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INSTRUMENT APPROACH CHARTS

1. **Instrument Approach Procedure (IAP) Charts**
   a. FAR 9175, Takeoff and Landing under IFR, requires the use of standard IAPs prescribed for the airport in FAR Part 97, Standard Instrument Approach Procedures, unless otherwise authorized by the FAA.
      1) FAR 91.175 also requires civil pilots flying into or out of military airports to comply with the IAPs and takeoff and landing minimums prescribed by the authority having jurisdiction over those airports.
   b. All IAPs are based on joint civil and military criteria contained in the U.S. Standard for Terminal Instrument Procedures (TERPS).
      1) The design of an IAP takes into account the interrelationship between airports, facilities, and the surrounding environment, terrain, obstacles, noise sensitivity, etc.
         a) Appropriate altitudes, courses, headings, distances, and other limitations are specified, and, once approved, the procedures are published and distributed by government (e.g., FAA) and commercial (e.g., JEPP) cartographers as IAP charts.
      2) Radar IAPs are established where requirements and facilities exist, but they are printed in tabular form by FAA.
         a) JEPP radar approaches are printed in chart form.
      3) Approach minimums are based on the local altimeter setting for that airport, unless annotated otherwise.
         a) When a different altimeter source is required, or more than one source is authorized, it will be annotated on the approach chart.
            i) EXAMPLE:Use Sidney altimeter setting, if not received, use Scottsbluff altimeter setting.
         b) Approach minimums may be raised when a nonlocal altimeter source is authorized.
         c) When more than one altimeter source is authorized, and the minima are different, they will be shown by separate lines in the approach minima box or a note.
            i) EXAMPLE:Use Manhattan altimeter setting; when not available, use Salina altimeter setting and increase all MDAs 40 feet.
         d) When the altimeter must be obtained from a source other than ATC, a note will indicate the source.
            i) EXAMPLE: Obtain local altimeter setting on CTAF.
         e) When the altimeter setting(s) on which the IAP is based is not available, the approach is not authorized.
      4) By adhering to the altitudes, flight paths, and weather minimums depicted on the IAP chart or vectors and altitudes assigned by the radar controller, you are assured of terrain and obstruction clearance and runway or airport alignment during approach for landing.
      5) IAPs are designed to provide an IFR descent from the en route environment to a point where a safe landing can be made.
         a) IAPs are prescribed and approved to ensure a safe descent during instrument flight conditions at a specific airport.
         b) You must understand these procedures and their use prior to attempting to fly instrument approaches.
      6) TERPS criteria are provided for the following types of IAPs:
         a) Precision approaches when an electronic glide slope is provided, such as an ILS approach
         b) Nonprecision approaches when glide slope information is not provided, such as VOR or GPS
   c. The methods used to depict prescribed altitudes on instrument approach charts differ

according to the techniques used by different chart publishers.

1) Altitude is depicted on FAA charts in the profile view with underscore, overscore, or both to identify it as minimum, maximum, or mandatory.
   a) Minimum altitude is depicted with the altitude value underscored, i.e., 2000.
      i) You are required to maintain altitude at or above the depicted value.
   b) Maximum altitude is depicted with the altitude value overscored, i.e., 2000.
      i) You are required to maintain altitude at or below the depicted value.
   c) Mandatory altitude is depicted with the altitude value both underscored and overscored, i.e., 2000.
      i) You are required to maintain altitude at the depicted level.
2) With very few exceptions, FAA charts use only the underscore to identify minimum altitudes.
   a) The depiction of maximum and minimum altitudes is used almost exclusively for military charts.
3) You are cautioned to adhere to altitudes as prescribed because, in certain instances, they may be used as the basis for vertical separation of aircraft by ATC.
   a) When a depicted altitude is specified in an ATC clearance, that altitude becomes mandatory.

d. **Instrument approach procedure naming**

1) Straight-in IAPs (those which the final approach course is within 30° of the centerline of the runway) are identified by the navigation system providing the final approach guidance and the runway to which the approach is aligned (e.g., VOR RWY 13).
2) Circling only IAPs (those which the final approach course is more than 30° than the runway heading) are identified by the navigational system providing final approach guidance and a letter (e.g., VOR-A).
3) More than one navigational system separated by a slash indicates that more than one type of equipment must be used to execute the final approach (e.g., VOR/DME RWY 31).
   a) Remember that an approved GPS navigation system may be substituted for a DME receiver, provided facility or fix coordinates can be called up from the current GPS airborne database.
4) More than one navigational system separated by the word “or” indicates either type of system may be used to execute the final approach (e.g., VOR or GPS RWY 15).
5) In some cases, other types of navigation systems may be required to execute other portions of the approach.
   a) You must ensure that your airplane is equipped with the required navigational system(s) in order to execute the approach, including the missed approach.
6) In the future, FAA will add a new notation for localizer (LOC) approaches when charted on an ILS approach requiring other navigational systems to fly the approach course.
   a) The LOC minimums will be annotated with the navigational system required (e.g., “DME Required” or “RADAR Required”).
   b) During the transition period, ILS approach charts will still exist without the annotation.
7) The naming of multiple approaches of the same type to the same runway is also changing.
   a) New approaches with the same navigational system for guidance will be annotated with an alphabetical suffix beginning at the end of the alphabet and working backwards for subsequent procedures (e.g., ILS Z RWY 28, ILS Y RWY 28, etc.).
   b) The existing annotations (e.g., ILS 2 RWY 28 or Silver ILS RWY 28) will

be phased out and eventually replaced with the new designation.

c) Category II and III ILS procedures are not subject to this naming convention.

8) GPS, Wide Area Augmentation System (WAAS), and lateral navigation (LNAV)/ vertical navigation (VNAV) approach procedures will be identified by the term RNAV and the runway (e.g., RNAV RWY 21).

a) VOR/DME RNAV approaches will continue to be identified as VOR/DME RNAV and the runway (e.g., VOR/DME RNAV RWY 21).

e. **Minimum safe/sector altitudes (MSA)** are published for emergency use on IAP charts.

1) For conventional navigation systems, the MSA is normally based on the primary omnidirectional facility (VOR) on which the IAP is predicated.

a) The MSA depiction on the approach chart contains the facility identifier of the NAVAID used to determine the MSA.

2) For RNAV approaches, the MSA is based on the runway waypoint (RWY WP), for straight-in approaches, or the airport waypoint (APT WP), for circling approaches.

3) For GPS approaches, the MSA center will be the missed approach waypoint (MAWP).

4) MSAs are expressed in feet above mean sea level and normally have a 25-NM radius; however, this radius may be expanded to 30 NM if necessary to encompass the airport landing surfaces.

5) Ideally, a single sector altitude is established and depicted on the plan view of approach charts.

a) When necessary, as many as four MSAs may be established, due to obstructions.

i) Each MSA sector will have no less than a 90° spread.

6) MSAs provide a 1,000-ft. clearance over all obstructions but do not necessarily assure acceptable navigation signal coverage.

f. **Minimum vectoring altitudes (MVA)** are established for use by ATC when radar vectoring is used but is not shown on your charts.

1) The MVA provides a 1,000-ft. clearance above the highest obstacle in nonmountainous areas and a 2,000-ft. clearance above the highest obstacle in designated mountainous areas.

a) Where lower MVAs are required in designated mountainous areas to be compatible with terminal routes or to permit vectoring to an IAP, a 1,000-ft. obstacle clearance may be authorized with the use of airport surveillance radar (ASR).

2) It is important for you to understand MVAs. Because of differences in the areas considered for MVA and the ability to isolate specific obstacles, some MVAs may be lower than the nonradar MEA, MOCA, or other minimum altitudes depicted on charts for a given location.

a) While being radar vectored, IFR altitude assignments by ATC will be at or above the MVA.

g. **Visual descent points (VDP)** are being incorporated into selected nonprecision IAPs.

1) The VDP is a defined point on the final approach course on a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may begin, provided the required visual reference(s) is established.

2) The VDP will normally be identified by DME on VOR and LOC procedures and by along track distance (ATD) to the next waypoint for RNAV procedures.

3) The VDP is identified on the profile view of the IAP chart by the symbol:**V**.

4) VDPs are intended to provide additional guidance where they are implemented.

a) No special technique is required to fly a procedure with a VDP.

b) You should not descend below the MDA prior to reaching the VDP and

acquiring the necessary visual reference(s).

5) If your airplane is not equipped to identify the VDP (e.g., you do not have a DME, but the VDP is identified by a DME fix), you should fly the approach procedure as though no VDP had been provided.

h. **Visual portion of the final segment**

1) Instrument procedure designers perform a visual area obstruction evaluation off the approach end of each runway authorized for instrument landing, straight-in, or circling.
2) Restrictions to instrument operations are imposed if penetrations of the obstruction clearance surface exists.
   a) These restrictions vary based on the severity of the penetrations and may include increasing visibility, denying VDPs, and prohibiting night instrument operations to the runway.

i. **Vertical descent angle (VDA) on nonprecision approaches**

1) Descent angles are currently published on some nonprecision approaches and the FAA's intent is to publish VDAs on all nonprecision approaches.
   a) Published along with the VDA is the threshold crossing height (TCH).
2) The VDA describes a computed path from the altitude at the FAF to the runway at the TCH.
   a) The optimum descent angle is 3.00°; and, whenever possible, the approach will be designed to accommodate this angle.
3) The VDA will provide you with a means to establish a stabilized approach from the FAF, or stepdown fix, to the TCH.
   a) Stabilized descent along this path is a key factor in the reduction of controlled flight into terrain (CFIT) incidents.
   b) You can use the published VDA and estimated/actual groundspeed to find a target rate of descent from the rate of descent table published with the IAPs.
4) You must be aware that the published VDA is for information only and it is strictly advisory in nature.
   a) There is no implicit additional obstacle clearance protection below the MDA.
   b) You must still respect the published MDA unless the necessary visual clues are present.
5) In rare cases, the published VDA will not be the same as the visual glide slope indicator (VGSI); VASI or PAPI.
   a) In these cases, the procedure will be annotated:"VGSI and descent angle not coincident."