TERMINAL PROCEDURES TABLE OF CONTENTS

CORRECTIONS, COMMENTS AND/OR PROCUREMENT

FOR CHARTING ERRORS, OR FOR CHANGES, ADDITIONS, RECOMMENDATIONS ON PROCEDURAL ASPECTS CONTACT:
FAA, Aeronautical Information Services
1305 East-West Highway
SSMC 4, Room 4531
Silver Spring, MD 20910-3281
Telephone: 1-800-638-8972
https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/

For inquiries regarding military charts, please contact **aerohelp@nga.mil**

FOR PROCUREMENT:
For digital products, visit our website at: **https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/**

For a list of approved FAA Print Providers, visit our website at:
https://www.faa.gov/air_traffic/flight_info/aeronav/print_providers/

Frequently asked questions (FAQ) are answered on our website at: **https://www.faa.gov/go/ais**
See the FAQs prior to contact via toll free number or email.

Request for the creation or revisions to Airport Diagrams should be in accordance with FAA Order 7910.4

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GENERAL INFORMATION/INSTRUCTIONS

CHANGE NOTICE (CN) FOR THE UNITED STATES GOVERNMENT

TERMINAL PROCEDURES PUBLICATION

GENERAL:
The United States Terminal Procedures are published in 25 Bound Volumes on a 56-day cycle. This CN is published at the mid 28-day point and contains revisions, additions and deletions to the last complete issue of the 24 volumes covering the conterminous U.S. There is no CN published for airports in the states of Alaska, Hawaii, or Pacific Islands.

OPERATIONAL USE OF THE CHANGE NOTICE:
During flight planning or in the case of an in-flight diversion, it is imperative that the pilot first consult this CN before making any decision as to which procedures are current at the airport of intended landing. If the airport of intended landing is not listed in the supplementary information or Index of Charts then the airport information in the basic 24 volumes has not changed.

INDEX OF TERMINAL PROCEDURES:
All civil airports which have revised, added or deleted procedures are listed alphabetically by city in the Index. In addition to the airport name, the Index includes the CN page number, the current procedure designation, the affected page and volume number in the last issue of the 24 conterminous US volumes and an indication whether the procedure is new, has been deleted, or replaces an existing procedure.

EFFECTIVE DATES:
All procedures in this CN are effective on the dates shown on the front cover unless indicated otherwise in the Index, i.e., if the procedure revision is effective on a date other than the CN publication date, this will be noted in the Index instructions by "Effective (date)". This will also be shown on the planview of the affected Chart(s).

CONSULT CURRENT NOTAMS.

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INOPERATIVE COMPONENTS OR VISUAL AIDS TABLE
(For Civil Use Only)

Straight-in and Sidestep landing minimums published on instrument approach procedure charts are based on full operation of all components and visual aids (see exception below for ALSF 1 & 2) associated with the particular approach chart being used. Higher minimums are required with inoperative components or visual aids as indicated below. If more than one component is inoperative, each minimum is raised to the highest minimum required by any single component that is inoperative. ILS glideslope inoperative minimums are published on the instrument approach charts as localizer minimums. This table applies to approach categories A thru D and is to be used unless amended by notes on the approach chart. Such notes apply only to the particular approach category(ies) as stated. Category E inoperative notes will be specified when published on civil charts. The inoperative table does not apply to Circling minimums. See legend page for description of components indicated below.

Full Operation Exception: For ALSF 1 & 2 operated as SSALR, or when the sequenced flashing lights are inoperative, there is no effect on visibility for ILS lines of minima.

(1) ILS, PAR, LPV, GLS minima

Inoperative Component or Visual Aid	Increase Visibility
All ALS types (except ODALS)	¼ mile

(2) ILS, LPV, GLS with visibility minima of RVR 1800†/2000*/2200*

Inoperative Component or Visual Aid	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	To RVR 4000† To RVR 4500*
TDZL or RCLS	To RVR 2400#
RVR	To ½ mile

#For ILS, LPV, GLS procedures with a 200 foot HAT, RVR 1800 authorized with use of FD or AP or HUD to DA. For ILS procedures with a 200 foot HAT with a restriction on autopilot usage, RVR 1800 authorized with use of FD or HUD to DA.

(3) All Approach Types and all lines of minima other than (1) & (2) above

Inoperative Component or Visual Aid	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	½ mile
MALSF, MALS, SSALF, SSALS, SALSF, SALS	¼ mile

(4) Sidestep minima (CAT C-D)

Inoperative Component or Visual Aid to Sidestep Runway	Increase Visibility
ALSF 1 & 2, MALSR, SSALR	½ mile

(5) All Approach Types, All lines of minima

Inoperative Component or Visual Aid	Increase Visibility
ODALS (CAT A-B)	¼ mile
ODALS (CAT C-D)	⅛ mile

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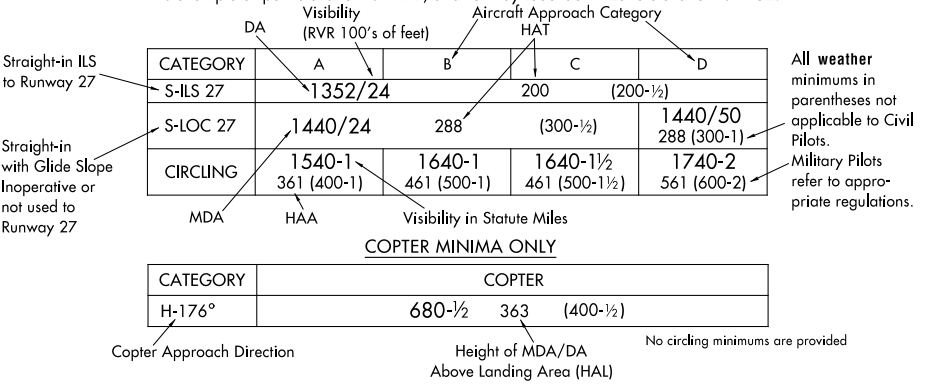
IFR LANDING MINIMA

The United States Standard for Terminal Instrument Procedures (TERPS) is the approved criteria for formulating instrument approach procedures. Landing minima are established for six aircraft approach categories (ABCDE and COPTER).
In the absence of COPTER MINIMA, helicopters may use the CAT A minimums of other procedures.

LANDING MINIMA FORMAT

In this example airport elevation is 1179, and runway touchdown zone elevation is 1152.



COPTER MINIMA ONLY

CATEGORY	COPTER
H-176°	680-½ 363 (400-½)

Copter Approach Direction

Height of MDA/DA Above Landing Area (HAL)

No circling minimums are provided

NOTE: The W symbol indicates outages of the WAAS vertical guidance may occur daily at this location due to initial system limitations. WAAS NOTAMS for vertical outages are not provided for this approach. 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.

RNAV minimums are dependent on navigation equipment capability, as stated in the applicable AFM, AFMS, or other FAA approved document. See AIM paragraph 5-4-5, AC 90-105 and AC 90-107 for detailed requirements for each line of minima.

COLD TEMPERATURE AIRPORTS

NOTE: A ❄-12°C symbol indicates a cold temperature altitude correction is required at this airport when reported temperature is at or below the published temperature. See the following Cold Temperature Error Table to make manual corrections. Advise ATC with altitude correction. Advising ATC with altitude corrections is not required in the final segment. See Aeronautical Information Manual (AIM), Chapter 7, for guidance and additional information. For a complete list, see the "Cold Temperature Airports" link under the Additional Resources heading at the bottom of the following page: http://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/search/

COLD TEMPERATURE ERROR TABLE

HEIGHT ABOVE AIRPORT IN FEET

REPORTED TEMP °C	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
+10	10	10	10	10	20	20	20	20	20	30	40	60	80	90
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10	20	30	40	50	60	70	80	90	100	150	200	290	390	490
-20	30	50	60	70	90	100	120	130	140	210	280	420	570	710
-30	40	60	80	100	120	140	150	170	190	280	380	570	760	950
-40	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
-50	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

AIRCRAFT APPROACH CATEGORIES

Aircraft approach category indicates a grouping of aircraft based on a speed of VREF, if specified, or if VREF not specified, 1.3 VSO at the maximum certificated landing weight. VREF, VSO, and the maximum certificated landing weight are those values as established for the aircraft by the certification authority of the country of registry. Helicopters are Category A aircraft. An aircraft shall fit in only one category. When necessary to operate the aircraft at an airspeed in excess of the maximum airspeed of its certified aircraft approach category, pilots should use the applicable higher category minima. For additional options and to ensure the aircraft remains within protected airspace, consult the AIM. See following category limits:

MANEUVERING TABLE

Approach Category	A	B	C	D	E
Speed (Knots)	0-90	91-120	121-140	141-165	Abv 165

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CIRCLING APPROACH OBSTACLE PROTECTED AIRSPACE

The circling MDA provides vertical obstacle clearance during a circle-to-land maneuver. The circling MDA protected area extends from the threshold of each runway authorized for landing following a circle-to-land maneuver for a distance as shown in the table below. The resultant arcs are then connected tangentially to define the protected area.

CIRCLING APPROACH MANEUVERING AIRSPACE RADIUS

Circling MDA protected areas use the radius distance shown in the following table, expressed in nautical miles (NM), dependent on aircraft approach category, and the altitude of the circling MDA, which accounts for true airspeed increase with altitude.

Circling MDA in feet MSL	Approach Category and Circling Radius (NM)				
	CAT A	CAT B	CAT C	CAT D	CAT E
1000 or less	1.3	1.7	2.7	3.6	4.5
1001-3000	1.3	1.8	2.8	3.7	4.6
3001-5000	1.3	1.8	2.9	3.8	4.8
5001-7000	1.3	1.9	3.0	4.0	5.0
7001-9000	1.4	2.0	3.2	4.2	5.3
9001 and above	1.4	2.1	3.3	4.4	5.5

Users may ignore the presence of C symbols on charts which will be removed on a day-forward basis. All circling areas within this volume have been evaluated for the circling MDA protected area radius shown in the table above.

Comparable Values of RVR and Visibility

The following table may be used for converting RVR to ground or flight visibility. For RVR values that fall between listed values, use the next higher RVR value; do not interpolate. For example, when converting 4800 RVR, use 5000 RVR with the resultant visibility of 1 mile.

RVR (feet)	Visibility (SM)	RVR (feet)	Visibility (SM)	RVR (feet)	Visibility (SM)	RVR (feet)	Visibility (SM)
1200	1/4	2200	1/2	3200*	5/8	5000*	1
1600*	1/4	2400*	1/2	3500	5/8	5500	1
1800	1/2	2600	1/2	4000*	3/4	6000*	1 1/4
2000	1/2	3000	5/8	4500*	7/8		

*Values repeated from 14 CFR 91.175 and shall be used for takeoff or landing minima.

If a visibility adjustment is required for a procedure with an RVR value, the RVR value should first be converted to visibility using this table. The visibility should then be increased by the adjustment value, and then may be converted back to the highest RVR value associated with that visibility. For example, if a procedure with 2000 RVR requires a 1/8 mile adjustment, first convert 2000 RVR to 1/2 SM. Adding 1/8 SM results in 5/8 SM, which may then be converted to 3500 RVR.

RADAR MINIMA

	RWY	GP/TCH/RPI	CAT	DA/ MDA-VIS	HAT HAA	CEIL-VIS	CAT	DA/ MDA-VIS	HAT HAA	CEIL-VIS
PAR	10	2.5°/42/1000	ABCDE	**195**/16	100	(100-1/4)				
	28	2.5°/48/1068	ABCDE	**187**/16	100	(100-1/4)				
ASR	10		ABC	**560**/40	463	(500-3/4)	DE	**560**/50	463	(500-1)
	28		AB	**600**/50	513	(600-1)	CDE	**600**/60	513	(600-1 1/4)
CIR	10		AB	**560-**1 1/4	463	(500-1 1/4)	CDE	**560-**1 1/2	463	(500-1 1/2)
	28		AB	**600-**1 1/4	503	(600-1 1/4)	CDE	**600-**1 1/2	503	(600-1 1/2)

Visibility (RVR 100's of feet)

Visibility in Statute Miles

All minimums in parentheses not applicable to Civil Pilots. Military Pilots refer to appropriate regulations.

Radar Minima:

1. Minima shown are the lowest permitted by established criteria. Pilots should consult applicable directives for their category of aircraft.
2. The circling MDA and weather minima to be used are those for the runway to which the final approach is flown- not the landing runway. In the above RADAR MINIMA example, a category C aircraft flying a radar approach to runway 10, circling to land on runway 28, must use an MDA of 560 feet with weather minima of 500-1½.

NOTE: Military RADAR MINIMA may be shown with communications symbology that indicates emergency frequency monitoring capability by the radar facility as follows: (E) VHF and UHF emergency frequencies monitored
(V) VHF emergency frequency (121.5) monitored
(U) UHF emergency frequency (243.0) monitored

Additionally, unmonitored frequencies which are available on request from the controlling agency may be annotated with an "x".

A Alternate Minimums not standard. Civil users refer to tabulation. USA/USN/USAF pilots refer to appropriate regulations.

A NA Alternate minimums are Not Authorized due to unmonitored facility or absence of weather reporting service.

T Airport is published in the Takeoff Minimums, (Obstacle) Departure Procedures, and Diverse Vector Area (Radar Vectors) tabulation.

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GENERAL INFORMATION

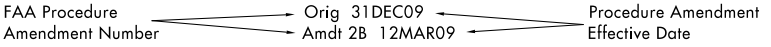
This publication is issued every 56 days and includes Standard Instrument Approach Procedures (SIAPS), Standard Instrument Departures (SIDs), Standard Terminal Arrivals (STARs), IFR Takeoff Minimums and (Obstacle) Departure Procedures (ODPs), IFR Alternate Minimums, and Radar Instrument Approach Minimums for use by civil and military aviation. The organization responsible for SIAPs, Radar Minimums, SIDs, STARs and graphic ODPs is identified in parentheses in the top margin of the procedure; e.g., (FAA), (FAA-O), (USA), (USAF), (USN). SIAPS with the (FAA) and (FAA-O) designation are regulated under 14 CFR, Part 97. SIAPs with the (FAA-O) designation have been developed by an authorized non-FAA service provider. See 14 CFR, Part 91.175 (a) and the AIM for further details. 14 CFR, Part 91.175 (g) and the Special Notices section of the Chart Supplement contain information on civil operations at military airports.

The FAA uses an internal numbering system on all charts in the TPP. This Approach and Landing (AL) number is located on the top center margin of the chart followed by the organization responsible for the procedure in parentheses, e.g., AL-18 (FAA), AL-11919 (FAA-O). Military procedures do not show AL number, but do show the appropriate authority for the procedure, e.g., (USAF).

CHART CURRENCY INFORMATION

Date of Latest Revision 09365

The Date of Latest Revision identifies the Julian date the chart was added or last revised for any reason. The first two digits indicate the year, the last three digits indicate the day of the year (001 to 365/6) in which the latest revision of any kind has been made to the chart.



The FAA Procedure Amendment Number represents the most current amendment of a given procedure. The Procedure Amendment Effective Date represents the AIRAC cycle date on which the procedure amendment was incorporated into the chart. Updates to the amendment number & effective date represent procedural/criteria revisions to the charted procedure, e.g., course, fix, altitude, minima, etc. On Departure Procedures and Standard Terminal Arrivals, procedural revisions to the current chart are indicated by an upnumber to the procedure title with the procedure amendment effective date following. On Radar Minima, Takeoff Minimums and (Obstacle) Departure Procedures and Diverse Vector Areas, the FAA Procedure Amendment Number, Procedure Effective Date, and the Julian Date of Last Revision will be shown on the same line, e.g., AMDT 2 10DEC15 (15344).

MISCELLANEOUS

★ Indicates a non-continuously operating facility, see Chart Supplement.

For Civil (FAA) instrument procedures, "RADAR REQUIRED" in the planview of the chart indicates that ATC radar must be available to assist the pilot when transitioning from the en route environment. "Radar required" in the pilot briefing portion of the chart indicates that ATC radar is required on portions of the procedure outside the final approach segment, including the missed approach. Some military procedures also have equipment requirements such as "Radar Required", but do not conform to the same charting application standards used by the FAA.

Distances are in nautical miles (except visibility in statute miles and Runway Visual Range in hundreds of feet). Runway dimensions are in feet. Elevations are in feet, Mean Sea Level (MSL). Ceilings are in feet above airport elevation. Radials/bearings/headings/courses are magnetic. Horizontal Datum: Unless otherwise noted on the chart, all coordinates are referenced to North American Datum 1983 (NAD 83), which for charting purposes is considered equivalent to World Geodetic System 1984 (WGS 84).

Terrain is scaled within the neat lines (planview boundaries) and does not accurately underlie not-to-scale distance depictions or symbols.

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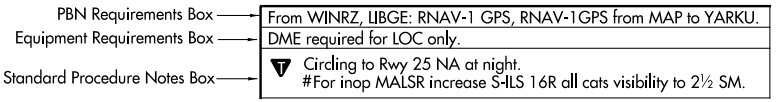
STANDARD TERMINAL ARRIVALS AND DEPARTURE PROCEDURES

The use of the associated codified STAR/DP and transition identifiers are requested of users when filing flight plans online. It must be noted that when filing a STAR/DP with a transition, the first three coded characters of the STAR and the last three coded characters of the DP are replaced by the transition code. Examples: ACTON SIX ARRIVAL, file (AQN.AQN6); ACTON SIX ARRIVAL, EDNAS TRANSITION, file (EDNAS.AQN6). FREEHOLD THREE DEPARTURE, file (FREH3.RBV), FREEHOLD THREE DEPARTURE, ELWOOD CITY TRANSITION, file (FREH3.EWC).

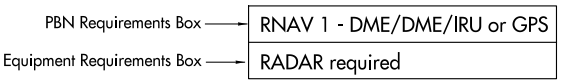
PROCEDURE PBN/EQUIPMENT REQUIREMENTS

Users will begin to see Performance-Based Navigation (PBN) Requirements and Equipment Requirements on Instrument Approach Procedures (IAPs), RNAV STARs and RNAV DPs prominently displayed in separate, standardized notes boxes. For procedures with PBN elements, the PBN box will contain the procedure's navigation specification(s); and, if required: specific sensors or infrastructure needed for the navigation solution; any additional or advanced functional requirements; the minimum Required Navigation Performance (RNP) value and any amplifying remarks. Items listed in this PBN box are REQUIRED for the procedure's PBN elements. The Equipment Requirements Box will list non-PBN requirements. On charts with both PBN elements and equipment requirements, the PBN requirements box will be listed first. The publication of these notes will continue incrementally until all charts have been amended to comply with the new standard.

IAP PBN/Equipment Requirements Notes Box



RNAV STAR and DP PBN/Equipment Requirements Notes Box



PILOT CONTROLLED AIRPORT LIGHTING SYSTEMS

Reference the Chart Supplement for detailed information on pilot controlled lighting (PCL) systems.

Available FAA standard approach lighting systems are charted as a negative symbol to indicate pilot contolled lighting, e.g., (A1), (V)

Available airport lighting systems that are charted as notes, e.g. REIL, MIRL, are shown with a negative "(L)" symbol beside the name to indicate pilot controlled lighting.

To activate lights, use frequency indicated in the communications section of the chart with a (L)

KEY MIKE	FUNCTION
7 times within 5 seconds	Highest intensity available
5 times within 5 seconds	Medium or lower intensity (Lower REIL or REIL-off)
3 times within 5 seconds	Lowest intensity available (Lower REIL or REIL-off)

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ABBREVIATIONS 25107

AAF	Army Air Field
AAUP	Attention All Users Page
ADF	Automatic Direction Finder
ADIZ	Air Defense Identification Zone
AFAUX	Air Force Auxiliary
AFB	Air Force Base
AFRC	Armed Forces Reserve Center/Air Force Reserve Command
AGL	Above Ground Level
AFHP	Air Force Heliport
AFIS	Automatic Flight Information Service
AHP	Army Heliport
ALF	Auxiliary Landing Field
ALS	Approach Light System
ALSF	Approach Light System with Sequenced Flashing Lights
ANGB	Air National Guard Base
ANGS	Air National Guard Station
Ant	Antenna
AOB	At or Below
AP	Autopilot System
APCH	Approach
APP CON	Approach Control
AR	Authorization Required
ARB	Air Reserve Base
ARPT	Airport
ARR	Arrival
AS	Air Station
ASOS	Automated Surface Observing System
ASR	Airport Surveillance RADAR
ASSC	Airport Surface Surveillance Systems
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
ATIS	Automatic Terminal Information Service
AUNICOM	Automated UNICOM
AWOS	Automated Weather Observing System
Baro-VNAV	Barometric Vertical Navigation
BC	Back Course
brg	Bearing
CAPT	Captain
CAT	Category
CCW	Counterclockwise
CDI	Course Deviation Indicator
CGAS	Coast Guard Air Station
Chan	Channel
CIR	Circling
CL	Centerline Lighting System
CLNC DEL	Clearance Delivery
CNF	Computer Navigation Fix
CPDLC	Controller Pilot Data Link Communications
CTAF	Common Traffic Advisory Frequency
CW	Clockwise
D-ATIS	Digital-Automatic Terminal Information Service
DA	Decision Altitude
DEP	Departure
DEP CON	Departure Control
DER	Departure End of Runway
DH	Decision Height
DME	Distance Measuring Equipment
DP	Departure Procedure
DTHR	Displaced Runway Threshold
DVA	Diverse Vector Area
ELEV	Elevation
EMAS	Engineered Material Arresting System
EXEC	Executive
FAF	Final Approach Fix
FD	Flight Director System
FL	Flight Level
FLD	Field
FM	Fan Marker
FMS	Flight Management System
GBAS	Ground Based Augmentation System
GCA	Ground Control Approach
GCO	Ground Communication Outlet
GLS	Ground Based Augmentation System Landing System
GP	Glidepath
GPS	Global Positioning System
GS	Glide Slope
HAA	Height Above Airport
HAL	Height Above Landing
HAT	Height Above Touchdown
HATh	Height Above Threshold
HCH	Heliport Crossing Height
hdg	Heading
HIRL	High Intensity Runway Lights
HUD	Head-up Display
IAF	Initial Approach Fix
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organization
IF	Intermediate Fix
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IM	Inner Marker
INC	Incorporated
Inop	Inoperative
INT	Intersection
INTCNTL	Intercontinental
INTL	International
JNGB	Joint National Guard Base
JRB	Joint Reserve Base
K	Knots
KIAS	Knots Indicated Airspeed
LAAS	Local Area Augmentation System

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ABBREVIATIONS 25107

LDA	Localizer Type Directional Aid
Ldg	Landing
LIRL	Low Intensity Runway Lights
LNAV	Lateral Navigation
LOA	Letter of Agreement/ Authorization
LOC	Localizer
LOM	Locator Outer Marker
LP	Localizer Performance
LPV	Localizer Performance with Vertical Guidance
LR	Lead Radial
LRRS	Long Range RADAR Station
MAA	Maximum Authorized Altitude
MALS	Medium Intensity Approach Lighting System
MALSF	Medium Approach Lighting System with Sequenced Flashers
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MAP	Missed Approach Point
MCAF	Marine Corps Air Facility
MCALF	Marine Corps Auxiliary Landing Filed
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCOLF	Marine Corps Outlying Field
MDA	Minimum Descent Altitude
MEA	Minimum Enroute Altitude
MEML	Memorial
METRO	Metropolitan
MIRL	Medium Intensity Runway Lights
MM	Middle Marker
MOCA	Minimum Obstruction Clearance Altitude
MRA	Minimum Reception Altitude
MSL	Mean Sea Level
MSPEC	Management Specification
MUNI	Municipal
N/A	Not Applicable
NA	Not Authorized
NAAS	Naval Auxiliary Air Station
NAF	Naval Air Facility
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NDB	Nondirectional Radio Beacon
NM	Nautical Mile
NOLF	Naval Outlying Field
NoPT	No Procedure Turn
NOTAM	Notice to Airmen
NS	Naval Station
NTL	National
ODALS	Omnidirectional Approach Lighting System
ODP	Obstacle Departure Procedure
OM	Outer Marker
OPSPEC	Operations Specification
PAR	Precision Approach Radar
PDC	Pre-Departure Clearance
PRM	Precision Runway Monitor
Pvt	Private
R	Radial
RA	Radio Altimeter setting height
RAIL	Runway Alignment Indicator Lights
RCLS	Runway Centerline Light System
REIL	Runway End Identifier Lights
RF	Radius to Fix
RGNL	Regional
RLLS	Runway Lead-in Light System
RNAV	Area Navigation
RNP	Required Navigation Performance
RPI	Runway Point of Interception)
RVR	Runway Visual Range
RWY	Runway
S	Straight-in
SALS	Simplified Short Approach Light System
SALSF	Short Approach Lighting System with Sequenced Flashing Lights
SDF	Simplified Directional Facility
SFB	Space Force Base
SID	Standard Instrument Departure
SM	Statute Mile
SR-SS	Sunrise-Sunset
SSALF	Short Approach Lighting System with Sequenced Flashing Lights
SSALR	Simplified Short Approach Light System with Runway Alignment Indicator Lights
SSALS	Simplified Short Approach Lighting System
ST	Saint
STE	Sainte
STAR	Standard Terminal Arrival
TAA	Terminal Arrival Area
TACAN	Tactical Air Navigation
TCH	Threshold Crossing Height
TDZ	Touchdown Zone
TDZE	Touchdown Zone Elevation
TDZ/CL	Touchdown Zone and Runway Centerline Lighting
TDZL	Touchdown Zone Lights
THR	Threshold
TODA	Takeoff Distance Available
TORA	Takeoff Run Available
tr	Track
TRML	Terminal
TWR	Tower
UNICOM	Universal Communications Station
USA	United States Army
USAF	United States Air Force

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ABBREVIATIONS 25107

USCG……	United States Coast Guard
USMC……	United States Marine Corps
USN……	United States Navy
USSF……..	United States Space Force
VASI……	Visual Approach Slope Indicator
VCOA……	Visual Climb Over Airport
VDA……	Vertical Descent Angle
VDP……	Visual Descent Point
VFR……...	Visual Flight Rules
VGSI……..	Visual Glide Slope Indicator
VNAV…….	Vertical Navigation
VOR……...	Very High Frequency Omni-Directional Range
VORTAC……...	Very High Frequency Omni-Directional Range/Tactical Air Navigation
WAAS……	Wide Area Augmentation System
WP/WPT……...	Waypoint

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INSTRUMENT APPROACH PROCEDURES (CHARTS)

PLANVIEW SYMBOLS

ROUTES

Procedure Track

Feeder Route

Missed Approach

Visual Flight Path

165°
345°
Procedure Turn
(Type degree and point of turn optional)

Minimum Route Altitude → 3100 NoPT to LOM
045°
Mileage → (14.2)

HOLDING PATTERNS

Hold-in-lieu of Procedure Turn

HOLD 10000 / 8000
090° (IAS) 270°
4 NM

HOLD 10000 / 8000
090° 1 min 270°

Missed Approach
090°
270°

Arrival
HOLD 8000
090°
270°

Holding pattern with maximum restricted airspeed:
(175K) applies to all altitudes.
(210K) applies to altitudes above 6000′ to and including 14000′.
Arrival Holding Pattern altitude restrictions will be indicated when they deviate from the adjacent leg.

Timing or distance limits for Hold-in-lieu of Procedure Turn Holding Patterns will be shown.
DME fixes may be shown.

FIXES/ATC REPORTING REQUIREMENTS

Reporting Point

Waypoint

MAP WP (Flyby)

MAP WP (Flyover)

GLGHR INT — Intersection

MYLES
I-LVF 14.9 — (Distance From Facility)

DME

Flyover Point

x (CFTSP) — Computer Navigation Fix (CNF)-No ATC Function ("x" omitted when it is a MAP)

R-198 → Radial line and value

LR-198 → Lead Radial

LB-198 → Lead Bearing

ALTITUDES

5500 Mandatory Altitude
2500 Minimum Altitude
4300 Maximum Altitude
3000 Recommended Altitude
5000 Mandatory Block
3000 Altitude

INDICATED AIRSPEED

175K	120K	250K	180K
Mandatory Airspeed	Minimum Airspeed	Maximum Airspeed	Recommended Airspeed

RADIO AIDS TO NAVIGATION

110.1 Underline indicates No Voice transmitted on this frequency

VOR
VORTAC
TACAN
VOR/DME
DME
NDB
NDB/DME
LOM (Compass locator at Outer Marker)
Marker Beacon

Marker beacons that are not specifically part of the procedure.

Localizer Front Course (LOC/LDA)
Right side shading- Front course

Localizer Back Course
Left side shading- Back Course

SDF Course

LOC/LDA/SDF Transmitter
LOC/DME
(shown when installation is offset from its normal postion off the end of the runway.)

Primary NAVAID
LIMA
114.5 LIM
Chan 92

Secondary NAVAID
LOM
AKRON
362 AK

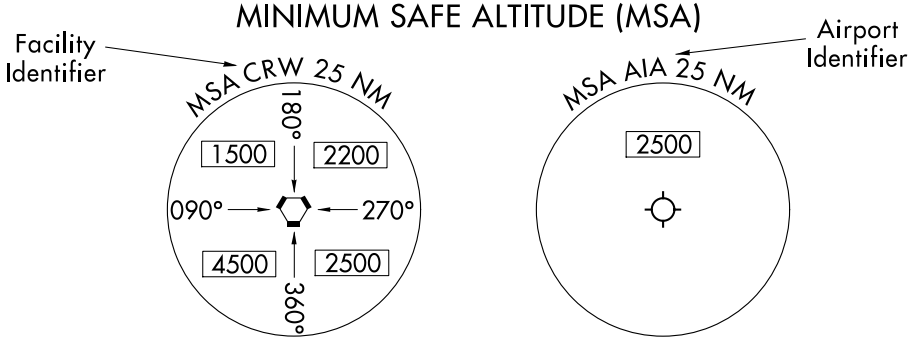
TACAN or DME NAVAID
SCOTT
Chan 59
SKE
(112.2)
VHF Paired Frequency

30 OCT 2025 to 27 NOV 2025

30 OCT 2025 to 27 NOV 2025

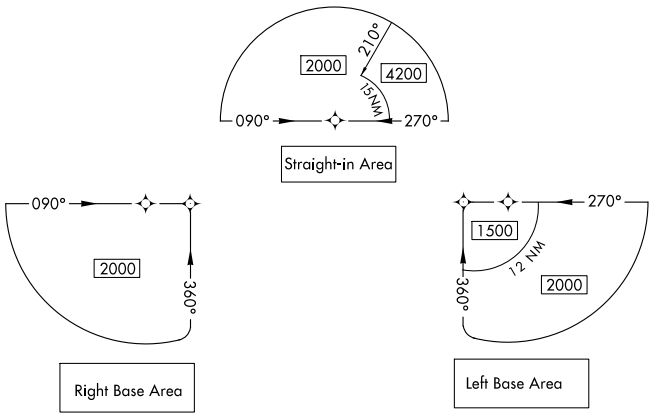
PLANVIEW SYMBOLS

MINIMUM SAFE ALTITUDE (MSA)



(arrows on distance circle identify sectors)

TERMINAL ARRIVAL AREA (TAA)



MISCELLANEOUS

VOR Changeover Point

RWY 15 S12° 00.52′ W77° 06.91′ End of Rwy Coordinates (DoD only)

Distance not to scale

International Boundary

Air Defense Identification Zone

SPECIAL USE AIRSPACE

R-352

R-Restricted W-Warning
P-Prohibited A-Alert
MOA-Military Operations Area

AIRPORTS

Primary and Secondary (named in planview)

Civil

Seaplane Base

Heliport

Joint (Civil-Military)

OBSTACLES

- Spot Elevation
- Obstacle
- Highest Obstacle
- Highest Spot Elevation
- Group of Obstacles
- ± Doubtful accuracy

30 OCT 2025 to 27 NOV 2025

PROFILE VIEW

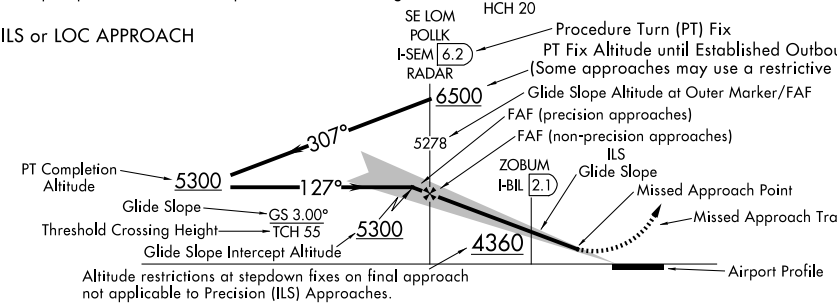
Three different methods are used to depict either electronic or vertical guidance: "GS", "GP", or "VDA".

1. "GS" indicates that an Instrument Landing System (ILS) electronic glide slope (a ground antenna) provides vertical guidance. The profile section of ILS procedures depict a GS angle and TCH in the following format: GS 3.00°, TCH 55.

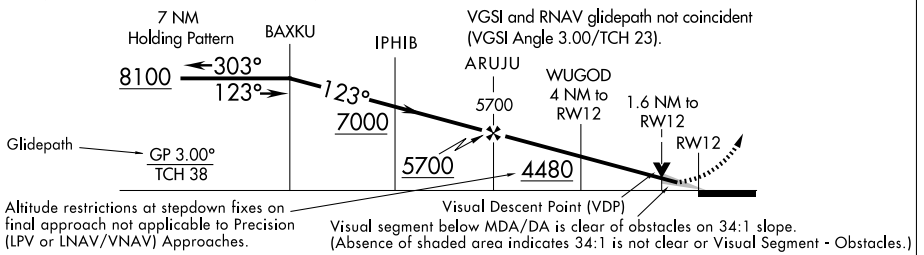
2. "GP" on GLS and RNAV procedures indicates that either electronic vertical guidance (via Wide Area Augmentation System - WAAS or Ground Based Augmentation System - GBAS) or barometric vertical guidance is provided. GLS and RNAV procedures with a published decision altitude (DA/H) depict a GP angle and TCH in the following format: GP 3.00°, TCH 50.

3. An advisory vertical descent angle (VDA) is provided on non-vertically guided conventional procedures and RNAV procedures with only a minimum descent altitude (MDA) to assist in preventing controlled flight into terrain. On Civil (FAA) procedures, this information is placed above or below the procedure track following the fix it is based on. Absence of a VDA or a note that the VDA is not authorized indicates that the prescribed obstacle clearance surface is not clear and the VDA must not be used below MDA. VDA is depicted in the following format: 3.00°, TCH 55. On Copter procedures this is depicted in the following format: 7.30°, HCH 20.

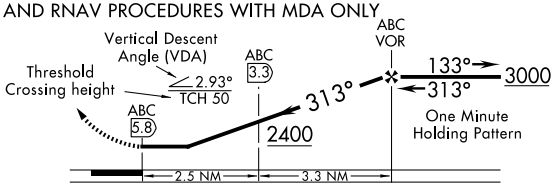
ILS or LOC APPROACH



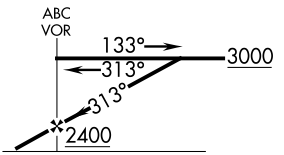
RNAV and GLS PROCEDURES WITH VERTICAL GUIDANCE



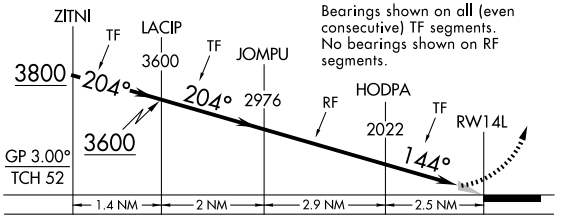
NON-VERTICALLY GUIDED CONVENTIONAL PROCEDURES AND RNAV PROCEDURES WITH MDA ONLY



DESCENT FROM HOLDING PATTERN



RNP APPROACH WITH TF AND RF SEGMENTS



ALTITUDES

5500	Mandatory Altitude	3000	Recommended Altitude
2500	Minimum Altitude	5000 / 3000	Mandatory Block Altitude
4300	Maximum Altitude		

PROFILE SYMBOLS

2400 — Glide Slope/Glidepath Intercept Altitude and final approach fix for vertically guided approach procedures.

▼ Visual Descent Point (VDP)

Visual Flight Path

Note: Facilities and waypoints are depicted as a solid vertical line while fixes and intersections are depicted as a dashed vertical line.

RADIO AIDS TO NAVIGATION

Compulsory:

VOR VORTAC DME NDB/DME

VOR/DME TACAN NDB

Non-Compulsory:

VOR VORTAC DME NDB/DME

VOR/DME TACAN NDB

LOM (Compass locator at outer marker)

Marker Beacon

BACK COURSE

Localizer Front Course

Localizer Back Course (Shading on left)

(T) indicates frequency protection range

ORLANDO
112.25 (T) ORL
Chan 59(Y)

Underline indicates no voice transmitted on this frequency

(Y) TACAN must be placed in "Y" mode to receive distance information

TACAN or DME NAVAID Box

SCOTT
Chan 59
SKE
(112.2)

VHF Paired Frequency

FIXES/ATC REPORTING REQUIREMENTS

Unnamed DME fix

▲ Reporting Point (Compulsory)

△ Reporting Point (Non-Compulsory)

Obvious DME (DME mileage matches route mileage)

75 DME Mileage (when not obvious)

Waypoint (Compulsory)

Waypoint (Non-Compulsory)

Flyover Point

x
(CFTSP) Computer Navigation Fix (CNF) - No ATC Function

AIRPORTS

Civil Military Joint (Civil-Military)

Airports not served by the procedure shown in screened color

Civil Military Joint (Civil-Military)

ROUTES

MAA FL200 Maximum Authorized Altitude

4500 MEA-Minimum Enroute Altitude

*3500 MOCA-Minimum Obstruction Clearance Altitude

270° Arrival Route

(65) Mileage between Radio Aids, Reporting Points, and Route Breaks

Transition Route

R-275 Radial line and value

Lost Communications Track

V12 J80 Airway/Jet Route Identification

(IAS) Holding Pattern

Lost Comm Holding Pattern

Holding pattern with maximum restricted airspeed
(175K) applies to all altitudes
(210K) applies to altitudes above 6000' to and including 14000'

SPECIAL USE AIRSPACE

R-352

R-Restricted W-Warning
P-Prohibited A-Alert
MOA-Military Operations Area

ALTITUDES

5500 Mandatory Altitude (Cross at)

2300 Minimum Altitude (Cross at or above)

4800 Maximum Altitude (Cross at or below)

15000
12000
Block Altitude

Altitude change at other than Radio Aids to Navigation

INDICATED AIRSPEED

175K Mandatory Airspeed

120K Minimum Airspeed

250K Maximum Airspeed

MISCELLANEOUS

Changeover Point

Air Defense Identification Zone

N Indicates True North is not aligned to the top of the page

Ldg KLAS and KHND

Ldg Rwys 16L/C/R

Terminus identifier

30 OCT 2025 to 27 NOV 2025

RADIO AIDS TO NAVIGATION

Compulsory:

VOR · VORTAC · DME · NDB/DME · VOR/DME · TACAN · NDB

Non-Compulsory:

VOR · VORTAC · DME · NDB/DME · VOR/DME · TACAN · NDB

LOC · LOC/DME (shown when installation is offset from its normal position off the end of the runway.)

LOM (Compass locator at outer marker)

Marker Beacon

Localizer Front Course

BACK COURSE

Localizer Back Course (Shading on left)

(T) indicates frequency protection range

ORLANDO
112.25 (T) ORL
Chan 59(Y)

Underline indicates no voice transmitted on this frequency

(Y) TACAN must be placed in "Y" mode to receive distance information

TACAN or DME NAVAID Box

SCOTT
Chan 59
SKE
(112.2)

VHF Paired Frequency

FIXES/ATC REPORTING REQUIREMENTS

Unnamed DME fix

▲ Reporting Point (Compulsory)

△ Reporting Point (Non-Compulsory)

Obvious DME (DME mileage matches route mileage)

75 DME Mileage (when not obvious)

Waypoint (Compulsory)

Waypoint (Non-Compulsory)

Flyover Point

x (CFTSP) Computer Navigation Fix (CNF) - No ATC Function

MISCELLANEOUS

Changeover Point

Distance not to scale

International Boundary

Sector Boundary

Air Defense Identification Zone

Takeoff Minimums and (Obstacle) Departure Procedures entry published.

ROUTES

4500 MEA-Minimum Enroute Altitude

*3500 MOCA-Minimum Obstruction Clearance Altitude

270° Departure Route

(65) Mileage between Radio Aids, Reporting Points, and Route Breaks

Transition Route

R-275 Radial line and value

Lost Communications Track

Visual Flight Path

V12 J80 Airway/Jet Route Identification

(IAS) Holding Pattern

Lost Comm Holding Pattern

Holding pattern with maximum restricted airspeed (175K) applies to all altitudes
(210K) applies to altitudes above 6000' to and including 14000'

SPECIAL USE AIRSPACE

R-352

R-Restricted W-Warning
P-Prohibited A-Alert
MOA-Military Operations Area

ALTITUDES

5500 Mandatory Altitude (Cross at)

2300 Minimum Altitude (Cross at or above)

4800 Maximum Altitude (Cross at or below)

15000 / 12000 Block Altitude

TOP ALTITUDE: 5000 Top altitude restriction

INDICATED AIRSPEED

175K Mandatory Airspeed

120K Minimum Airspeed

250K Maximum Airspeed

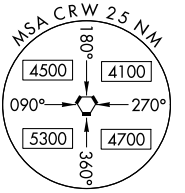
AIRPORTS

Heliport

Civil · Military · Joint (Civil-Military)

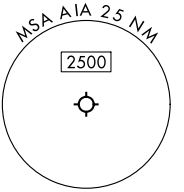
MINIMUM SAFE ALTITUDE (MSA)

Facility Identifier



(arrows on distance circle identify sectors)

Airport Identifier



30 OCT 2025 to 27 NOV 2025

AIRPORT DIAGRAM/AIRPORT SKETCH

Runways

Hard Surface | Other Than Hard Surface | Taxiways, Parking Areas | Stopways, Overruns, Blast Pads | Metal Surface

Closed Runway | Closed Surface | Non-Movement | Under Construction | Water Runway

ARRESTING GEAR: Specific arresting gear systems; e.g., BAK12, MA-1A etc., shown on airport diagrams, not applicable to Civil Pilots. Military Pilots refer to appropriate DOD publications.

uni-directional | bi-directional | Jet Barrier

ARRESTING SYSTEM (EMAS)

REFERENCE FEATURES

Displaced Threshold
Hot Spot
Runway Holding Position Markings
Buildings
Self-Serve Fuel ##
Tanks
Obstructions
Airport Beacon #
Runway Radar Reflectors
Bridges
Control Tower # TWR

	Unlit	Lit
Wind Cone		
Landing Tee		
Tetrahedron		

When Control Tower and Rotating Beacon are co-located, Beacon symbol will be used and further identified as TWR.

See appropriate Chart Supplement for information.

Runway Weight Bearing Capacity or Pavement Classification Number (PCN)/Pavement Classification Rating (PCR) is shown as a codified expression. Refer to the appropriate Supplement/Directory for applicable codes e.g., RWY 14-32 PCR 560 R/B/W/T; S-75, D-185, 2D-325, 2D/2D2-1120

Helicopter Alighting Areas

Negative Symbols used to identify Copter Procedures

landing point.....

NOTE:
Landmark features depicted on Copter Approach insets and sketches are provided for visual reference only.

Runway TDZ elevation.....TDZE 123

Runway Slope..... ←0.3% Down.....0.8% UP→
(shown when rounded runway slope is ≥ 0.3%)

NOTE:
Runway Slope measured to midpoint on runways 8000 feet or longer.

U.S. Navy Optical Landing System (OLS) "OLS" location is shown because of its height of approximately 7 feet and proximity to edge of runway may create an obstruction for some types of aircraft.

Approach light symbols are shown in the Flight Information Handbook.

Airport diagram scales are variable.

True/magnetic North orientation may vary from diagram to diagram

Coordinate values are shown in 1 or ½ minute increments. They are further broken down into 6 second ticks, within each 1 minute increments.

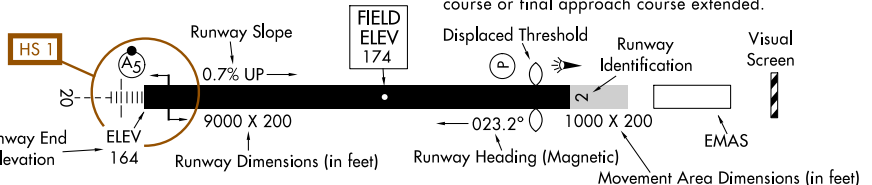
Positional accuracy within ± 600 feet unless otherwise noted on the chart.

Runway length depicted is the physical length of the runway (end-to-end, including displaced thresholds if any) but excluding areas designated as stopways.

A D symbol is shown to indicate runway declared distance information available, see appropriate Chart Supplement for distance information.

NOTE:
All new and revised airport diagrams are shown referenced to the World Geodetic System (WGS) (noted on appropriate diagram), and may not be compatible with local coordinates published in DoD FLIP. (Foreign Only)

The airport sketch box includes the final approach course or final approach course extended.



SCOPE

Airport diagrams are specifically designed to assist in the movement of ground traffic at locations with complex runway/taxiway configurations. Airport diagrams are not intended to be used for approach and landing or departure operations. For revisions to Airport Diagrams: Consult FAA Order 7910.4.

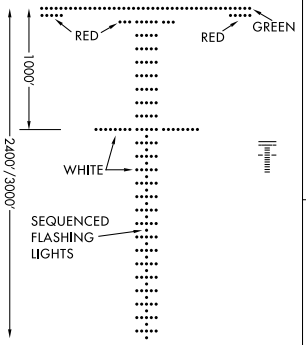
Approach lighting and visual glide slope systems are indicated on the airport sketch by an identifier, e.g., (A2), (V), etc.

A dot " ● " portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A1). Negative symbology, e.g., (A1), (V) indicates Pilot Controlled Lighting (PCL).

CATEGORY I APPROACH LIGHTING SYSTEM

(A1)

ALSF-1

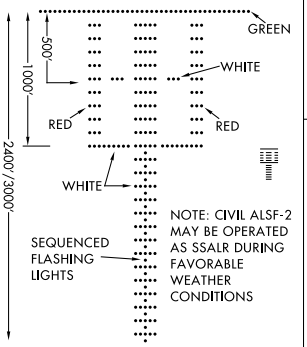


(High Intensity)
LENGTH 2400/3000 FEET

CATEGORY II APPROACH LIGHTING SYSTEM

(A)

ALSF-2

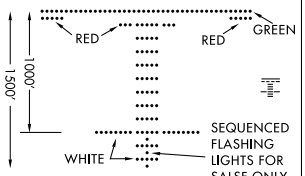


(High Intensity)
LENGTH 2400/3000 FEET

SHORT APPROACH LIGHTING SYSTEM

(A2) (A2)

SALS/SALSF



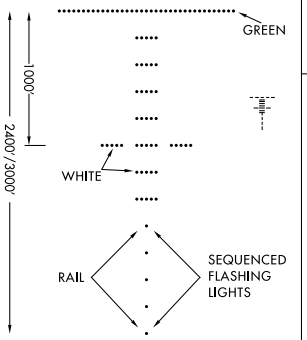
(High Intensity)
LENGTH 1500 FEET

SIMPLIFIED SHORT APPROACH LIGHTING SYSTEM

with Runway Alignment Indicator Lights

(A3)

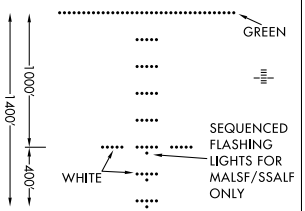
SSALR



(High Intensity)
LENGTH 2400/3000 FEET

MEDIUM INTENSITY (**MALS** and **MALSF**) OR SIMPLIFIED SHORT (**SSALS** and **SSALF**) APPROACH LIGHTING SYSTEMS

(A4) (A4)



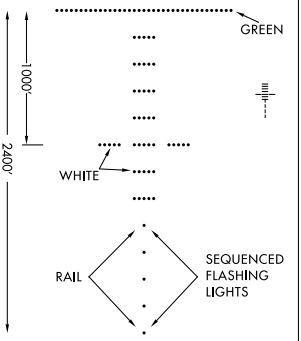
LENGTH 1400 FEET

MEDIUM INTENSITY APPROACH LIGHTING SYSTEM

with Runway Alignment Indicator Lights

(A5)

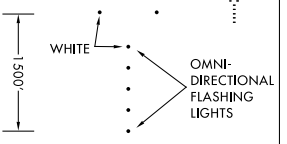
MALSR



LENGTH 2400 FEET

OMNIDIRECTIONAL APPROACH LIGHTING SYSTEM

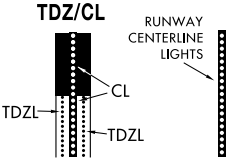
ODALS



LENGTH 1500 FEET

RUNWAY TOUCHDOWN ZONE AND CENTERLINE LIGHTING SYSTEMS

TDZ/CL



AVAILABILITY of TDZ/CL will be shown by NOTE in SKETCH e.g. "TDZ/CL Rwy 15"

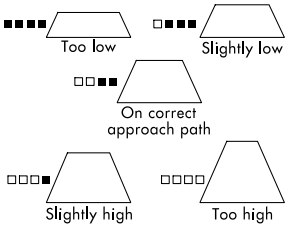
30 OCT 2025 to 27 NOV 2025

Approach lighting and visual glide slope systems are indicated on the airport sketch by an identifier, (A2), (V) etc.

A dot "●" portrayed with approach lighting letter identifier indicates sequenced flashing lights (F) installed with the approach lighting system e.g., (A1). Negative symbology, e.g., (A1), (V) indicates Pilot Controlled Lighting (PCL).

(P) PRECISION APPROACH PATH INDICATOR

PAPI



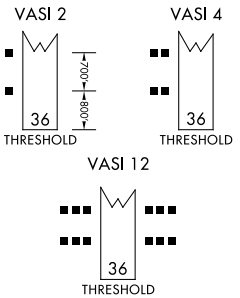
Legend: □ White ■ Red

(V) VISUAL APPROACH SLOPE INDICATOR

VASI

VISUAL APPROACH SLOPE INDICATOR WITH STANDARD THRESHOLD CLEARANCE PROVIDED.

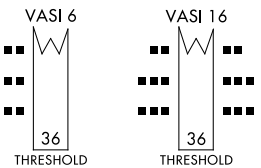
ALL LIGHTS WHITE — TOO HIGH
FAR LIGHTS RED, NEAR LIGHTS WHITE — ON GLIDE SLOPE
ALL LIGHTS RED — TOO LOW



(V3) VISUAL APPROACH SLOPE INDICATOR

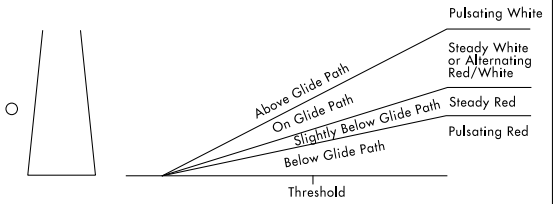
VASI

3-BAR, 6 OR 16 BOX, VISUAL APPROACH SLOPE INDICATOR THAT PROVIDES 2 GLIDE ANGLES AND 2 THRESHOLD CROSSING HEIGHTS.



(V2) PULSATING VISUAL APPROACH SLOPE INDICATOR

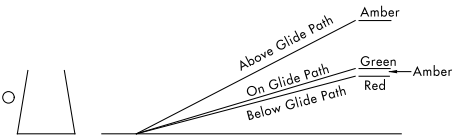
PVASI



CAUTION: When viewing the pulsating visual approach slope indicators in the pulsating white or pulsating red sectors, it is possible to mistake this lighting aid for another aircraft or a ground vehicle. Pilots should exercise caution when using this type of system.

(V4) TRI-COLOR VISUAL APPROACH SLOPE INDICATOR

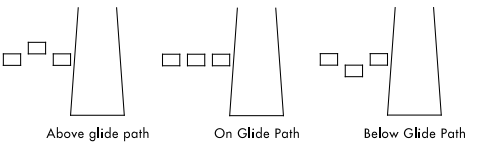
TRCV



CAUTION: When the aircraft descends from green to red, the pilot may see a dark amber color during the transition from green to red.

(V5) ALIGNMENT OF ELEMENTS SYSTEMS

APAP



Painted panels which may be lighted at night. To use the system the pilot positions the aircraft so the elements are in alignment.

30 OCT 2025 to 27 NOV 2025

FREQUENCY PAIRING TABLE

TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY	TACAN CHANNEL	VHF FREQUENCY
17Y	108.05	40X	110.30	88Y	114.15
18X	108.10	40Y	110.35	89Y	114.25
18Y	108.15	41Y	110.45	90Y	114.35
19Y	108.25	42X	110.50	91Y	114.45
20X	108.30	42Y	110.55	92Y	114.55
20Y	108.35	43Y	110.65	93Y	114.65
21Y	108.45	44X	110.70	94Y	114.75
22X	108.50	44Y	110.75	95Y	114.85
22Y	108.55	45Y	110.85	96Y	114.95
23Y	108.65	46X	110.90	97Y	115.05
24X	108.70	46Y	110.95	98Y	115.15
24Y	108.75	47Y	111.05	99Y	115.25
25Y	108.85	48X	111.10	100Y	115.35
26X	108.90	48Y	111.15	101Y	115.45
26Y	108.95	49Y	111.25	102Y	115.55
27Y	109.05	50X	111.30	103Y	115.65
28X	109.10	50Y	111.35	104Y	115.75
28Y	109.15	51Y	111.45	105Y	115.85
29Y	109.25	52X	111.50	106Y	115.95
30X	109.30	52Y	111.55	107Y	116.05
30Y	109.35	53Y	111.65	108Y	116.15
31Y	109.45	54X	111.70	109Y	116.25
32X	109.50	54Y	111.75	110Y	116.35
32Y	109.55	55Y	111.85	111Y	116.45
33Y	109.65	56X	111.90	112Y	116.55
34X	109.70	56Y	111.95	113Y	116.65
34Y	109.75	80Y	113.35	114Y	116.75
35Y	109.85	81Y	113.45	115Y	116.85
36X	109.90	82Y	113.55	116Y	116.95
36Y	109.95	83Y	113.65	117Y	117.05
37Y	110.05	84Y	113.75	118Y	117.15
38X	110.10	85Y	113.85	119Y	117.25
38Y	110.15	86Y	113.95		
39Y	110.25	87Y	114.05		

See the Chart Supplement for a complete listing.

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INSTRUMENT TAKEOFF AND APPROACH PROCEDURE CHARTS
RATE OF CLIMB TABLE
(ft per min)

The rate of climb table is provided for use in planning and executing climbs with a known or approximate ground speed. Rates of climb in ft per min are monitored with a vertical speed indicator (VSI). The use of a climb rate should not be used if it will exceed the aircraft's operational limitations.

ft/NM	%	GROUND SPEED (knots)										
		60	90	120	150	180	210	240	270	300	330	360
152	2.50	152	228	304	380	456	532	608	684	760	836	912
200	3.29	200	300	400	500	600	700	800	900	1000	1100	1200
210	3.46	210	315	420	525	630	735	840	945	1050	1155	1260
220	3.62	220	330	440	550	660	770	880	990	1100	1210	1320
230	3.79	230	345	460	575	690	805	920	1035	1150	1265	1380
240	3.95	240	360	480	600	720	840	960	1080	1200	1320	1440
250	4.11	250	375	500	625	750	875	1000	1125	1250	1375	1500
260	4.28	260	390	520	650	780	910	1040	1170	1300	1430	1560
270	4.44	270	405	540	675	810	945	1080	1215	1350	1485	1620
280	4.61	280	420	560	700	840	980	1120	1260	1400	1540	1680
290	4.77	290	435	580	725	870	1015	1160	1305	1450	1595	1740
300	4.94	300	450	600	750	900	1050	1200	1350	1500	1650	1800
310	5.10	310	465	620	775	930	1085	1240	1395	1550	1705	1860
320	5.27	320	480	640	800	960	1120	1280	1440	1600	1760	1920
330	5.43	330	495	660	825	990	1155	1320	1485	1650	1815	1980
340	5.60	340	510	680	850	1020	1190	1360	1530	1700	1870	2040
350	5.76	350	525	700	875	1050	1225	1400	1575	1750	1925	2100
360	5.92	360	540	720	900	1080	1260	1440	1620	1800	1980	2160
370	6.09	370	555	740	925	1110	1295	1480	1665	1850	2035	2220
380	6.25	380	570	760	950	1140	1330	1520	1710	1900	2090	2280
390	6.42	390	585	780	975	1170	1365	1560	1755	1950	2145	2340
400	6.58	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
450	7.41	450	675	900	1125	1350	1575	1800	2025	2250	2475	2700
500	8.23	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
550	9.05	550	825	1100	1375	1650	1925	2200	2475	2750	3025	3300

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INSTRUMENT TAKEOFF AND APPROACH PROCEDURE CHARTS
RATE OF DESCENT TABLE
(ft per min)

The rate of descent table is provided for use in planning and executing descents with a known or approximate ground speed. The descent chart may also be used to calculate a constant rate of descent in the final segment on a non-precision approach. This rate of descent is advisory only. Rates of descent in ft per min are monitored with a vertical speed indicator (VSI). The use of a descent rate should not be used if it will exceed the aircraft's operational limitations.

ANGLE	ft/NM	GROUND SPEED (knots)										
		60	90	120	150	180	210	240	270	300	330	360
2.0	212	212	318	424	530	637	743	849	955	1061	1167	1273
2.5	265	265	398	531	663	796	929	1061	1194	1326	1459	1592
2.6	276	276	414	552	690	828	966	1104	1242	1380	1518	1655
2.7	287	287	430	573	716	860	1003	1146	1289	1433	1576	1719
2.8	297	297	446	594	743	892	1040	1189	1337	1486	1634	1783
2.9	308	308	462	616	770	923	1077	1231	1385	1539	1693	1847
3.0	318	318	478	637	796	955	1115	1274	1433	1592	1751	1911
3.1	329	329	494	658	823	987	1152	1316	1481	1645	1810	1974
3.2	340	340	510	679	849	1019	1189	1359	1529	1699	1868	2038
3.3	350	350	526	701	876	1051	1226	1401	1577	1752	1927	2102
3.4	361	361	541	722	902	1083	1263	1444	1624	1805	1985	2166
3.5	372	372	557	743	929	1115	1301	1487	1672	1858	2044	2230
3.6	382	382	573	765	956	1147	1338	1529	1720	1911	2103	2294
3.7	393	393	589	786	982	1179	1375	1572	1768	1965	2161	2358
3.8	404	404	605	807	1009	1211	1413	1614	1816	2018	2220	2421
3.9	414	414	621	828	1036	1243	1450	1657	1864	2071	2278	2485
4.0	425	425	637	850	1062	1275	1487	1700	1912	2124	2337	2549
4.5	478	478	717	956	1196	1435	1674	1913	2152	2391	2630	2869
5.0	532	532	797	1063	1329	1595	1861	2126	2392	2658	2924	3190
5.5	585	585	878	1170	1463	1755	2048	2340	2633	2925	3218	3510
6.0	639	639	958	1277	1597	1916	2235	2555	2874	3193	3512	3832
6.5	692	692	1038	1385	1731	2077	2423	2769	3115	3461	3808	4154
7.0	746	746	1119	1492	1865	2238	2611	2984	3357	3730	4103	4476
7.5	800	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
8.0	854	854	1281	1708	2135	2562	2989	3416	3843	4270	4697	5124
8.5	908	908	1362	1816	2270	2724	3178	3632	4086	4540	4994	5448
9.0	962	962	1444	1925	2406	2887	3368	3849	4331	4812	5293	5774
9.5	1017	1017	1525	2034	2542	3050	3559	4067	4576	5084	5592	6101
10.0	1071	1071	1607	2143	2678	3214	3750	4286	4821	5357	5893	6428

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