straight ahead. In these cases, the published departure instructions will include the language "turn left(right) as soon as practicable." These departures will also include a ceiling and visibility minimum of at least 300 and 1. Pilots encountering one of these DPs should preplan the climb out to gain altitude and begin the turn as quickly as possible within the bounds of safe operating practices and operating limitations. This type of departure procedure is being phased out.

NOTE-
"Practical" or "feasible" may exist in some existing departure text instead of "practicable."

35.3.2 The 40:1 obstacle identification surface begins at the departure end of the runway and slopes upward at 152 FPNM until reaching the minimum IFR altitude or entering the en route structure.

35.3.3 Climb gradients greater than 200 FPNM are specified when required for obstacle clearance and/or ATC required crossing restrictions.

EXAMPLE-
"Cross ALPHA intersection at or below 4000; maintain 6000." The pilot climbs at least 200 FPNM to 6000. If 4000 is reached before ALPHA, the pilot levels off at 4000 until passing ALPHA; then immediately resumes at least 200 FPNM climb.

35.3.4 Climb gradients may be specified only to an altitude/fix, above which the normal gradient applies.

EXAMPLE-
"Minimum climb 340 FPNM to ALPHA." The pilot climbs at least 340 FPNM to ALPHA, then at least 200 FPNM to MIA.

35.3.5 Some DPs established solely for obstacle avoidance require a climb in visual conditions to cross the airport or an on-airport NAVAID in a specified direction, at or above a specified altitude. These procedures are called Visual Climb Over the Airport (VCOA).

EXAMPLE-
"Climb in visual conditions so as to cross the McElory Airport southbound, at or above 6000, then climb via Keemmling radial zero three three to Keemmling VORTAC."

35.4 Who is responsible for obstacle clearance? DPs are designed so that adherence to the procedure by the pilot will ensure obstacle protection. Additionally:

35.4.1 Obstacle clearance responsibility also rests with the pilot when he/she chooses to climb in visual conditions in lieu of flying a DP and/or depart under increased takeoff minima rather than fly the climb gradient. Standard takeoff minima are one statute mile for aircraft having two engines or less and one-half statute mile for aircraft having more than two engines. Specified ceiling and visibility minima (VCOA or increased takeoff minima) will allow visual avoidance of obstacles until the pilot enters the standard obstacle protection area. Obstacle avoidance is not guaranteed if the pilot maneuvers farther from the airport than the specified visibility minimum prior to reaching the specified altitude. DPs may also contain what are called Low Close in Obstacles. These obstacles are less than 200 feet above the departure end of runway elevation and within one NM of the runway end, and do not require increased takeoff minimums. These obstacles are identified on the SID chart or in the Take-off Minimums and (Obstacle) Departure Procedures section of the U. S. Terminal Procedure booklet. These obstacles are especially critical to aircraft that do not lift off until close to the departure end of the runway or which climb at the minimum rate. Pilots should also consider drift following lift-off to ensure sufficient clearance from these obstacles. That segment of the procedure that requires the pilot to see and avoid obstacles ends when the aircraft crosses the specified point at the required altitude. In all cases continued obstacle clearance is based on having climbed a minimum of 200 feet per nautical mile to the specified point and then continuing to climb at least 200 foot per nautical mile during the departure until reaching the minimum enroute altitude, unless specified otherwise.

35.4.2 ATC may assume responsibility for obstacle clearance by vectoring the aircraft prior to reaching the minimum vectoring altitude by using a Diverse Vector Area (DVA). The DVA has been assessed for departures which do not follow a specific ground track. ATC may also vector an aircraft off a previously assigned DP. In all cases, the 200 FPNM climb gradient is assumed and obstacle clearance is not provided by ATC until the controller begins to provide navigational guidance in the form of radar vectors.

NOTE-
When used by the controller during departure, the term "radar contact" should not be interpreted as relieving pilots of their responsibility to maintain appropriate terrain and obstruction clearance which may include flying the obstacle DP.

35.4.3 Pilots must preplan to determine if the aircraft can meet the climb gradient (expressed in feet per nautical mile) required by the departure procedure, and be aware that flying at a higher than anticipated ground speed increases the climb rate requirement in feet per minute. Higher than standard climb gradients are specified by a note on the departure procedure chart for graphic DPs, or in the Take-Off Minimums and (Obstacle) Departure Procedures section of the U.S. Terminal Procedures booklet for textual ODPs. The required climb gradient, or higher, must be maintained to the specified altitude or fix, then the standard climb gradient of 200 ft/NM can be resumed. A table for the conversion of climb gradient (feet per nautical mile) to climb rate (feet per minute), at a given ground speed, is included on page D1 of the U.S. Terminal Procedures booklets.

35.5 Where are DPs located? DPs will be listed by airport in the IFR Takeoff Minimums and (Obstacle) Departure Procedures Section, Section C, of the Terminal Procedures Publications (TPPs). If the DP is textual, it will be described in TPP Section C. SIDs and complex ODPs will be published graphically and named. The name will be listed by airport name and runway in Section C. Graphic ODPs will also have the term "(OBSTACLE)" printed in the charted procedure title, differentiating them from SIDs.

35.5.1 An ODP that has been developed solely for obstacle avoidance will be indicated with the symbol "T" on appropriate Instrument Approach Procedure (IAP) charts and DP charts for that airport. The "T" symbol will continue to refer users to TPP Section C. In the case of a graphic ODP, the TPP Section C will only contain the name of the ODP. Since there may be both a textual and a graphic DP, Section C should still be checked for additional information. The nonstandard minimums and minimum climb gradients found in TPP Section C also apply to charted DPs and radar vector departures unless different minimums are specified on the charted DP. Takeoff minimums and departure procedures apply to all runways unless otherwise specified. New graphic DPs will have all the information printed on the graphic depiction. As a general rule, ATC will only assign an ODP from a nontowered airport when compliance with the ODP is necessary for aircraft to aircraft separation. Pilots may use the ODP to help ensure separation from terrain and obstacles.

35.6 Responsibilities

35.6.1 Each pilot, prior to departing an airport on an IFR flight should consider the type of terrain and other obstacles on or in the vicinity of the departure airport; and:

35.6.2 Determine whether an ODP is available; and

35.6.3 Determine if obstacle avoidance can be maintained visually or if the ODP should be flown; and

35.6.4 Consider the effect of degraded climb performance and the actions to take in the event of an engine loss during the departure.

35.6.5 After an aircraft is established on an ODP/SID and subsequently vectored or cleared off of the ODP or SID transition, pilots shall consider the ODP/SID canceled, unless the controller adds "expect to resume ODP/SID."

35.6.6 Aircraft instructed to resume a procedure which contains restrictions, such as a DP, shall be issued/reissued all applicable restrictions or shall be advised to comply with those restrictions.

35.6.7 If an altitude to "maintain" is restated, whether prior to or after departure, previously issued "ATC" altitude restrictions are cancelled. All minimum crossing altitudes which are not identified on the chart as ATC restrictions are still mandatory for obstacle clearance. If an assigned altitude will not allow the aircraft to cross a fix at the minimum crossing altitude, the pilot should request a higher altitude in time to climb to the crossing restriction or request an alternate routing. ATC altitude restrictions are only published on SIDs and are identified on the chart with "(ATC)" following the altitude. When an obstruction clearance minimum crossing altitude is also to be published at the same fix, it is identified by the term "(MCA)."

35.6.8 Pilots of civil aircraft operating from locations where SIDs are established may expect ATC clearances containing a SID. Use of a SID requires pilot possession of the textual description or graphic depiction of the approved current SID, as appropriate. RNAV SIDs must be retrievable by the procedure name from the aircraft database and conform to charted procedure. ATC must be immediately advised if the pilot does not possess the assigned SID, or the aircraft is not capable of flying the SID. Notification may be accomplished by filing "NO SID" in the remarks section of the filed flight plan or by the less desirable method of verbally advising ATC. Adherence to all restrictions on the SID is required unless clearance to deviate is received.

35.6.9 Controllers may omit the departure control frequency if a SID clearance is issued and the departure control frequency is published on the SID.

35.7 RNAV Departure Procedures

35.7.1 All public RNAV SIDs and graphic ODPs are RNAV 1. These procedures generally start with an initial RNAV or heading leg near the departure runway end. In addition, these procedures require system performance currently met by GPS or DME/DME/IRU RNAV systems that satisfy the criteria discussed in AC 90-100A, U.S. Terminal and En Route Area Navigation (RNAV) Operations. RNAV 1 procedures require the aircraft's total system error remain bounded by ± 1 NM for 95% of the total flight time.

19.2.2 A new type of APV approach procedure, in addition to LNAV/VNAV, is being implemented to take advantage of the lateral precision provided by WAAS. This angular lateral precision, combined with an electronic glidepath allows the use of TERPS approach criteria very similar to that used for present precision approaches, with adjustments for the larger vertical containment limit. The resulting approach procedure minima, titled LPV (localizer performance with vertical guidance), may have decision altitudes as low as 200 feet height above touchdown with visibility minimums as low as $^1/_2$ mile, when the terrain and airport infrastructure support the lowest minima. LPV minima are published on the RNAV (GPS) approach charts (see ENR 1.5, paragraph 12, Instrument Approach Procedure Charts).

19.2.3 WAAS initial operating capability provides a level of service that supports all phases of flight including LNAV, LNAV/VNAV and LPV approaches.

19.2.4 A new nonprecision WAAS approach, called Localizer Performance (LP) is being added in locations where the terrain or obstructions do not allow publication of vertically guided LPV procedures. This new approach takes advantage of the angular lateral guidance and smaller position errors provided by WAAS to provide a lateral only procedure similar to an ILS Localizer. LP procedures may provide lower minima than a LNAV procedure due to the narrower obstacle clearance surface.

19.3 General Requirements

19.3.1 WAAS avionics must be certified in accordance with Technical Standard Order (TSO) C−145A, Airborne Navigation Sensors Using the (GPS) Augmented by the Wide Area Augmentation System (WAAS); or TSO−146A, Stand−Alone Airborne Navigation Equipment Using the Global Positioning System (GPS) Augmented by the Wide Area Augmentation System (WAAS), and installed in accordance with Advisory Circular (AC) 20−130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors, or AC 20−138A, Airworthiness Approval of Global Positioning System (GPS) Navigation Equipment for Use as a VFR and IFR Navigation System.

19.3.2 GPS/WAAS operation must be conducted in accordance with the FAA−approved aircraft flight manual (AFM) and flight manual supplements. Flight manual supplements will state the level of approach procedure that the receiver supports. IFR approved WAAS receivers support all GPS only operations as long as lateral capability at the appropriate level is functional. WAAS monitors both GPS and WAAS satellites and provides integrity.

19.3.3 GPS/WAAS equipment is inherently capable of supporting oceanic and remote operations if the operator obtains a fault detection and exclusion (FDE) prediction program.

19.3.4 Air carrier and commercial operators must meet the appropriate provisions of their approved operations specifications.

19.3.5 Prior to GPS/WAAS IFR operation, the pilot must review appropriate Notices to Airmen (NOTAMs) and aeronautical information. This information is available on request from an Automated Flight Service Station. The FAA will provide NOTAMs to advise pilots of the status of the WAAS and level of service available.

19.3.5.1 The term UNRELIABLE is used in conjunction with GPS and WAAS NOTAMs. The term UNRELIABLE is an advisory to pilots indicating the expected level of WAAS service (LNAV/VNAV, LPV) may not be available; e.g., **!BOS BOS WAAS LPV AND LNAV/VNAV MNM UNREL WEF 0305231700 − 0305231815**. WAAS UNRELIABLE NOTAMs are predictive in nature and published for flight planning purposes. Upon commencing an approach at locations NOTAMed WAAS UNRELIABLE, if the WAAS avionics indicate LNAV/VNAV or LPV service is available, then vertical guidance may be used to complete the approach using the displayed level of service. Should an outage occur during the approach, reversion to LNAV minima may be required.

a) Area−wide WAAS UNAVAILABLE NOTAMs indicate loss or malfunction of the WAAS system. In flight, Air Traffic Control will advise pilots requesting a GPS or RNAV (GPS) approach of WAAS UNAVAILABLE NOTAMs if not contained in the ATIS broadcast.

b) Site−specific WAAS UNRELIABLE NOTAMs indicate an expected level of service, e.g., LNAV/VNAV or LPV may not be available. Pilots must request site−specific WAAS NOTAMs during flight planning. In flight, Air Traffic Control will not advise pilots of WAAS UNRELIABLE NOTAMs.

c) When the approach chart is annotated with the W symbol, site−specific WAAS UNRELIABLE

NOTAMs or Air Traffic advisories are not provided for outages in WAAS LNAV/VNAV and LPV vertical service.

NOTE-
Area-wide WAAS UNAVAILABLE NOTAMs apply to all airports in the WAAS UNAVAILABLE area designated in the NOTAM, including approaches at airports where an approach chart is annotated with the W symbol.

19.3.6 GPS/WAAS was developed to be used within SBAS GEO coverage (WAAS or other interoperable system) without the need for other radio navigation equipment appropriate to the route of flight to be flown. Outside the SBAS coverage or in the event of a WAAS failure, GPS/WAAS equipment reverts to GPS-only operation and satisfies the requirements for basic GPS equipment.

19.3.7 Unlike TSO-C129 avionics, which were certified as a supplement to other means of navigation, WAAS avionics are evaluated without reliance on other navigation systems. As such, installation of WAAS avionics does not require the aircraft to have other equipment appropriate to the route to be flown.

19.3.7.1 Due to initial system limitation, there are certain restrictions on WAAS operations. Pilots may plan to use any instrument approach authorized for use with WAAS avionics at a required alternate. However, when using WAAS at an alternate airport, flight planning must be based on flying the RNAV (GPS) LNAV minima line, or minima on a GPS approach procedure, or conventional approach procedure with "or GPS" in the title. Code of Federal Regulation (CFR) Part 91 nonprecision weather requirements must be used for planning. Upon arrival at an alternate, when the WAAS navigation system indicates that LNAV/VNAV or LPV service is available, then vertical guidance may be used to complete the approach using the displayed level of service. The FAA has begun removing the **NA** (Alternate Minimums Not Authorized) symbol from select RNAV (GPS) and GPS approach procedures so they may be used by approach approved WAAS receivers at alternate airports. Some approach procedures will still require the **NA** for other reasons, such as no weather reporting, so it cannot be removed from all procedures. Since every procedure must be individually evaluated, removal of the **NA** from RNAV (GPS) and GPS procedures will take some time.

19.4 Flying procedures with WAAS

19.4.1 WAAS receivers support all basic GPS approach functions and will provide additional capabilities. One of the major improvements is the ability to generate an electronic glide path, independent of ground equipment or barometric aiding. This eliminates several problems such as cold temperature effects, incorrect altimeter setting or lack of a local altimeter source and allows approach procedures to be built without the cost of installing ground stations at each airport. Some approach certified receivers will only support a glide path with performance similar to Baro-VNAV, and are authorized to fly the LNAV/VNAV line of minima on the RNAV (GPS) approach charts. Receivers with additional capability which support the performance requirements for precision approaches (including update rates and integrity limits) will be authorized to fly the LPV line of minima. The lateral integrity changes dramatically from the 0.3 NM (556 meter) limit for GPS, LNAV and LNAV/VNAV approach mode, to 40 meters for LPV. It also adds vertical integrity monitoring, which for LNAV/VNAV and LPV approaches bounds the vertical error to 50 meters.

19.4.2 When an approach procedure is selected and active, the receiver will notify the pilot of the most accurate level of service supported by the combination of the WAAS signal, the receiver, and the selected approach, using the naming conventions on the minima lines of the selected approach procedure. For example, if an approach is published with LPV minima and the receiver is only certified for LNAV/VNAV, the equipment would indicate "LPV not available - Use LNAV/VNAV minima," even though the WAAS signal would support LPV. If flying an existing LNAV/VNAV procedure, the receiver will notify the pilot "LNAV/VNAV available" even if the receiver is certified for LPV and the WAAS signal supports LPV. If the WAAS signal does not support published minima lines which the receiver is certified to fly, the receiver will notify the pilot with a message such as "LPV not available - use LNAV/VNAV minima" or "LPV not available - use LNAV minima." Once this notification has been given, the receiver will operate in this mode for the duration of that approach procedure. The receiver cannot change back to a more accurate level of service until the next time an approach is activated.

PART 3 – AERODROMES (AD)

AD 0.

AD 0.1 Preface – Not applicable

AD 0.2 Record of AIP Amendments – See GEN 0.2-1

AD 0.3 Record of AIP Supplements – Not applicable

AD 0.4 Checklist of Pages

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0.4-2	14 FEB 08
0.6-1	15 MAR 07
AD 1	
1.1-1	15 MAR 07
1.1-2	15 MAR 07
1.1-3	15 MAR 07
1.1-4	15 MAR 07
1.1-5	15 MAR 07
1.1-6	15 MAR 07
1.1-7	15 MAR 07
1.1-8	15 MAR 07
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2-55	14 FEB 08

AD 0.5 List of Hand Amendments to the AIP − Not applicable

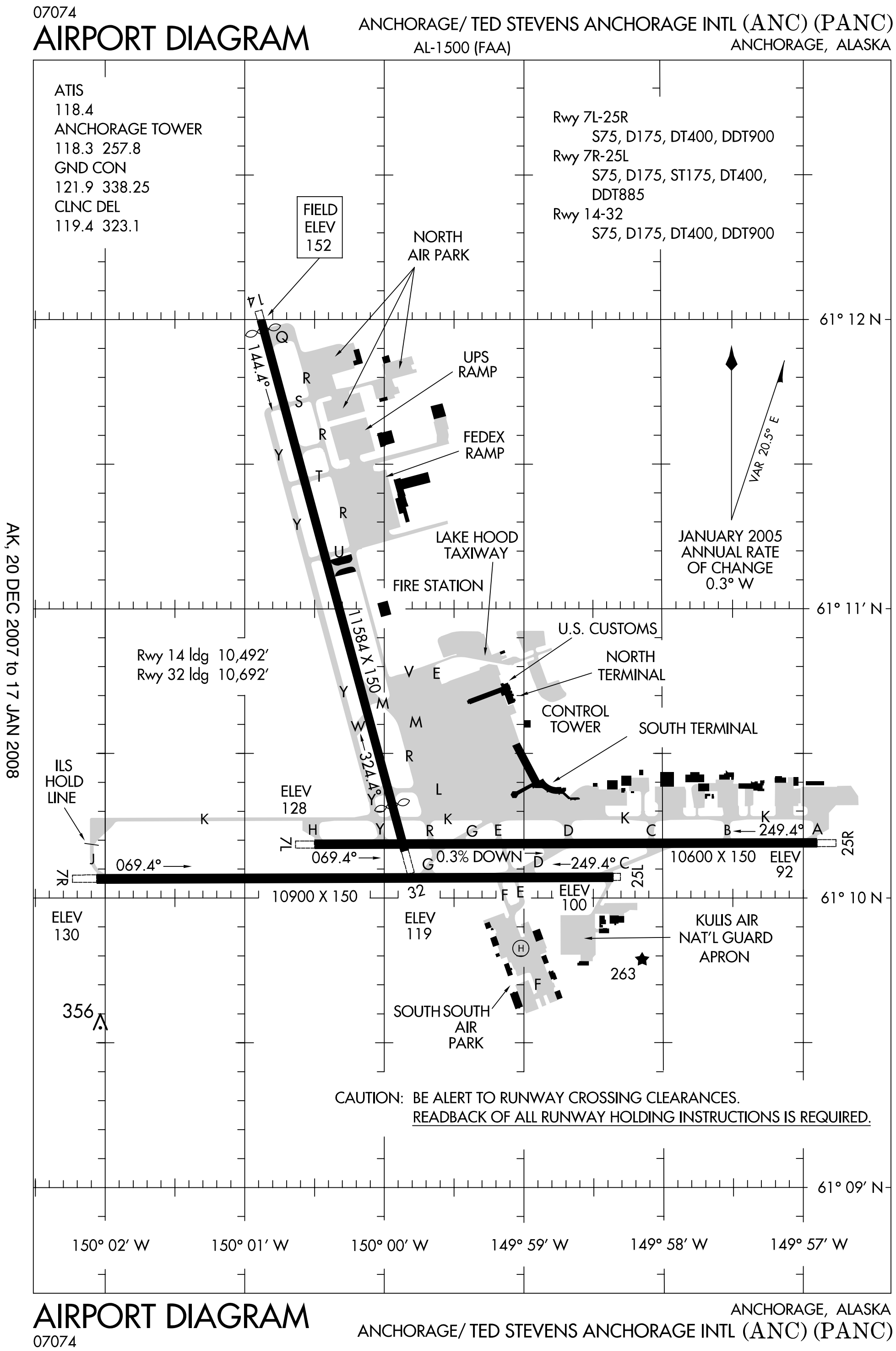
ICAO ID	Location	Airport Name	Designation
Tennessee			
KMEM	Memphis	Memphis International	Regular
KBNA	Nashville	Nashville International	Regular
Texas			
KDFW	Dallas	Dallas-Fort Worth International	Regular
KELP	El Paso	El Paso International	Regular
KIAH	Houston	George Bush Intercontinental/ Houston	Regular
KLRD	Laredo	Laredo International	Regular
KSAT	San Antonio	San Antonio International	Regular
Utah			
KSLC	Salt Lake City	Salt Lake City International	Regular
Virgin Islands			
TIST	Charlotte Amalie St. Thomas	Cyril E. King	Regular
TISX	Christiansted St. Croix	Henry E Rohlsen	Regular

ICAO ID	Location	Airport Name	Designation
Washington			
KPAE	Everett	Snohomish County (Paine Field)	Alternate
KSEA	Seattle	Seattle-Tacoma International	Regular
KGEG	Spokane	Spokane International	Alternate
Wisconsin			
KMKE	Milwaukee	General Mitchell International	Regular

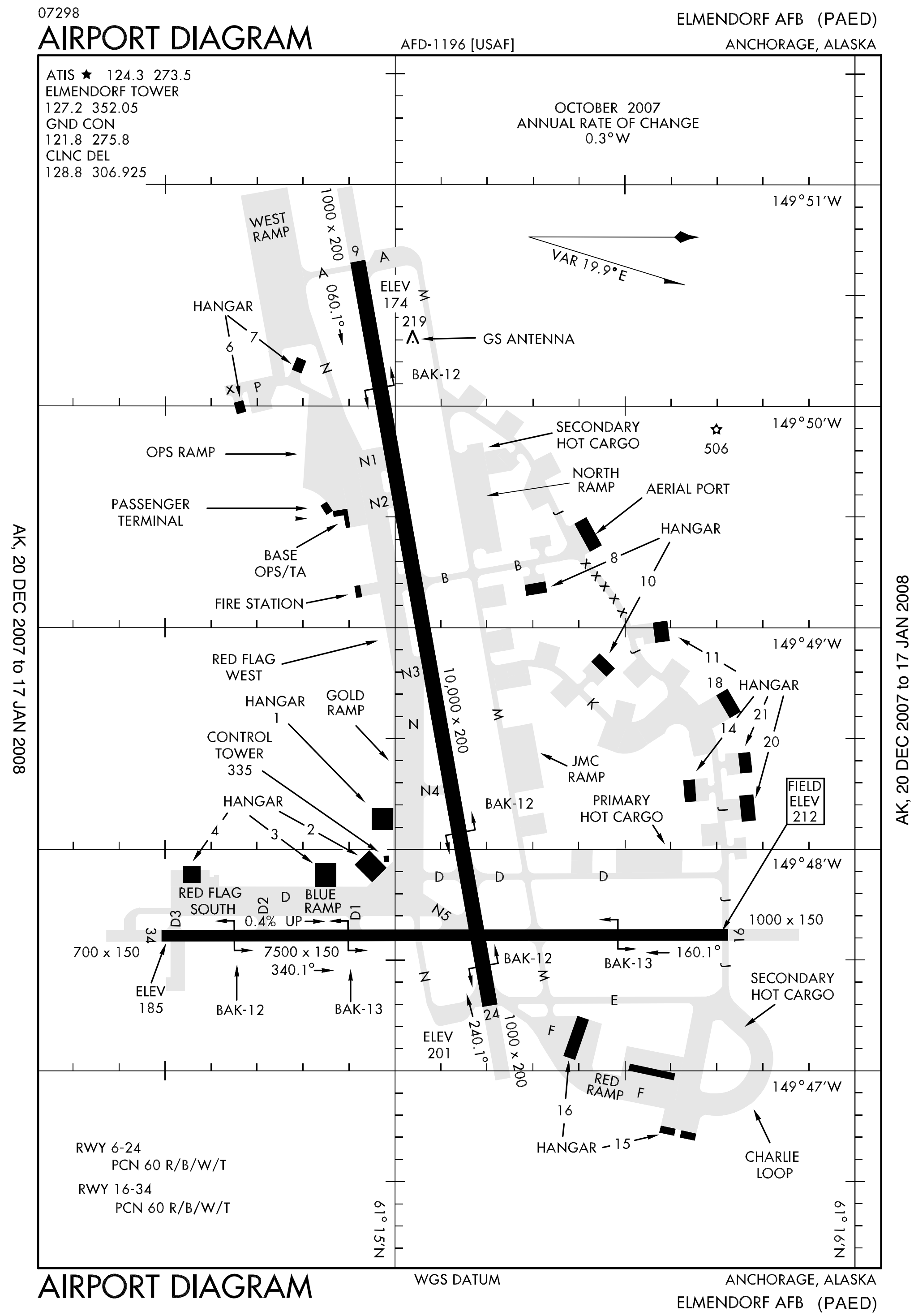
1.1 Diagrams of these airports, arranged alphabetically by state and in the order listed above, are on the pages following. The most up-to-date diagrams of these and other U.S. airports are in the Terminal Procedures Publication (TPP). For additional information on these airports, see the U.S. Airport/ Facility Directory (A/FD).

1.2 Both the A/FD and TPP may be purchased from:
National Aeronautical Charting Office (NACO)
Distribution Division,
Federal Aviation Administration
6303 Ivy Lane, Suite 400
Greenbelt, MD 20770
Telephone: 301-436-8301/6990
301-436-6829 (FAX)
e-mail: 9-AMC-Chartsales@faa.gov

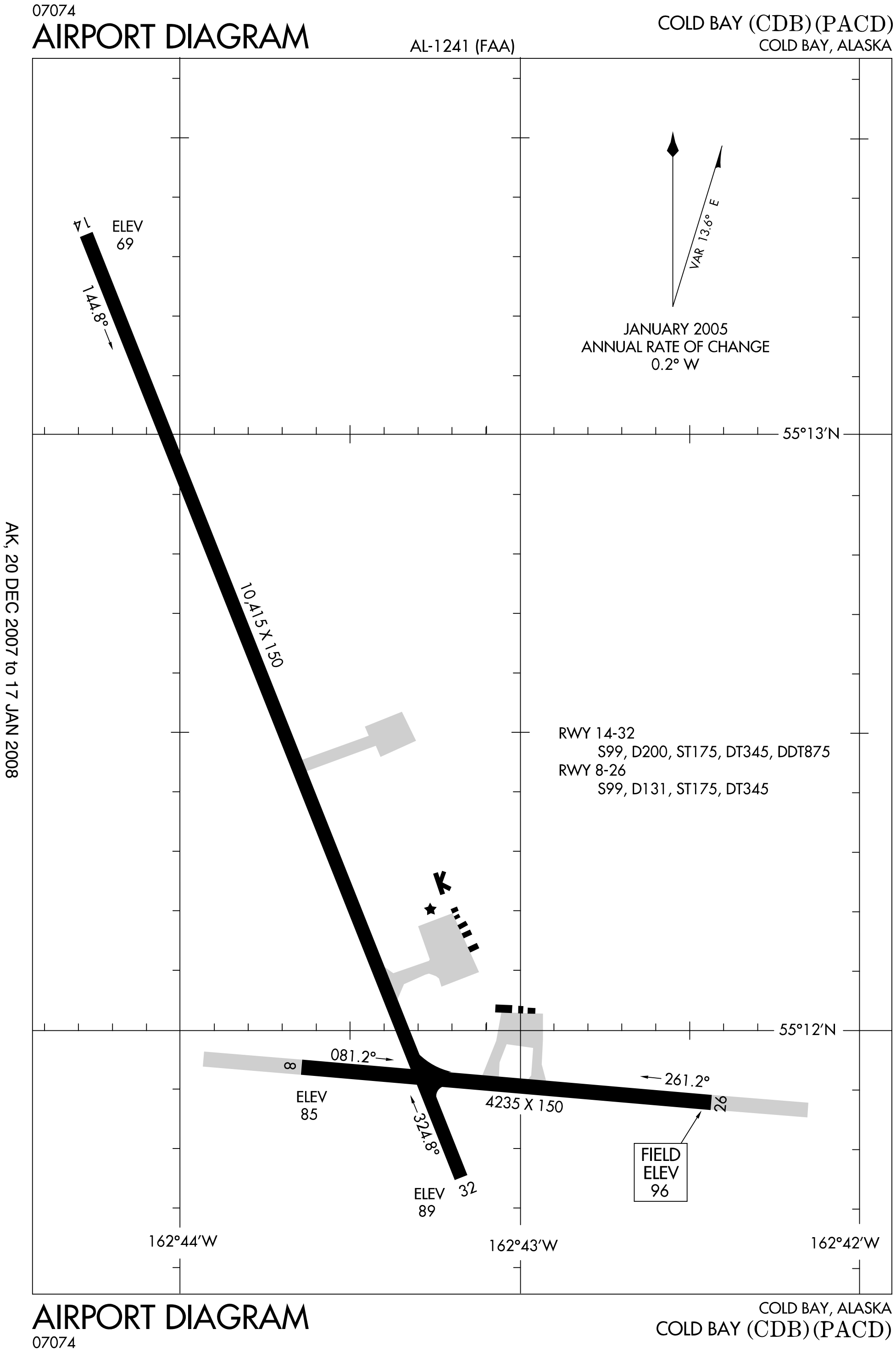
Anchorage, Alaska
Ted Stevens Anchorage International
ICAO Identifier PANC



Anchorage, Alaska
Elmendorf AFB
ICAO Identifier PAED



Cold Bay, Alaska
Cold Bay
ICAO Identifier PACD



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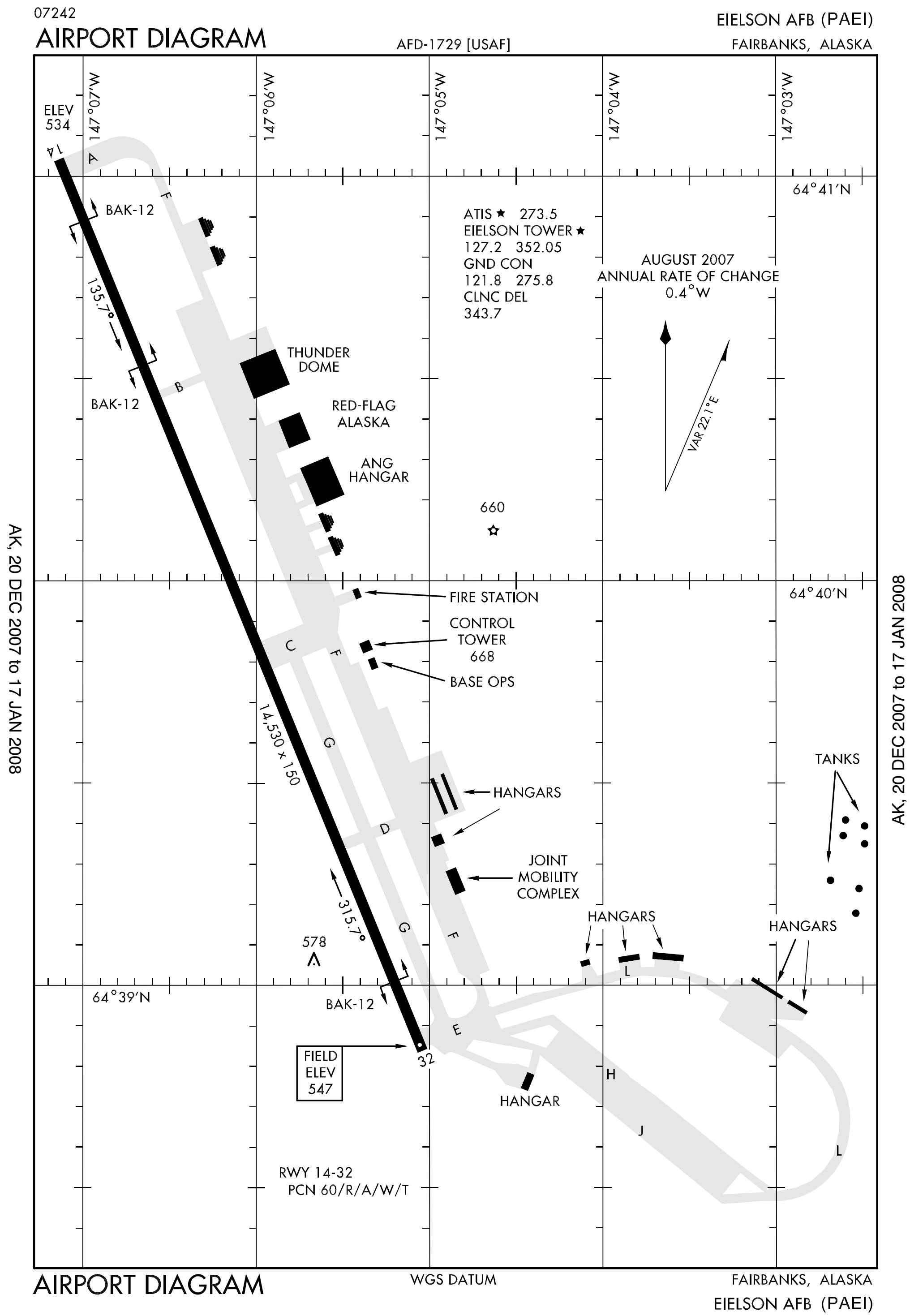
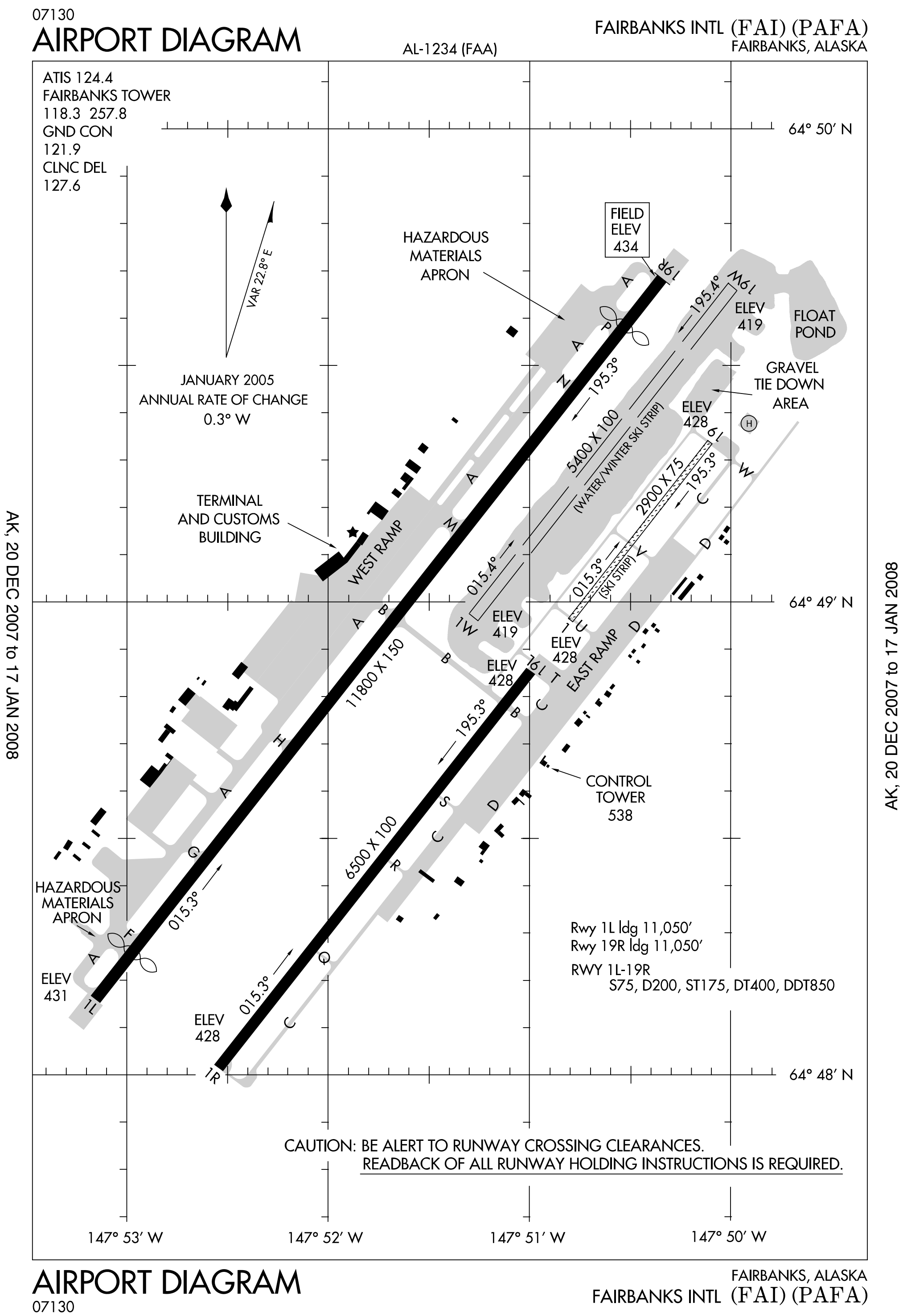
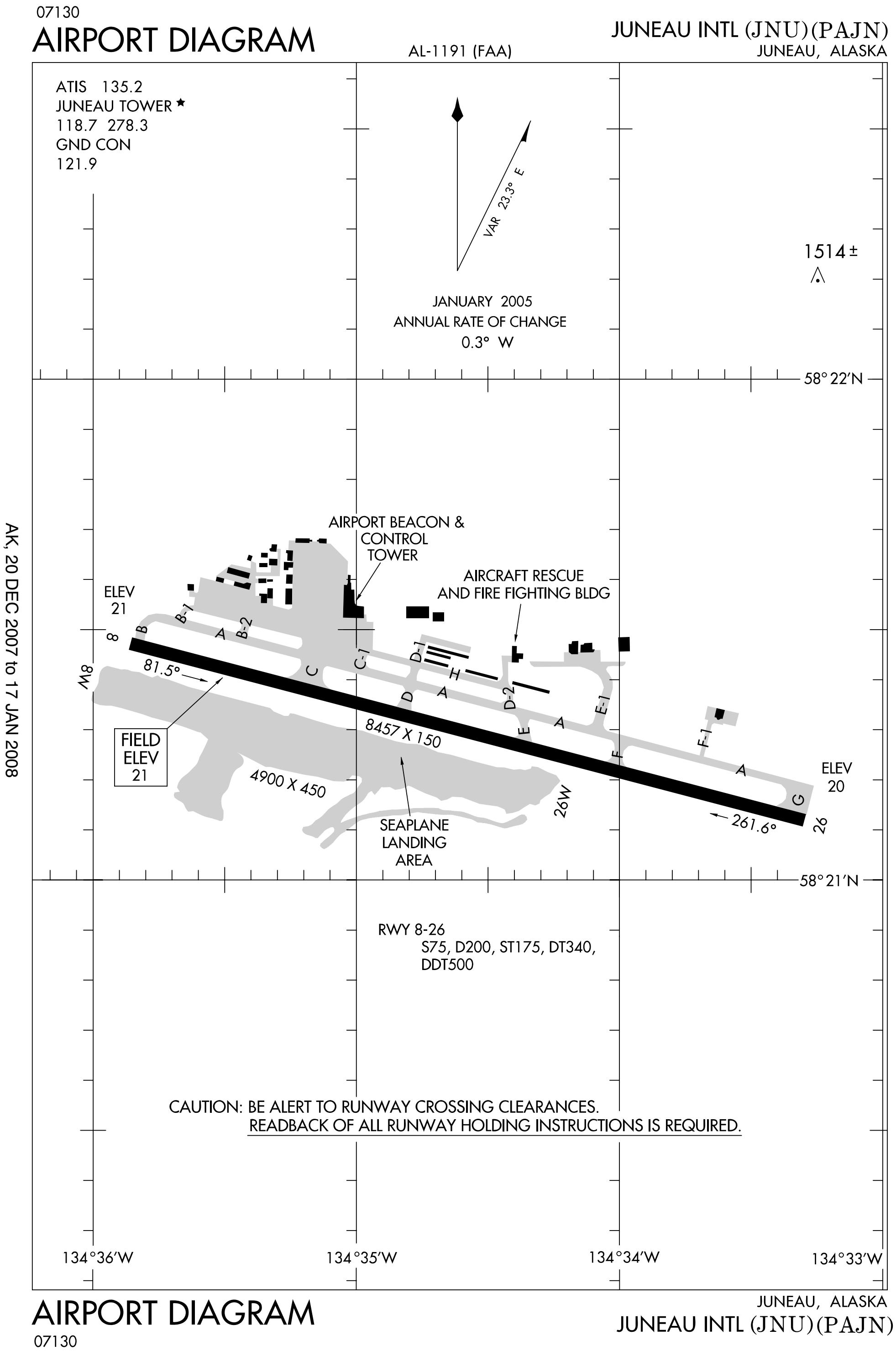
Eielson AFB
ICAO Identifier PAEI



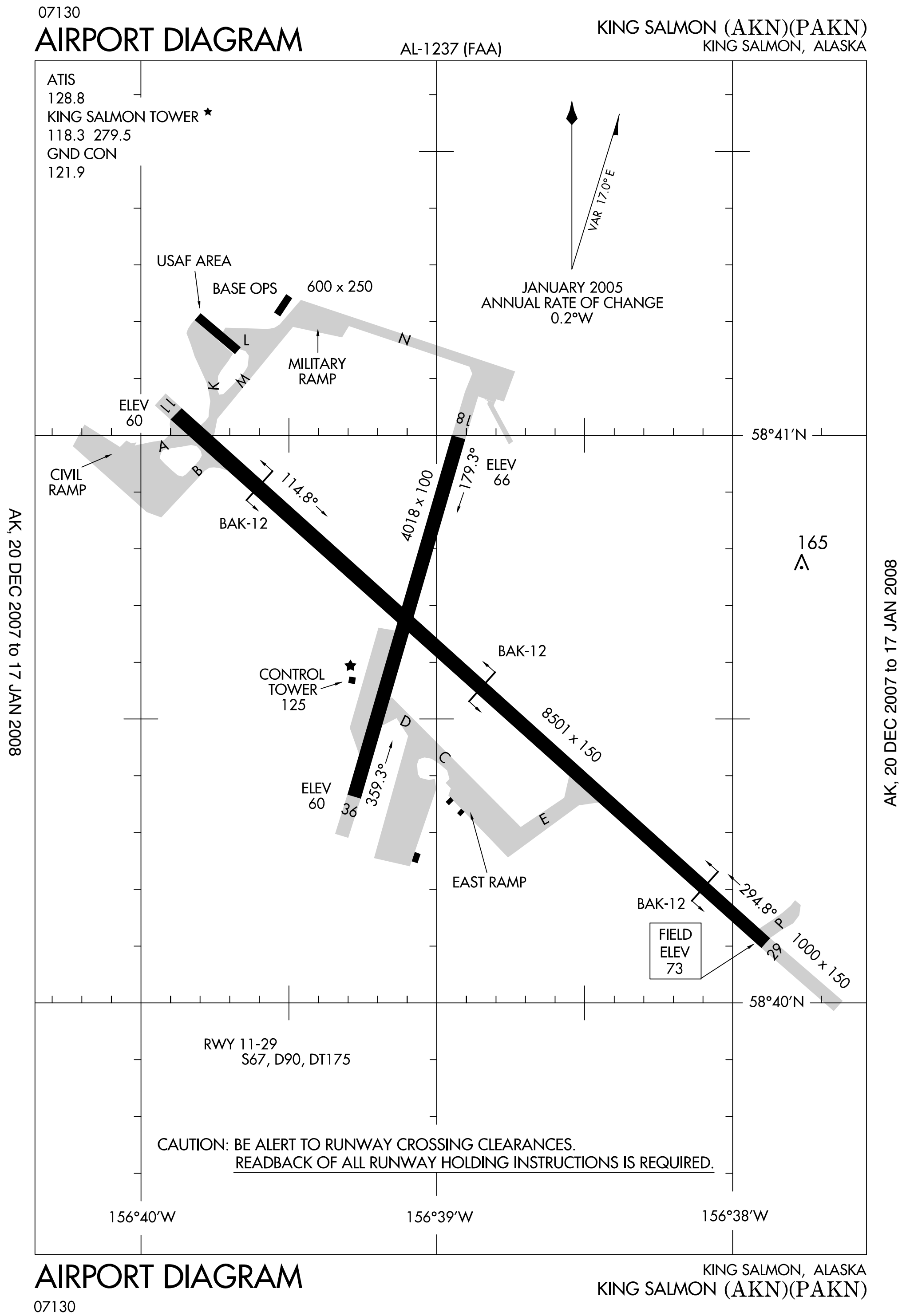
Fairbanks, Alaska
Fairbanks International
ICAO Identifier PAFA



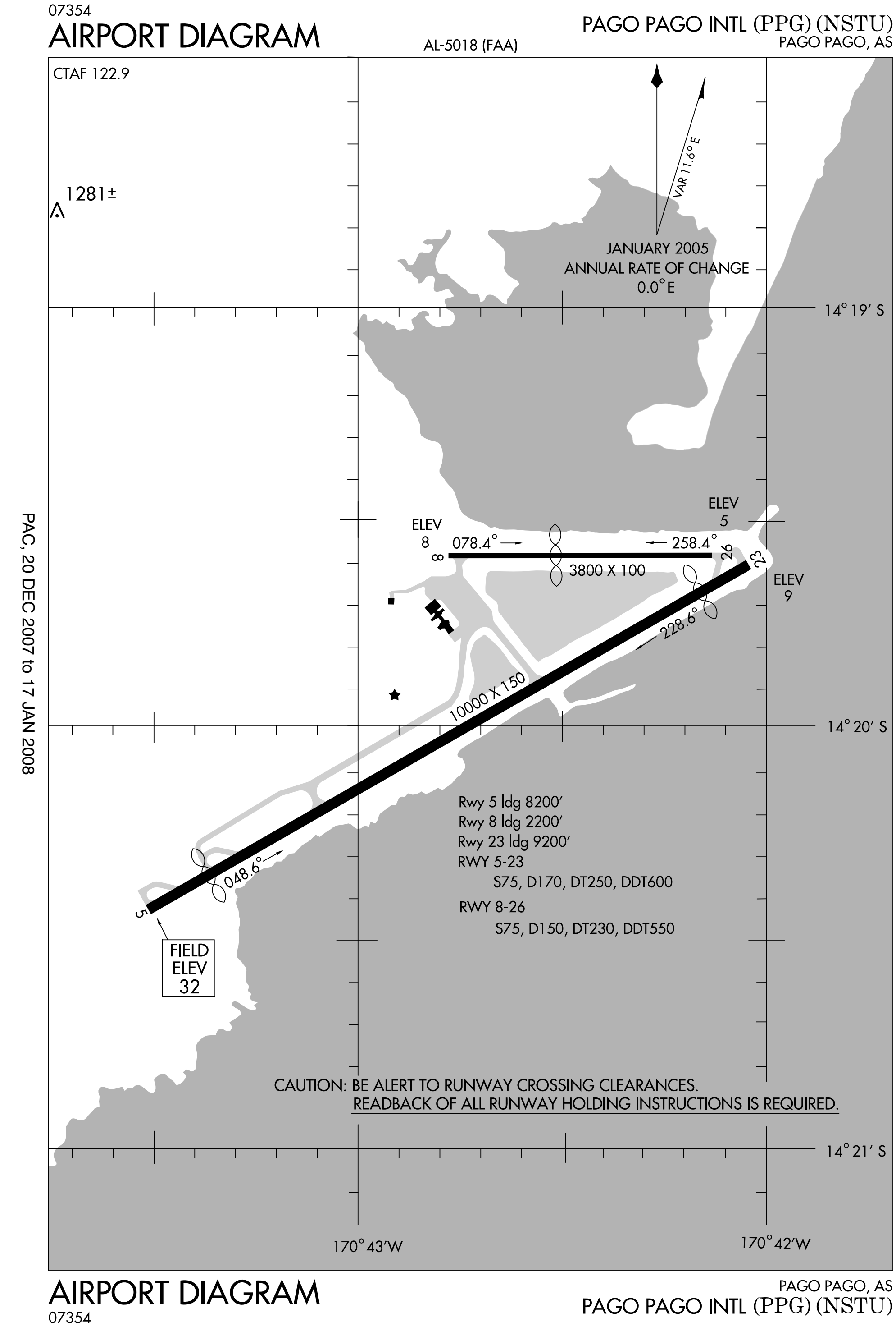
Juneau, Alaska
Juneau International
ICAO Identifier PAJN



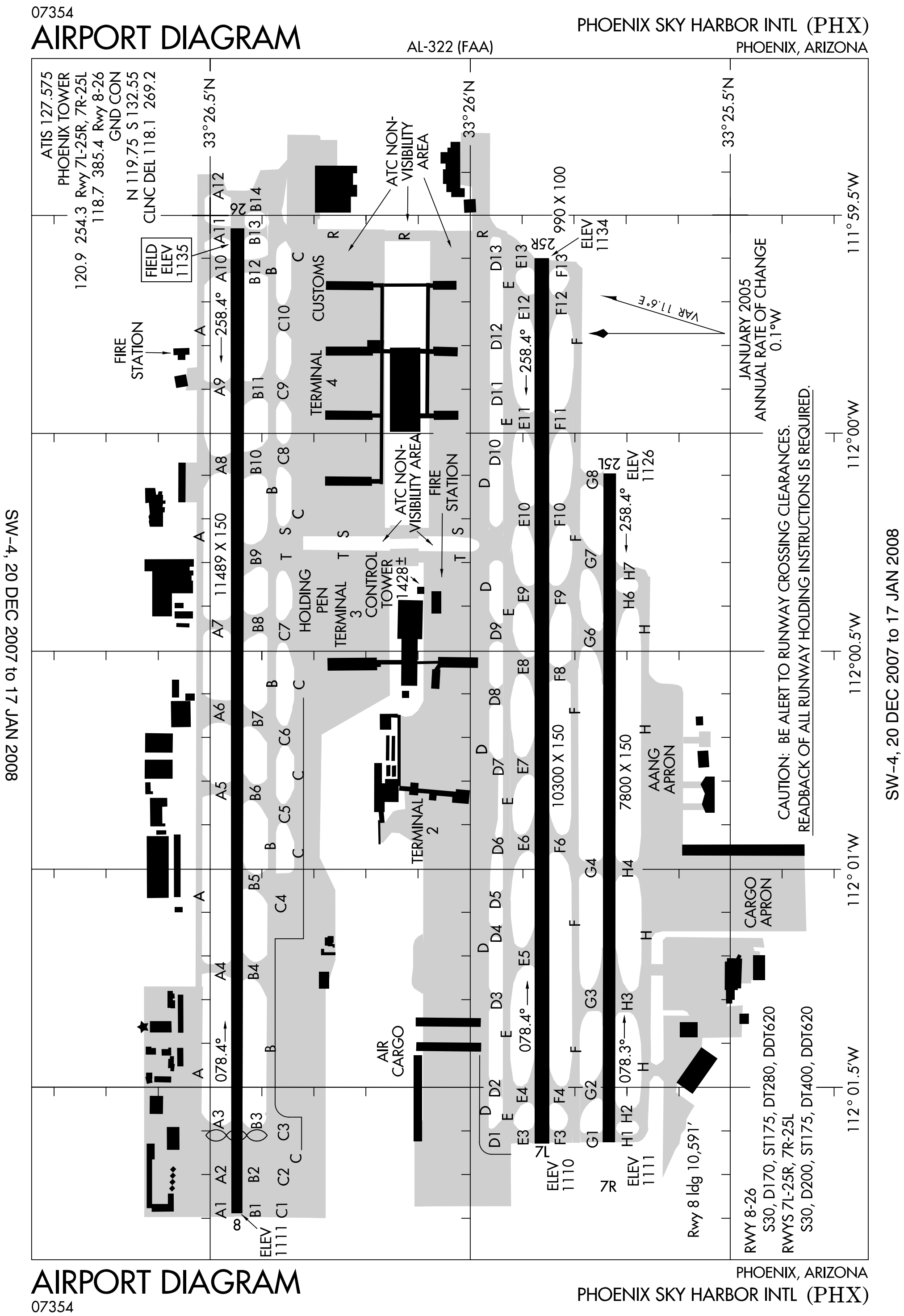
King Salmon, Alaska
King Salmon
ICAO Identifier PAKN



Pago Pago, American Samoa
Pago Pago/International
ICAO Identifier NSTU



Phoenix, Arizona
Phoenix Sky Harbor International
ICAO Identifier KPHX



Tucson, Arizona
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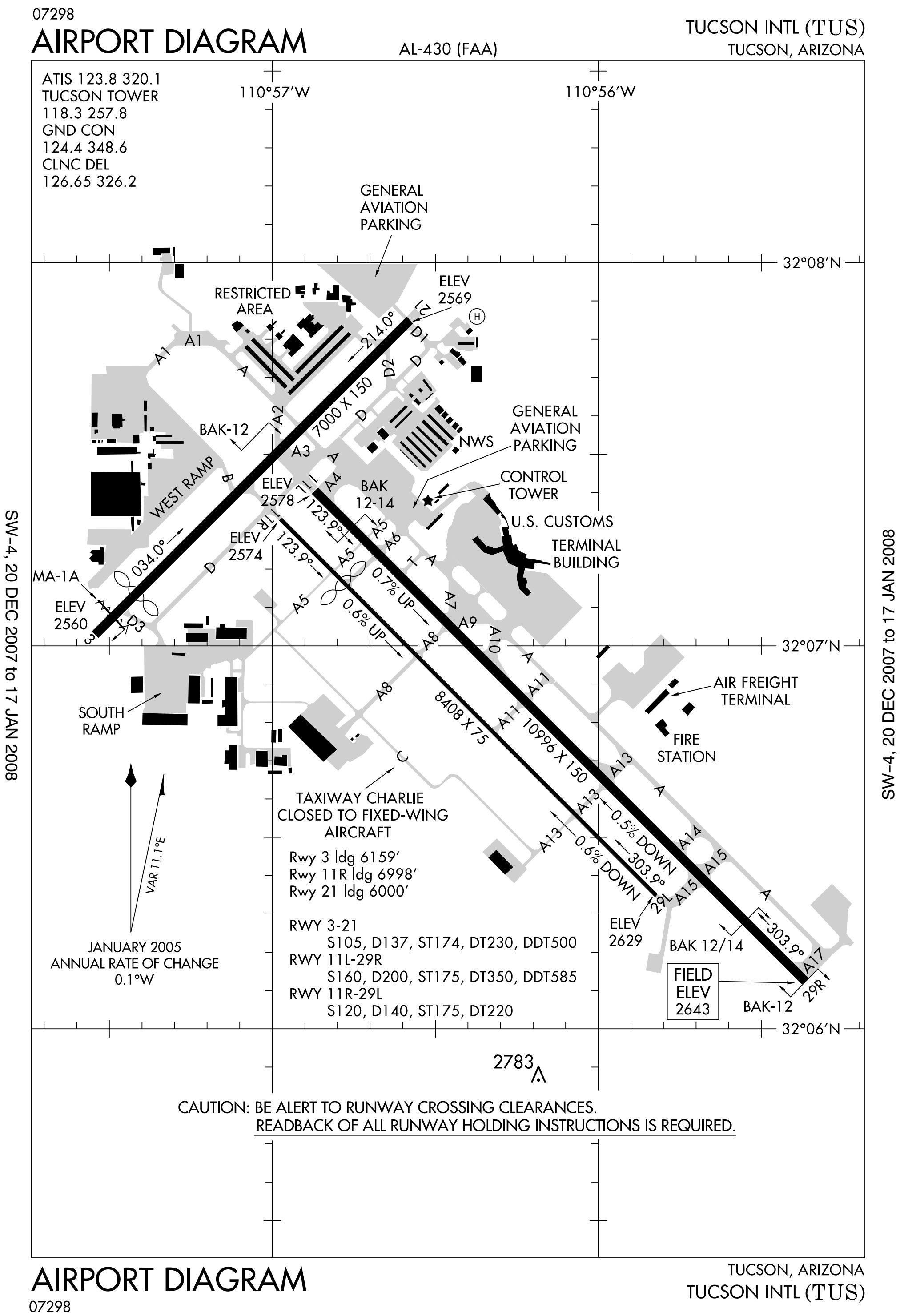
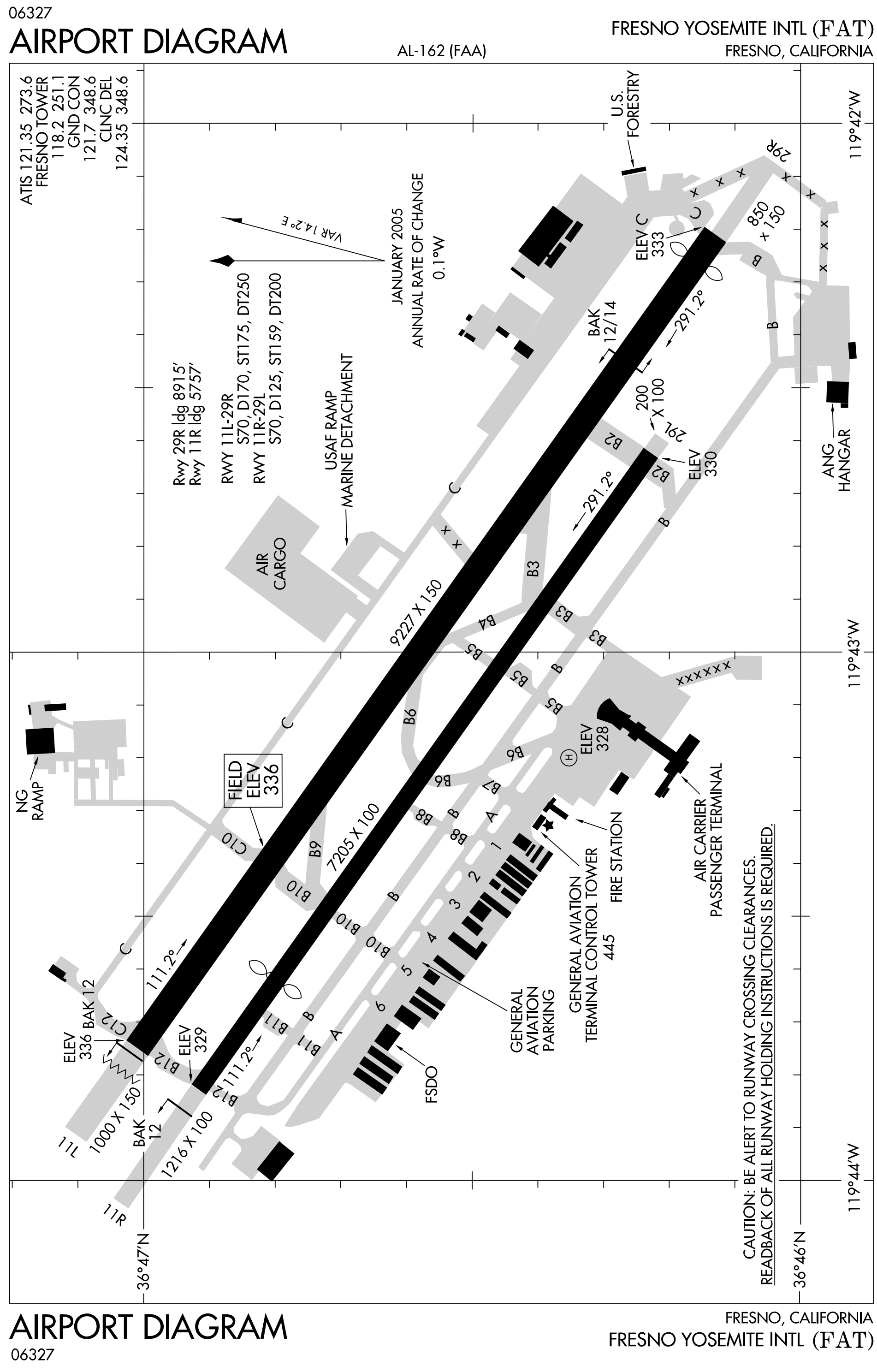
ICAO Identifier KTUS



Fresno, California
Fresno Yosemite International
ICAO Identifier KFAT

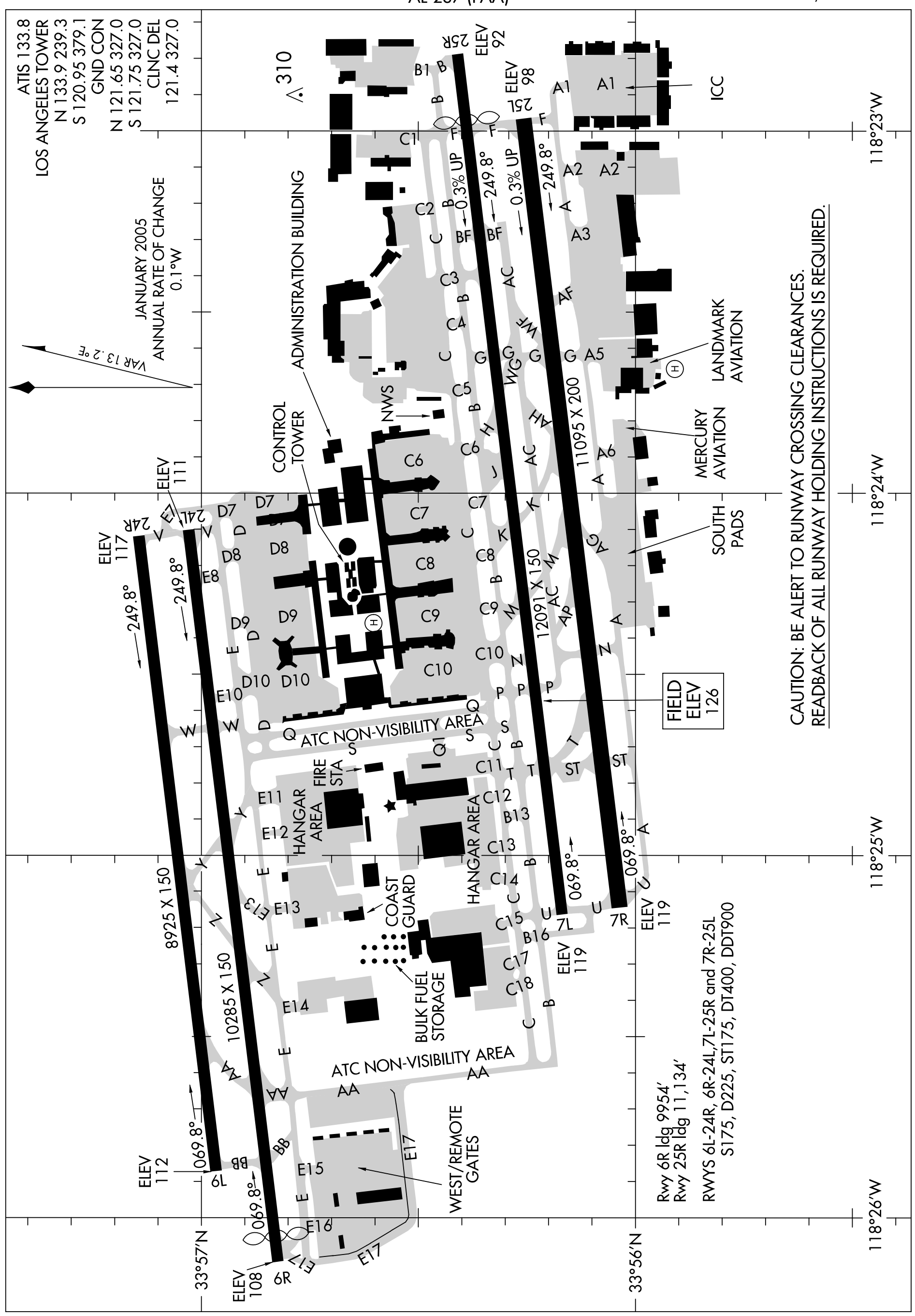


Los Angeles, California
Los Angeles International
ICAO Identifier KLAX

07354
AIRPORT DIAGRAM

AL-237 (FAA)

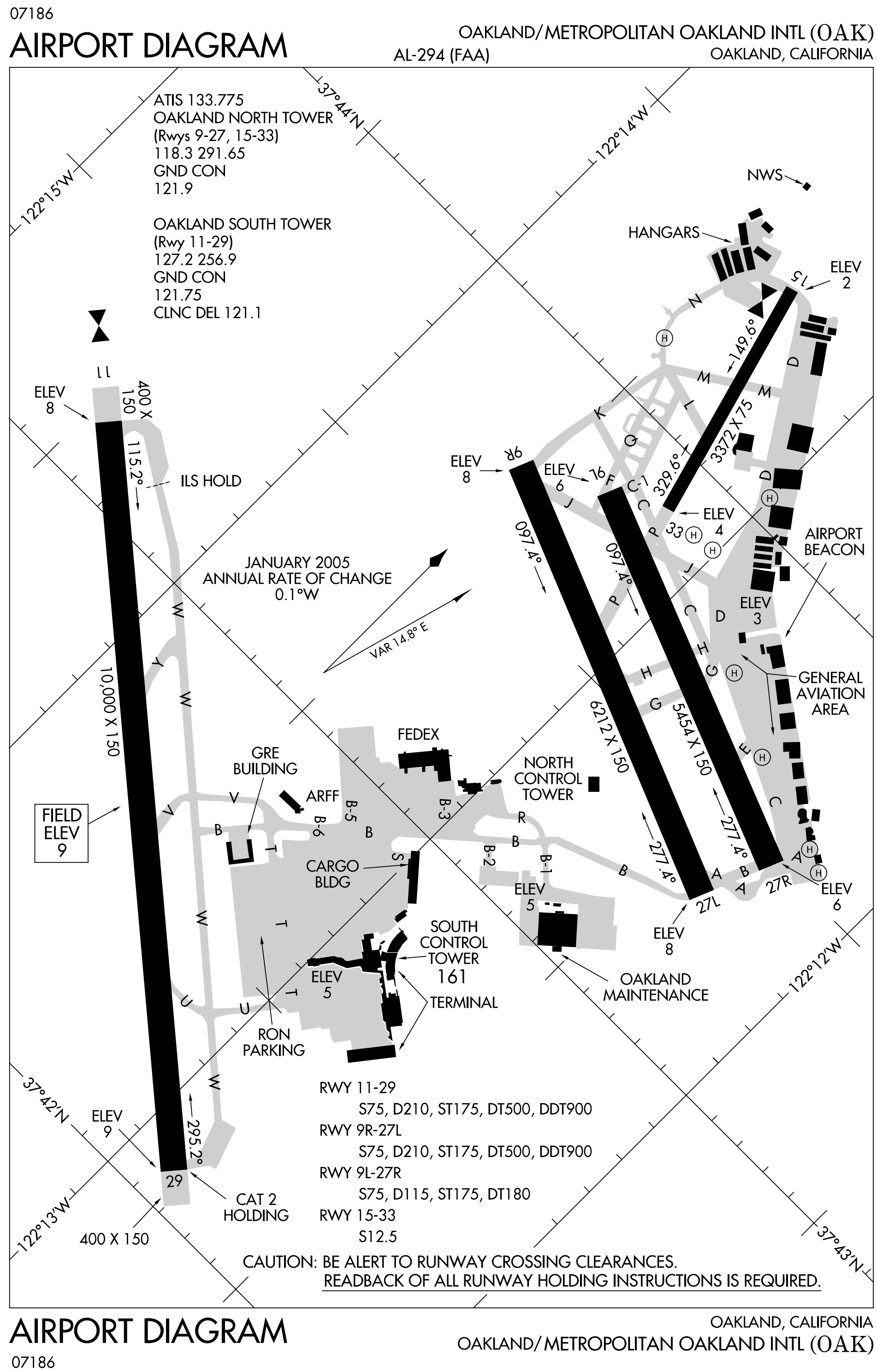
LOS ANGELES INTL (LAX)
LOS ANGELES, CALIFORNIA



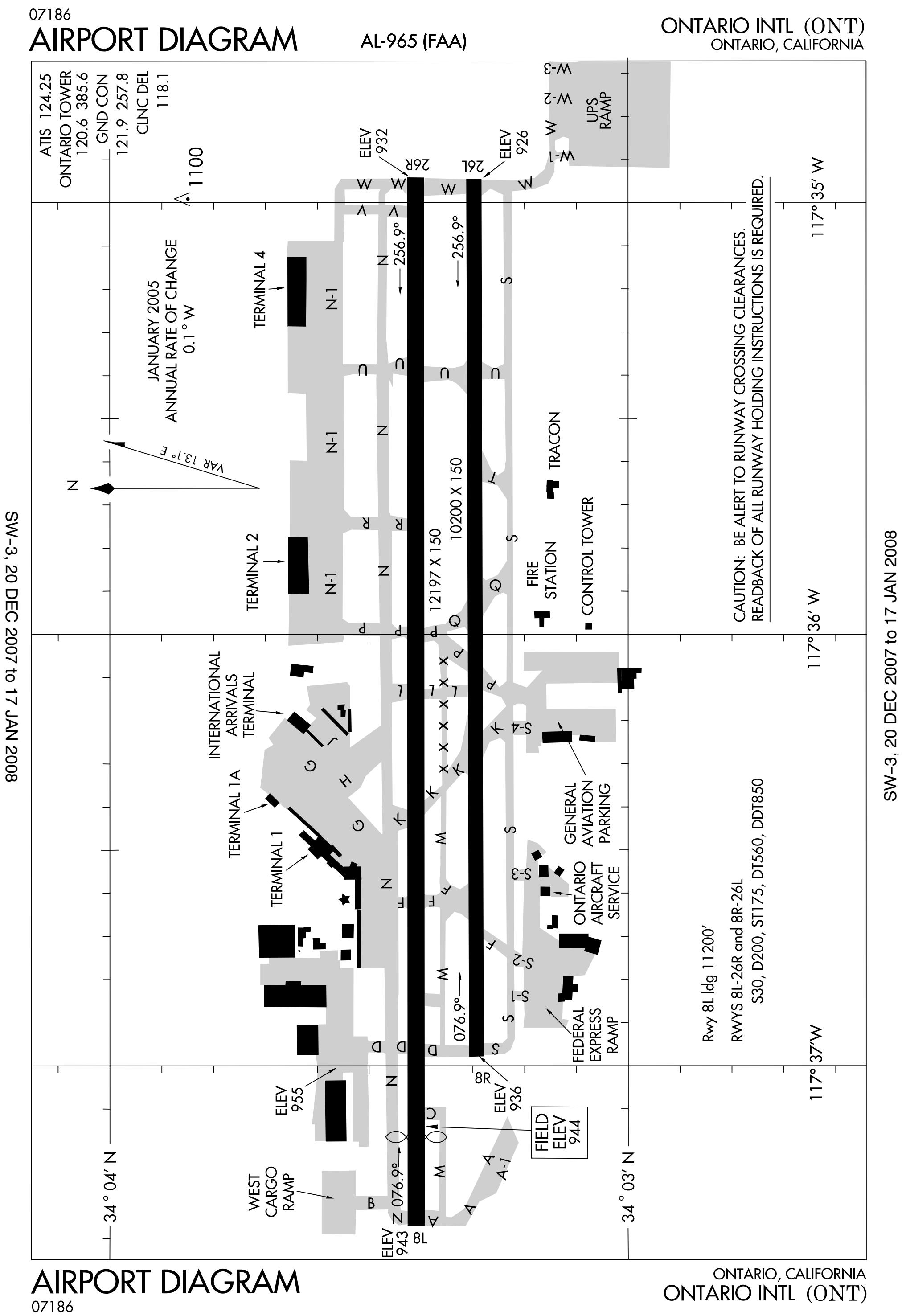
AIRPORT DIAGRAM
07354

LOS ANGELES, CALIFORNIA
LOS ANGELES INTL (LAX)

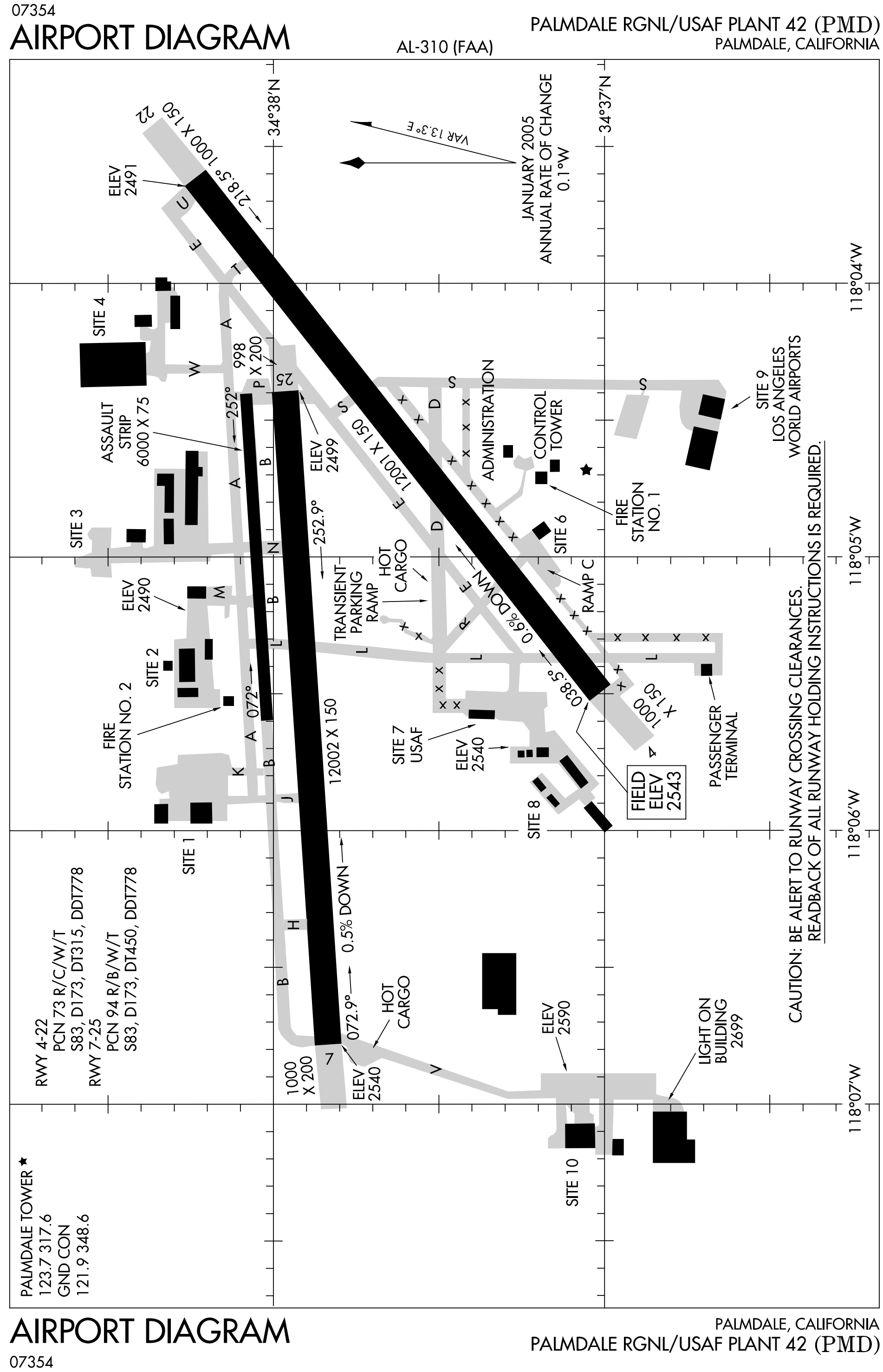
Oakland, California
Metropolitan Oakland International
ICAO Identifier KOAK



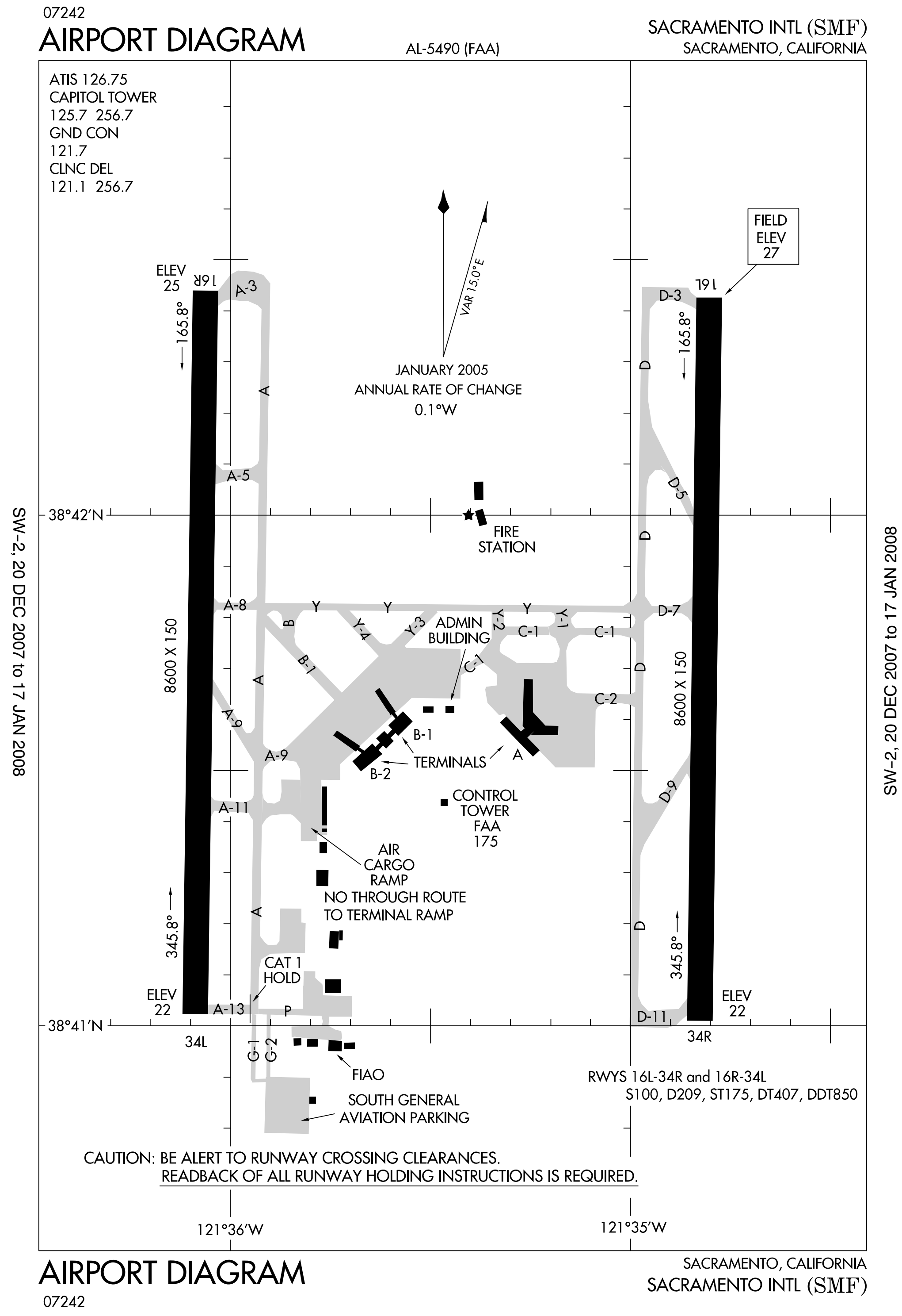
Ontario, California
Ontario International
ICAO Identifier KONT



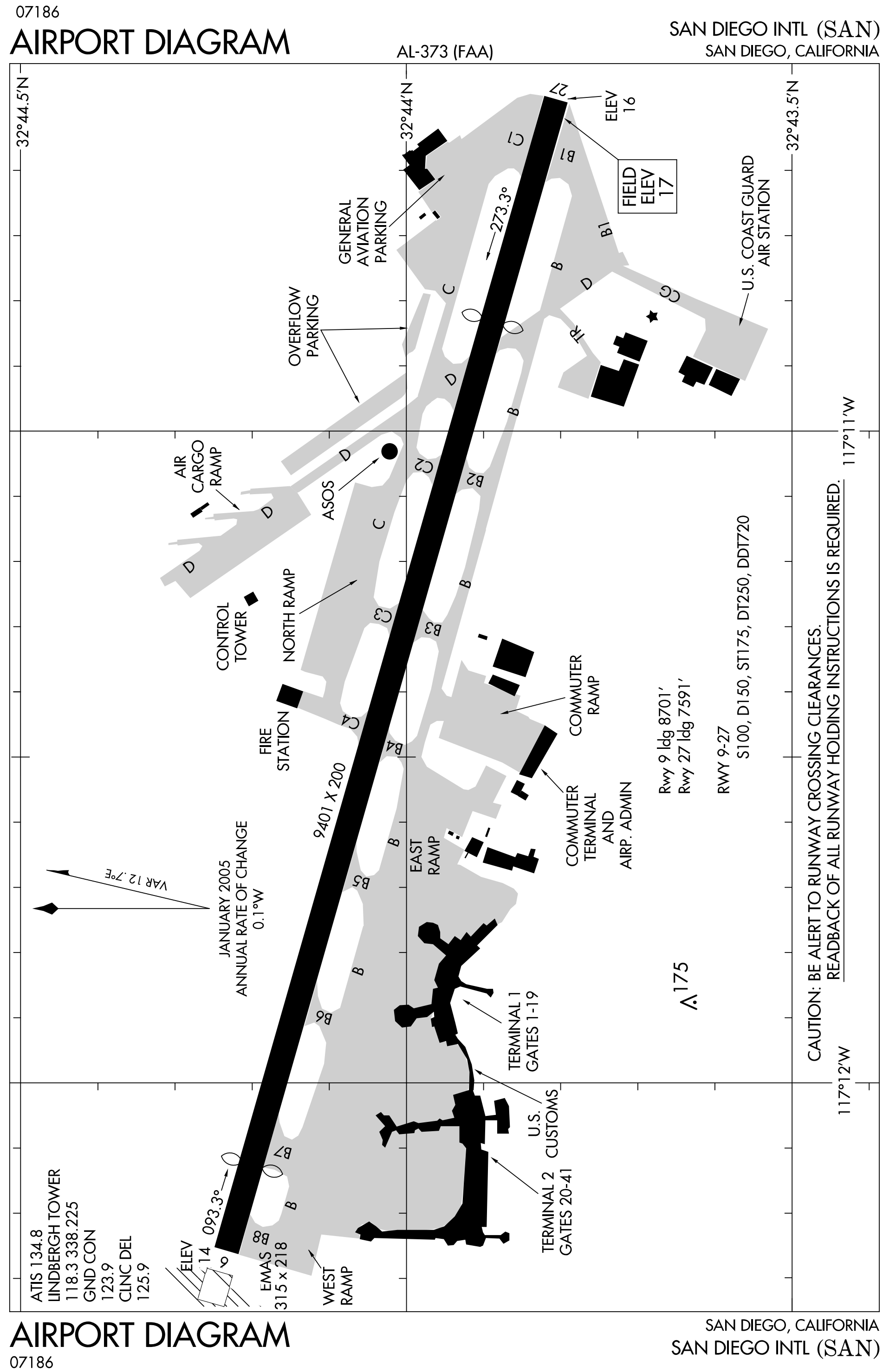
Palmdale, California
Palmdale Production Flight/Test Installation
AF Plant #42
ICAO Identifier KPMD



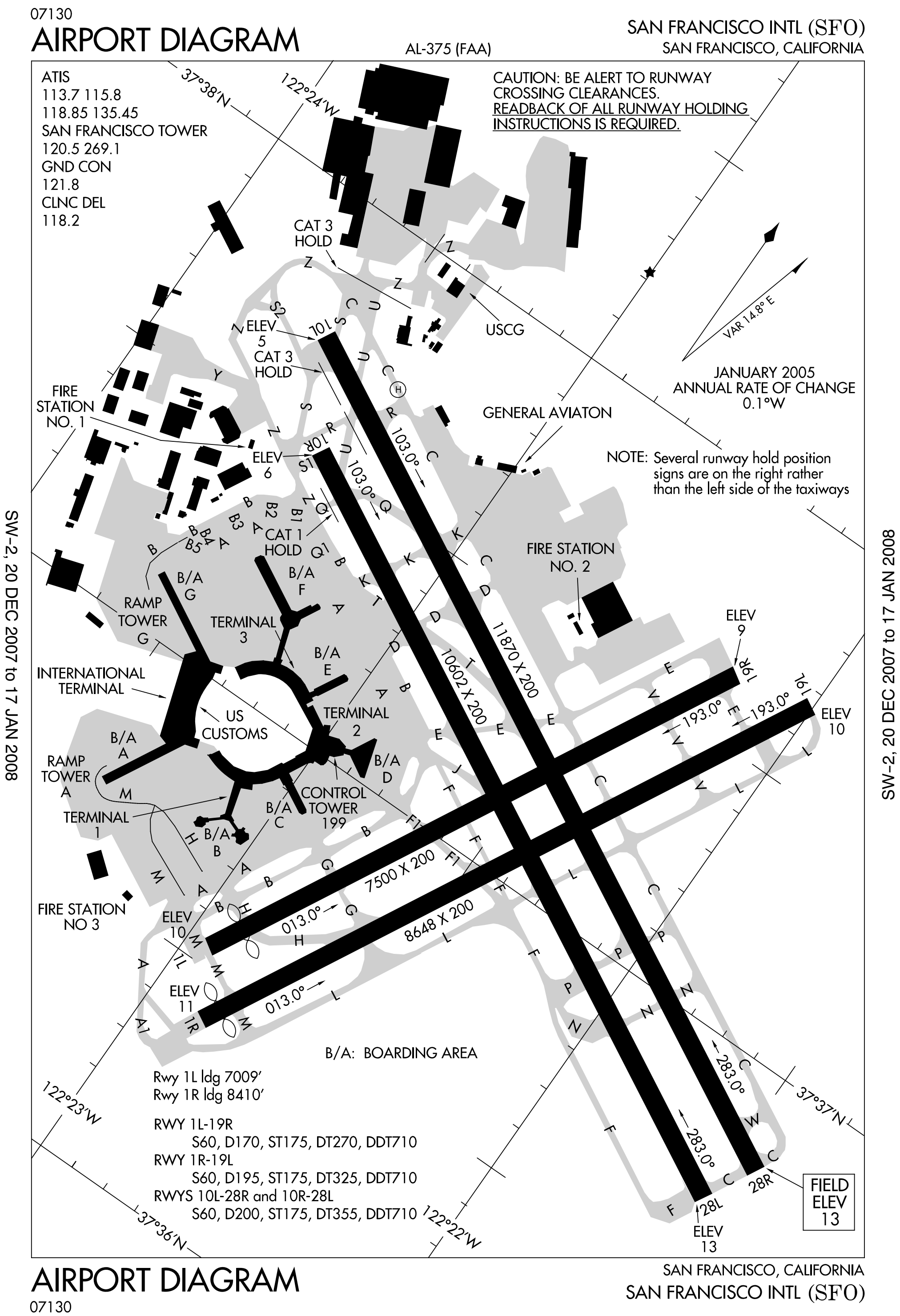
Sacramento, California
Sacramento International
ICAO Identifier KSMF



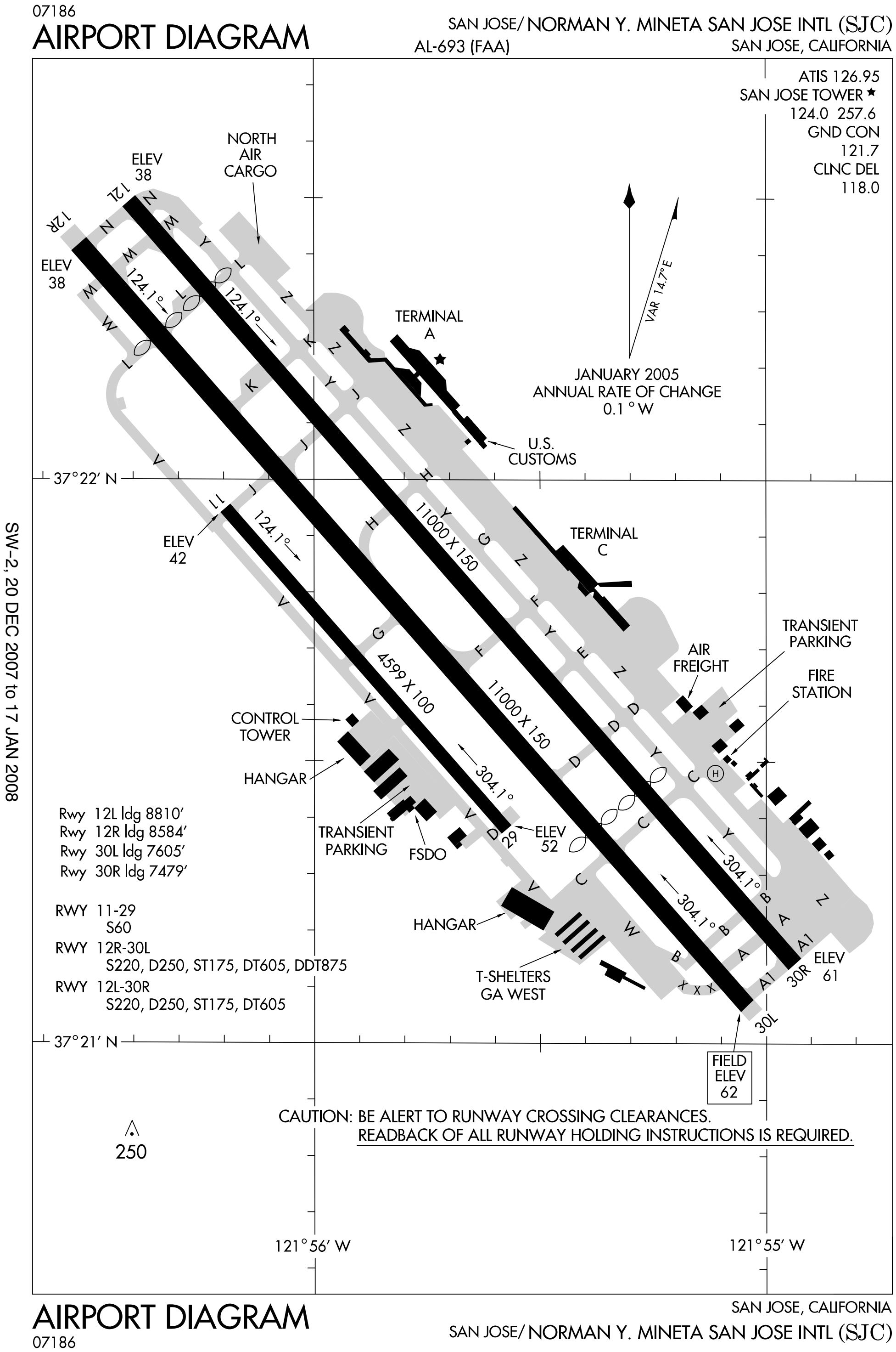
San Diego, California
San Diego International
ICAO Identifier KSAN



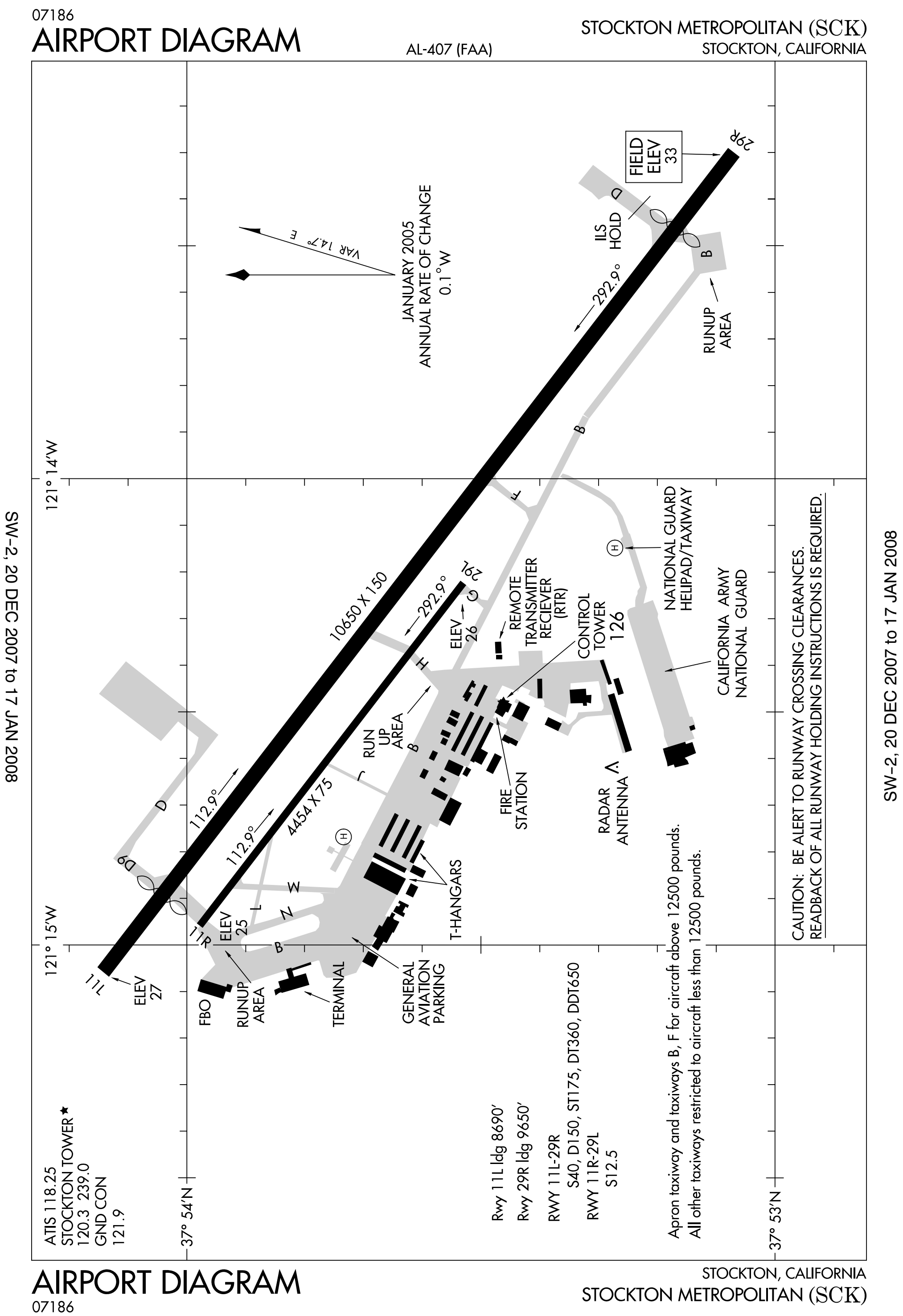
San Francisco, California
San Francisco International
ICAO Identifier KSFO



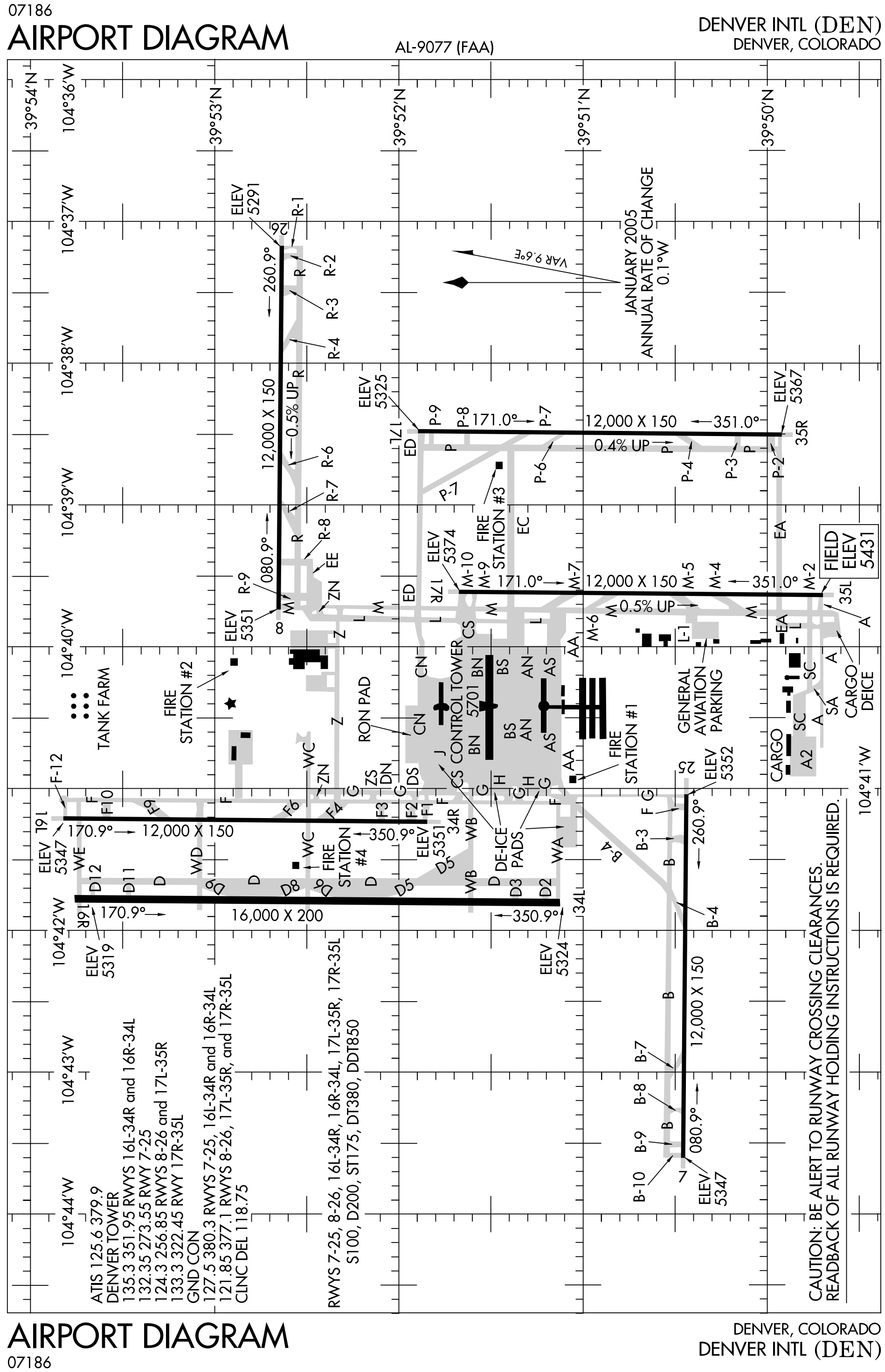
San Jose, California
Norman Y. Mineta San Jose International
ICAO Identifier KSJC



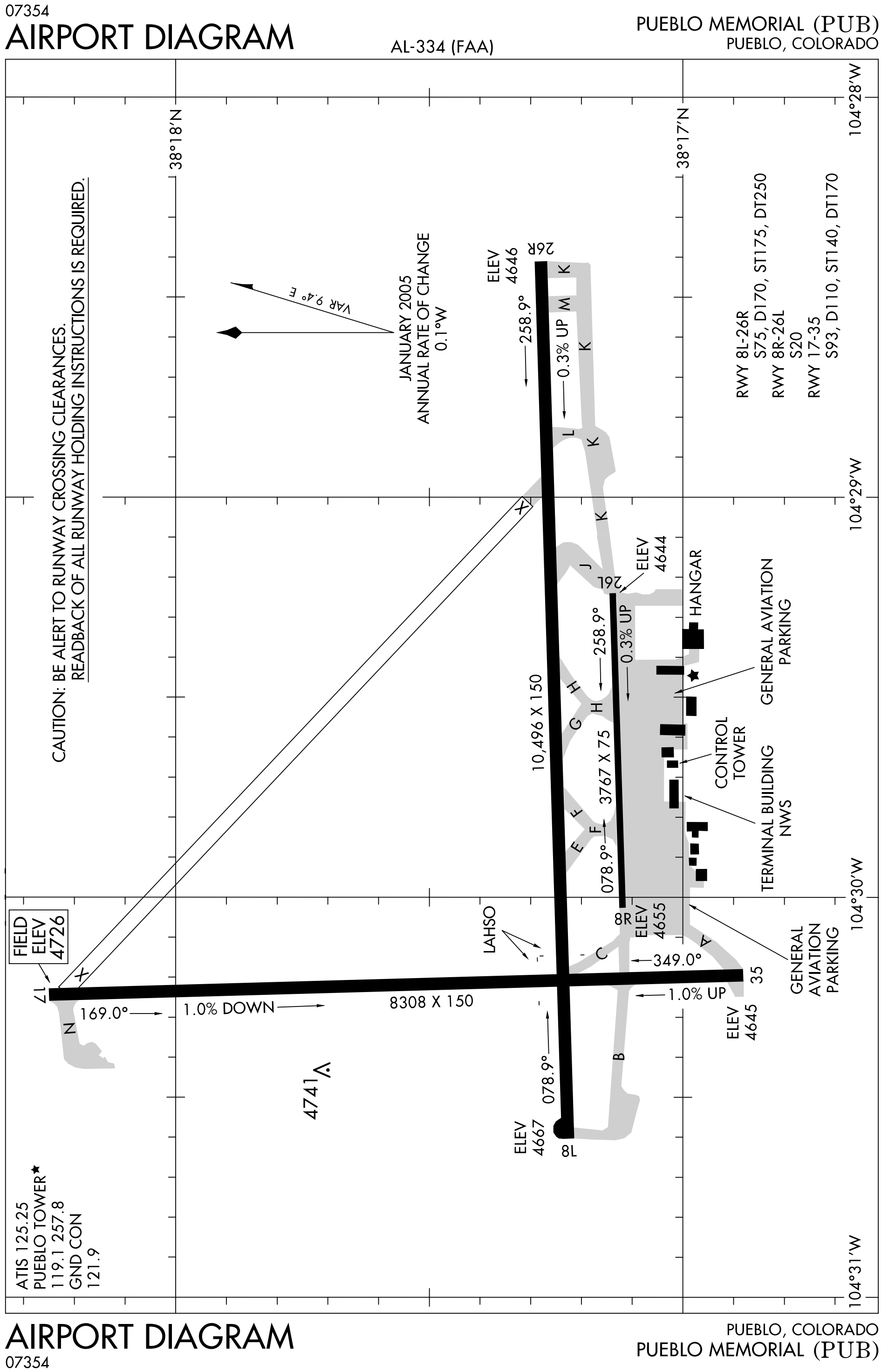
Stockton, California
Stockton Metropolitan
ICAO Identifier KSCK



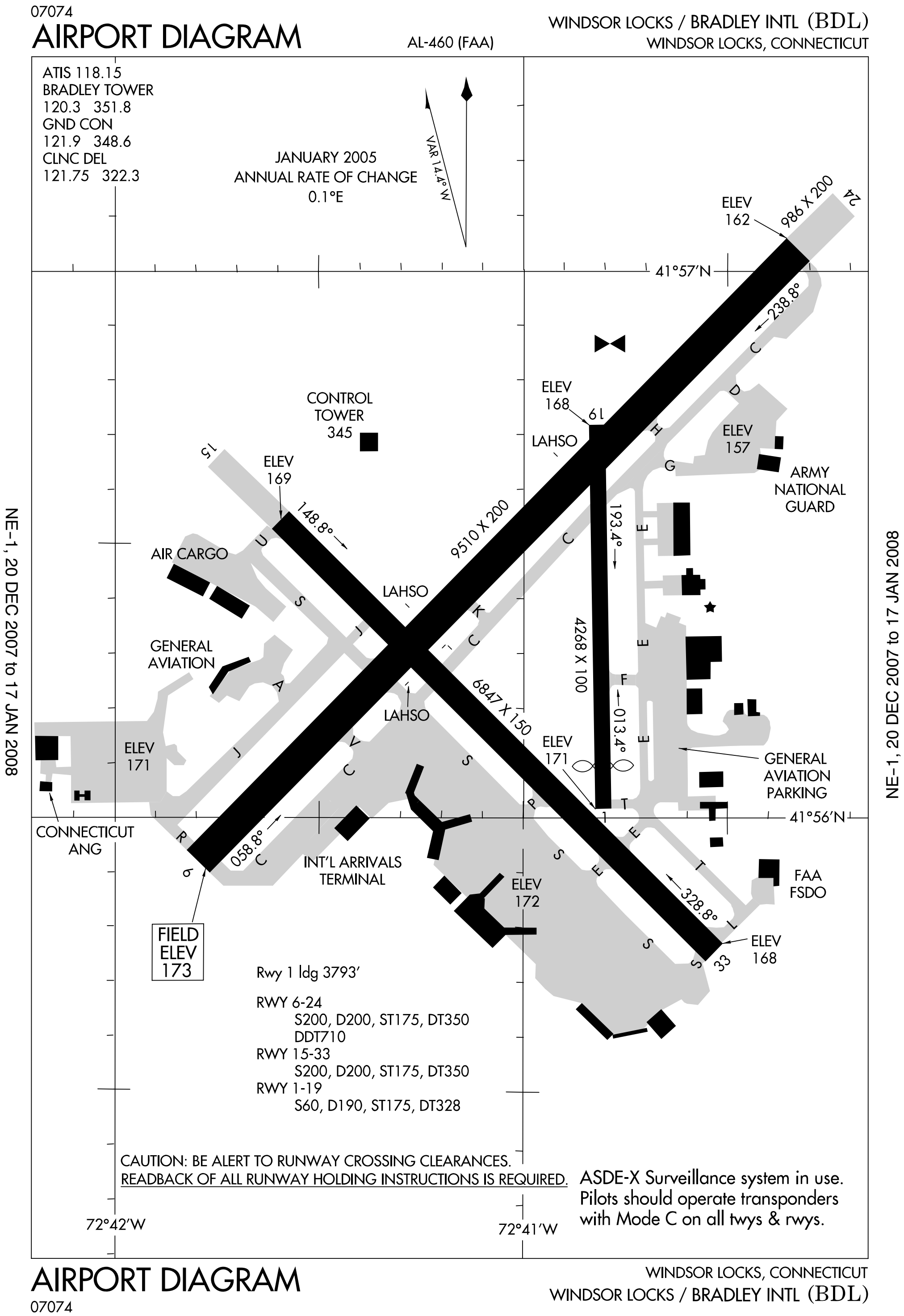
Denver, Colorado
Denver International
ICAO Identifier KDEN



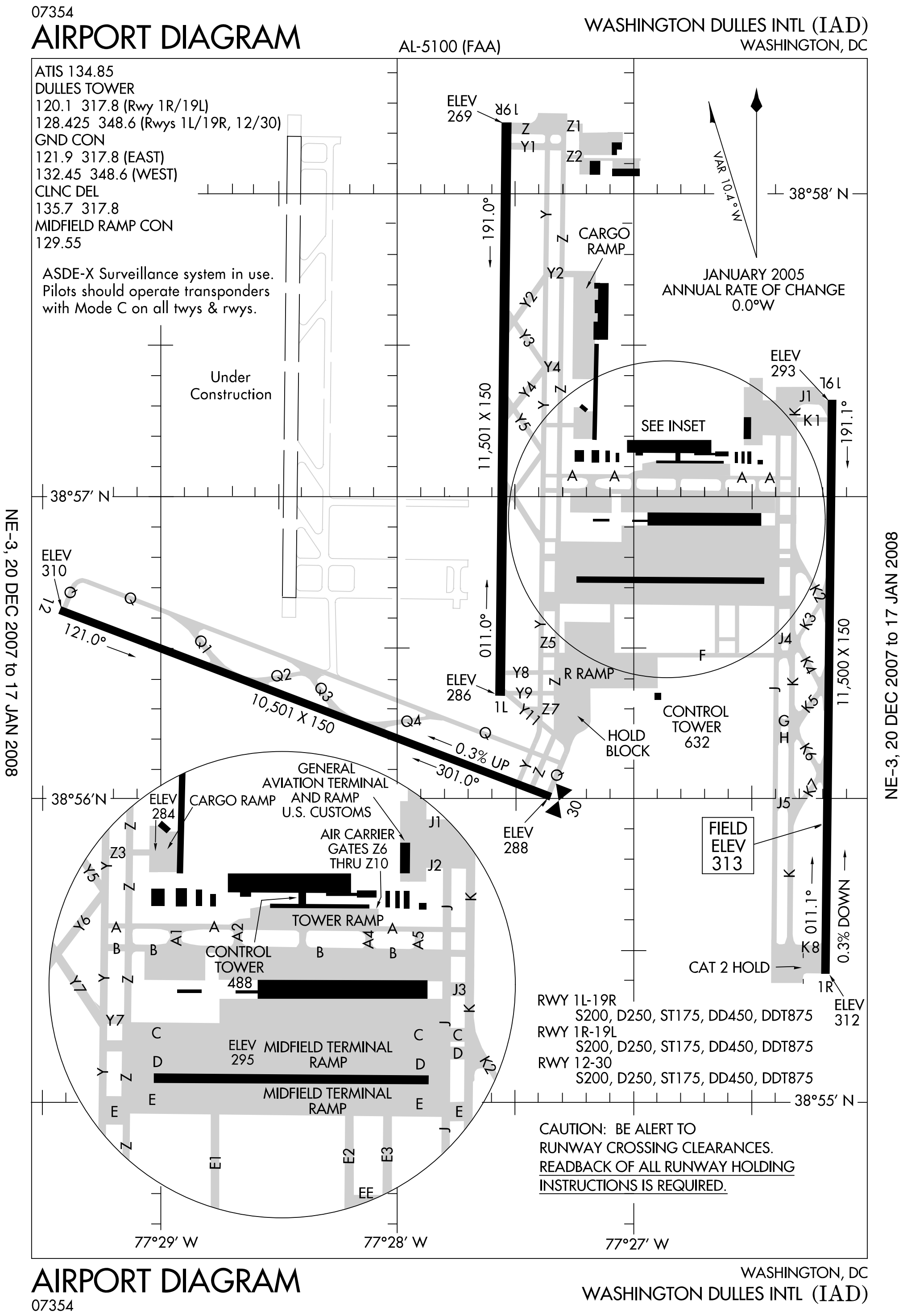
Pueblo, Colorado
Pueblo Memorial
ICAO Identifier KPUB



Windsor Locks, Connecticut
Bradley International
ICAO Identifier KBDL

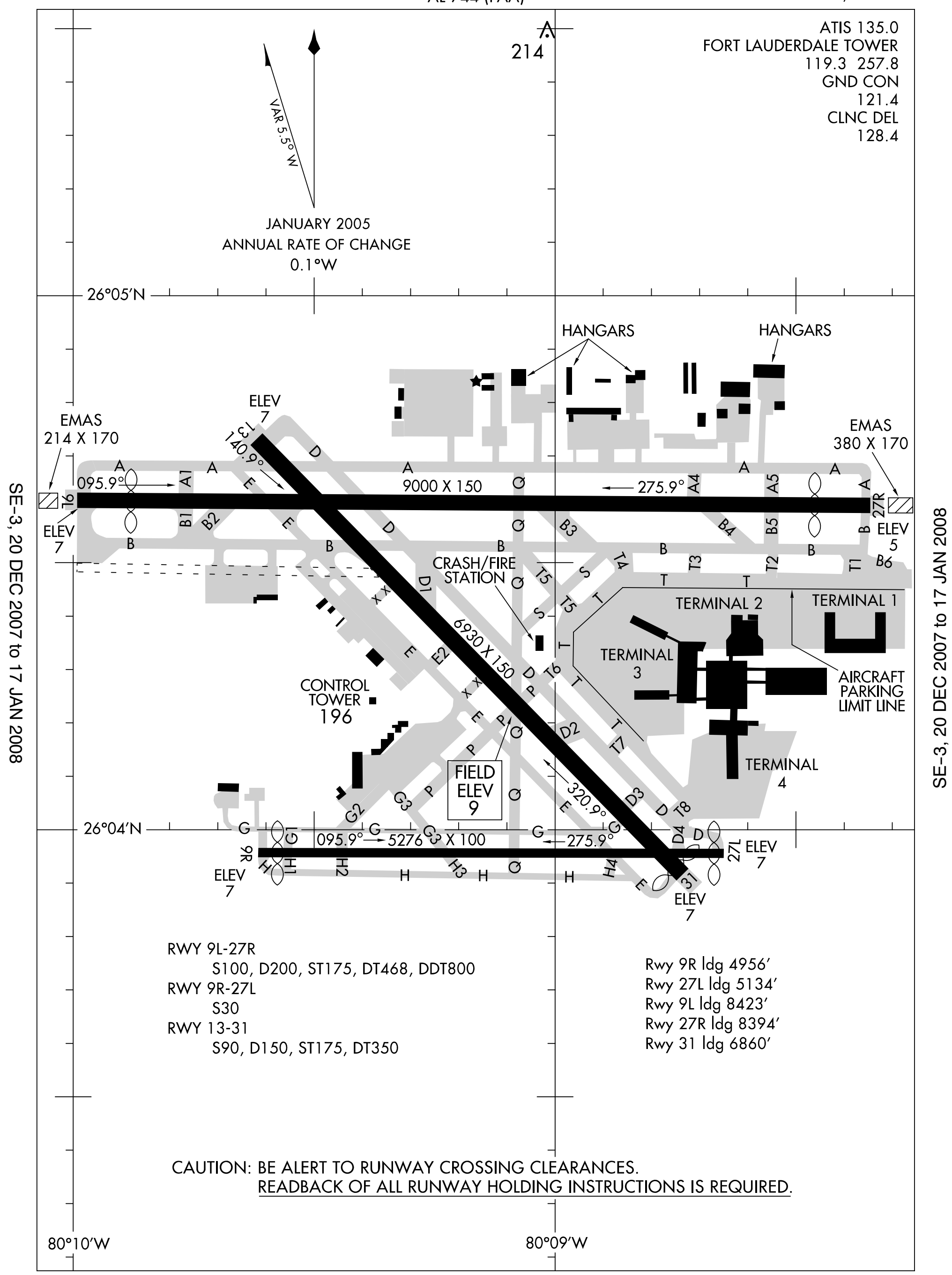


Washington, District of Columbia
Washington Dulles International
ICAO Identifier KIAD



Fort Lauderdale, Florida
Fort Lauderdale/Hollywood International
ICAO Identifier KFLL

07354
AIRPORT DIAGRAM
AL-744 (FAA)
FORT LAUDERDALE-HOLLYWOOD INTL (FLL)
FORT LAUDERDALE, FLORIDA



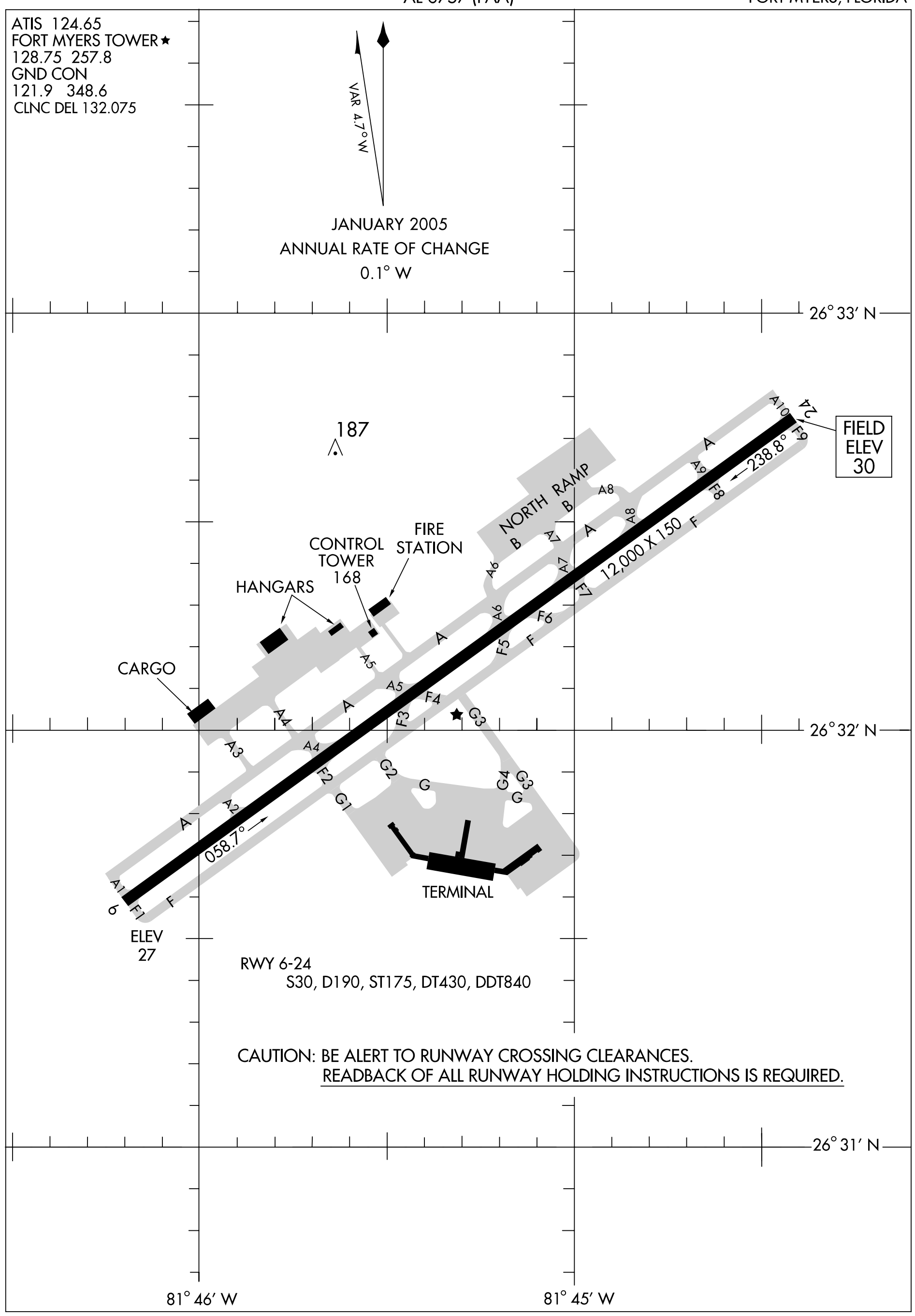
AIRPORT DIAGRAM
07354
FORT LAUDERDALE, FLORIDA
FORT LAUDERDALE-HOLLYWOOD INTL (FLL)

Fort Myers, Florida
Southwest Florida International
ICAO Identifier KRSW

07354
AIRPORT DIAGRAM

FORT MYERS/SOUTHWEST FLORIDA INTL (RSW)
AL-6757 (FAA)
FORT MYERS, FLORIDA

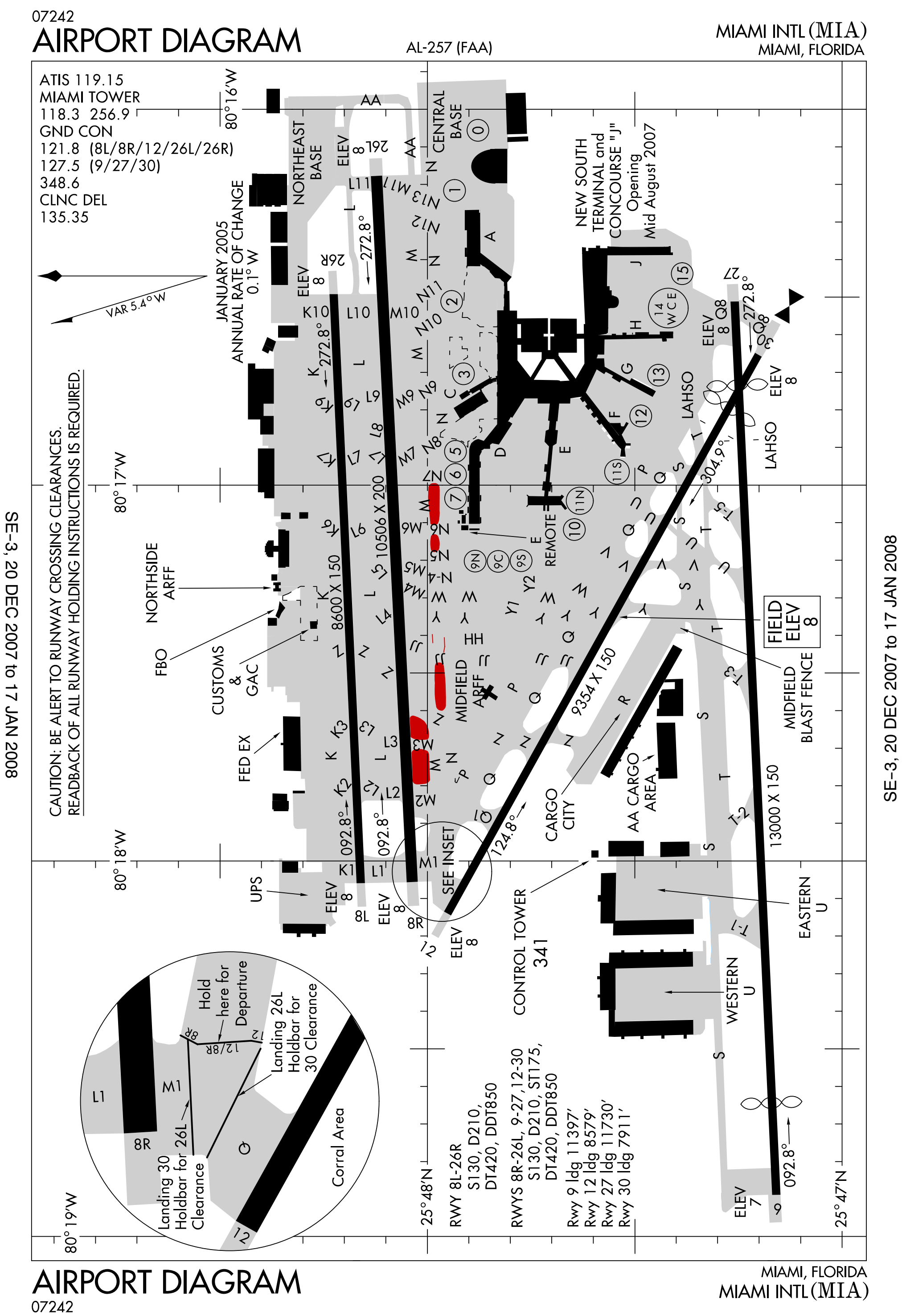
SE-3, 20 DEC 2007 to 17 JAN 2008



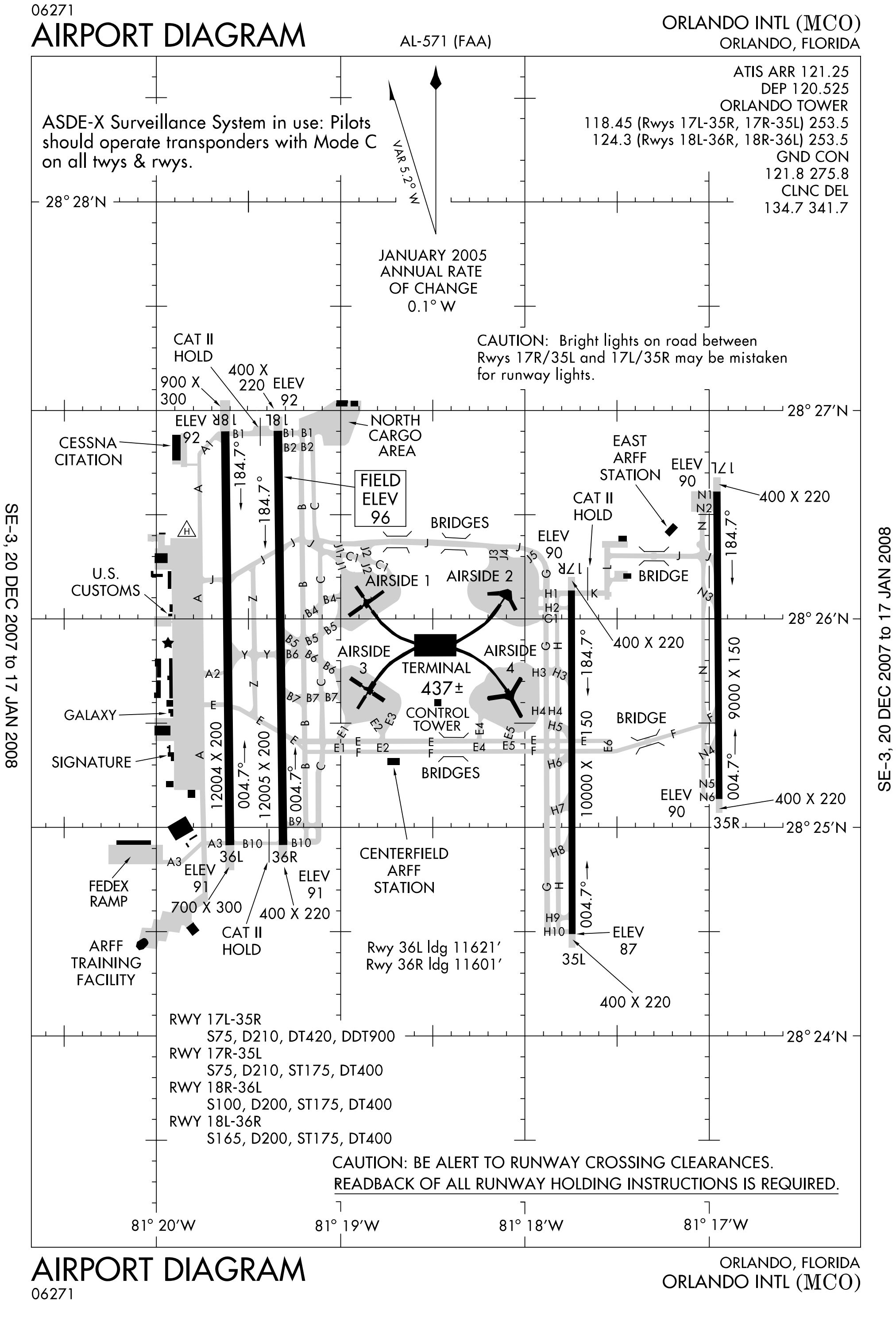
SE-3, 20 DEC 2007 to 17 JAN 2008

FORT MYERS, FLORIDA
AIRPORT DIAGRAM
FORT MYERS/SOUTHWEST FLORIDA INTL (RSW)
07354

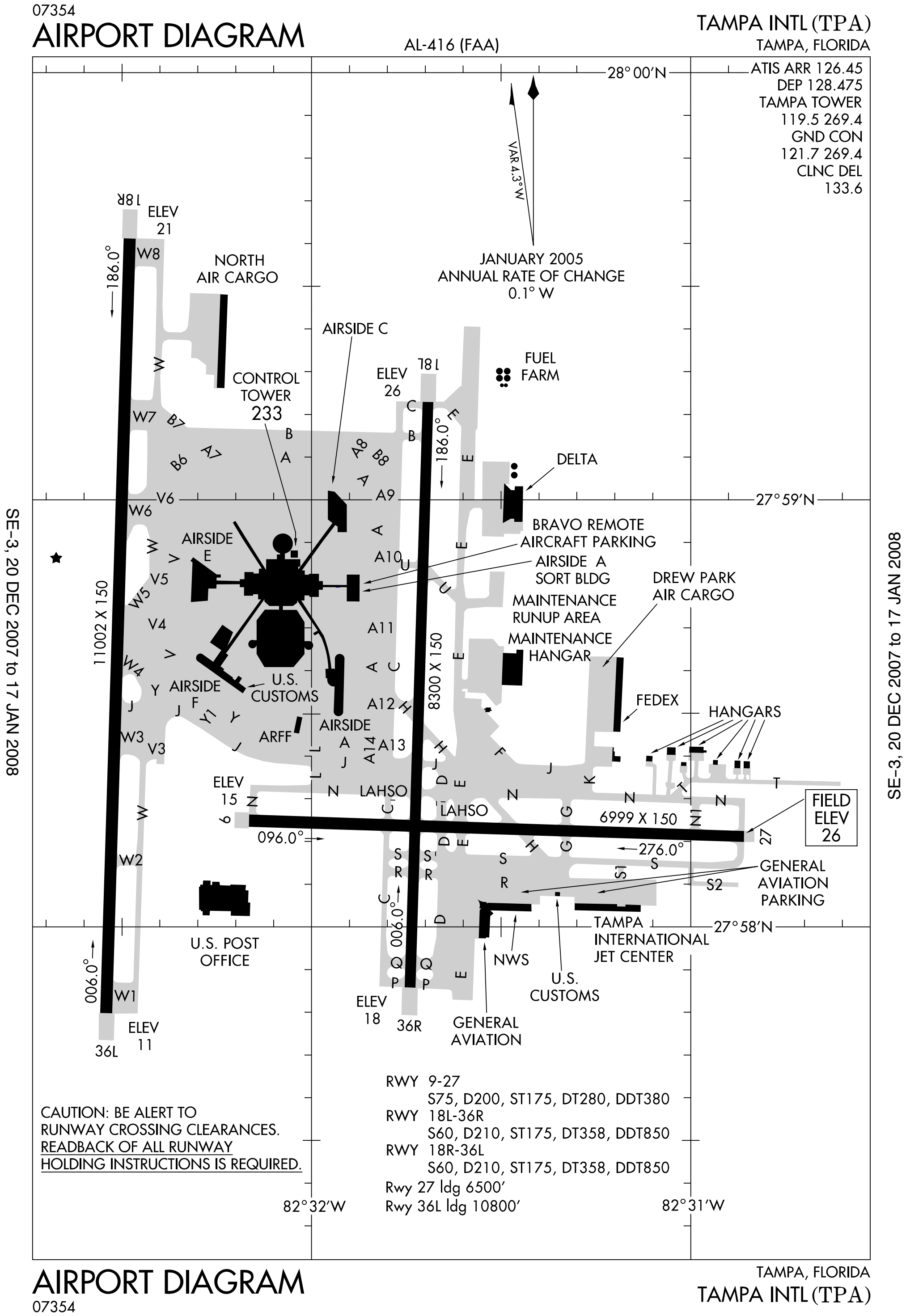
Miami, Florida
Miami International
ICAO Identifier KMIA



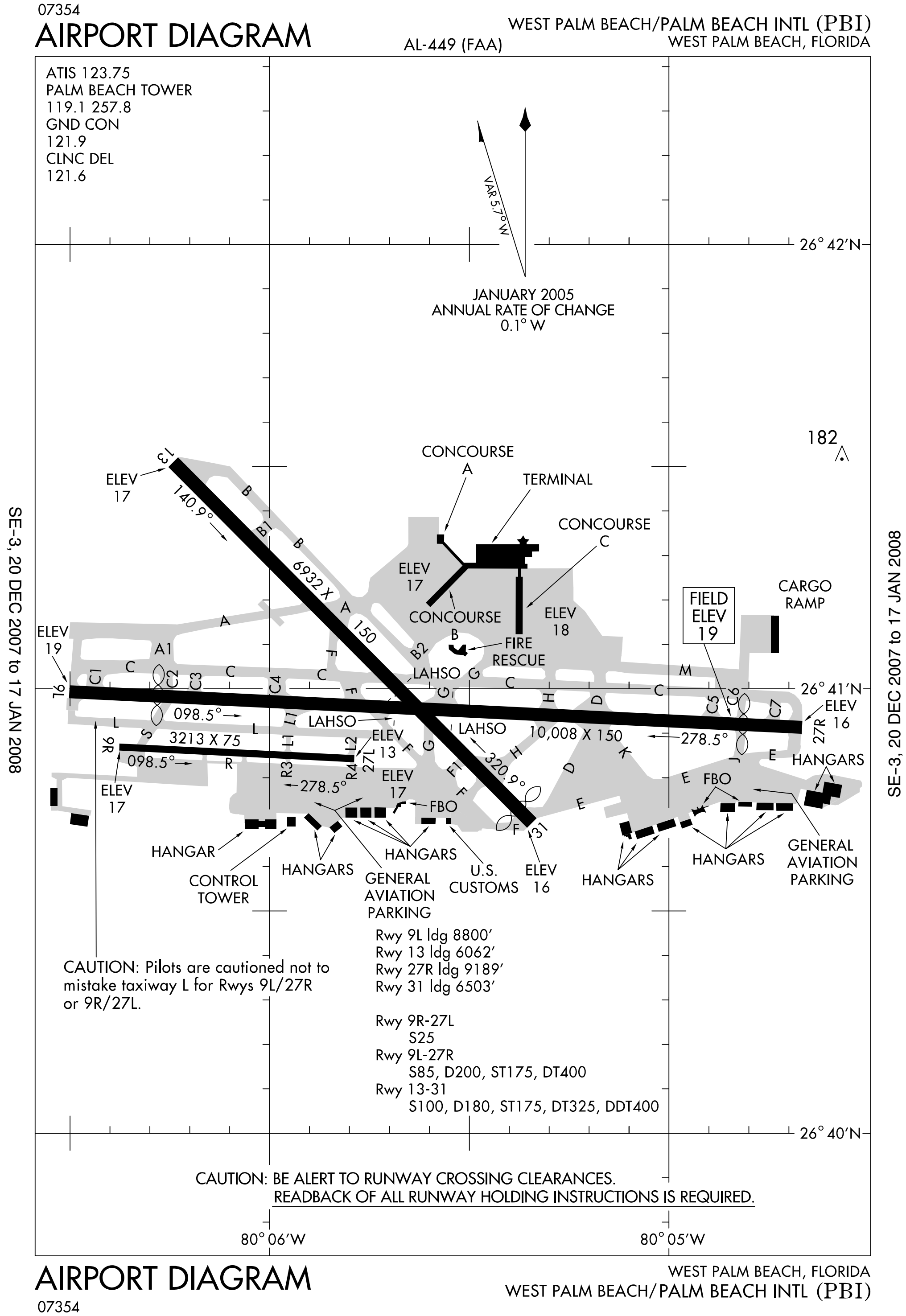
Orlando, Florida
Orlando International
ICAO Identifier KMCO



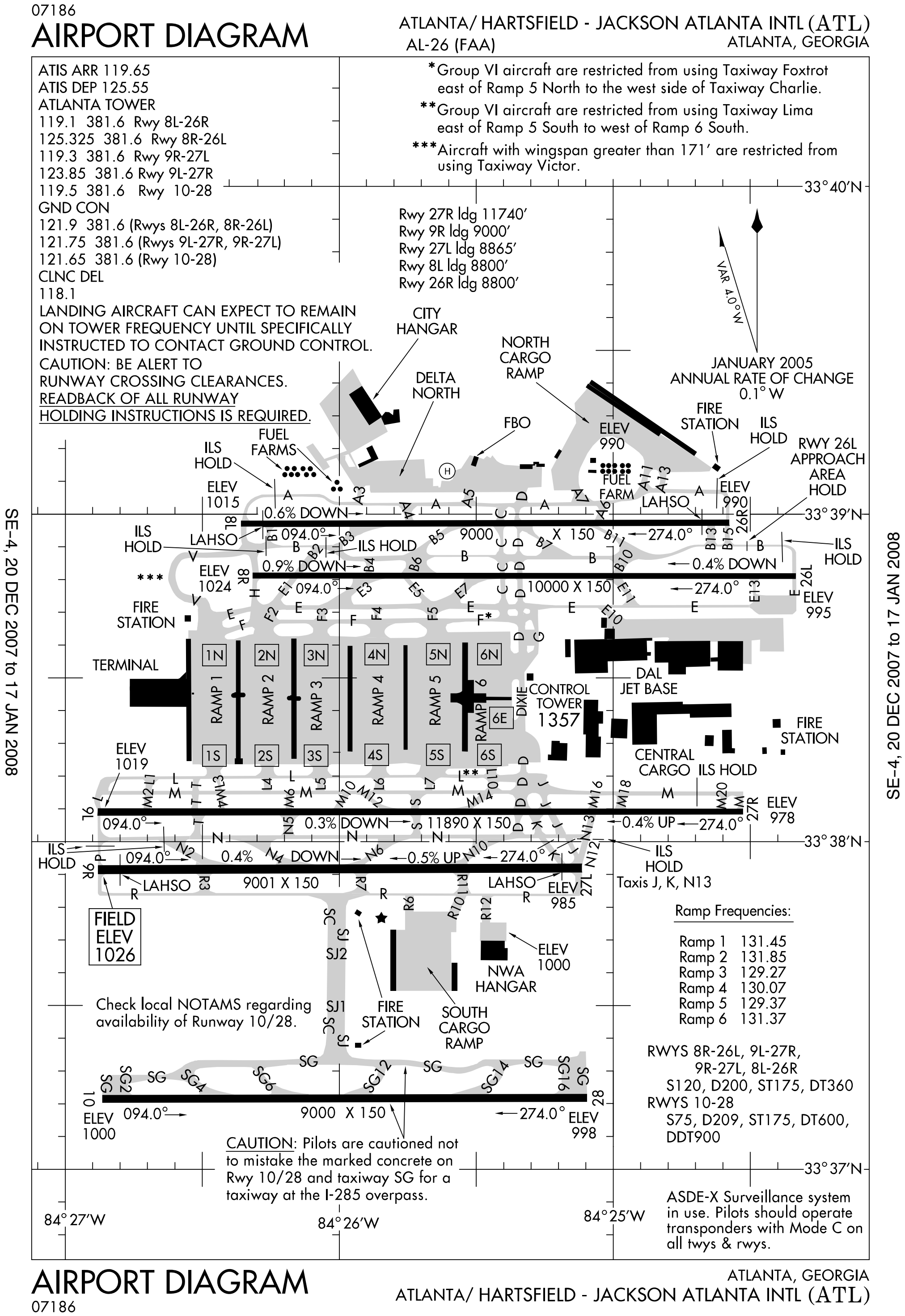
Tampa, Florida
Tampa International
ICAO Identifier KTPA



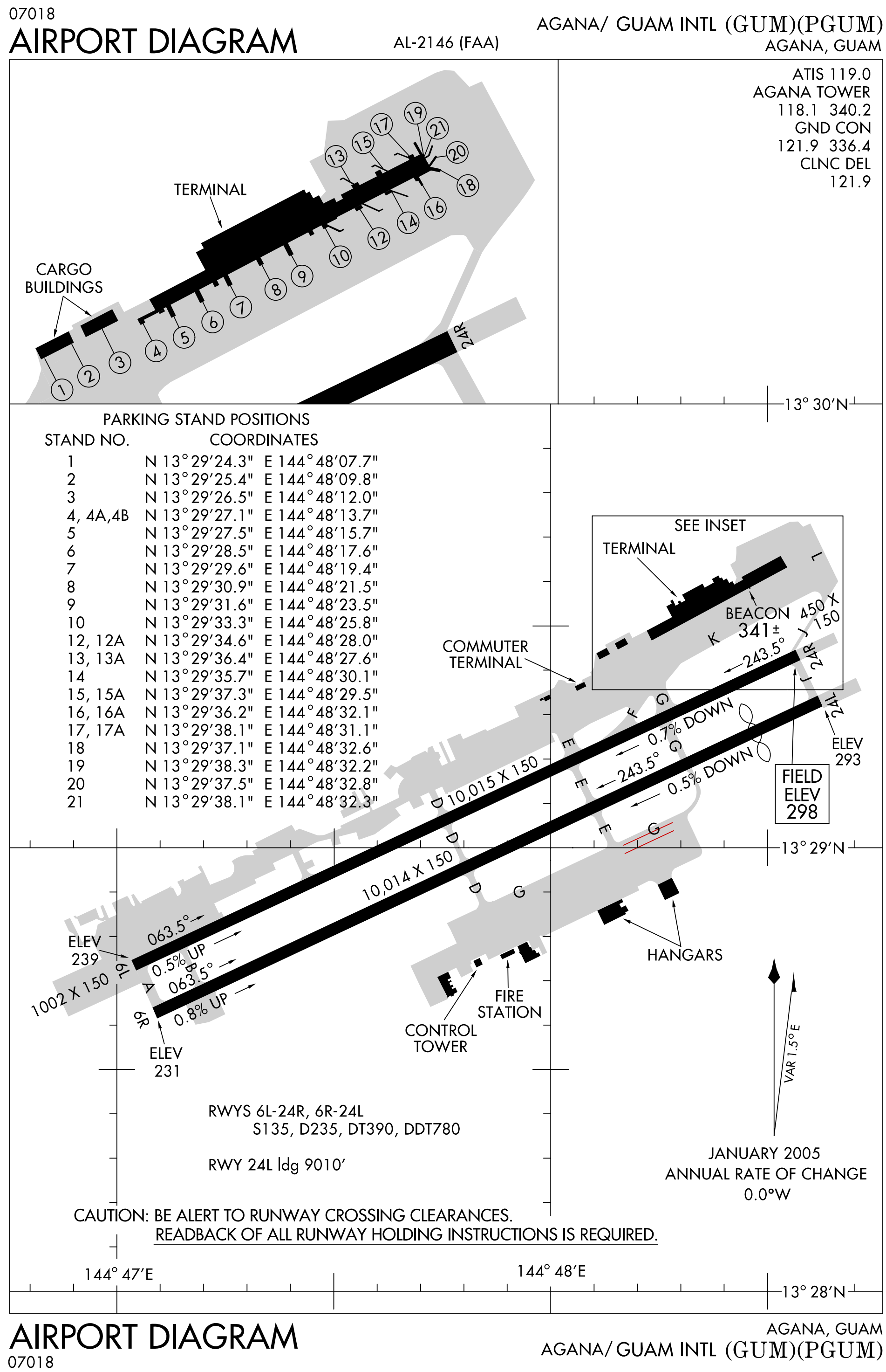
West Palm Beach, Florida
Palm Beach International
ICAO Identifier KPBI



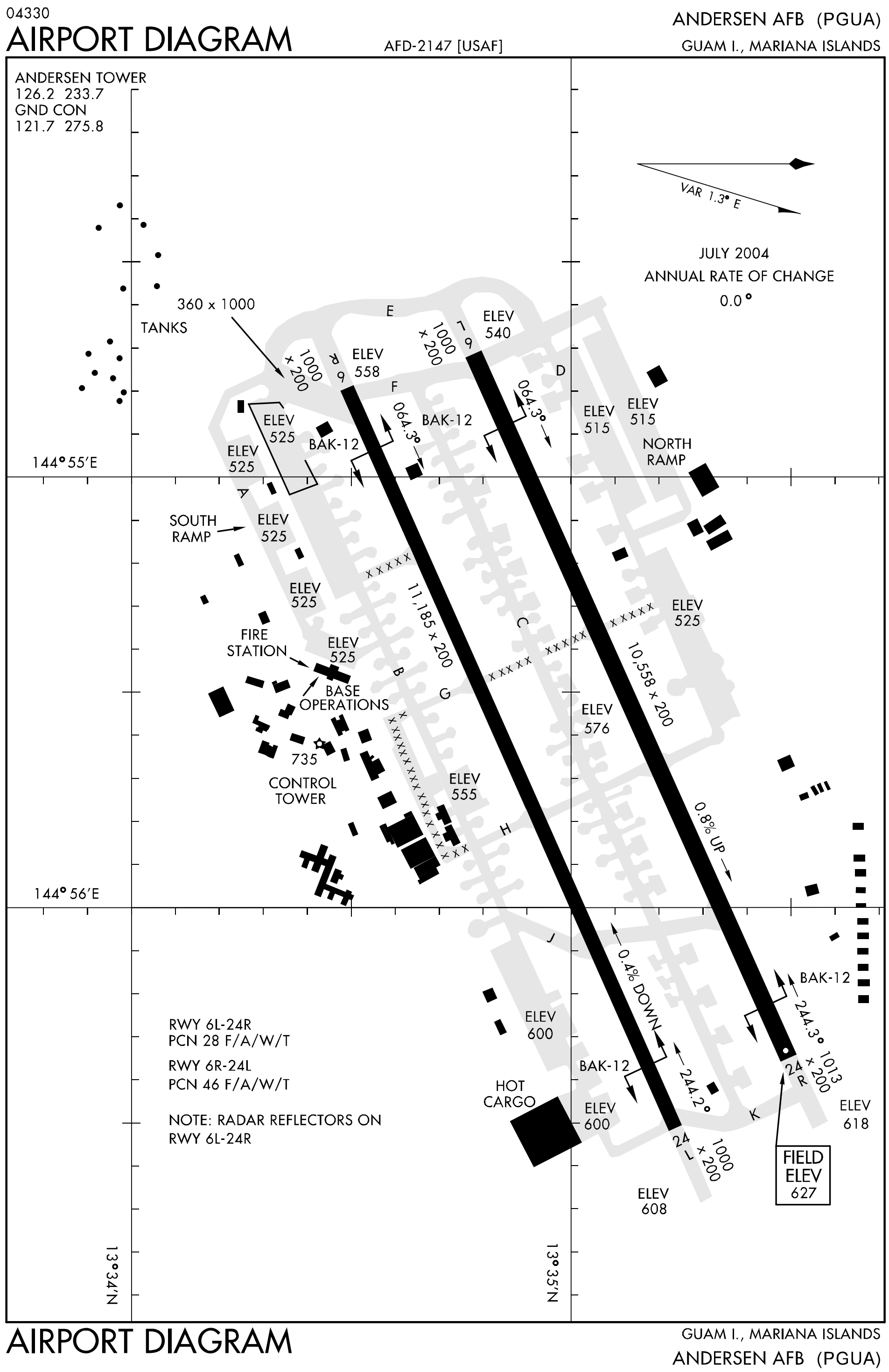
Atlanta, Georgia
Hartsfield–Jackson Atlanta International
ICAO Identifier KATL



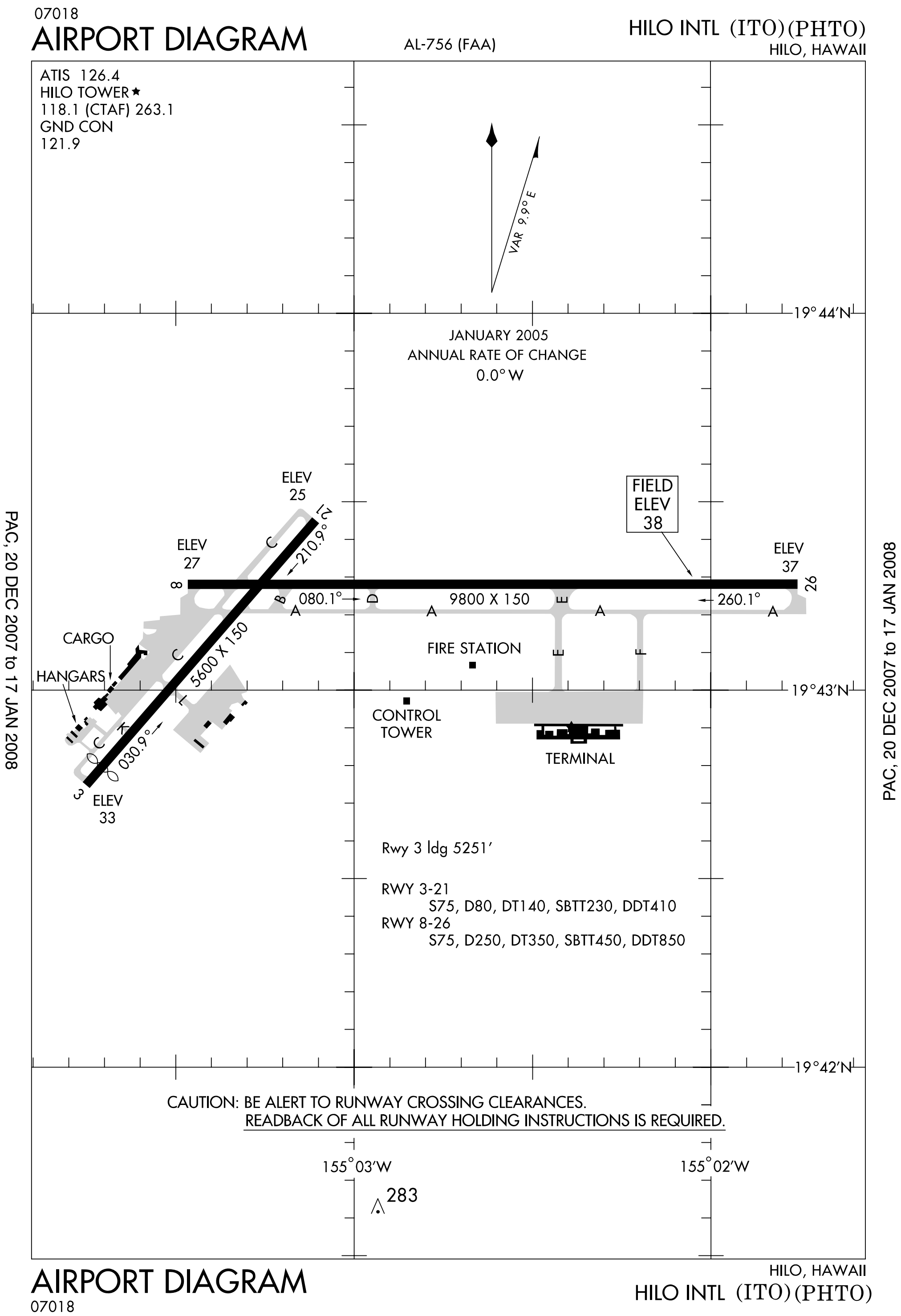
Agana, Guam
Guam International
ICAO Identifier PGUM



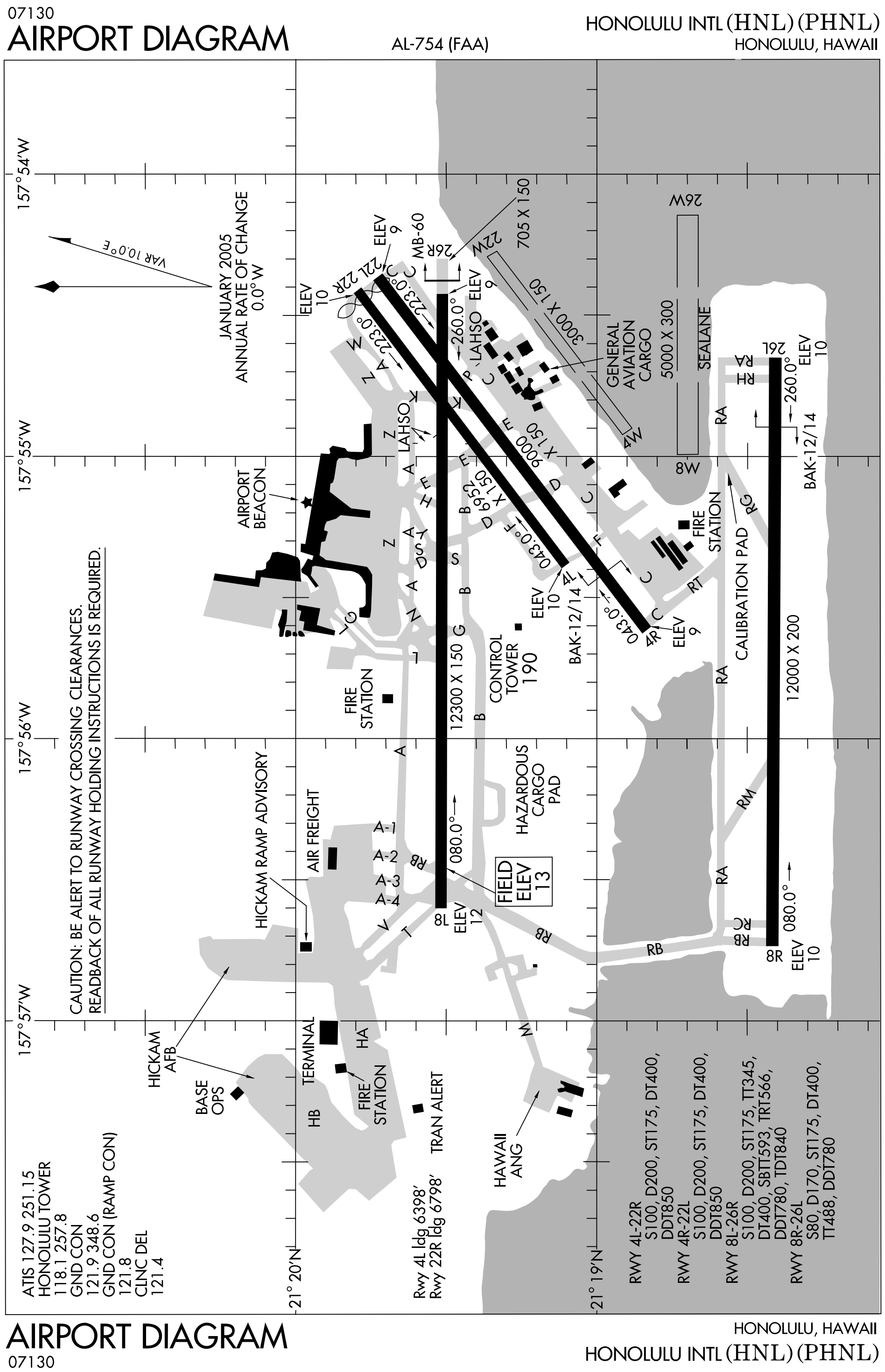
Guam Island, Guam
Andersen Air Force Base
ICAO Identifier PGUA



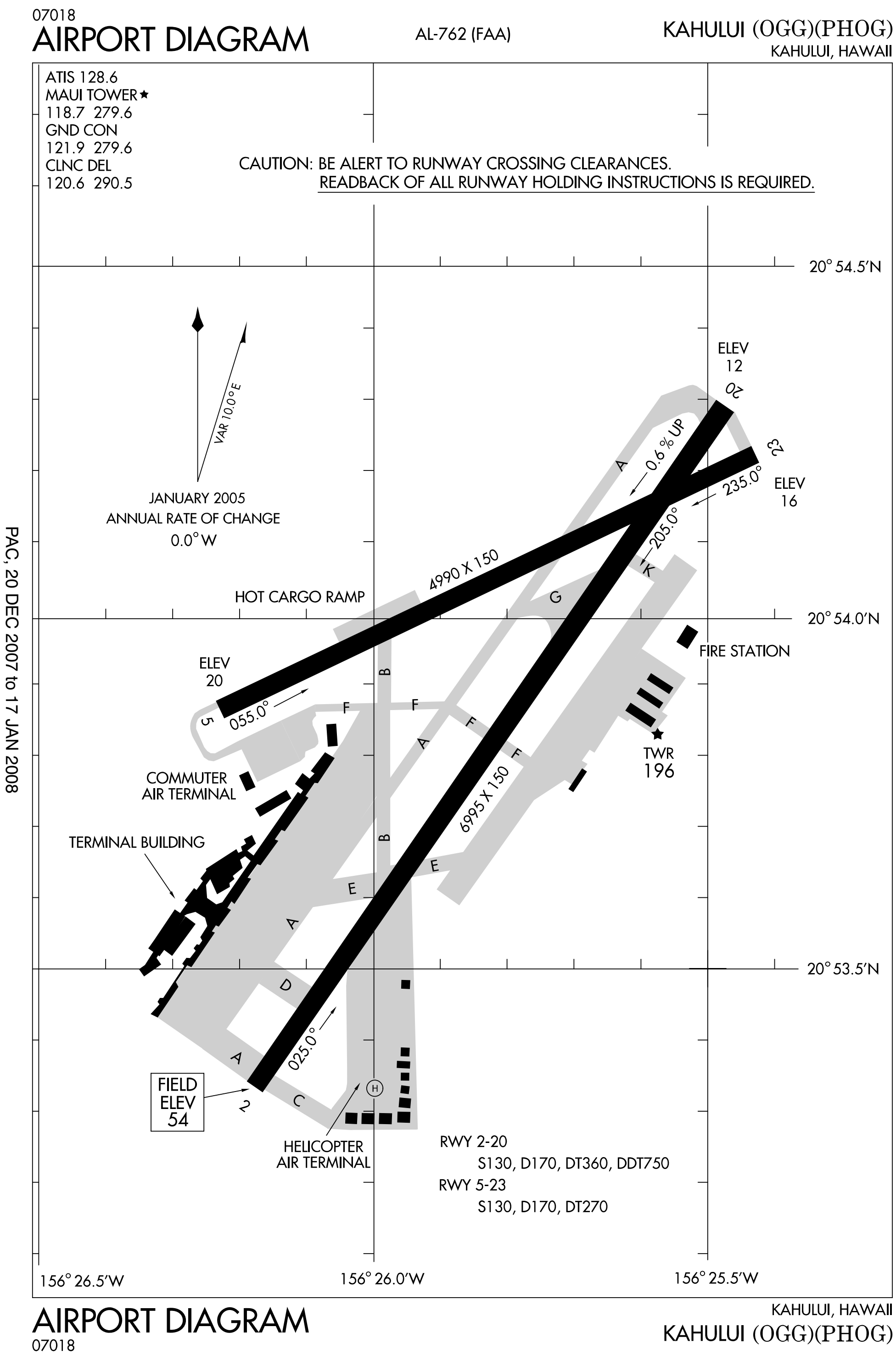
Hilo, Hawaii
Hilo International
ICAO Identifier PHTO



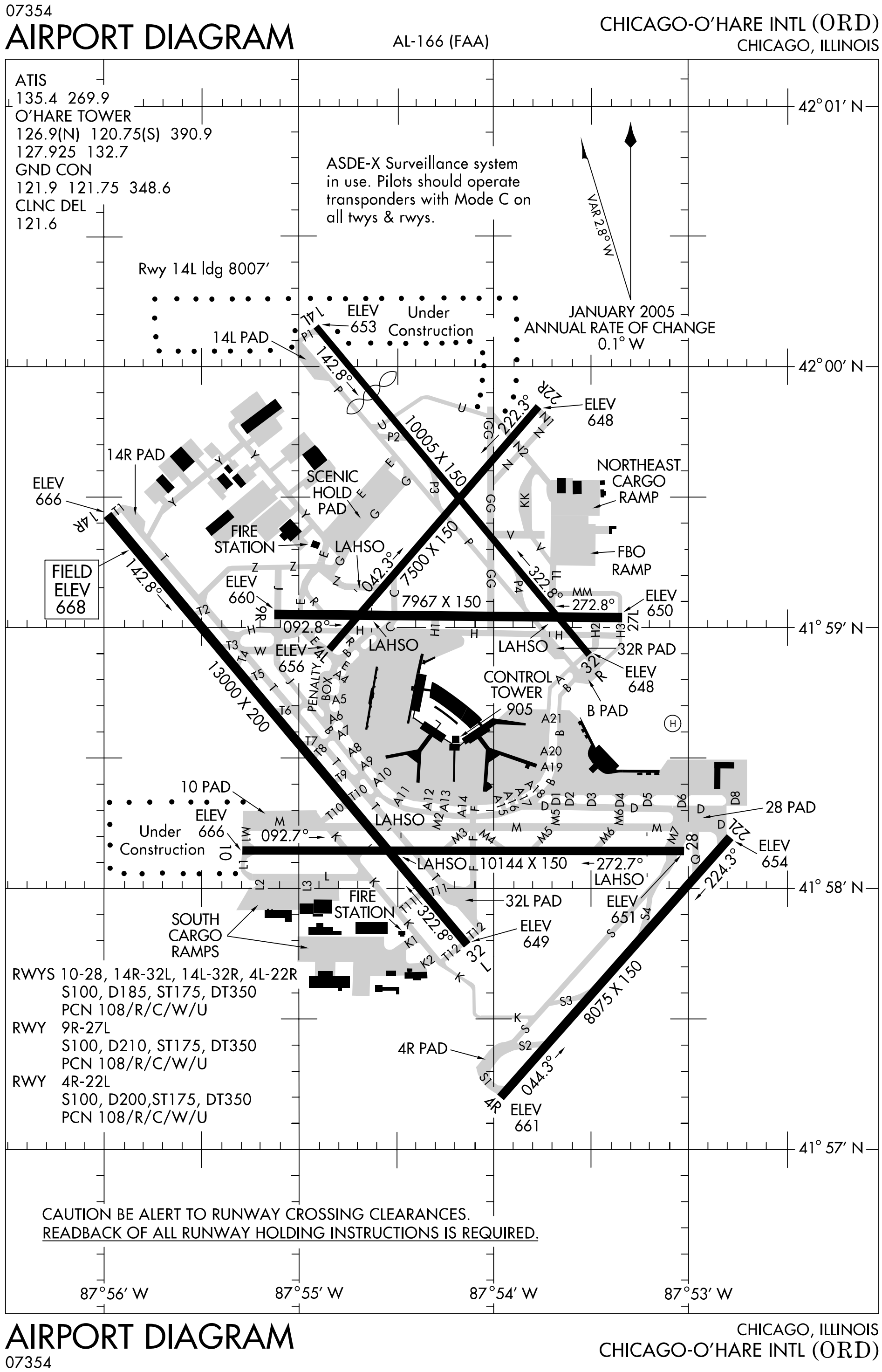
Honolulu, Hawaii
Honolulu International
ICAO Identifier PHNL



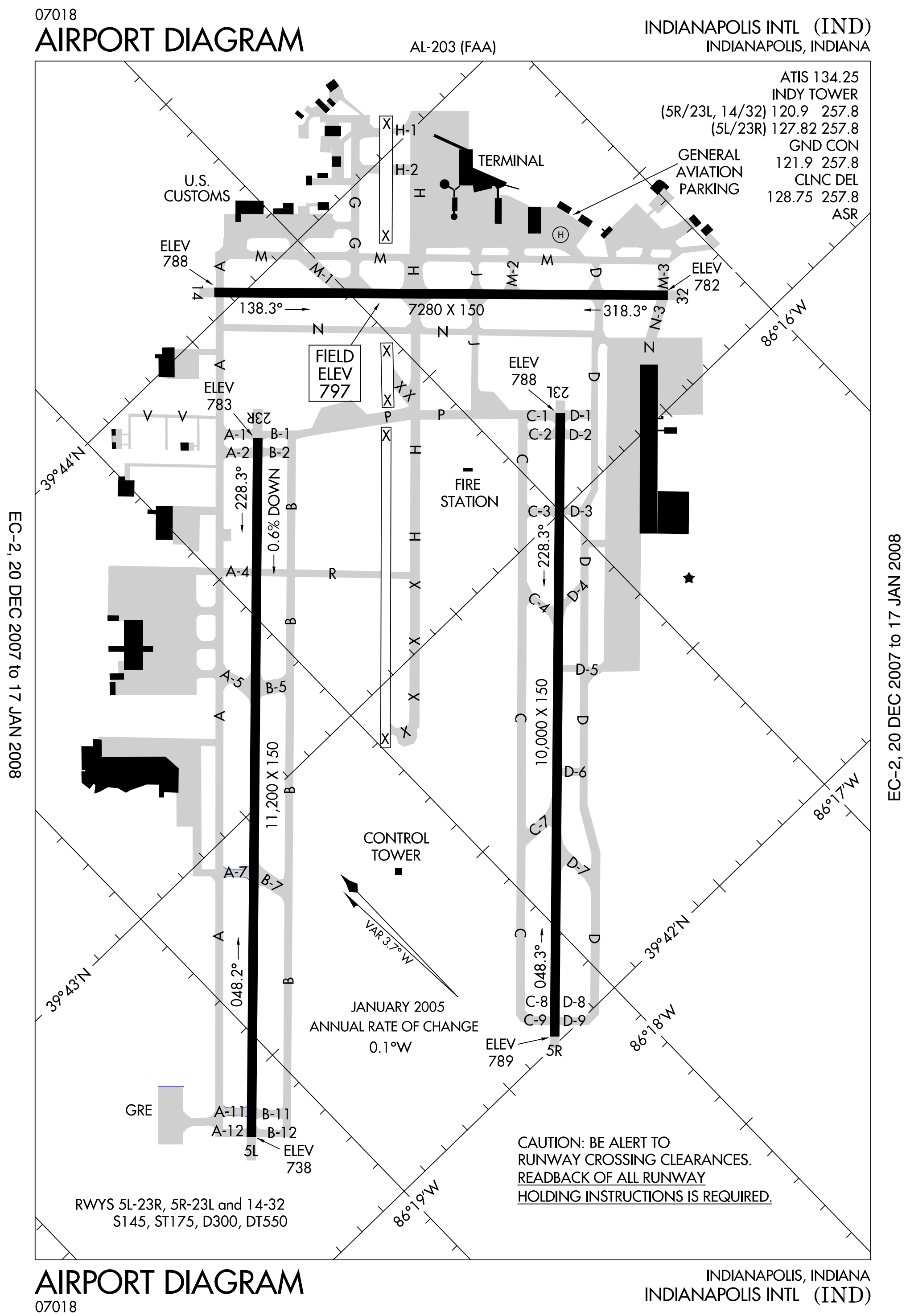
Kahului, Hawaii
Kahului
ICAO Identifier PHOG



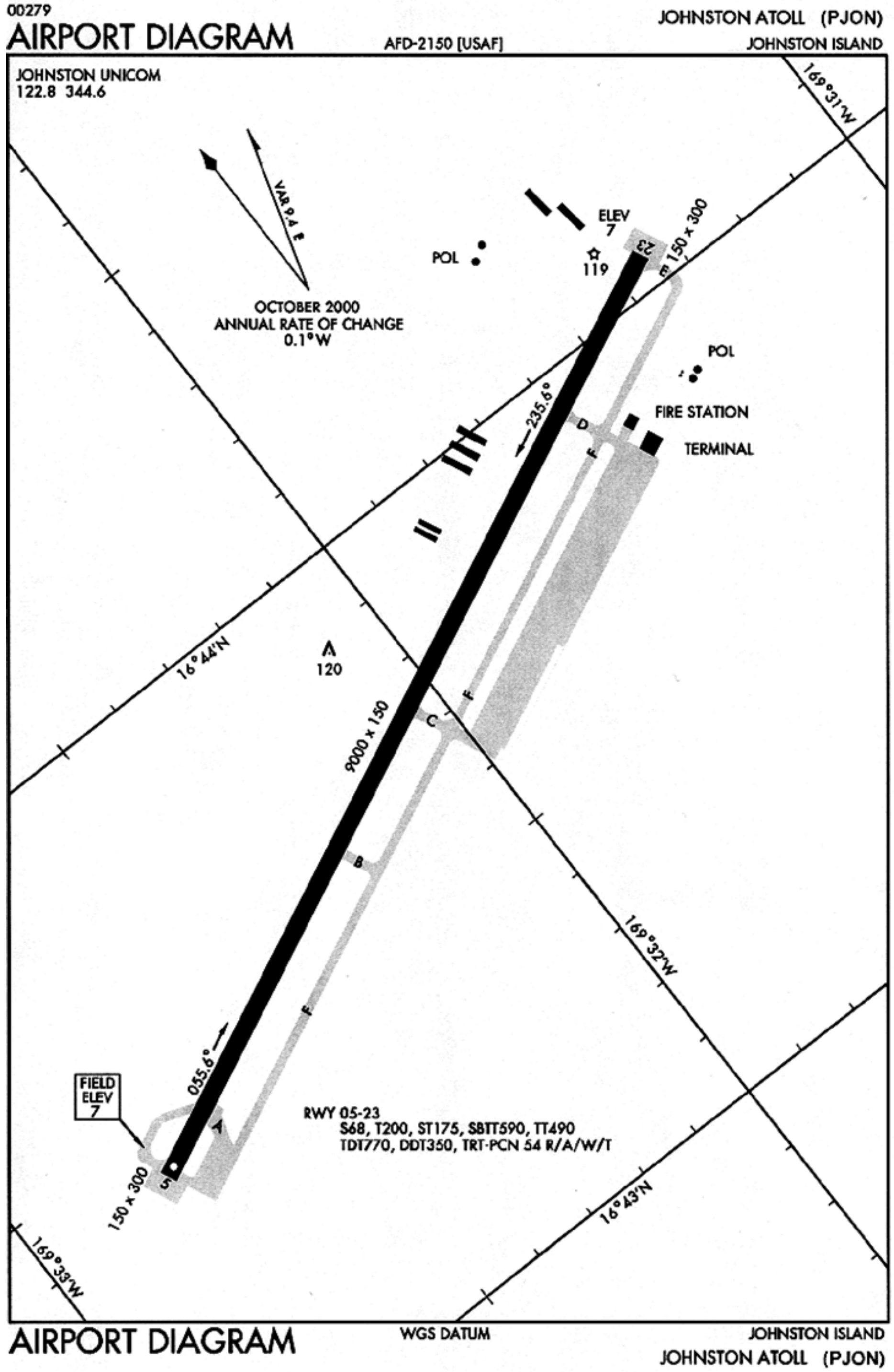
Chicago, Illinois
Chicago-O'Hare International
ICAO Identifier KORD



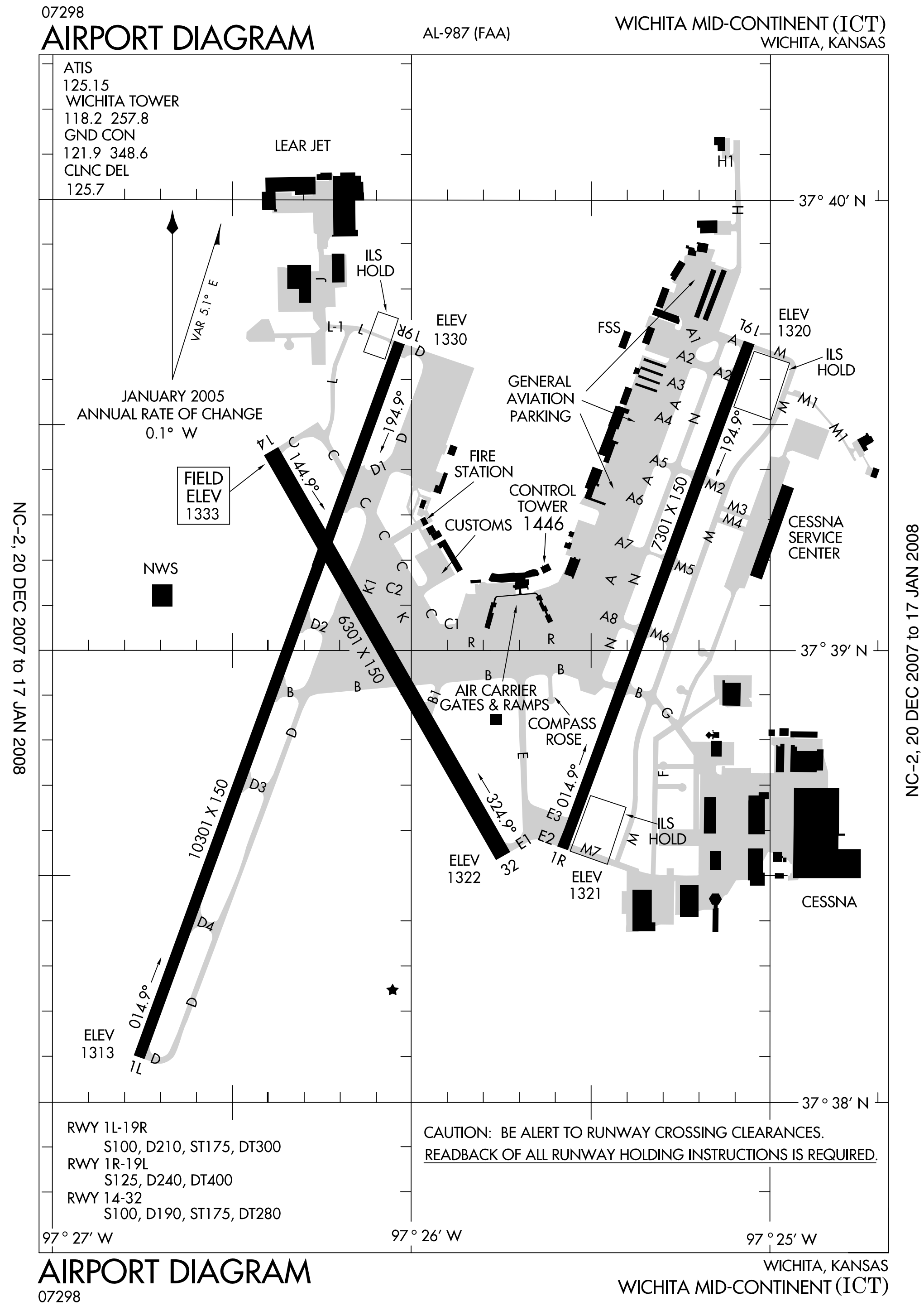
Indianapolis, Indiana
Indianapolis International
ICAO Identifier KIND



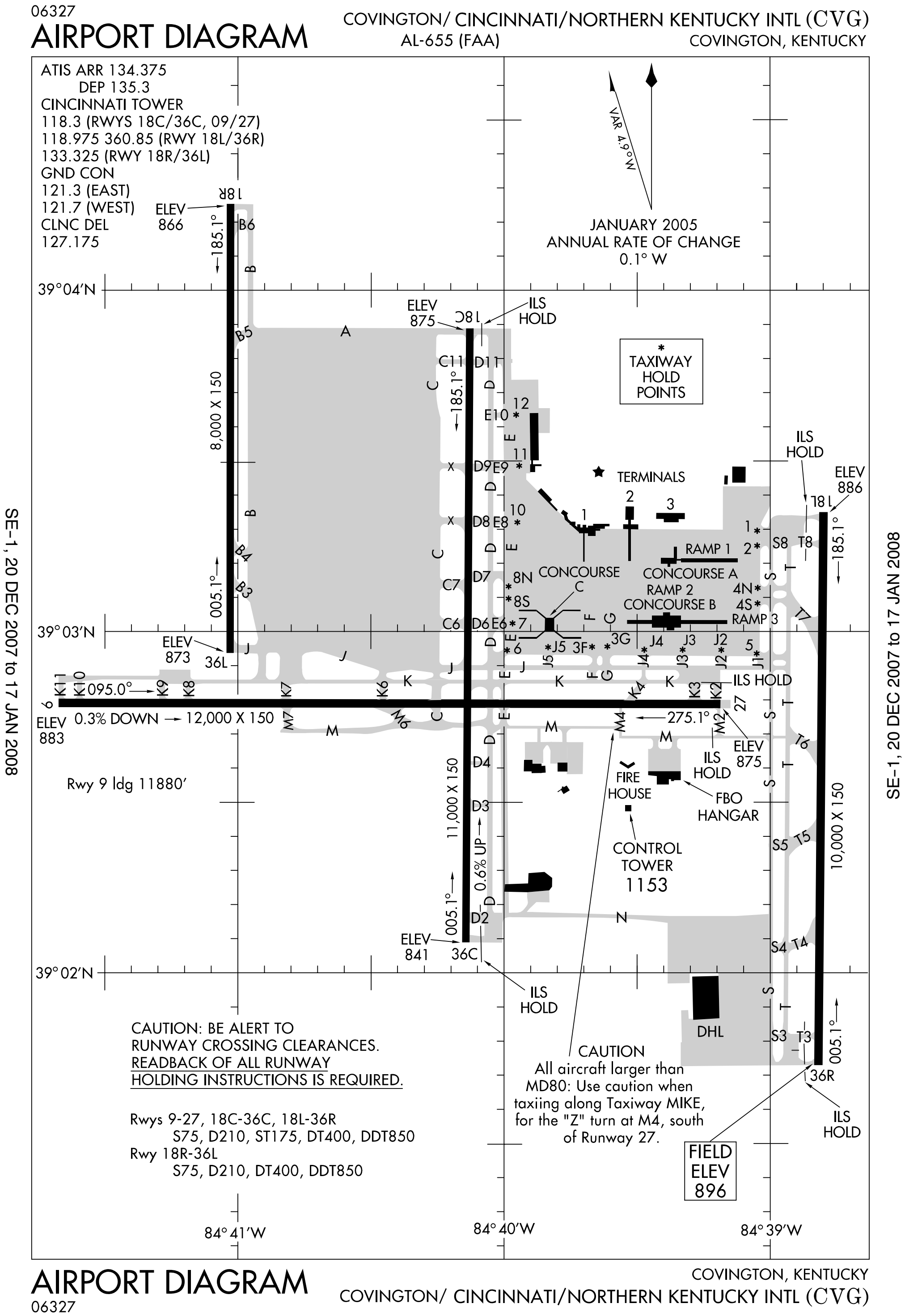
Johnston Island
Johnston Atoll
ICAO Identifier PJON



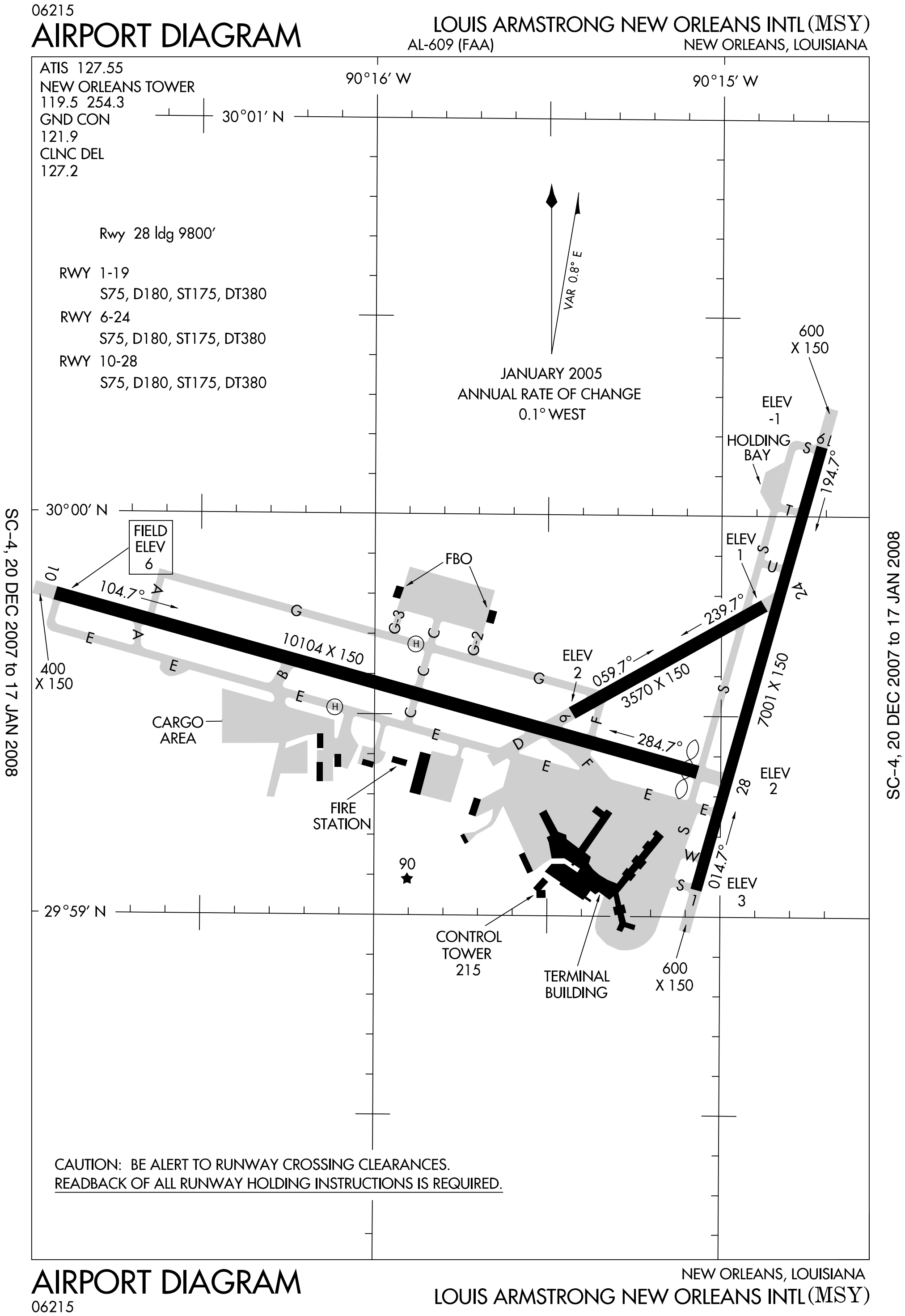
Wichita, Kansas
Wichita Mid-Continent
ICAO Identifier KICT



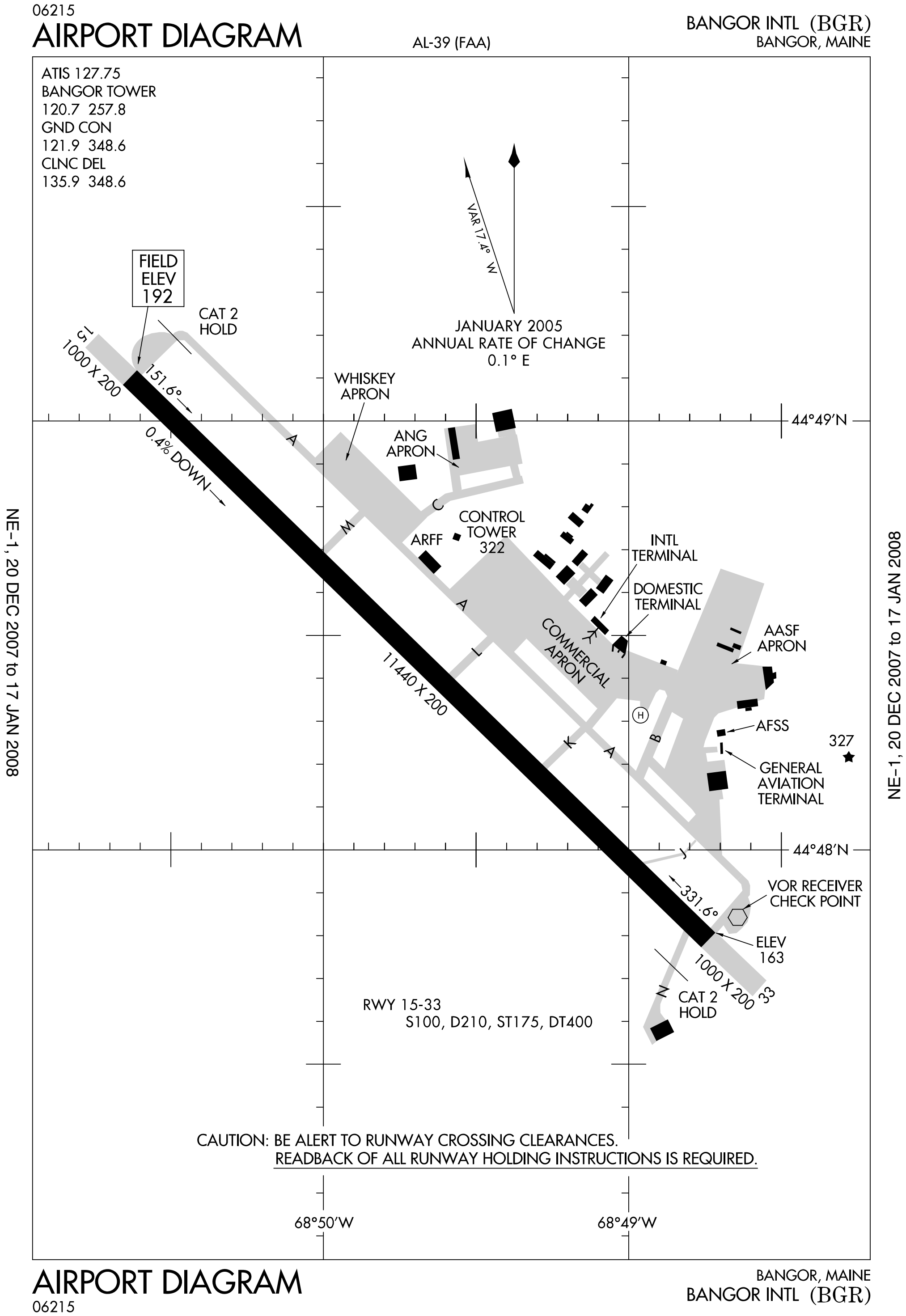
Covington, Kentucky
Cincinnati/Northern Kentucky International
ICAO Identifier KCVG



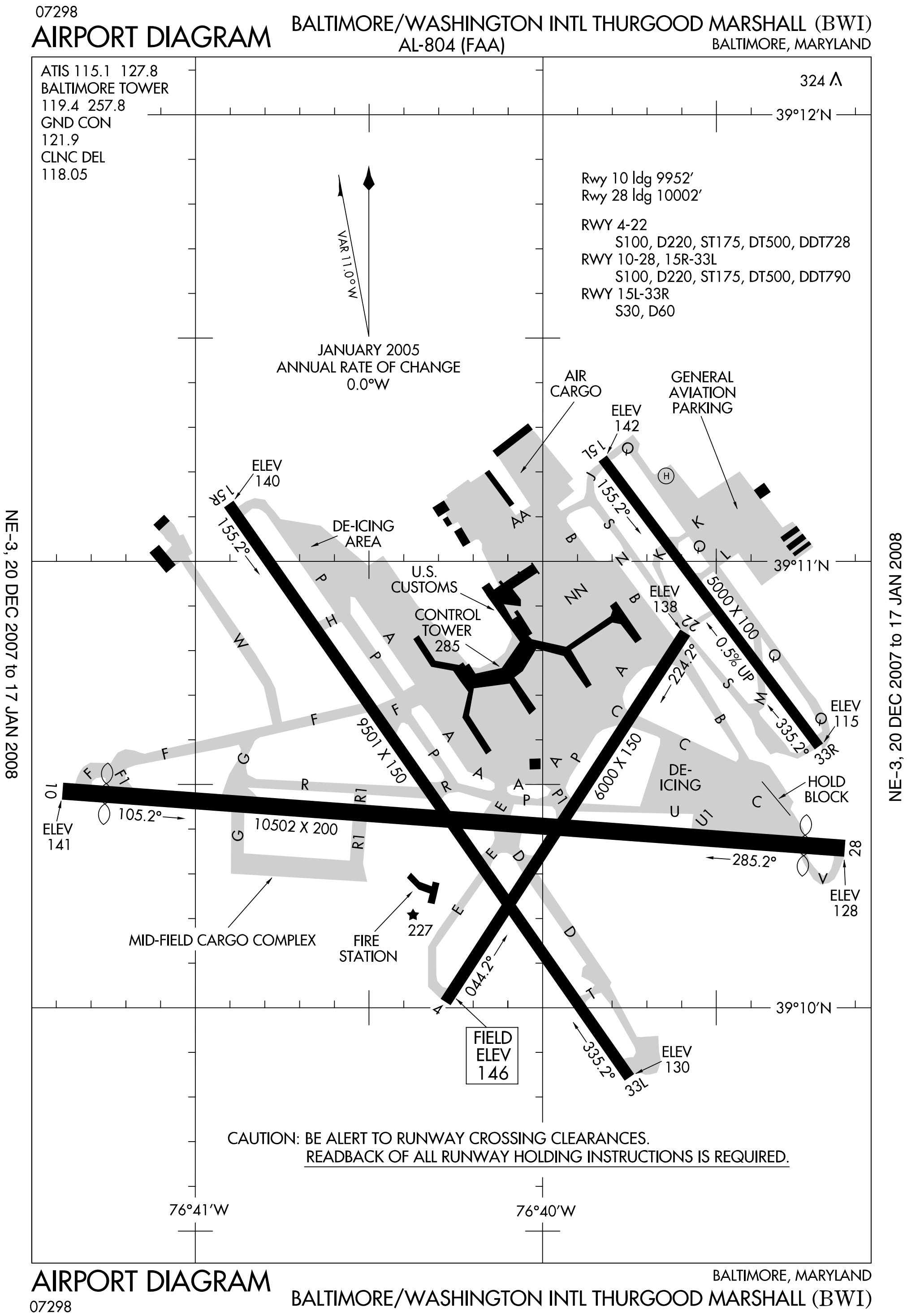
New Orleans, Louisana
Louis Armstrong New Orleans International
ICAO Identifier KMSY



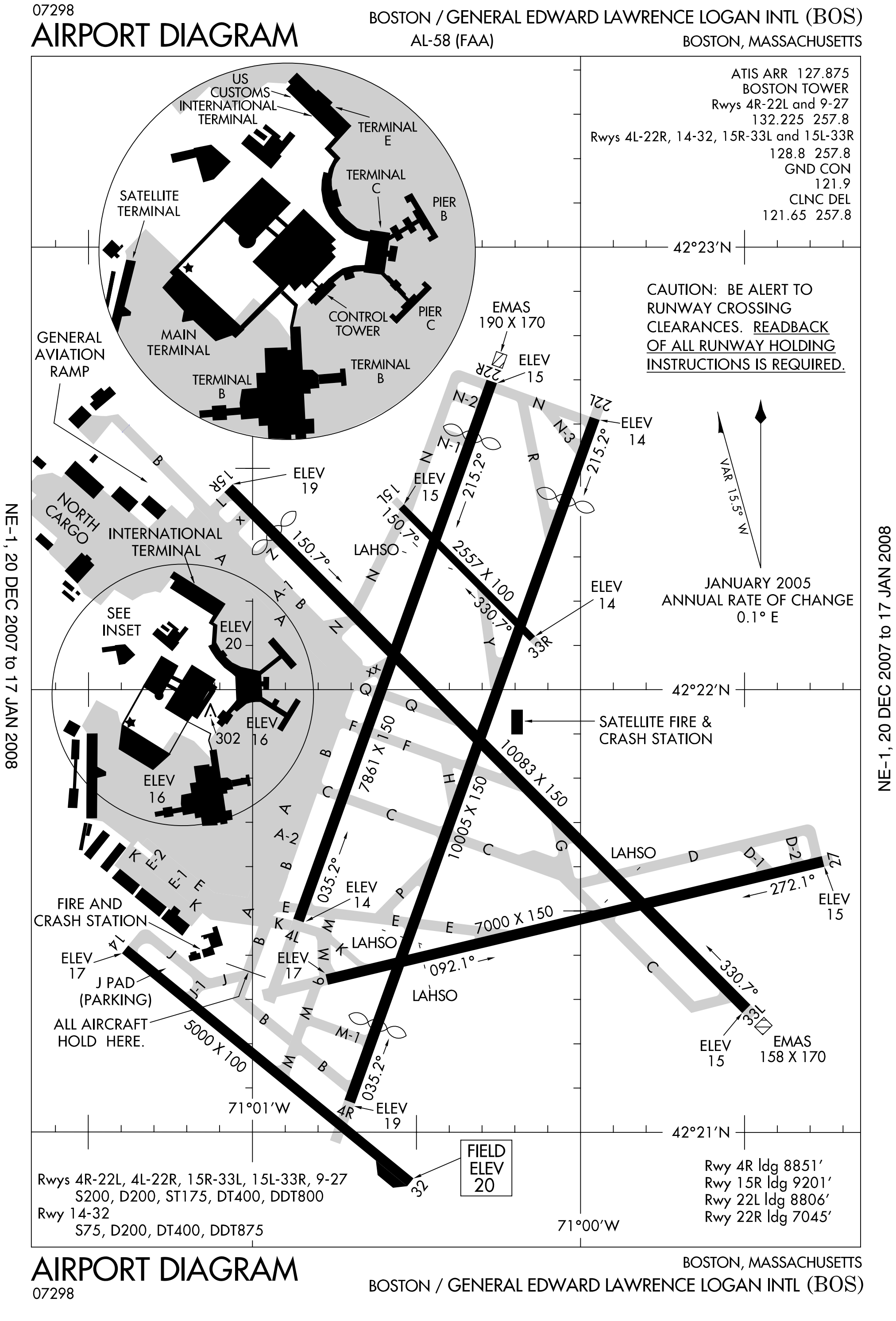
Bangor, Maine
Bangor International
ICAO Identifier KBGR



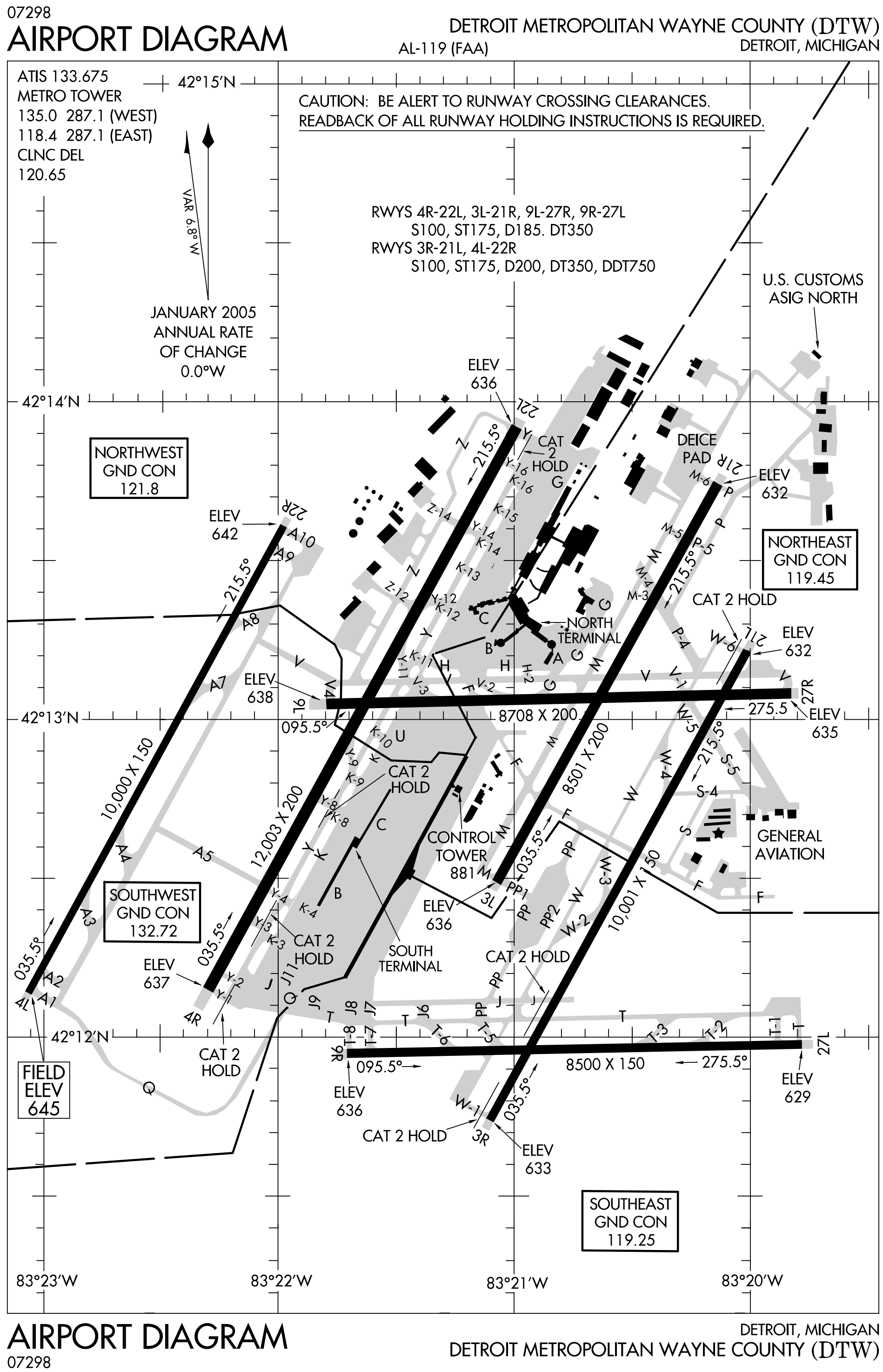
Baltimore, Maryland
Baltimore-Washington International Thurgood Marshall
ICAO Identifier KBWI



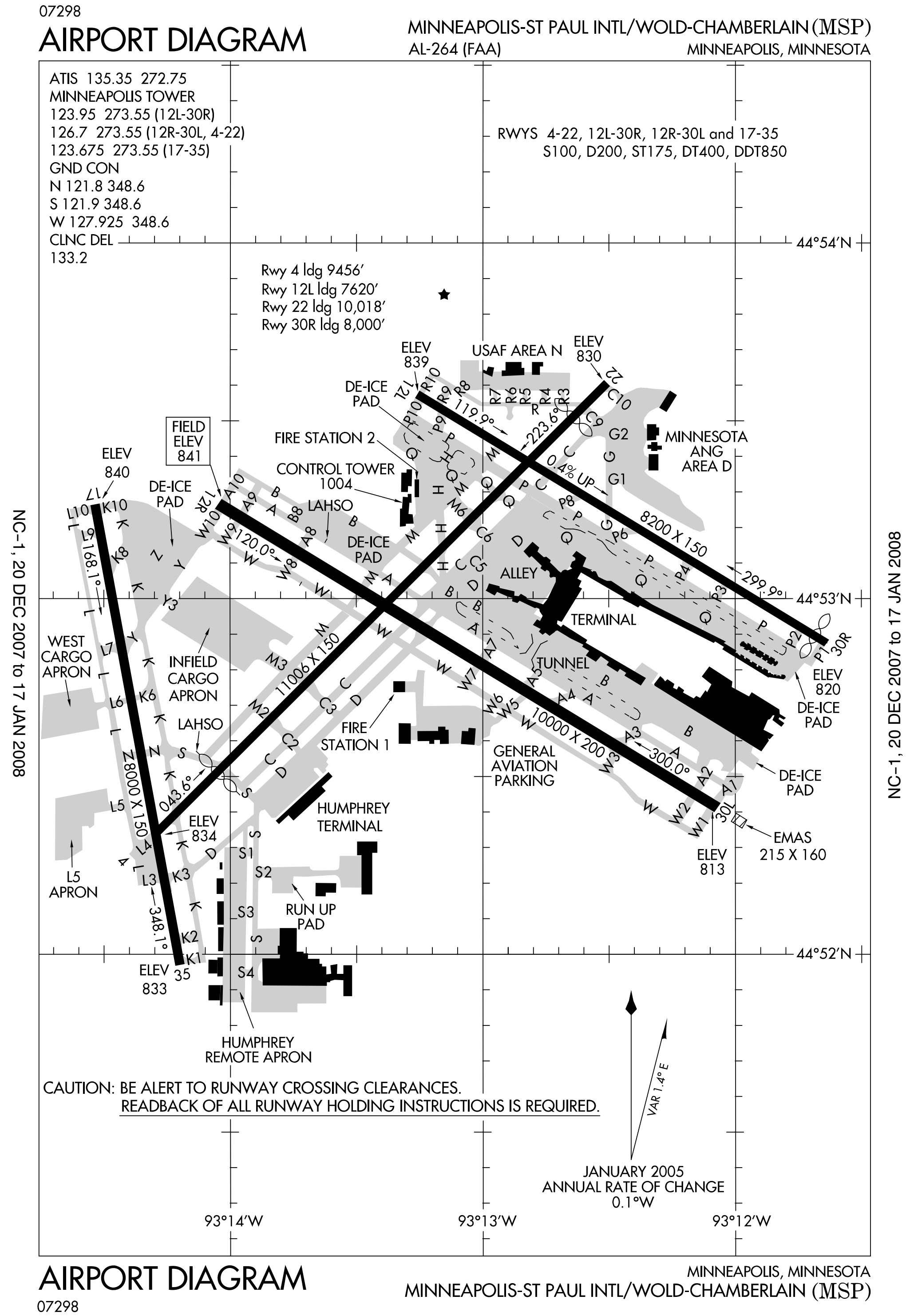
Boston, Massachusetts
General Edward Lawrence Logan International
ICAO Identifier KBOS



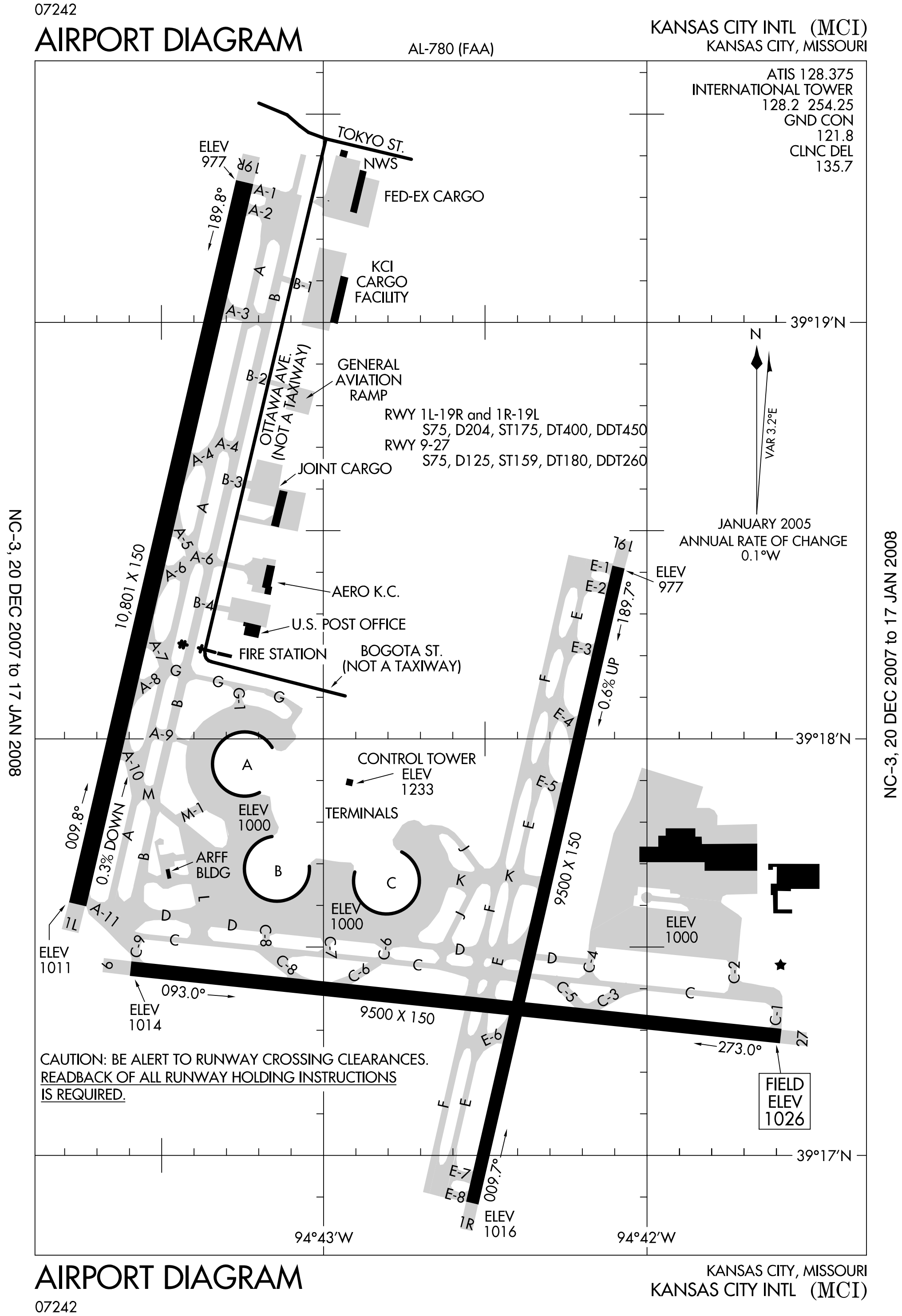
Detroit, Michigan
Detroit Metropolitan Wayne County
ICAO Identifier KDTW



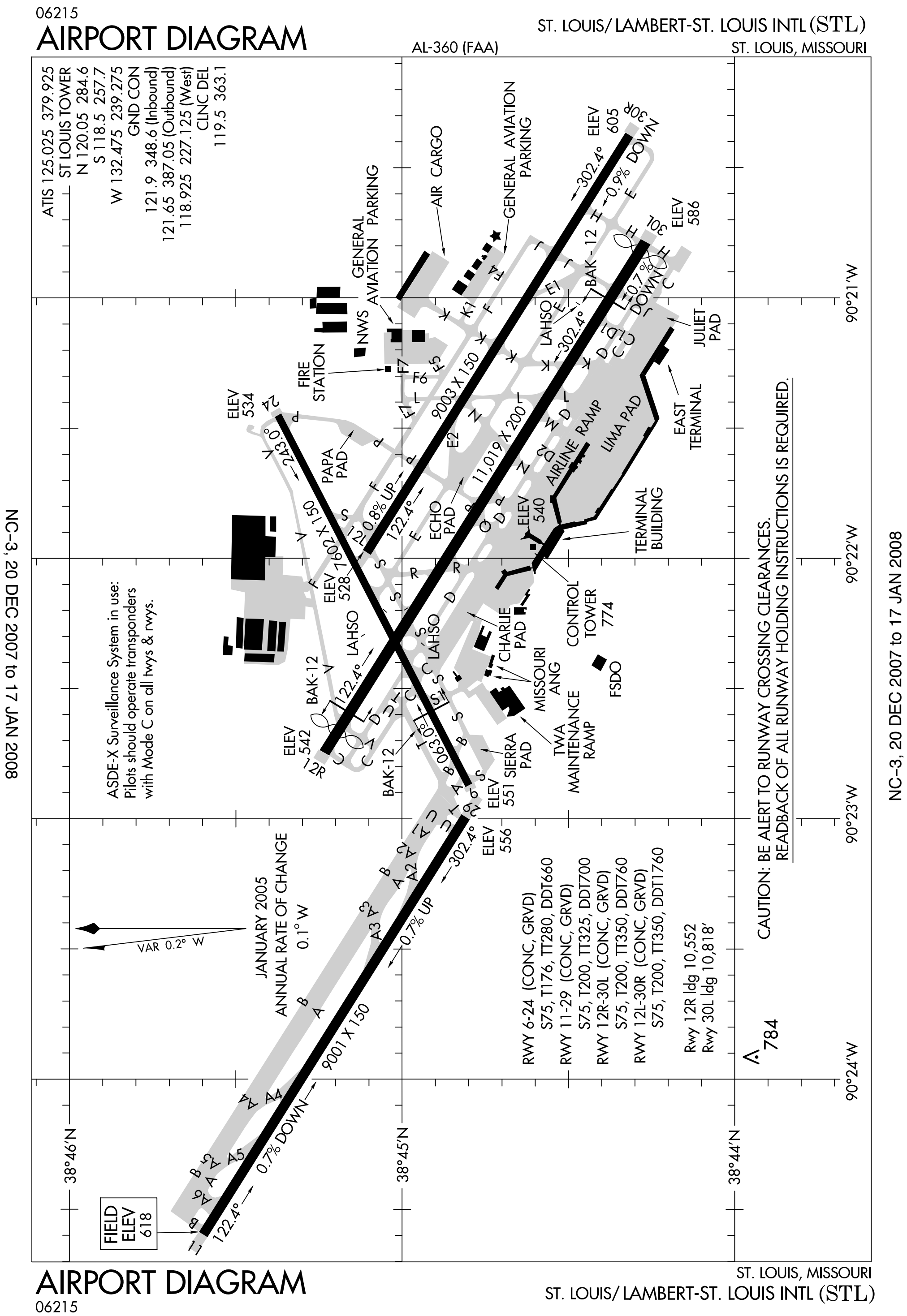
Minneapolis, Minnesota
Minneapolis-St. Paul International
(Wold-Chamberlain)
ICAO Identifier KMSP



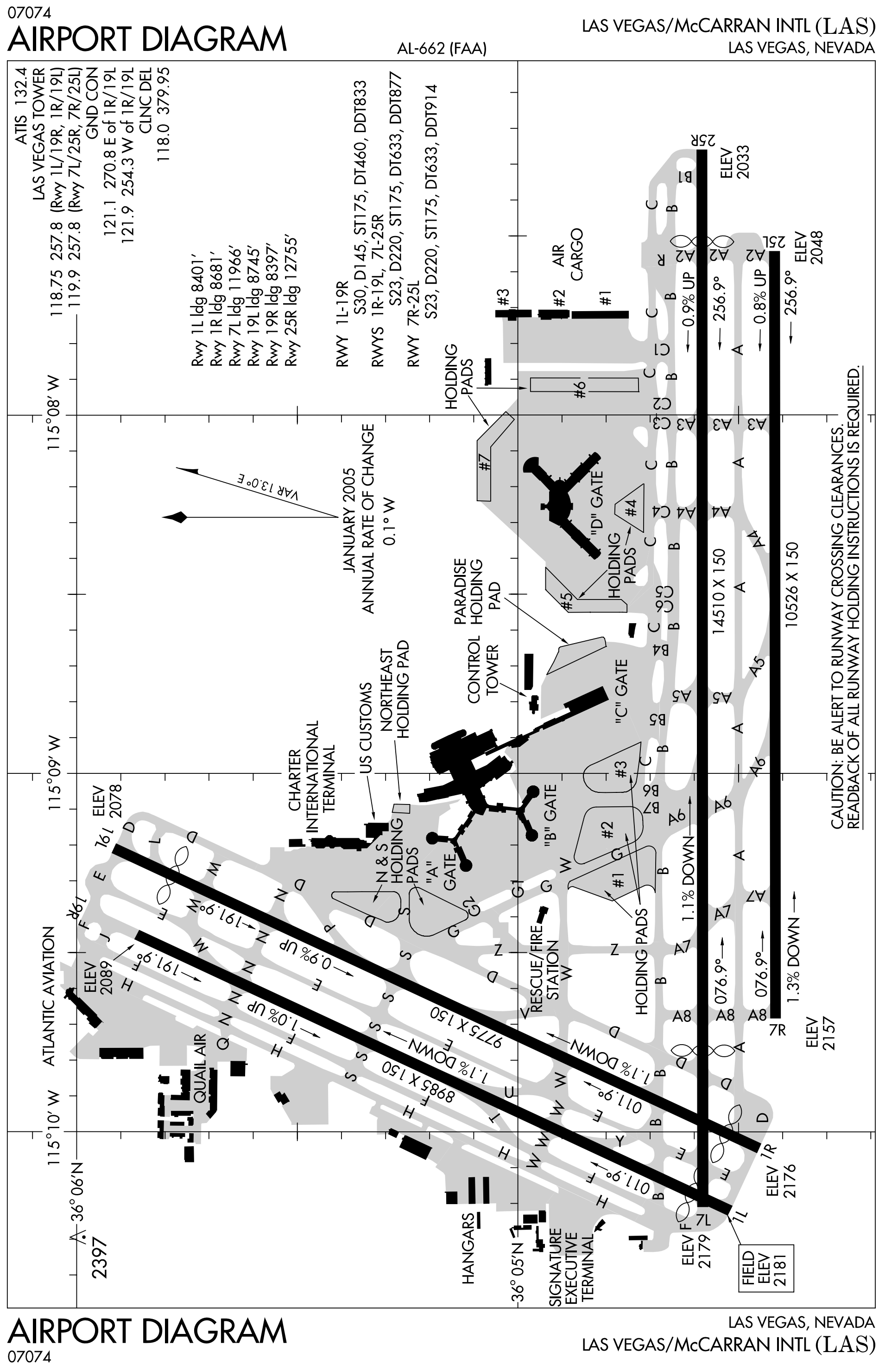
Kansas City, Missouri
Kansas City International
ICAO Identifier KMCI



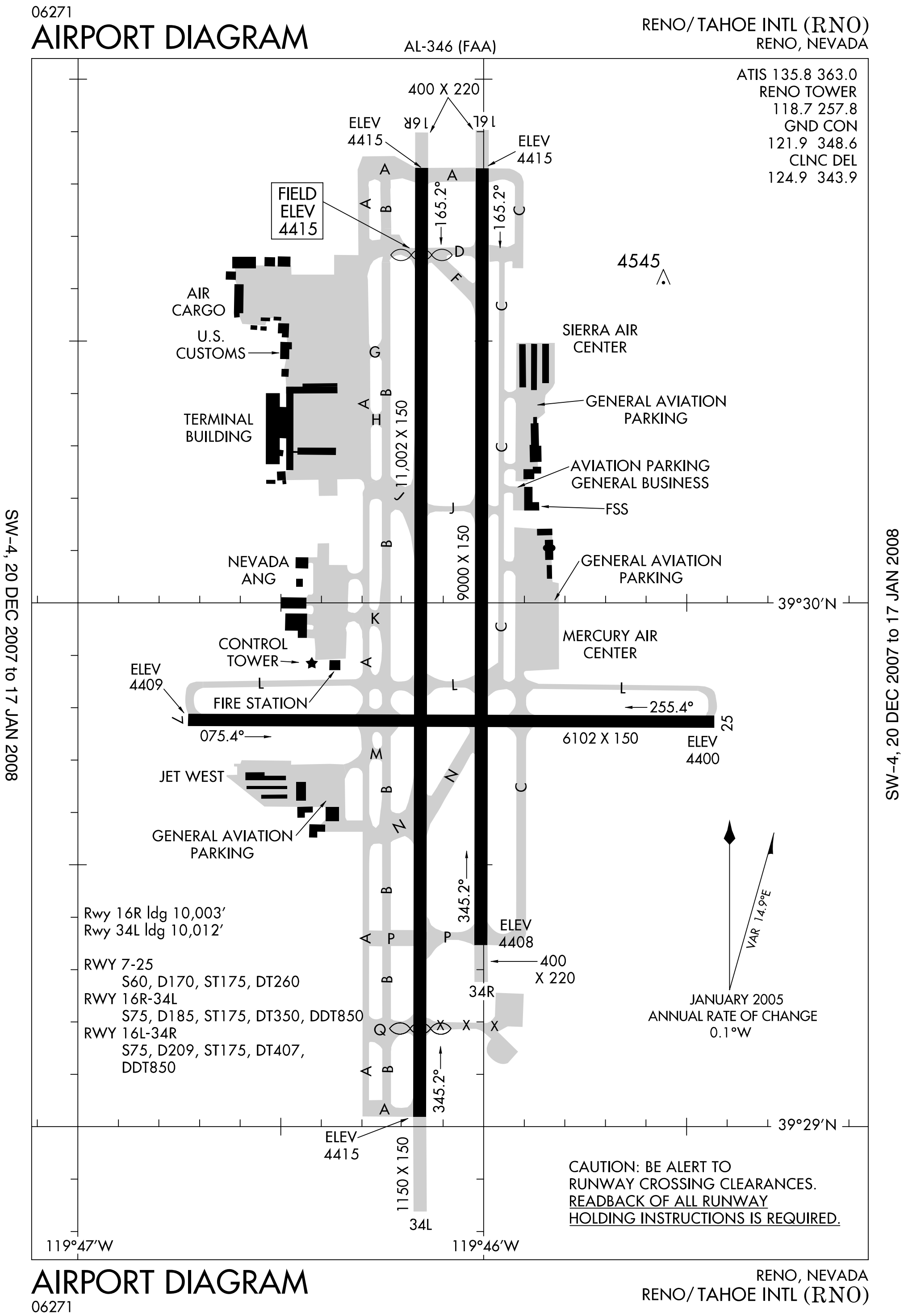
St. Louis, Missouri
Lambert-St. Louis International
ICAO Identifier KSTL



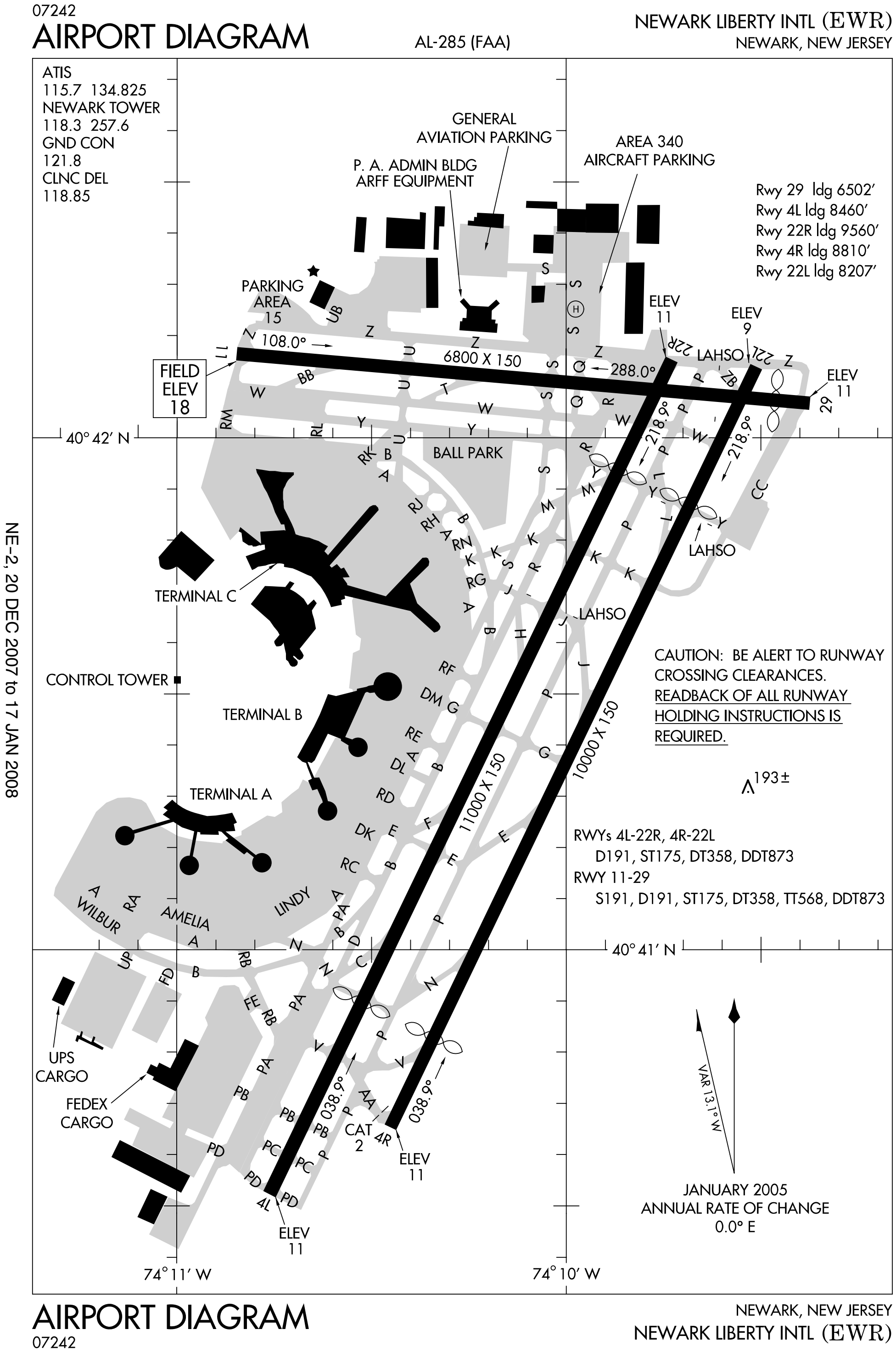
Las Vegas, Nevada
McCarren International
ICAO Identifier KLAS



Reno, Nevada
Reno/Tahoe International
ICAO Identifier KRNO



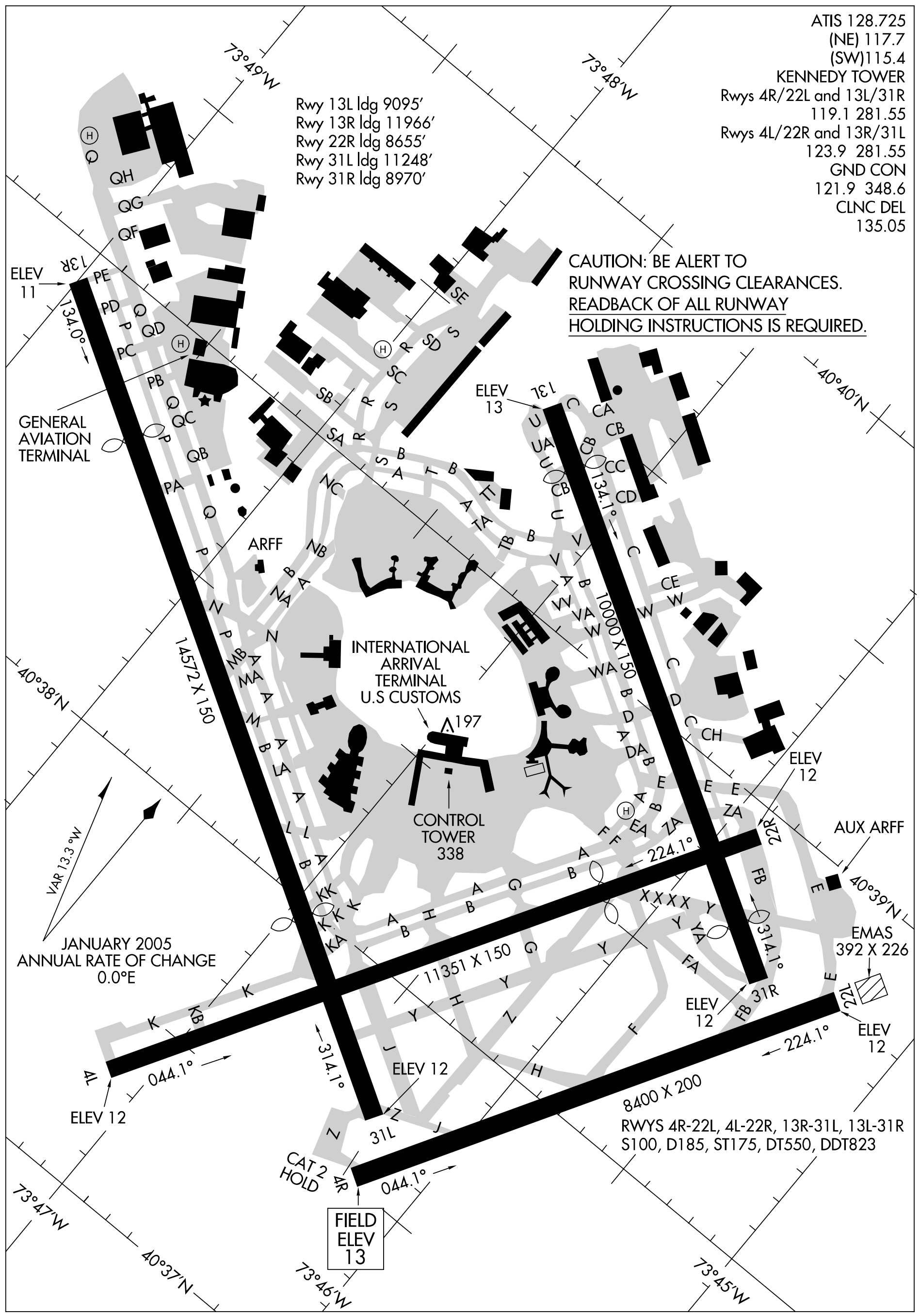
Newark, New Jersey
Newark Liberty International
ICAO Identifier KEWR



New York, New York
John F. Kennedy International
ICAO Identifier KJFK

07186
AIRPORT DIAGRAM
AL-610 (FAA)
NEW YORK / JOHN F. KENNEDY INTL (JFK)
NEW YORK, NEW YORK

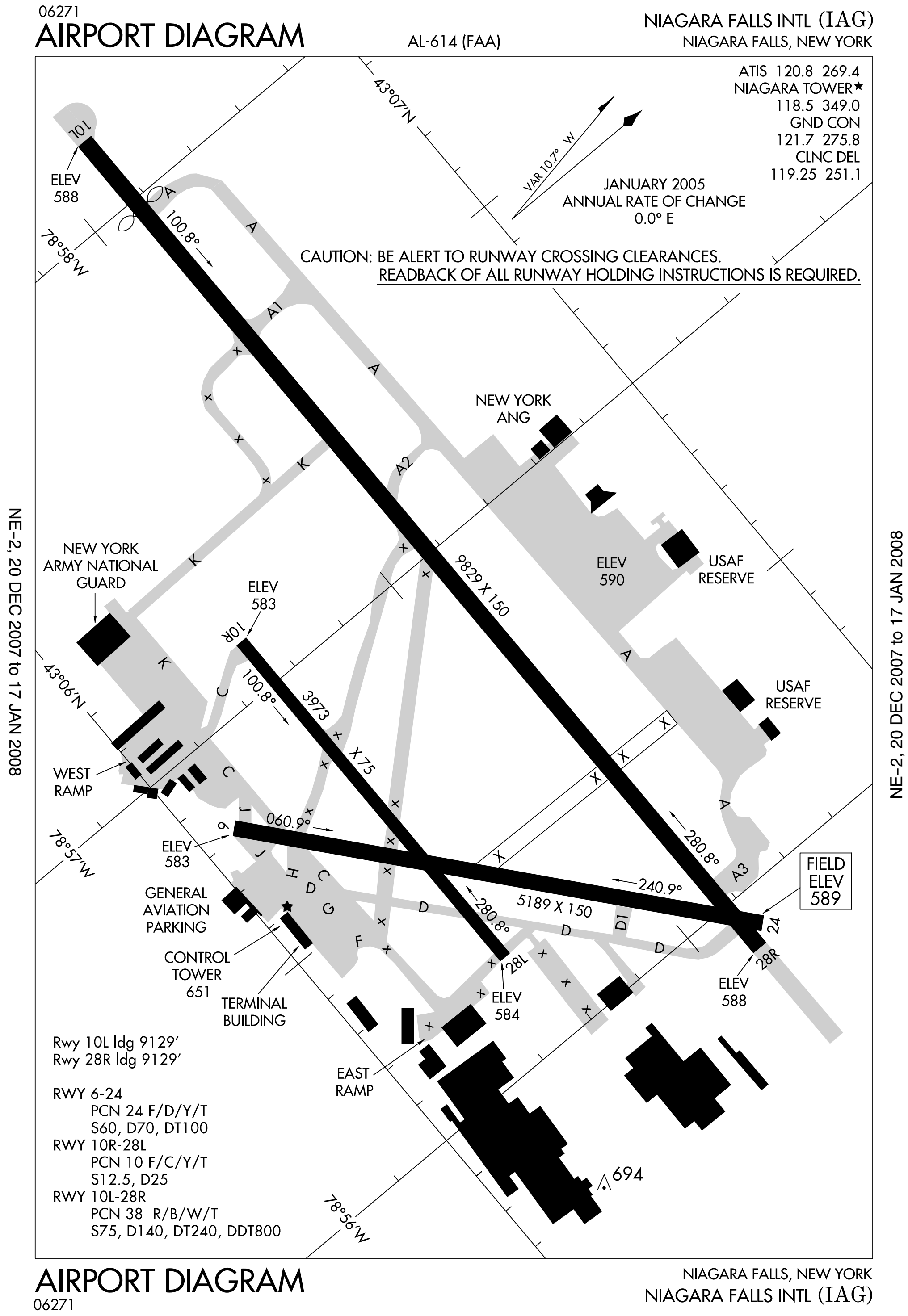
NE-2, 20 DEC 2007 to 17 JAN 2008



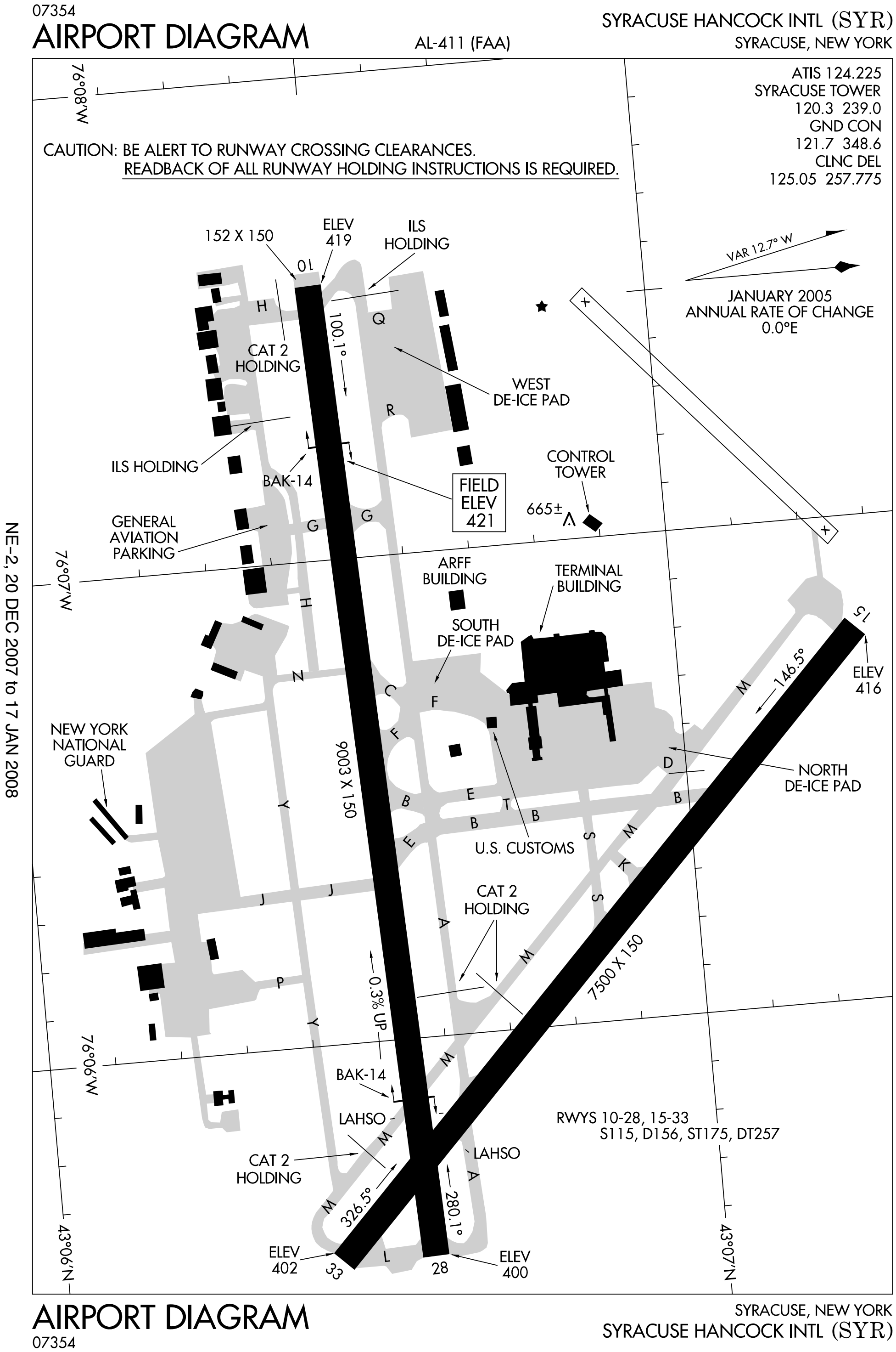
NE-2, 20 DEC 2007 to 17 JAN 2008

AIRPORT DIAGRAM
NEW YORK, NEW YORK
NEW YORK / JOHN F. KENNEDY INTL (JFK)
07186

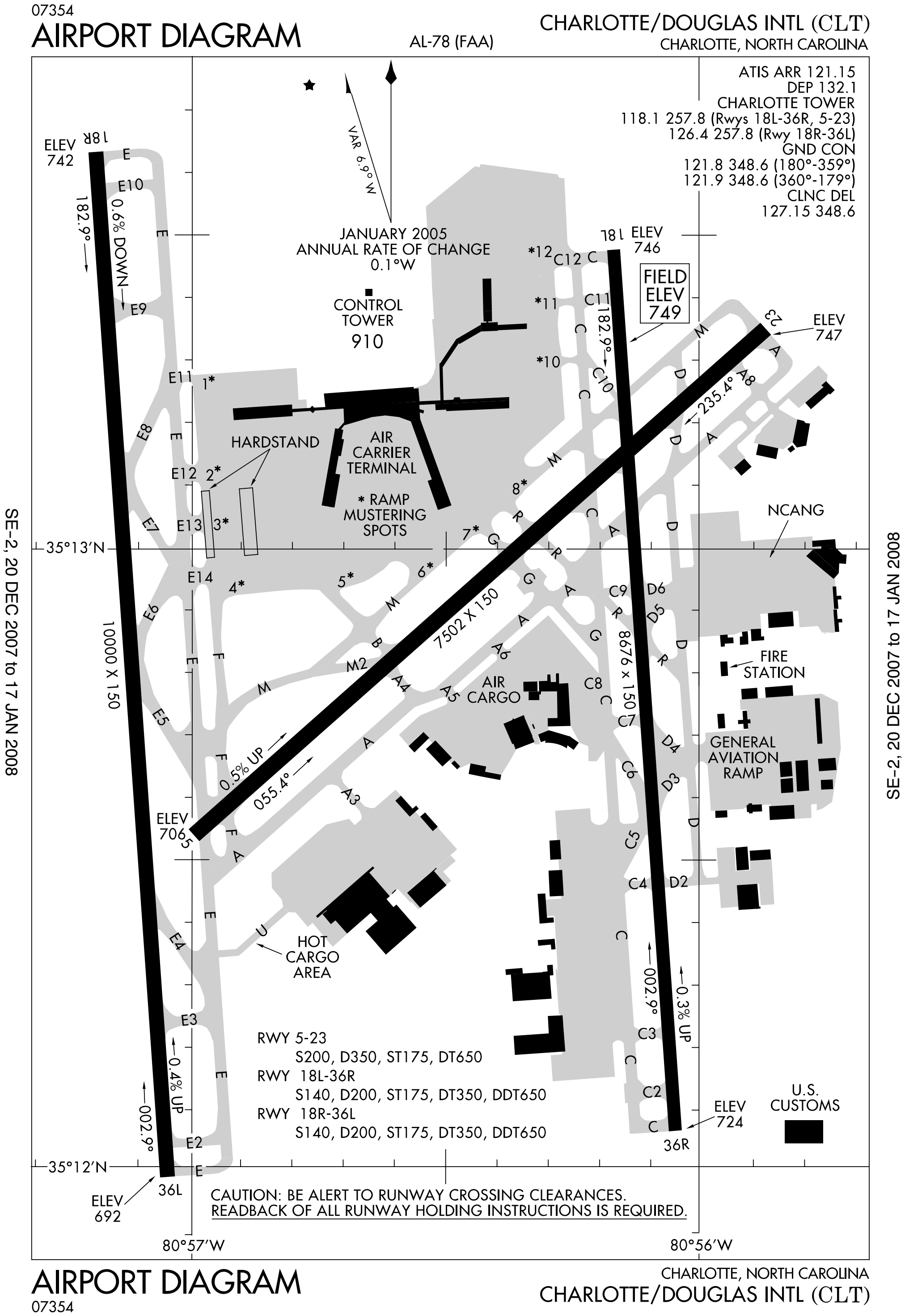
Niagara Falls, New York
Niagara Falls International
ICAO Identifier KIAG



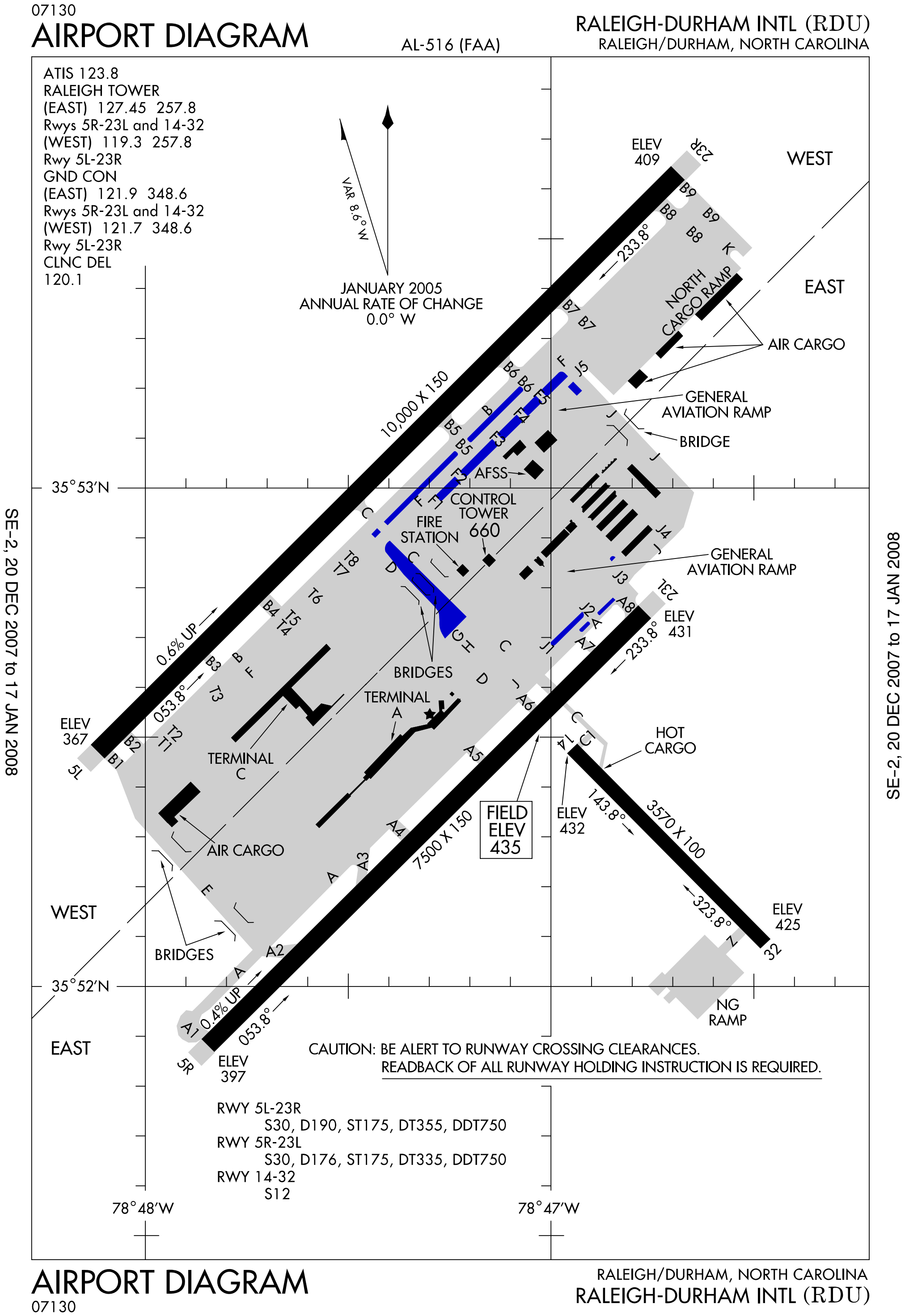
Syracuse, New York
Syracuse Hancock International
ICAO Identifier KSYR



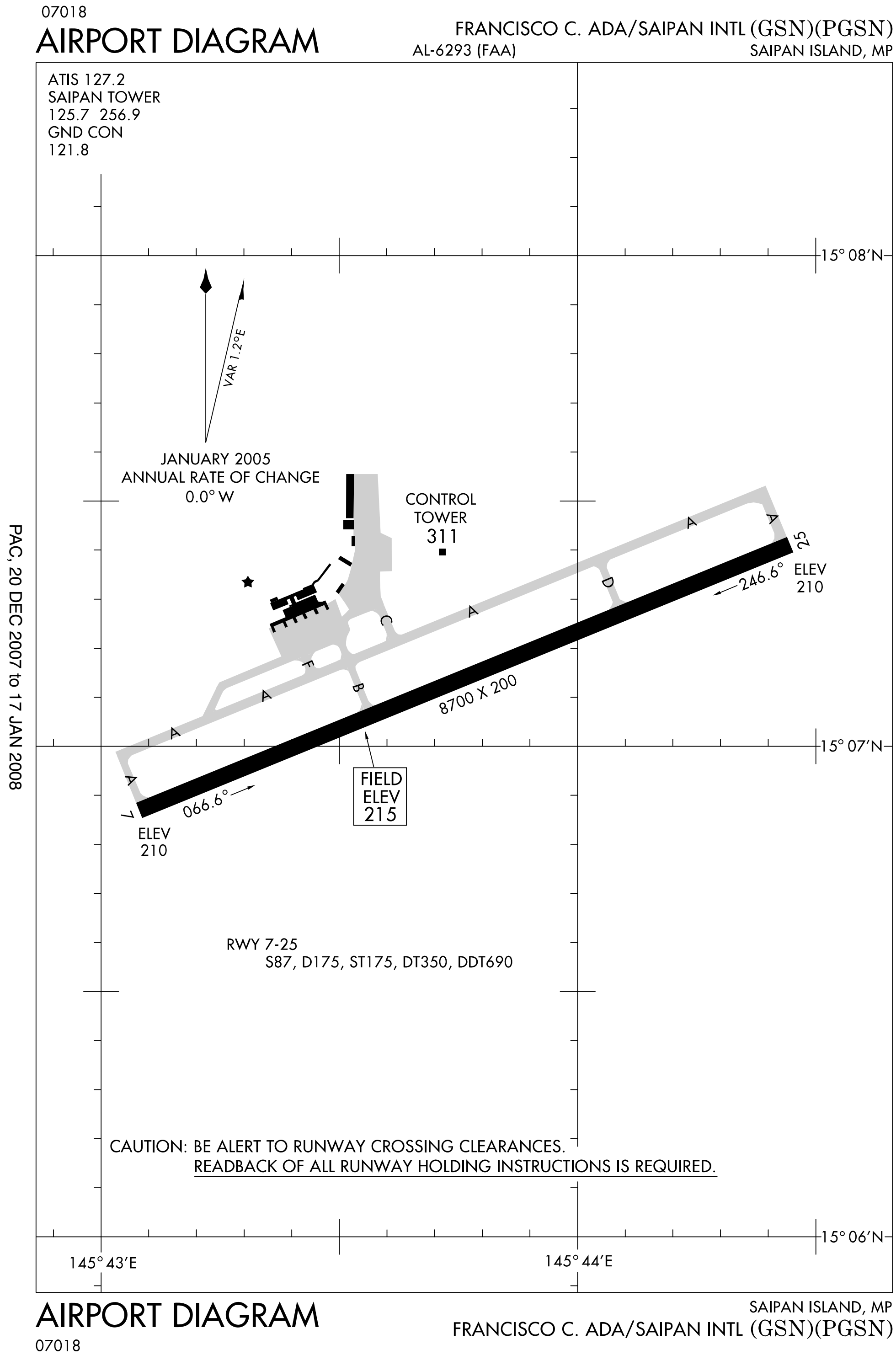
Charlotte, North Carolina
Charlotte/Douglas International
ICAO Identifier KCLT



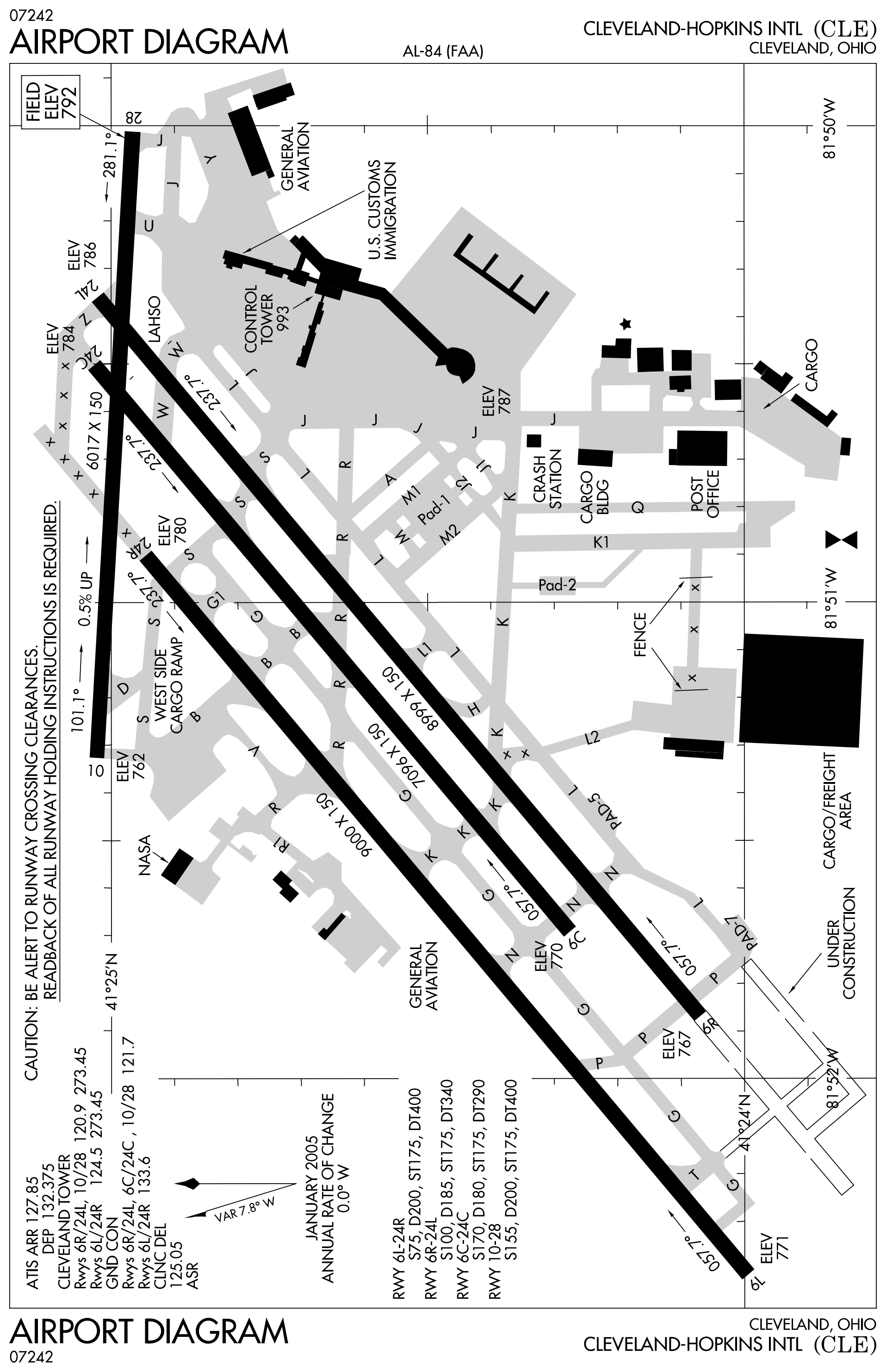
Raleigh-Durham, North Carolina
Raleigh-Durham International
ICAO Identifier KRDU



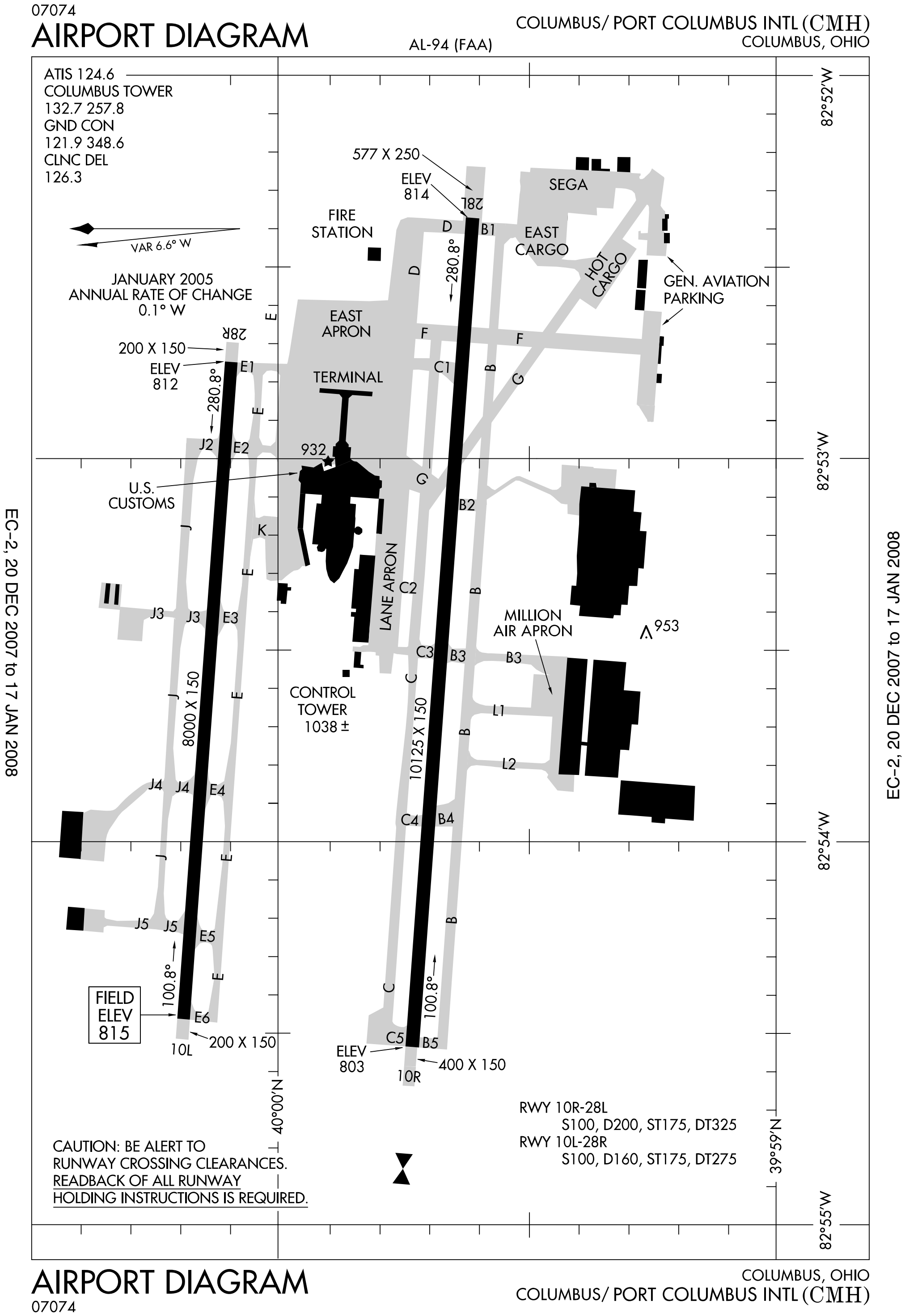
North Mariana Islands
Saipan Island
Francisco C. Ada/Saipan International
ICAO Identifier PGSN



Cleveland, Ohio
Cleveland-Hopkins International
ICAO Identifier KCLE

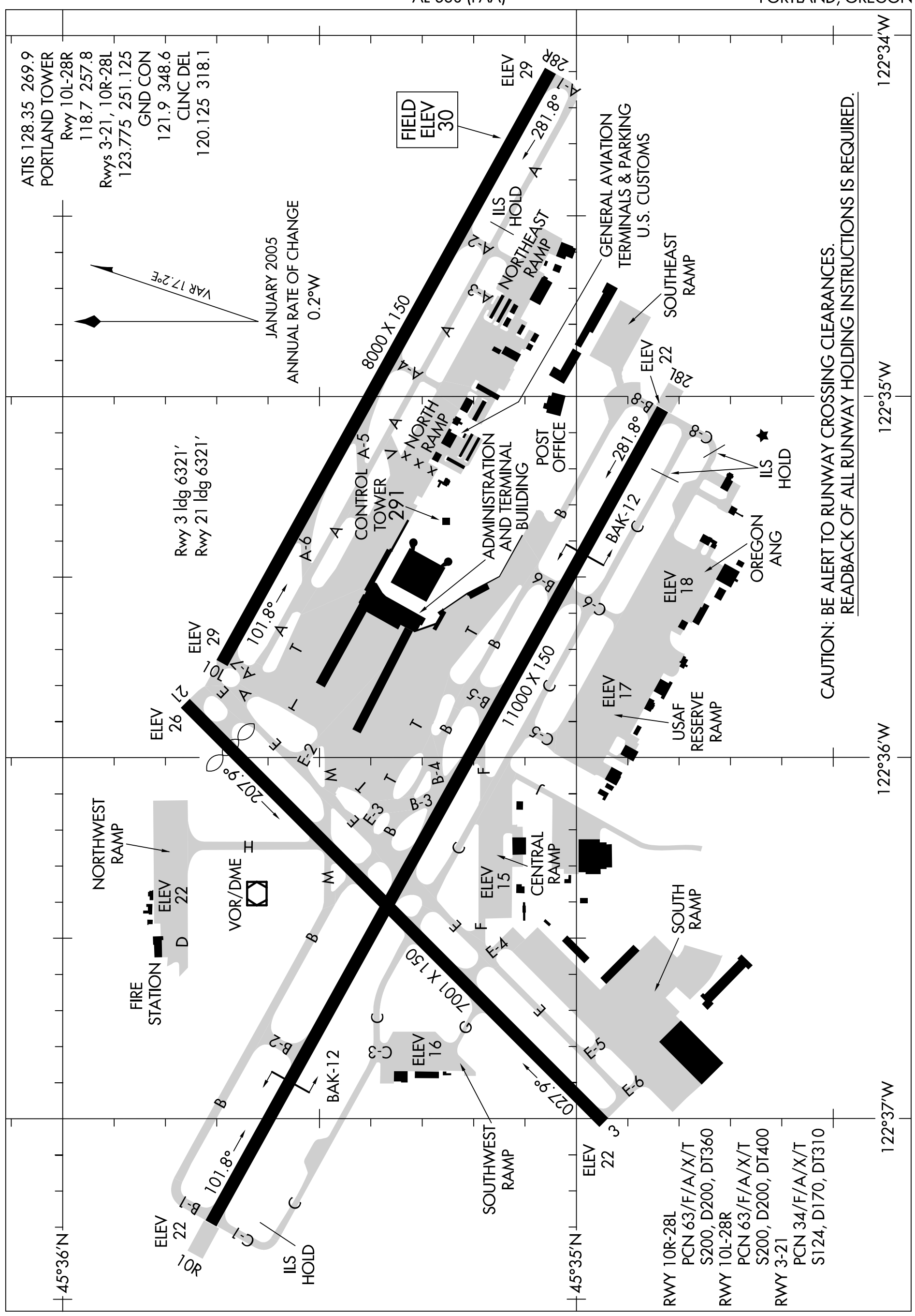


Columbus, Ohio
Port Columbus International
ICAO Identifier KCMH



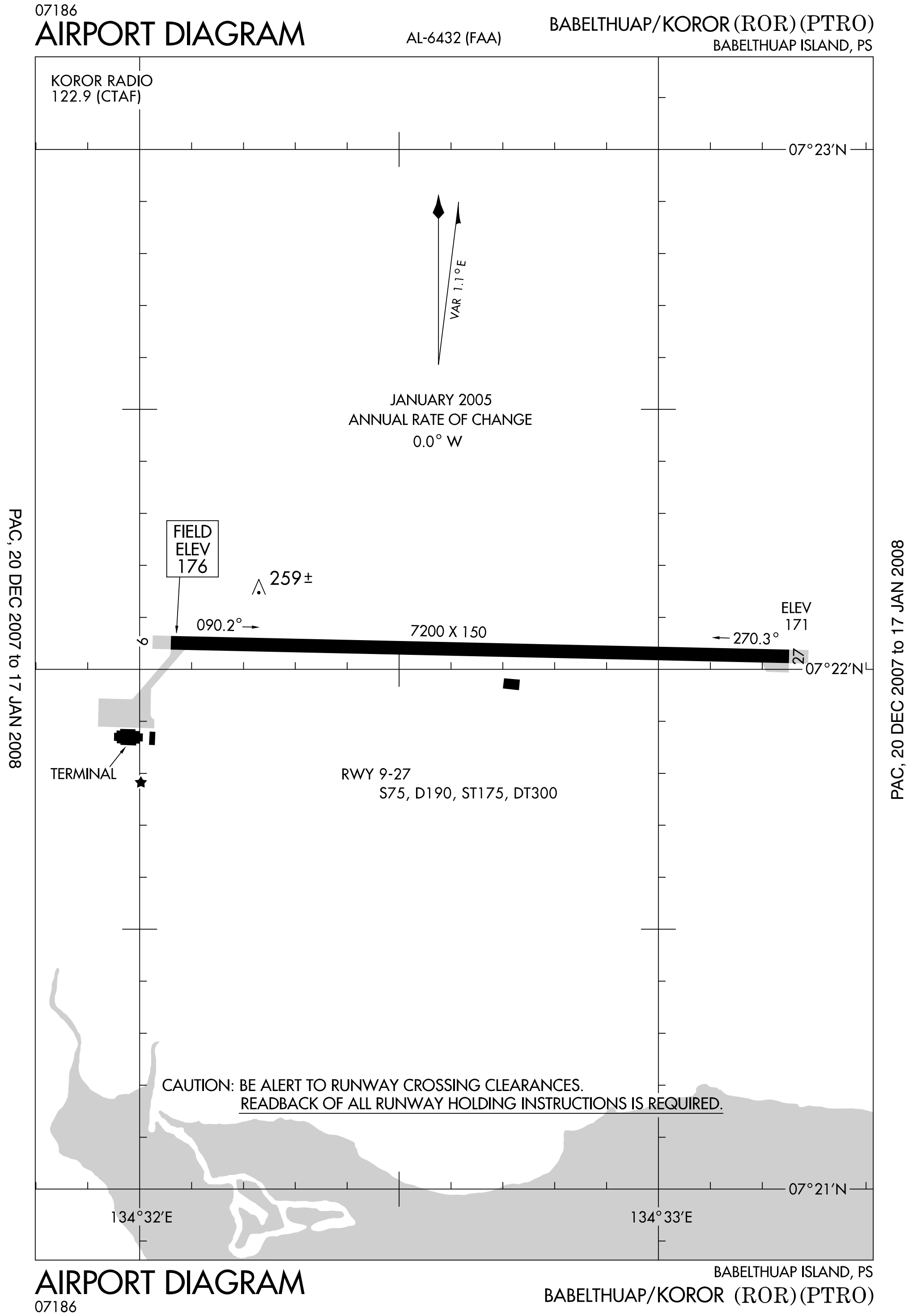
Portland, Oregon
Portland International
ICAO Identifier KPDX

07018
AIRPORT DIAGRAM
AL-330 (FAA)
PORTLAND INTL (PDX)
PORTLAND, OREGON

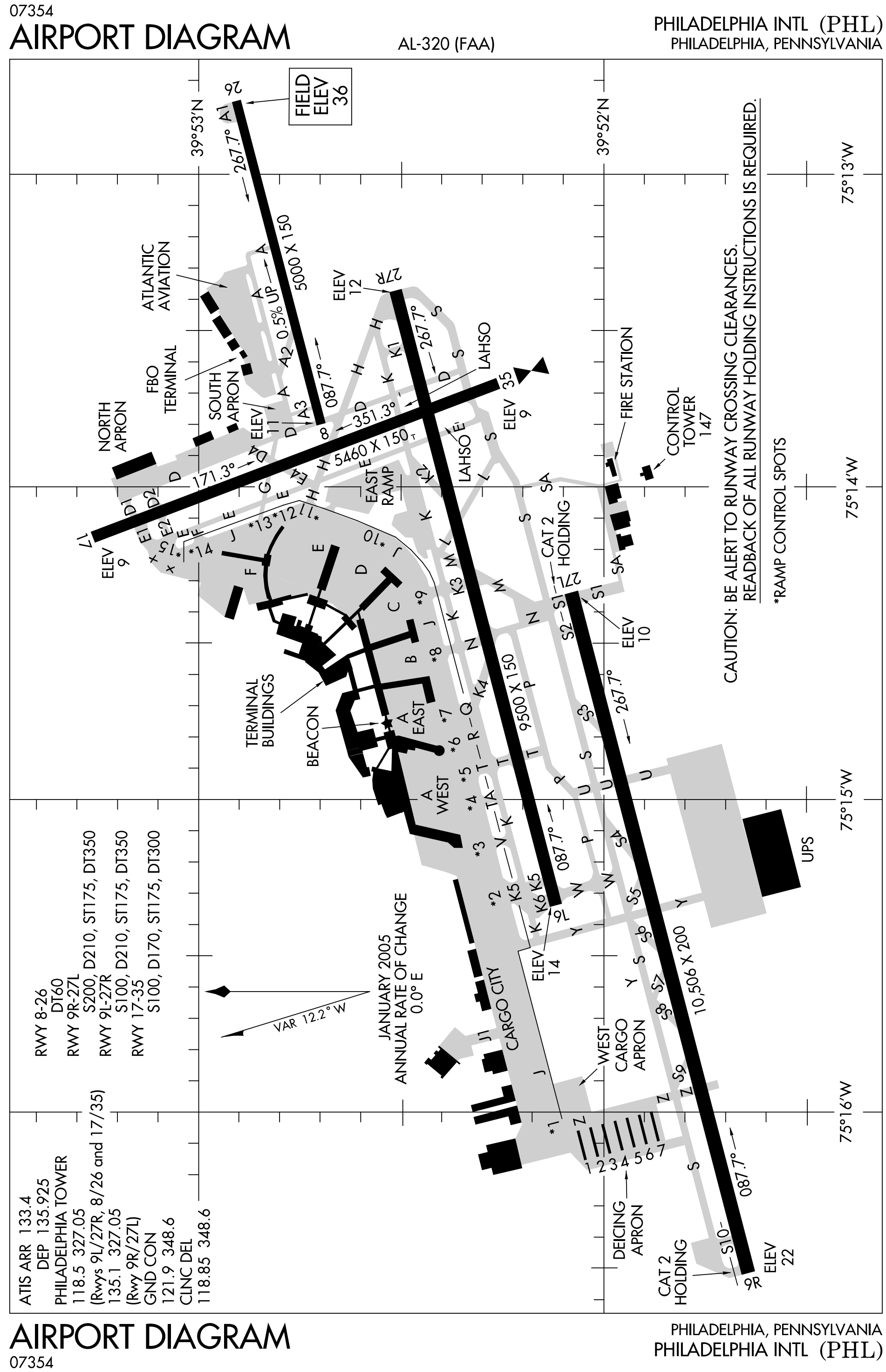


AIRPORT DIAGRAM
07018
PORTLAND, OREGON
PORTLAND INTL (PDX)

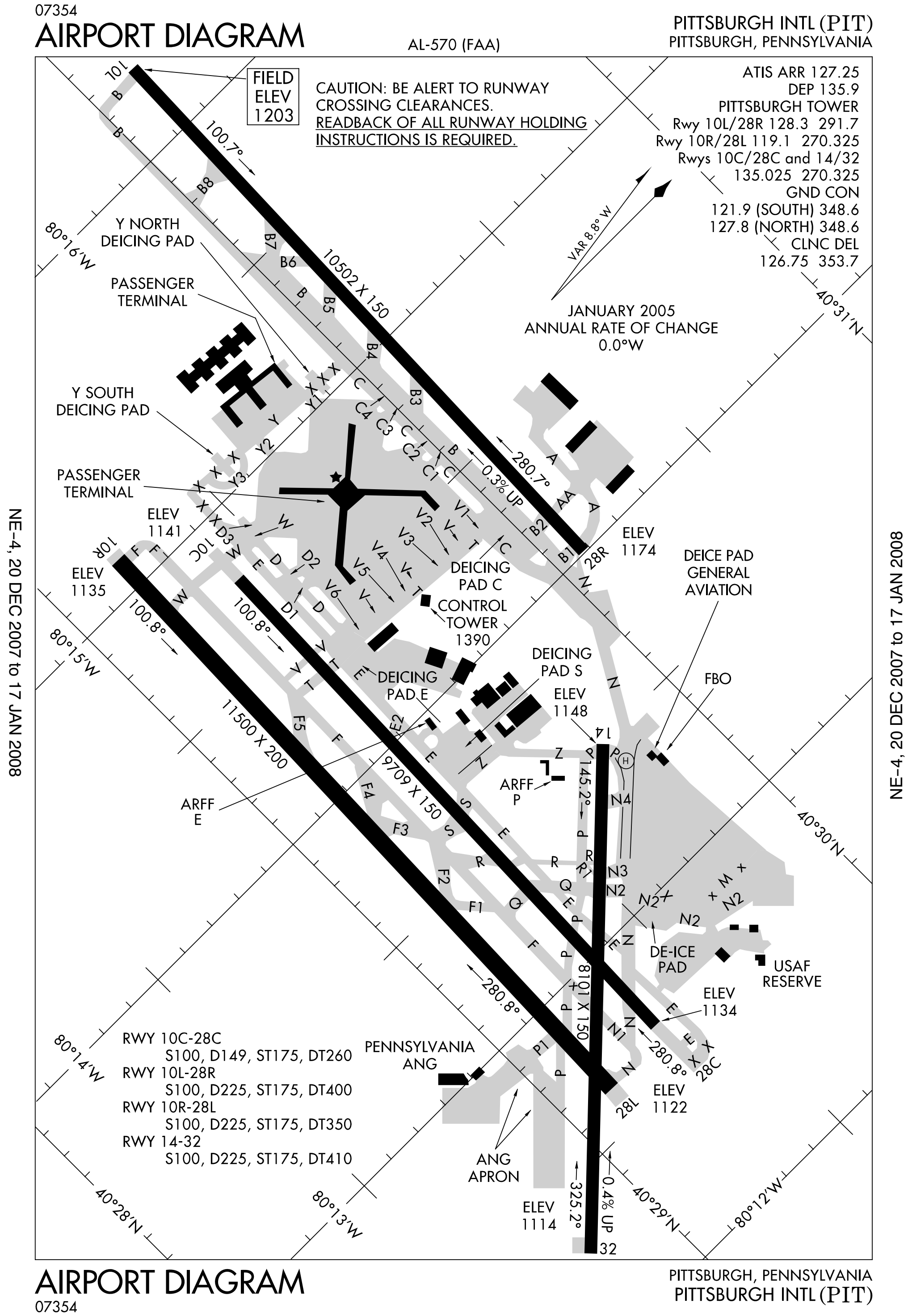
Babelthuap Island
Babelthuap/Koror
ICAO Identifier PTRO



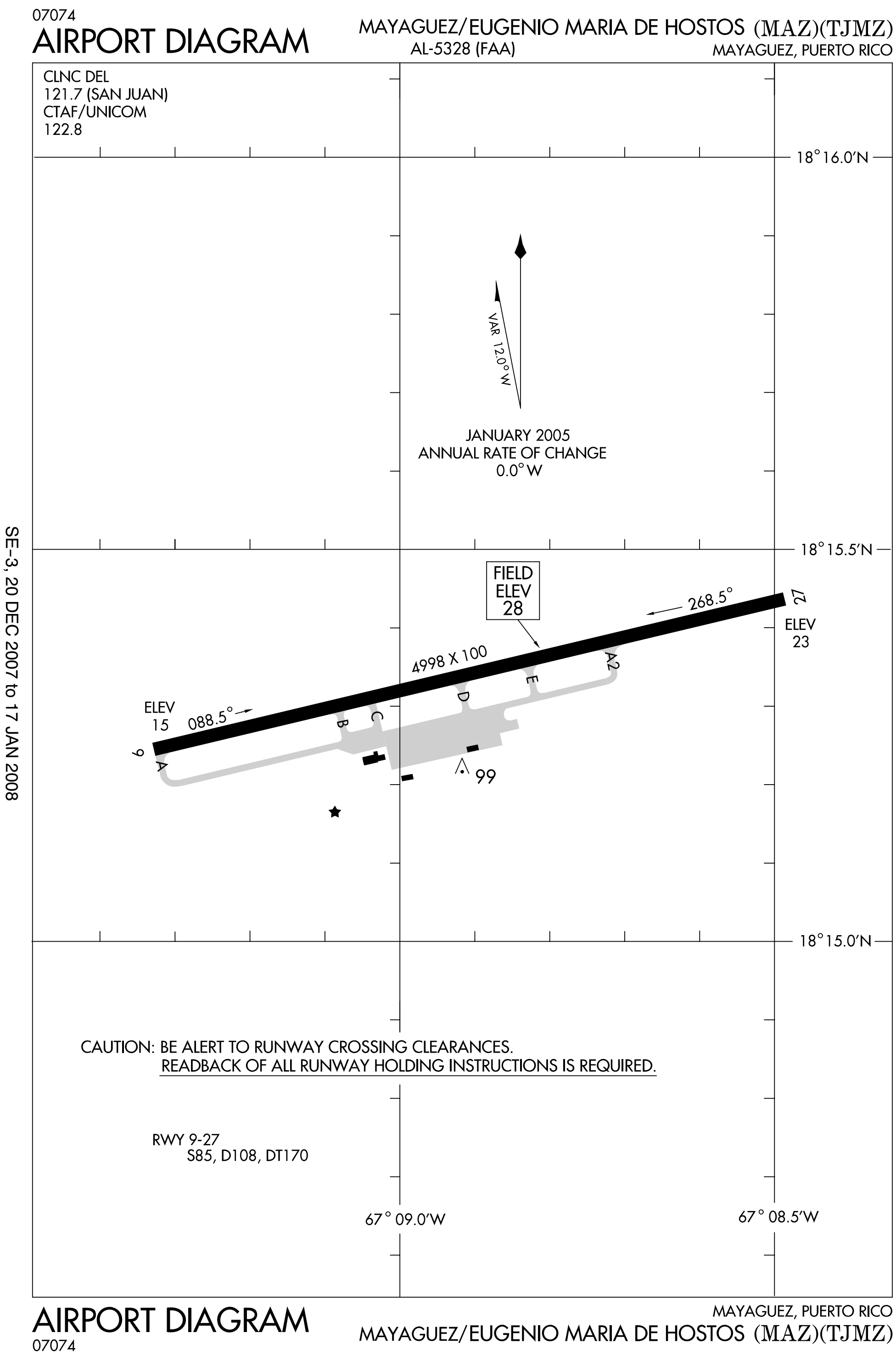
Philadelphia, Pennsylvania
Philadelphia International
ICAO Identifier KPHL



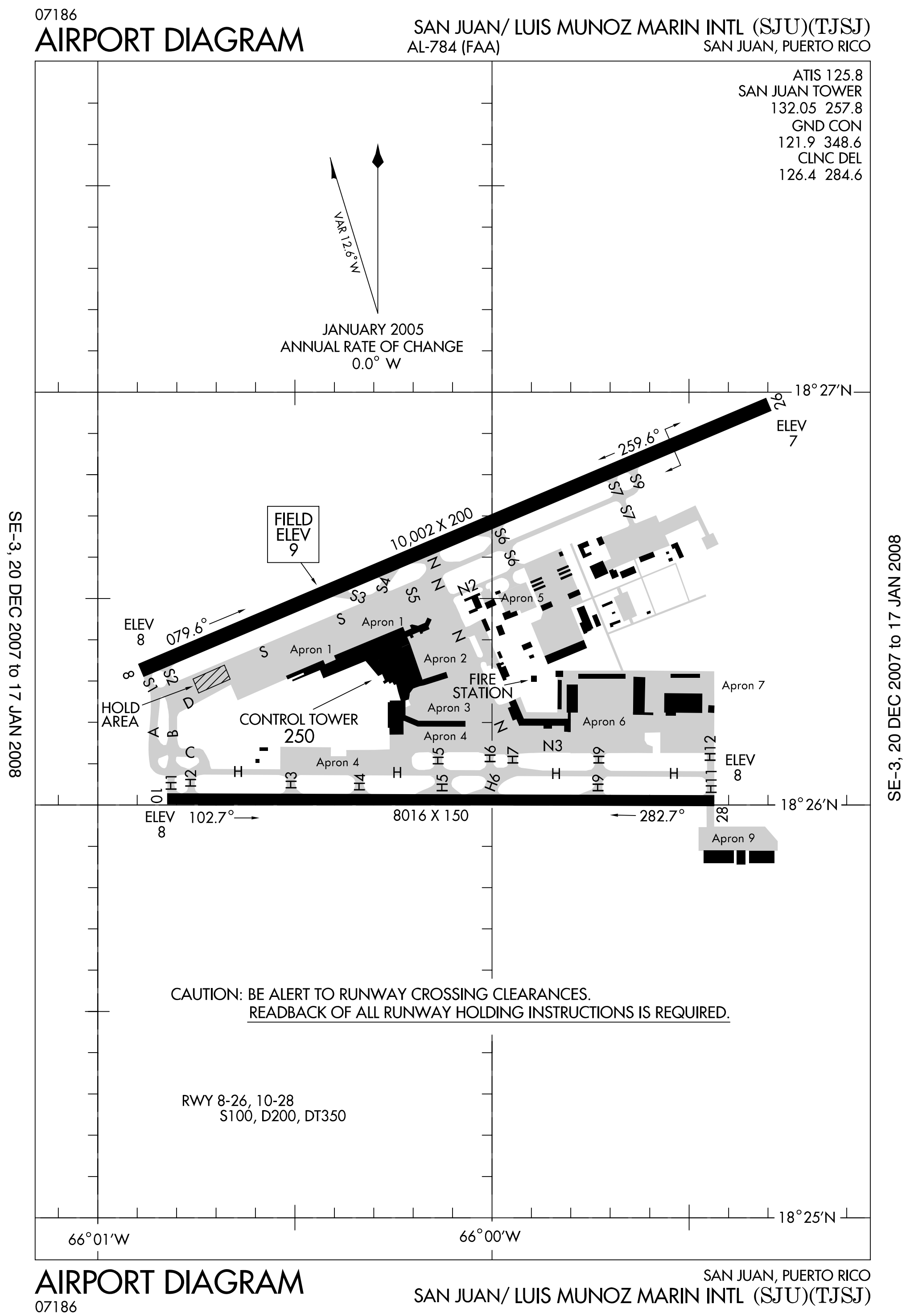
Pittsburgh, Pennsylvania
Pittsburgh International
ICAO Identifier KPIT



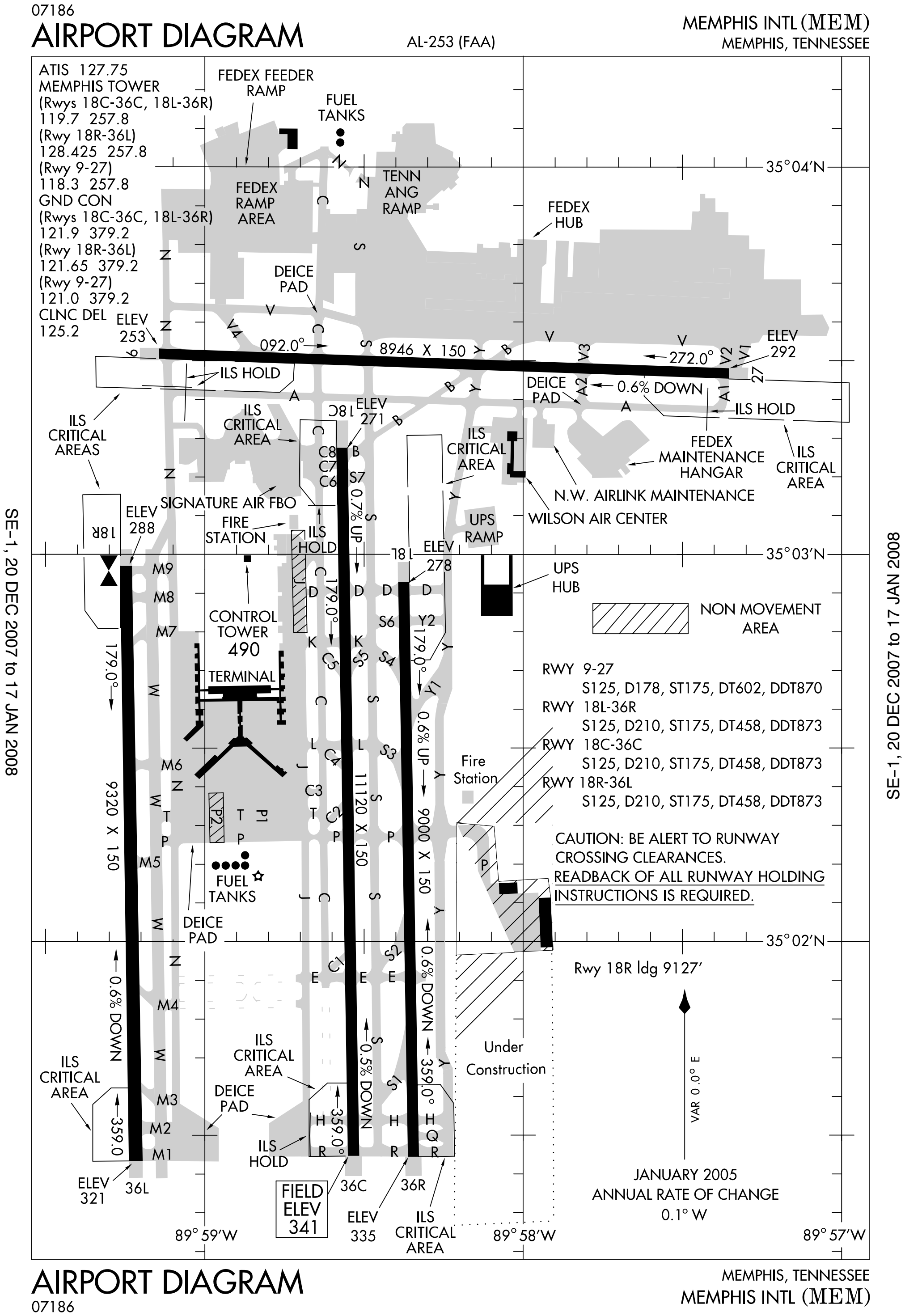
Mayaguez, Puerto Rico
Eugenio Maria De Hostos
ICAO Identifier TJMZ



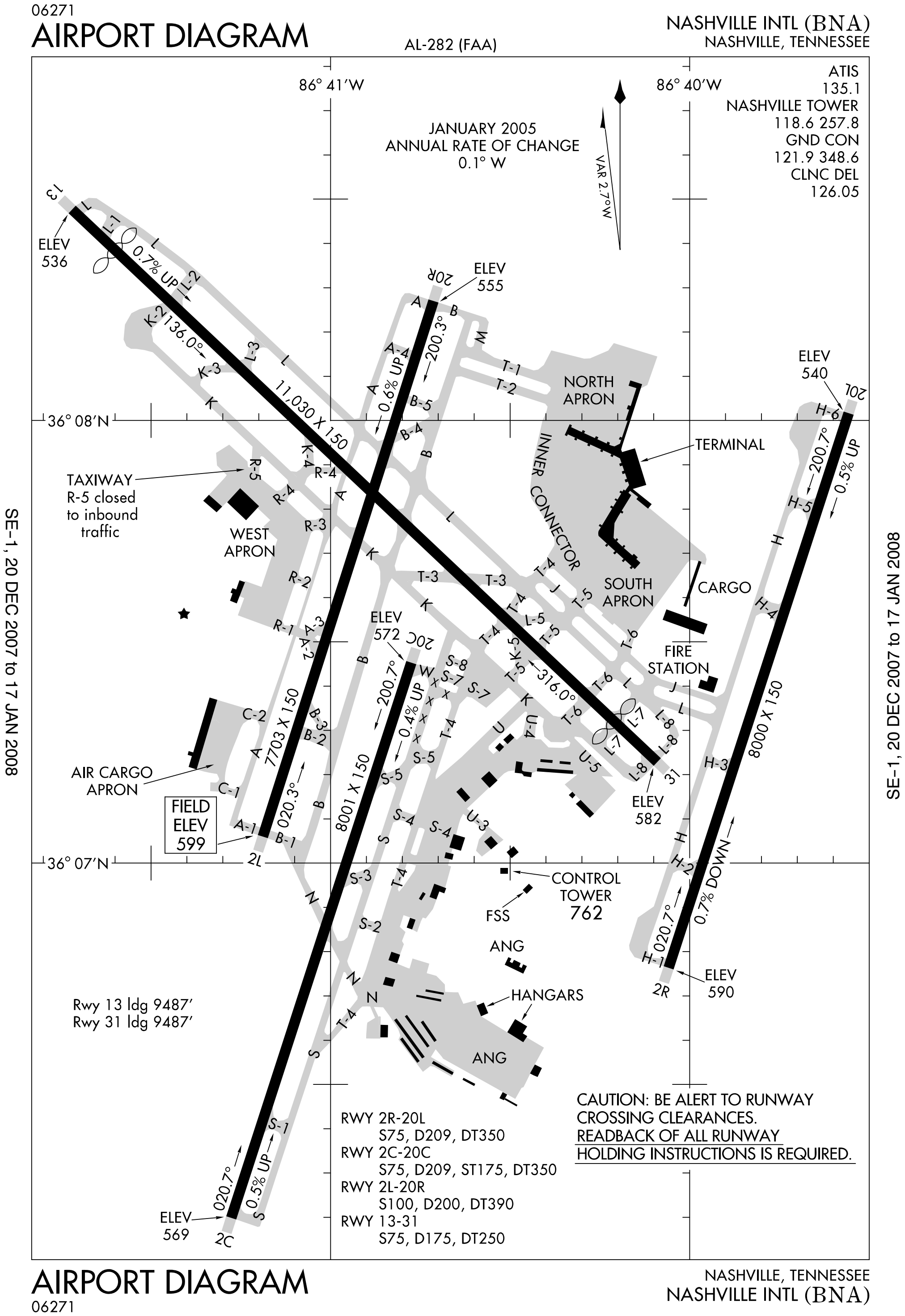
San Juan, Puerto Rico
Luis Munoz Marin International
ICAO Identifier TJSJ



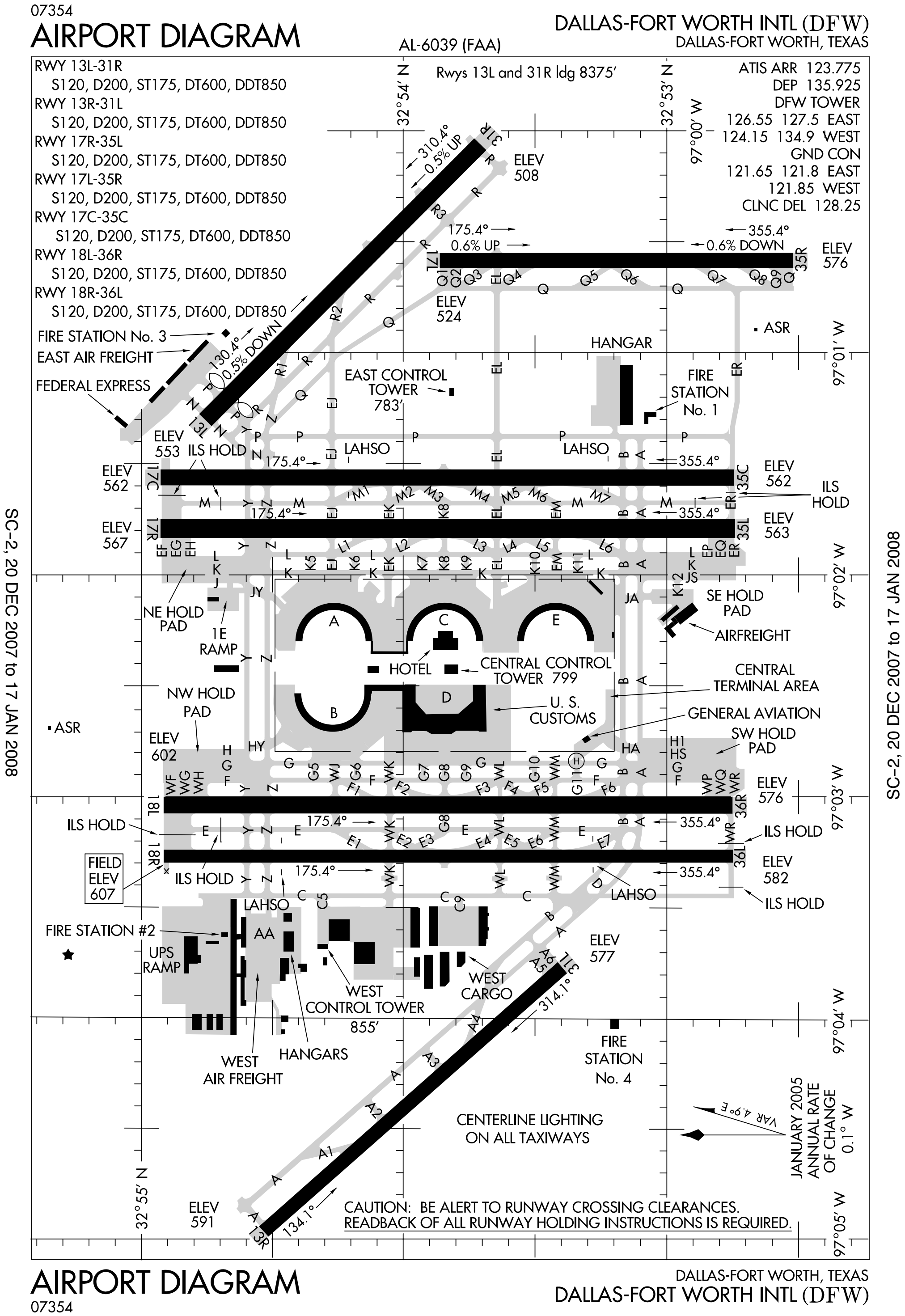
Memphis, Tennessee
Memphis International
ICAO Identifier KMEM



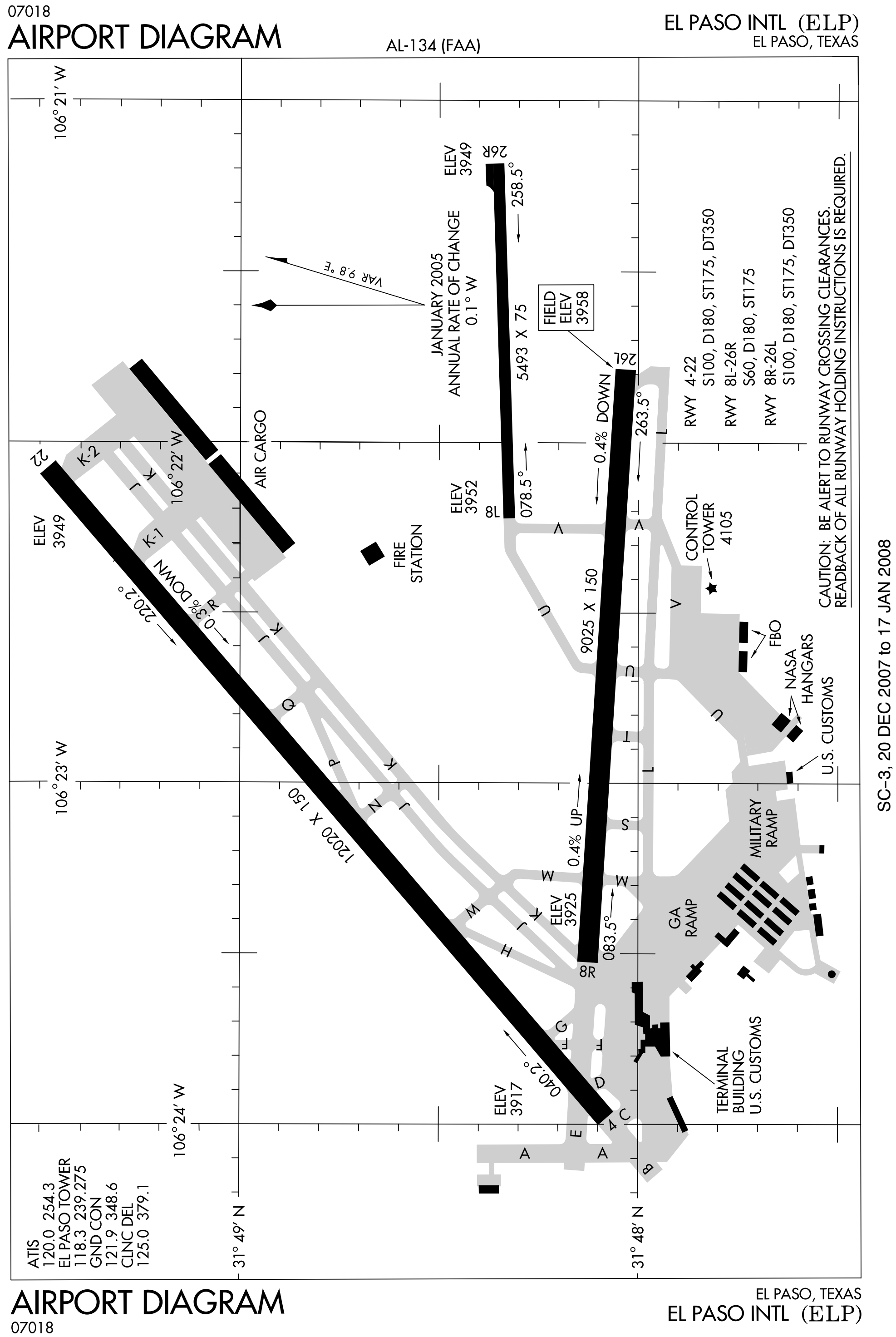
Nashville, Tennessee
Nashville International
ICAO Identifier KBNA



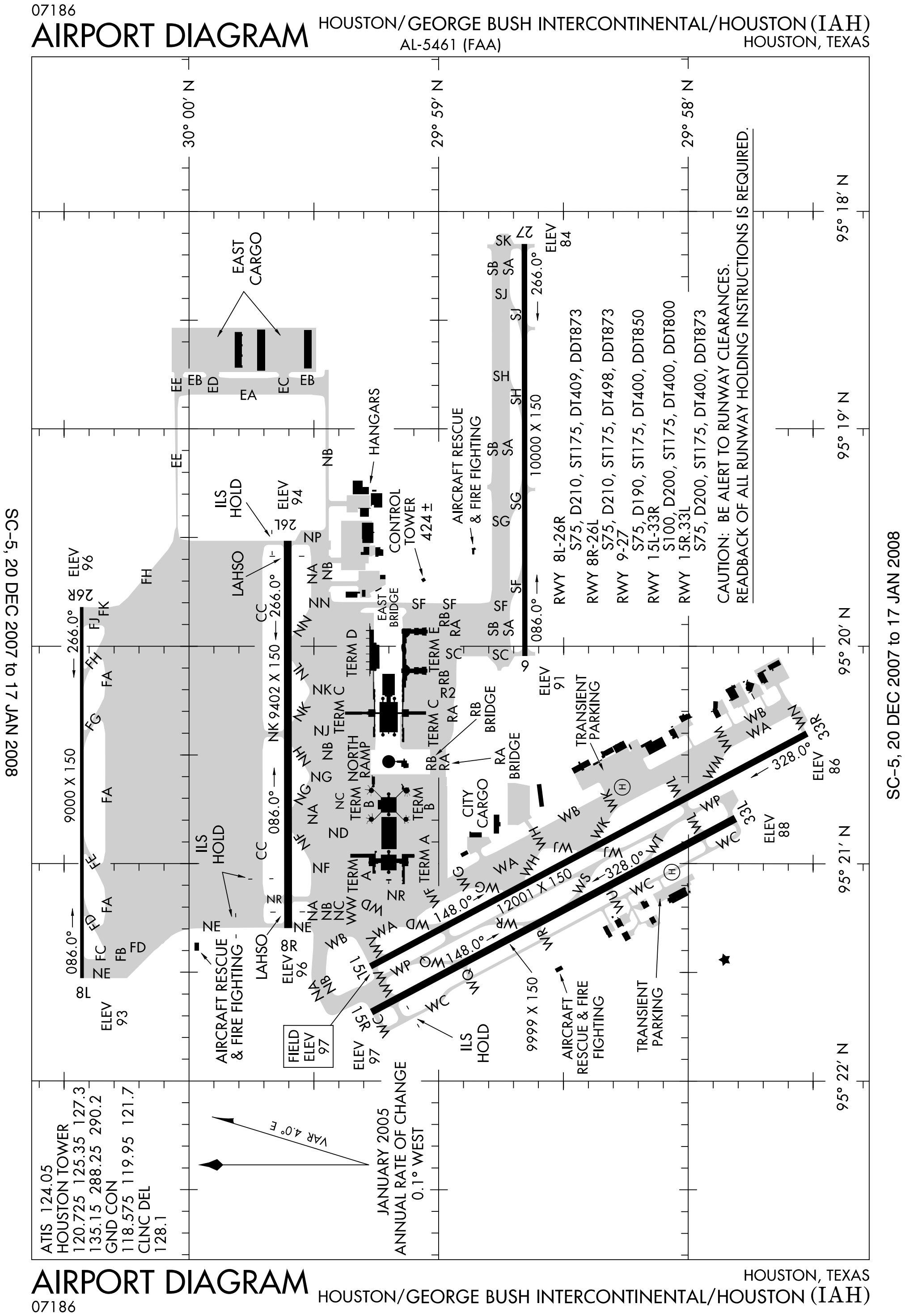
Dallas, Texas
Dallas-Fort Worth International
ICAO Identifier KDFW



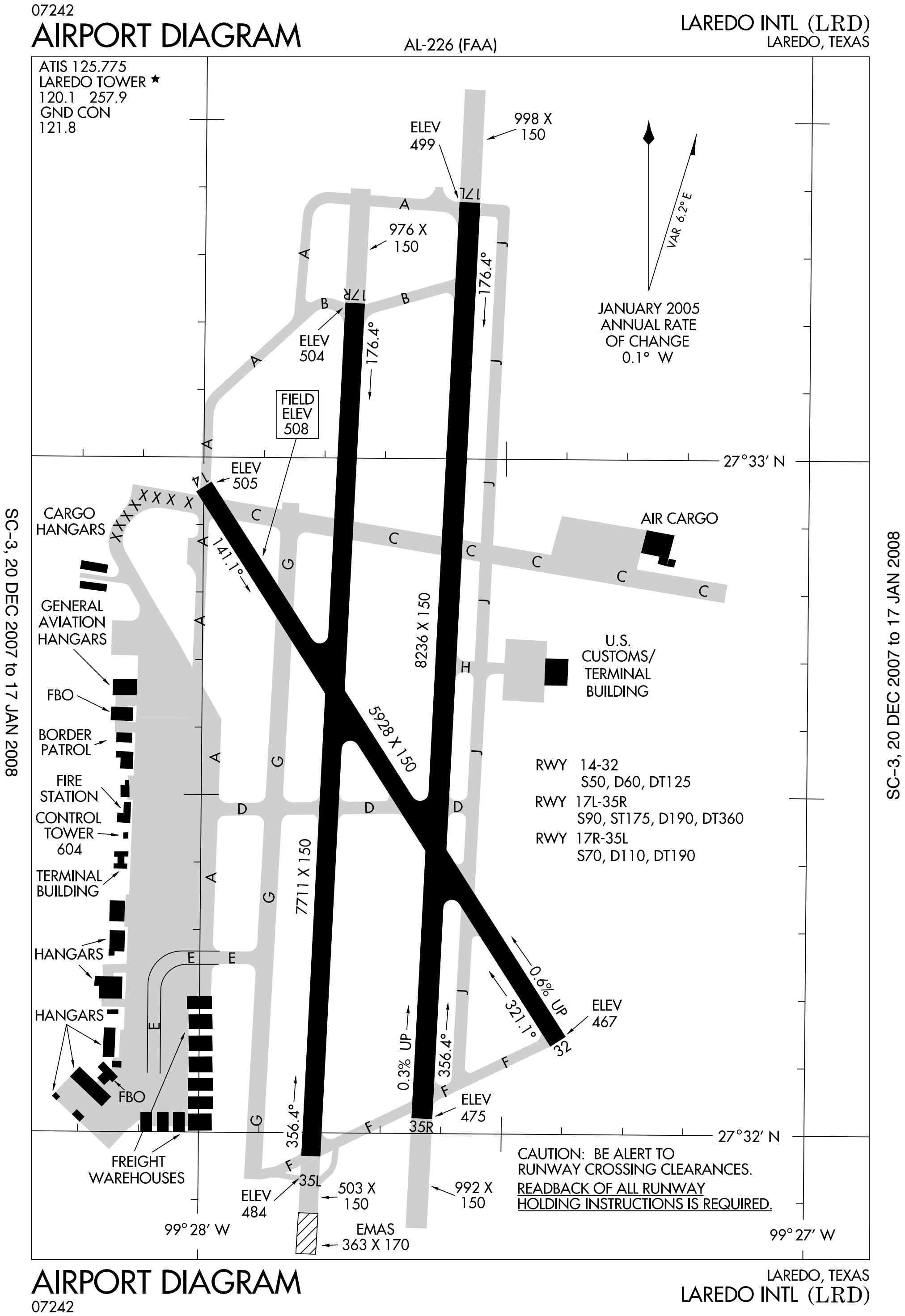
El Paso, Texas
El Paso International
ICAO Identifier KELP



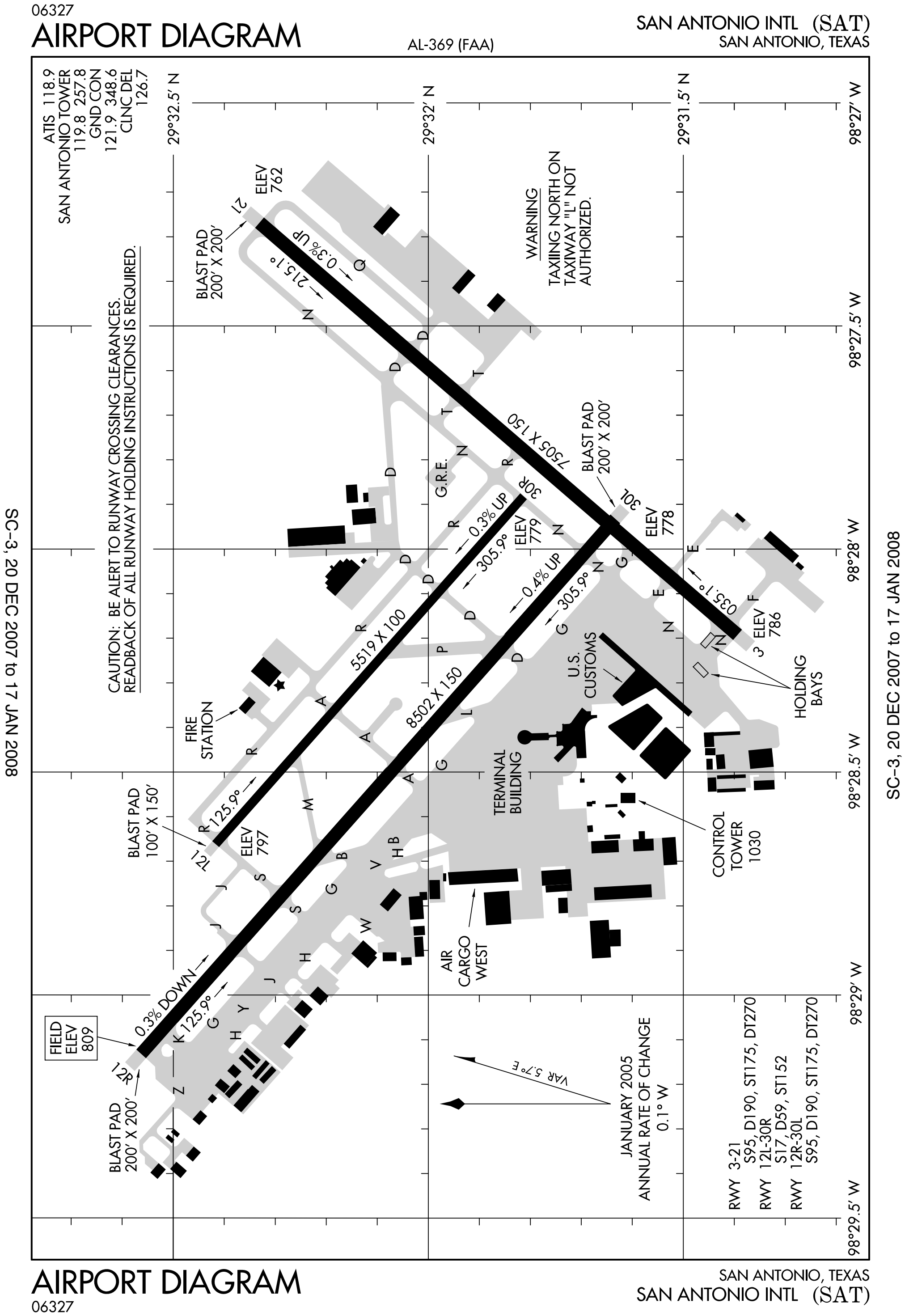
Houston, Texas
George Bush Intercontinental/Houston
ICAO Identifier KIAH



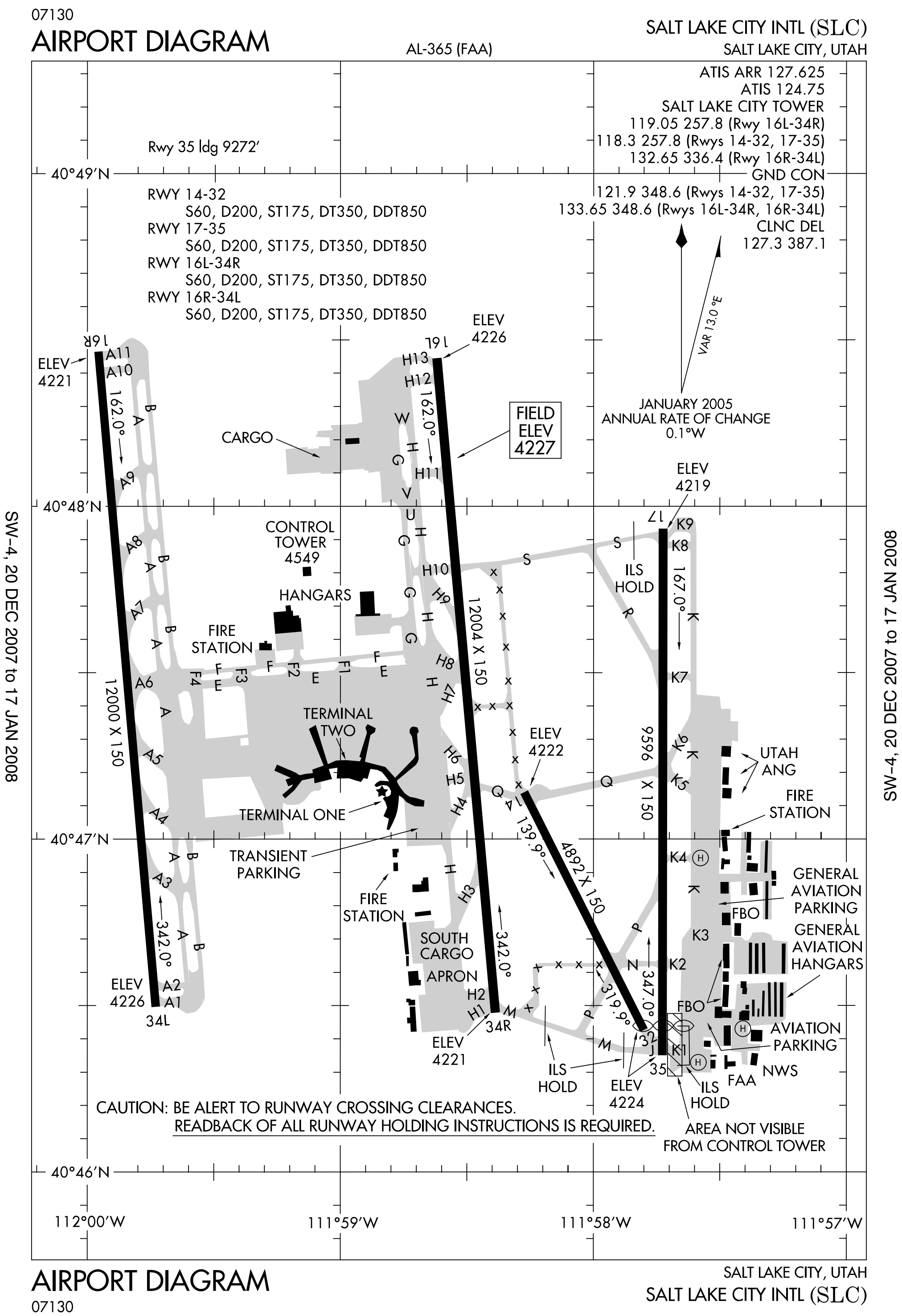
Laredo, Texas
Laredo International
ICAO Identifier KLRD



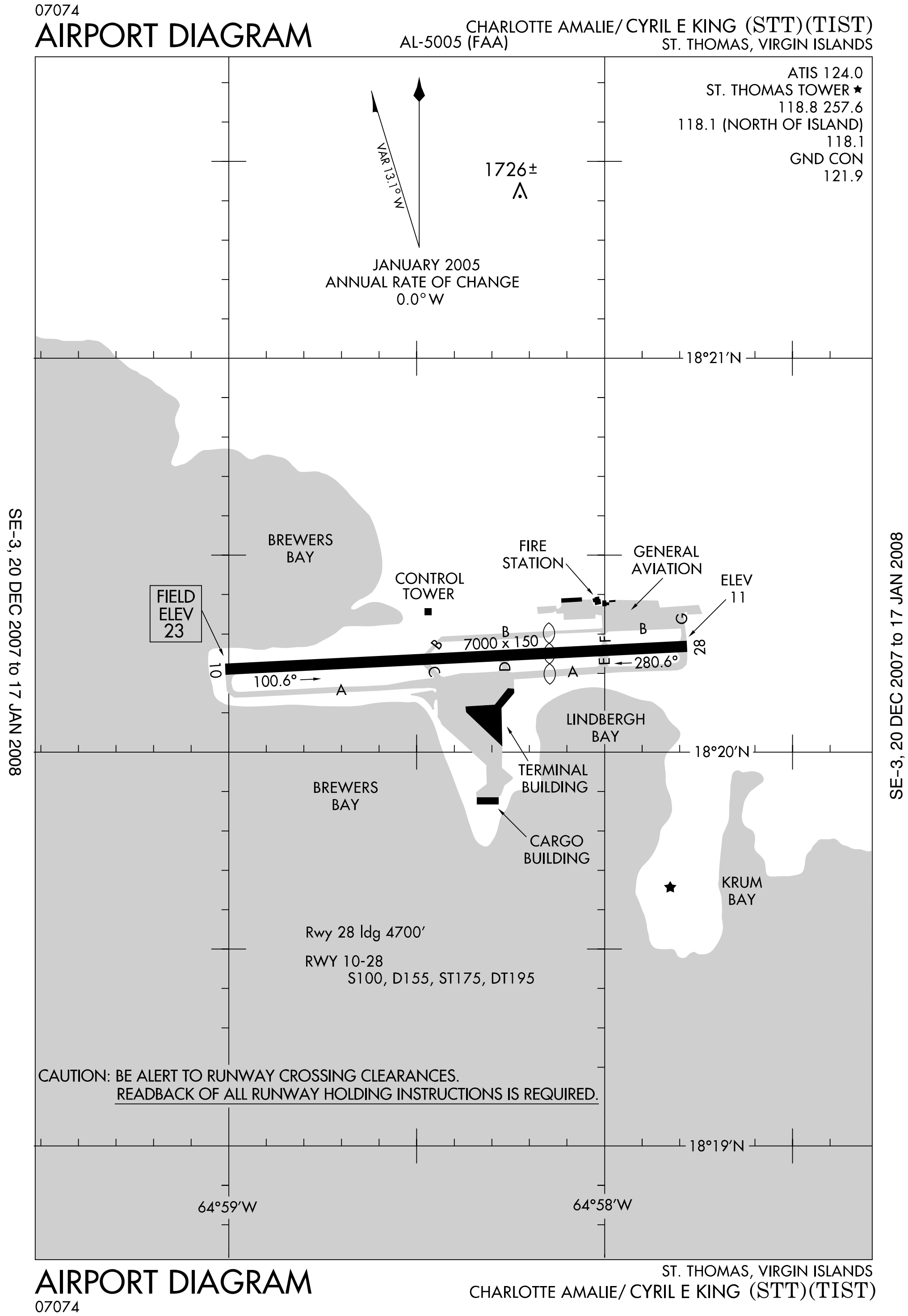
San Antonio, Texas
San Antonio International
ICAO Identifier KSAT



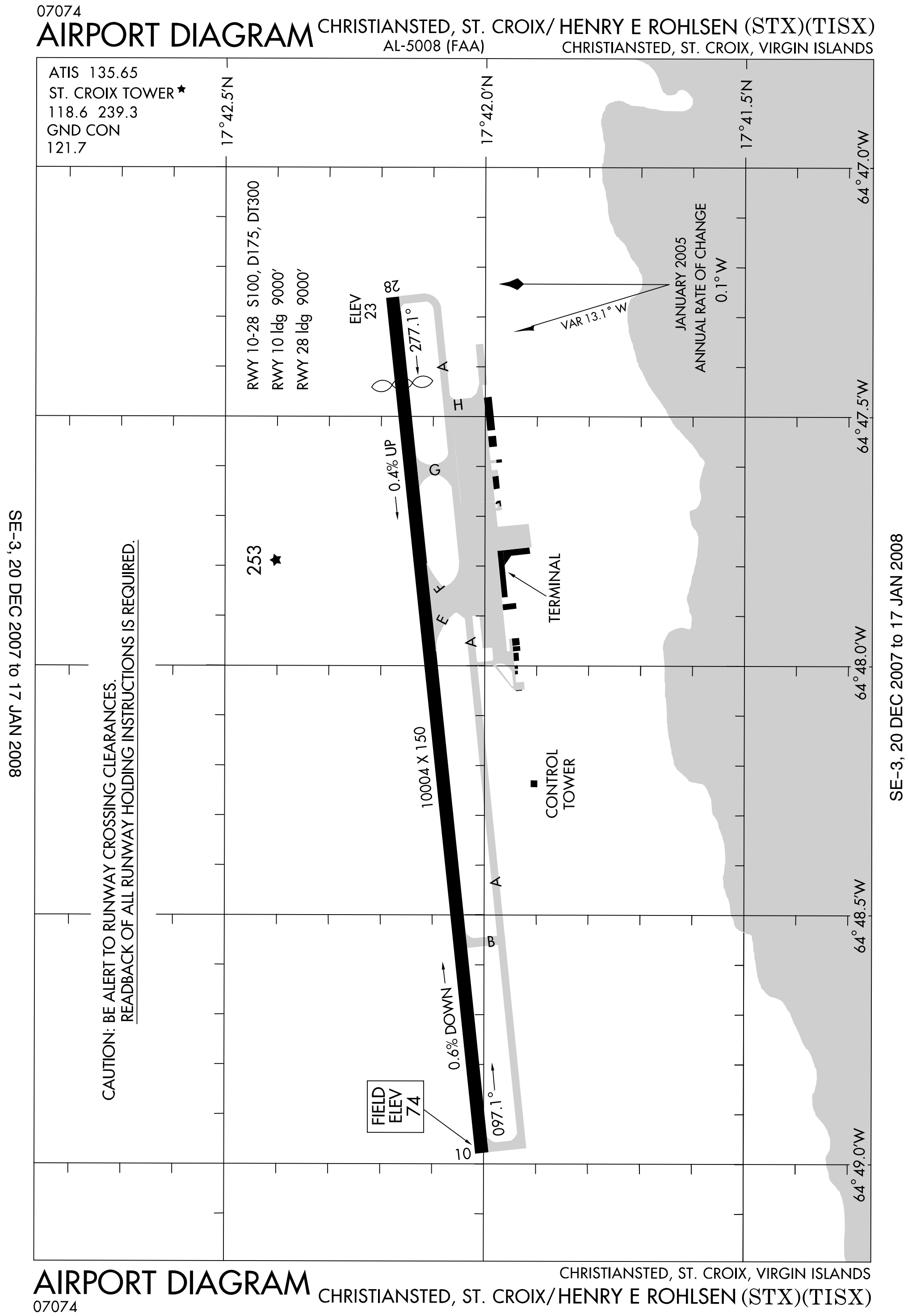
Salt Lake City, Utah
Salt Lake City International
ICAO Identifier KSLC



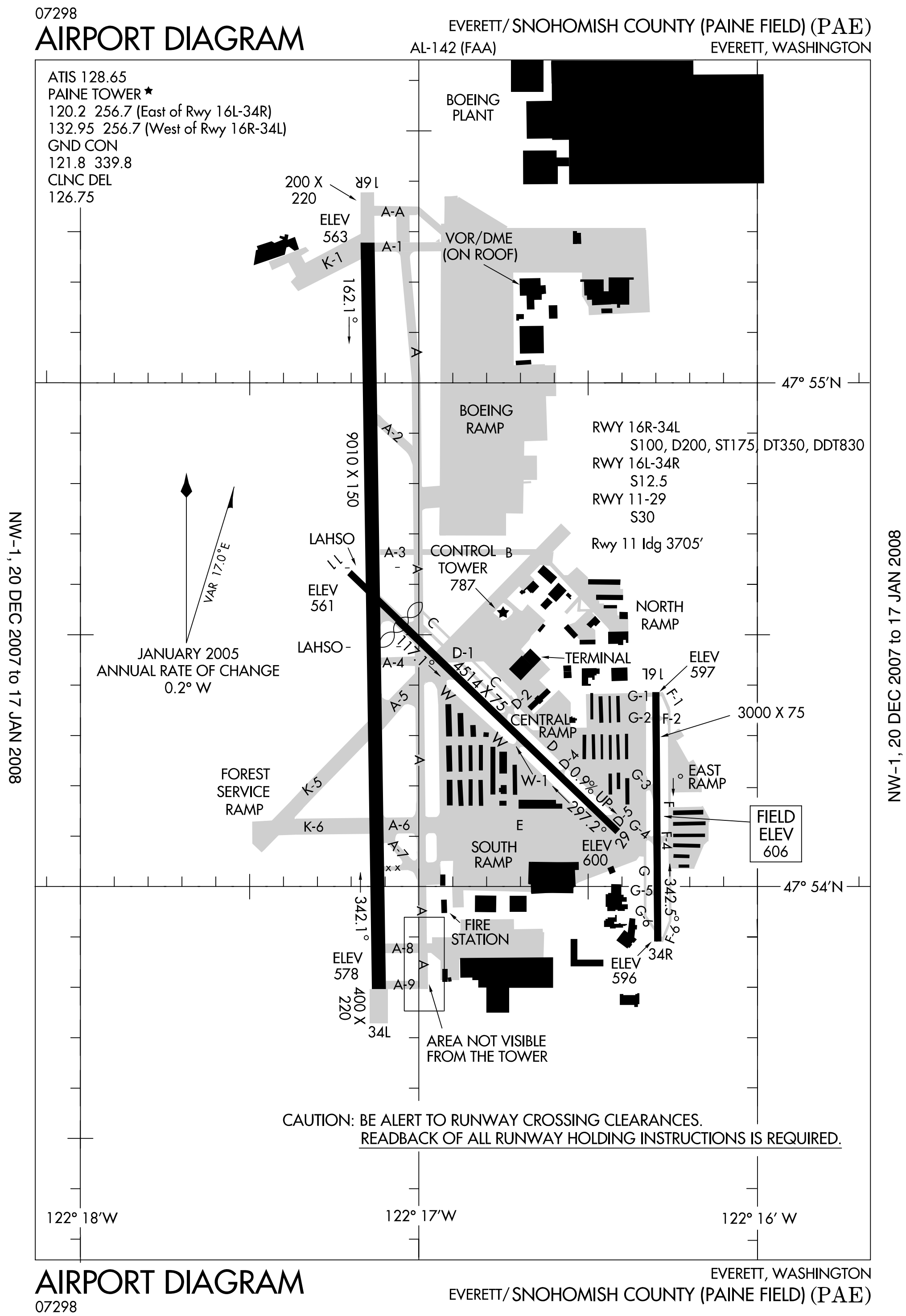
Charlotte Amalie St. Thomas, Virgin Islands
Cyril E. King
ICAO Identifier TIST



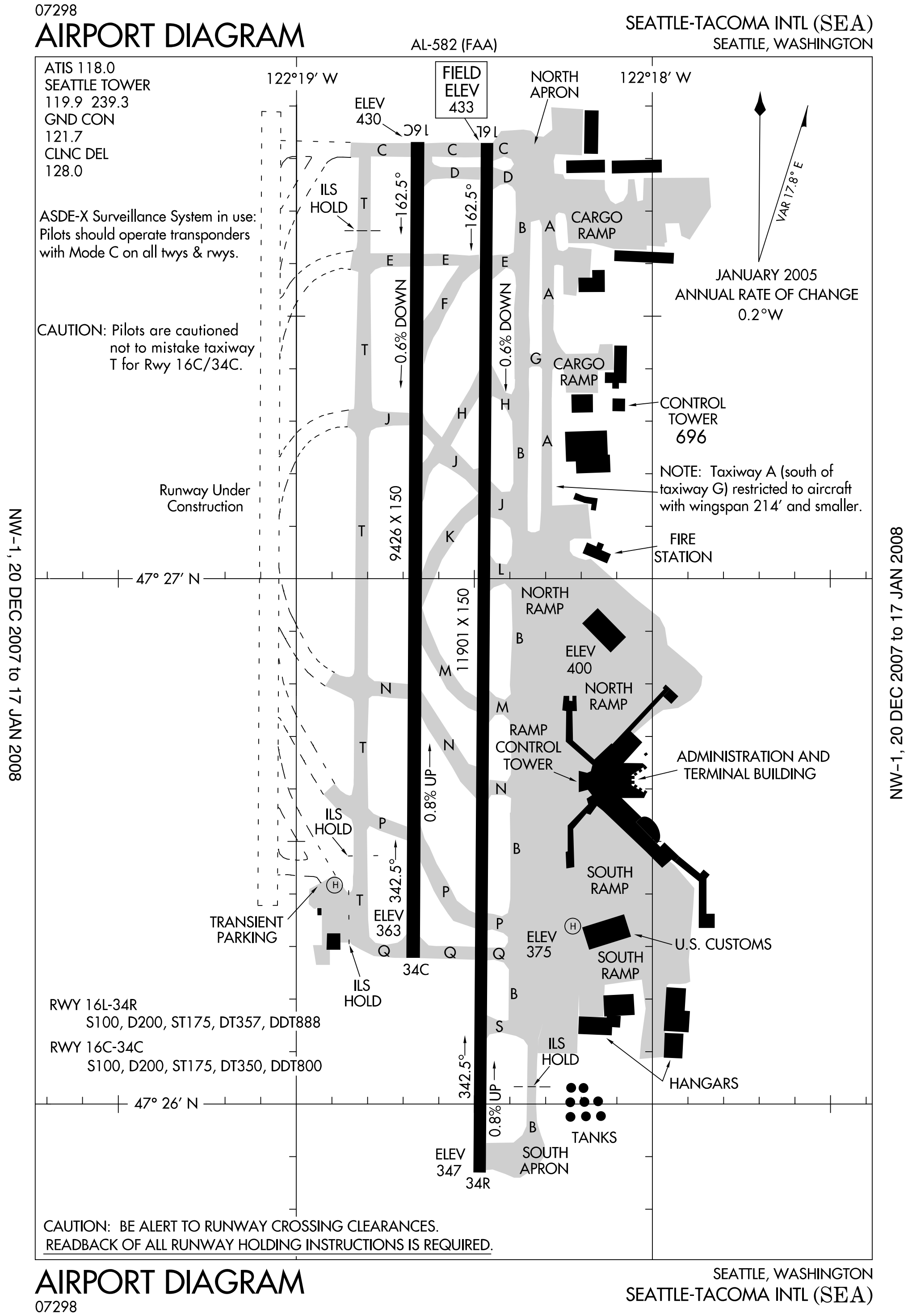
Christiansted St. Croix
Henry E Rohlsen
ICAO Identifier TISX



Everett, Washington
Snohomish County (Paine Field)
ICAO Identifier KPAE



Seattle, Washington
Seattle-Tacoma International
ICAO Identifier KSEA



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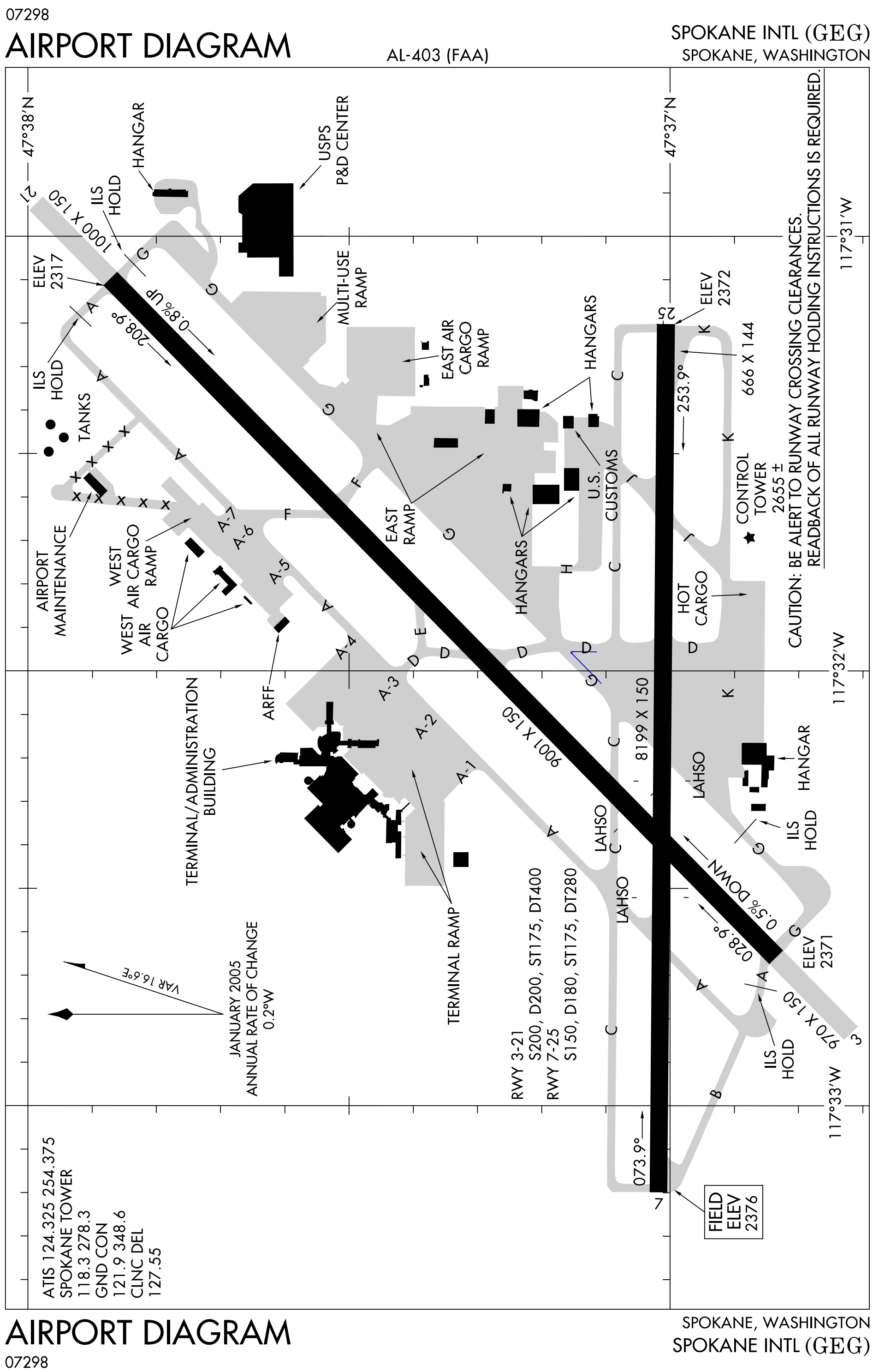
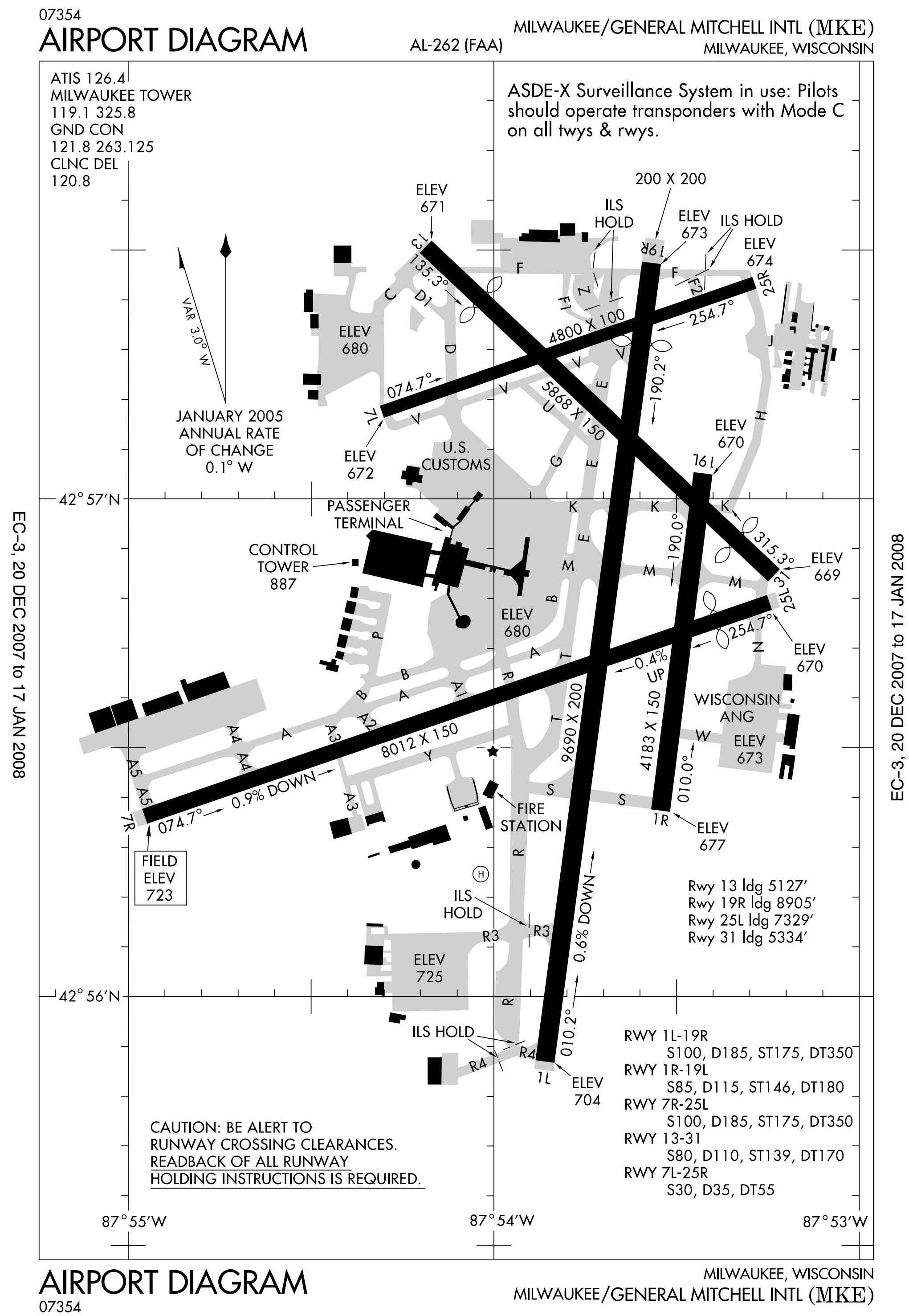
Spokane International
ICAO Identifier KGEG



Milwaukee, Wisconsin
General Mitchell International
ICAO Identifier KMKE



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